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PREFACE

Dear colleagues and friends,

It is our great pleasure to invite you to attend the EURASIAN GIS Congress 2018 held in Baku on 04-07, September 2018. EURASIAN GIS Congress 2018 is a candidate of one of the most important event in the scientific schedule and tenders a possibility for researchers and academicians who researches on GIS and related disciplines. You can find a first class programme of plenary speakers, technical sessions, exhibitions and social events in this book. You will be able to catch up with the developments in Geographical Information Sciences, Information Technology, Environmental Management and Resources, Sustainable Agriculture, Surveying, Photogrammetry and Remote Sensing, meet friends and experience the traditional and fascinating culture of AZERBAIJAN. As a international congress in the field of geo-spatial information and remote sensing, EURASIAN GIS Congress 2018 is devoted to promote the advancement of knowledge, research, development, education and training in Geographical Information Sciences, Information Technology, Environmental Management and Resources, Sustainable Agriculture, Surveying, Photogrammetry and Remote Sensing, their integration and applications, as to contribute to the well-being of humanity and the sustainability of the environment. The EURASIAN GIS Congress 2018 will provide us an opportunity to examine the challenges facing us, discuss how to support Future Earth with global geo-information, and formulate the future research agenda.

150 scientists from 13 countries attended to the congress. 7 plenary speakers, 120 oral presentations and 8 poster presentations, all together with 135 in total, are presented during the congress. 135 presentations take place in 21 sessions in three days.

The Congress is carried out with the support of the organizations as the Konya Technical University, Selcuk University, Azerbaijan National Academy of Sciences Institute of Geography, Baku State University, Ministry of Agriculture of Azerbaijan Republic, General Directorate of Land Registry and Cadastre, General Directorate of Agricultural Reform of Turkey, International Federation of Surveyors (FIG), International Society for Photogrammetry and Remote Sensing (ISPRS) and Igdir University. In addition, the congress is also supported by the commercial organizations of INTEGRIS LLC, KUTLUBEY Engineering Co, RUBIKON Geosystems LLC, NETCAD, HARMIAD Surveying Engineers Businessmen Association, GEOGIS Engineering Co, MESCIOGLU Engineering Co, EMI Group Information Technology Co, PaksoyTeknik, and 4B Ölçüm.

Finally, we cheer on all of you to participate in this congress of EURASIAN GIS, and special thanks to all sponsorships and government partners for the congress. Enjoy your time and share your experiences with your friends.

Baku/Azerbaijan, September, 2018

Prof. Dr. Ferruh YILDIZ Chair of The Organizing Committee **Prof. Dr. Ramiz Mahmud oglu MAMMADOV** Co-Chair of The Organizing Committee

PROSPECTS FOR INCREASING THE EFFICIENCY OF AEROSPACE MONITORING METHODS USED TO SOLVE THE PROBLEMS OF THE OIL AND GAS COMPLEX

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ABSTRACT:

Prospects of increasing the efficiency of aerospace monitoring methods to solve oil and gas complex problems are with the development and use of new methods, technologies and equipment sounding, aerospace information processing, modern geo-information technologies, as well as with the integration of aero-space and terrestrial data.

The article proposes various aspects of the application of aerospace monitoring methods for the inventory of oilfield facilities in Azerbaijan on land and at sea, monitoring of oil spills on the surface of the Caspian Sea, pollution of oil fields on the Apsheron Peninsula. Prospects of increasing the effectiveness of aerospace monitoring methods application with the advent of the Azerbaijani remote sensing satellite AZERSKY are considered. It is shown that the developed information-analytical system of oil fields of the Absheron peninsula, created on the basis of processing of aerospace information, map materials, integration with ground-based measurements, raises the effectiveness of operational analysis of oilfield situations.

KEY WORDS: Efficiency Aerospace Monitoring, Inventory of Oilfield Facilities, Oil Spills, Pollution of Oil Field

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RAPID URBANIZATION IN PUNJAB: A REAL CHALLENGE TO SOIL PROTECTION AND FOOD SECURITY

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ABSTRACT:

Growing urbanization in a city of Punjab, Lahore has a major threat to soil Quality and food security. The recent projected population of the Lahore is 9739,000. To feed this population, the Punjab government has a challenge that is land scarcity and soil quality. Increasing the land utilization toward the urbanization has scared the soil suitability and value. Through the declared statistics and satellite-driven information the land over the last 18 years, dynamics like cultivated land, loss of Punjab is analyzed and changes in spatial variations of soil properties (EC, pH, K, P, and OM). The land cover change of the three years (1998, 2008 and 2016) has increased from 13.06%, 19.01% to 27.14% respectively. The change in urban extend also effects the soil properties due to urbanization and industrialization. Although conversion of the cultivated land into an industry, however, this is the small part of the cultivated loss of land, bigger in soil quality which can be more scared in coming years. Facing rapid urbanization results in soil pollution in cities which can be a real challenge for food security.

KEY WORDS: geographical information system, Urbanization, Food security

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PEDOTRANSFER FUNCTIONS - THE BASIS OF SPATIALLY-DISTRIBUTED INFORMATION ON THE PHYSICAL PROPERTIES AND HYDROLOGY OF THE SOIL COVER

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ABSTRACT:

A quantitative and detailed information on spatially distributed physical properties of soils is required in the design of land reclamation activities, the organization of the territory and other soil-engineering projects. In particular, in the design and construction of drainage systems, information is needed on the spatial distribution of the projected area of hydraulic conductivity over the area; in the organization of irrigation systems, spatial distributions of the properties of water retention of soils, with precise farming, the distribution of agrochemical properties, etc. Taking into account that the properties of soils vary enormously in space, a method of calculating the desired soil properties (filtration coefficient, water retention, thermal diffusivity, etc.) by simple easily determined parameters of the parameters of soils, so that subsequently, using the easily identifiable spatially distributed property, calculate the necessary hydrological parameters of the soil cover and create the required physical property, hydrology or temperature regime of the soil cover necessary for the production of the GIS map project. This method is pedotransfer functions, which allow for fairly easy properties to statistically justify the spatial distribution of the required property. Examples of calculation and use of pedotransfer functions are given.

KEY WORDS: Soil, Spatial Distribution, Soil Properties, Soil Cover

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THE TRANSFORMATIONS OF SLOPE SLIDE LANDSCAPES OF GREAT CAUCASUS: POSSIBILITIES OF DISCOVERING OF MAIN FACTORS

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ABSTRACT:

The Southeast extremity of the Great Caucasus which are entering into limits of Azerbaijan is characterized by high dynamism of exogenic relief forming processes, making essential impact on development of a landscape situation. Thereupon there is a necessity of working out of various methods for construction of scenarios of possible changes of a geo ecological situation in the various hills having fatal consequences, by revealing of relationships of cause and effect. With that end in view, in this work possibilities of forecasting of landslips in natural area of the Great Caucasus with use available various data and also visual supervision have been analysed.

KEY WORDS: Processes, Slope, Exodynamic, Landscapes, Erosion, Factor, Sub District, Caucasus.

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SOIL THERMAL REGIMES OF COMPLEX SOIL COVER

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ABSTRACT:

The spatial representation of the complex soil cover and especially of such dynamic soil regimes as soil cover temperature is one of the most complicated tasks of modern agrophysics and GIS systems. Complex soil cover of Russian Plate landscapes has peculiarities of paleocryogenic soilscape such as areas with high organic matter content (loose zones) and compacted soil. Typically soil density varies from 0.73 g/cm3 to 1.54 g/cm3 in the arable layer and from 1.0 g/cm3 to 1.68 g/cm3 at the depth of 35-40 cm. Organic carbon content varies from 1.36% to 2.98% and from 0.23% to 4.65% in the arable layer and 35-40 cm layer, respectively. Objective of the study was to identify the spatial distribution in soil water and thermal regimes and to relate regimes to zones with different soil density. Soil water and thermal regime monitoring was conducted during 5 years at different temporal and spatial scales (from 0.01 to 4 ha). Temperature measurements showed that the loose soil layers were slowly warmed up during spring and summer months and became cold in winter due to low thermal diffusivity. The loose horizon accumulates and conserves more water during wet periods and becomes dryer during drought periods, compared to the compacted horizons. The results of the monitoring by GIS-systems illustrate spatial variability of the hydrothermal fields in the studied area and its relationship with locations of the compacted and loose soil zones. For the quantitative assessment of the regimes pedotransfer functions were developed to calculate soil water retention, hydraulic conductivity, thermal diffusivity from soil bulk density and soil organic carbon content on the base of pedotransfer functions. Good agreement was obtained between measured and estimated with the pedotransfer functions water content and temperature distributions in the soil.

KEY WORDS: Soil, Soil thermal, GIS

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THE CONDITIONS OF FORMATION OF CLOUD VORTEX ON THE CASPIAN SEA

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ABSTRACT:

The paper considers the possibilities of using space information in assessing weather conditions under a cloudy vortex over the Caspian Sea. Cloudiness is one of the most important factors determining the nature of many physical, as well as climateforming processes occurring in the Earth's atmosphere. Since the formation of clouds depends on the nature of the atmospheric circulation, the orography of the terrain, various physical parameters, etc., they carry information for estimating the weather conditions. It was found that the formation and conservation of mesoscale cloud vortices requires the presence of low inversion, the existence of a steady stream in the lower troposphere, and the presence of isolated obstacles (mountains, islands) rising above the lower inversion boundary and generating inertial oscillations. The greatest interest is cloudiness for aviation.

KEY WORDS: Cloudiness, Sea, Vortex, Stratus Cumulus, Boundary Layer, Turbulent Exchange

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COMPARISON OF LASER SCANNING AND CLOSE-RANGE PHOTOGRAMMETRY FOR 3D OBJECT MODELING

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ABSTRACT:

In recent years, by the developments of computer technology, personal computers have been improved and the use of three dimensional (3D) modeling has increased in both scientific arena and among the end users. The techniques that provide fast and reliable documentation and modeling like laser scanning and digital close-range photogrammetry became preferable with respect to classical methods.

Structure from Motion (SFM); is a revolutionary, low-cost and user-friendly photogrammetric technique that makes it possible to work on high-resolution data sets, especially in recent years. SFM provides the creation of digital models of 3D structures (terrain, buildings, earth shapes etc.) using two dimensional (2D) images taken as a series of sequences. This technique corresponds to the perception of the 3D world around people and other living things from the 2D images formed in the retina layer in the eye. Conventional photogrammetric techniques require 3D position and orientation information of camera and ground control points in order to be able to create a geometric model. In the SFM method, the model geometry and camera position are solved automatically and simultaneously. In order to align images, features must be viewed from one frame to another. The feature trajectories over time are then used to reconstruct their 3D positions and the camera's motion. Laser scanning technology is one of the latest techniques using in the field of 3D measurement. Laser scanning technology is an advantage in terms of time and cost compared with traditional measuring methods. Together with the increasing demand to 3D models, high cost of the commercial laser scanners and the difficulty of processing the data from these devices have led to the development of low-cost 3D laser scanning systems.

In this study, laser scanning technology and digital close-range photogrammetry were applied and two 3D models, one generated from laser scanning and the other one from image sequences of the same object were compared. Images of the object obtained with a mobile device which has a high-resolution camera and NextEngine 3D Laser Scanner was used to scan the object. To generate models from these different datasets, various 3D modeling software were used. Comparisons of 3D models were carried out with CloudCompare, an open-source 3D point cloud and triangular mesh processing software.

The results of this study showed that, both close-range photogrammetry and laser scanning gave successful results in 3D modeling of the object. As a downside, model generated from laser scanner has more empty areas that cannot be modeled. This shows us that close-range photogrammetry is more useful than laser scanning for the modeling of small and detailed objects.

KEY WORDS: Close Range Photogrammetry, Laser Scanning, 3D Modeling

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ECONOMIC GROWTH OF TUSAGA-Aktif

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ABSTRACT:

Officially the unique high precision positioning system is CORS-Tr (TUSAGA-Aktif) in Turkey. CORS-Tr has 146 permanent GNSS station and two control centres. Today more than 10000 individual user who are paying subscription, GNSS data, positioning services monthly or annually since 2011.

More than 30 user joining to CORS-Tr in every month from different sector. User sector, if we categorize, surveying, mining, construction, licensed surveyor, etc. But in this paper we will use five categories as Land Registry and Cadastre, Public Institutions, Municipalities, Universities and Licensed Surveyors to determine economic growth of CORS-Tr. Following years increasing rate of user's monthly will be much more higher by establishing additional permanent GSNSS station due to prevent extrapolation. This paper presents CORS-Tr economic growth estimation by last three years log data analysis using valuation approach.

KEY WORDS: CORS-Tr, TUSAGA-Aktif, GNSS Networks, User Log Data, Economic Growth of GNSS networks

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TUSAGA-Aktif EXAMPLE WITH RELATED TO LOCATION BASED ACTIVITY INTELLIGENCE

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ABSTRACT:

146 TUSAGA-Aktif (Turkey National Permanent GNSS Network-Active) continuous GPS Stations and Control Centres have been established in Turkey, considering Turkish Republic of North Cyprus (TRNC). With TUSAGA-Aktif, in any place and time, at centimetre accuracy, map and geographical information can be obtained in seconds. TUSAGA-Aktif system is one of the world's largest Contionusly Observing Reference Stations (CORS) systems in terms of number of stations and covers the area.

Every single month more than 50 users are joining to use TUSAGA-Aktif system. Today the system has more than 8000 users who are working for Governmental Organization, General Directorate of Land Registry and Cadastre, Private Companies, Municipalities, Universities and Licensed Surveyors.

CORS systems like TUSAGA-Aktif are producing different type of data such as GPS observation data, user correction data, user connection log data and etc. These data gives much information to system manager not only to improve user services but also to determine cm level of location of things, tectonic movements and water vapour and user activities on the field.

This paper presents initial studying about user activities on the field as a part of Location Based Activity Intelligence (LBAI) and Location Based Activity Recognition (LBAR) by using user connection log data.

KEY WORDS: CORS Stations, GNSS Data, GNSS Data Processing and Analysing, User location, User Activities, Location Based Activity Recognition (LBAR), Location Based Activity Intelligence (LBAI), Location Based Financial Intelligence (LBFI)

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USAGE OF VARIANCE IN DETERMINATION OF SINUOSITY INTERVALS FOR ROAD MATCHING

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ABSTRACT:

Geo-object matching is a process that identifies, classifies and matches the object pairs with regards to their maximum similarity in whole datasets. The matching process is used to handle updating, aligning, optimizing, integrating and/or quality measuring of road networks. There are several metrics used in matching algorithms such as Hausdorff distance, orientation, valence, sinuosity etc. Sinuosity is a ratio of actual length of a road to the straight length among start and end points of the same road. Sinuosity defines how curve a road is. In a matching process, it is necessary to determine the sinuosity thresholds or intervals firstly. Sinuosity intervals can be determined by several data classification methods such as equal interval, quantile, natural breaks and geometrical interval. Furthermore, the intervals determined by Ireland Transportation Agency can be used in parallel with this purpose. In this study, it was aimed to find out if the variance can be used in determination of sinuosity intervals as well. An experiment was conducted to compare all of the methods mentioned above. According to the results, the efficiency of the sinuosity intervals determined by the methods in road matching differs from 37.4% to 49.4%, and it seems that the intervals determined by the variance are the most efficient ones.

KEY WORDS: Variance, Sinuosity, Intervals, Road Matching, Data Integration

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ACCURACY ANALYSIS OF 1:5000 SCALED MAPS PRODUCED IN TURKEY AND THEIR GIS DATA BASE STANDARDS

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ABSTRACT:

In Turkey, for agricultural land consolidation projects, generally 1:5000 scaled digital photogrammetric maps are used. These maps are produced generally as orthophoto and vector maps using aerial photogrammetry. In special cases when it is not possible to take aerial photos these maps are being produced using high resolution satellite imagery.

In this study, accuracies obtained from 1:5000 scaled digital photogrammetric maps produced in Turkey for agricultural engineering applications are compared to the national and international accuracy standards and then reached a conclusion about their quality criteria. Besides, conformity of the data structure of these maps to the national and international GIS standards are also investigated.

KEY WORDS: GIS, Photogrammetry, Accuracy Analysis

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THE FEATURES OF CADASTRAL LANDS ESTIMATION OF SPECIALLY PROTECTED NATURAL AREAS OF THE SOUTH OF BAIKAL SIBERIA

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ABSTRACT:

The issues of land's cadastre estimation of specially protected natural areas (SPNA) are still not fully decided. This is due to the exclusivity of objects and the complexity of accounting for the many functions that they perform. Meanwhile, the valuation of these lands is necessary for decision-making management and using of appropriate environmental mechanisms.

In the Irkutsk region, the total area of lands classified as protected areas (according to 2017 year) amounted to 1552,4 thousand hectares, of which the share of natural reserves (Vitimskii, Baikalo–Lenskii) and the Baikal national Park accounts for 1550,3 thousand hectares. The average specific indicators of the cadastral value of protected areas varies from 19.35 RUB./m2 to 24.19 RUB./m2, herewith the land protected areas located near lake Baikal, which is a world heritage site, have the highest value.

For today, the estimation of the natural resources of protected areas has not taken into account the value of the soil cover, which, due to its special properties, should be considered as an independent component of the biosphere. Soil, as a natural-historical body of environment, has an important hydrological, atmospheric, lithospheric and biospheric value.

In present time, environmental and land legislation does not contain a specific mechanism for soil protection. In addition, the role of protected areas in soil cover preservation is minimal today: in most cases, information about the soil is absent at protected areas. Meanwhile, indicators of undisturbed soils of protected ecosystems are very important for monitoring as reference objects.

The relevance of this study is due to the needless of necessarily estimation of soil's value at improving of the cadastral valuation of land protected areas.

Creation of the Red Book for soils of the Russian Federation (including regional cadastres of reference and especially valuable soils) and it's reinforcement by necessary legal documents can become a legal basis for improvement of cadastral land's estimation of protected areas.

KEY WORDS: soil, land cadastre, lands estimation, soil Red book, specially protected natural areas

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PROTECTION OF PERSONAL DATA: EXAMPLE OF GEOGRAPHIC INFORMATION SYSTEMS

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ABSTRACT:

Right of protection of personal data is among the fundamental human rights and freedoms and it bears significant importance legal state principle and democracy to gain depth. Protection of personal data has gained great importance in the last forty-year time. An important factor relating with this is that privacy area of private lives of people has become more defenceless as information and communication technologies developed and capacities to collect data and to process them automatically increased. Depending on technological and democratic development levels, countries have begun to take important steps to establish legal arrangements and institutional structures with the aim to protect personal data starting from 1970s onward. In Turkey with the provision which is added to the Constitution in 2010, the necessary legal basis relating with protection of personal data has been established. In 2016, the law about the protection of personal data has been accepted and the legal arrangement deficiency in this area has been eliminated. In our study, the provisions of law relating with the protection of personal data will be investigated and afterwards measures which are required to be taken for the protection of existing personal data will be examined in the Geographic Information System, being a database processing system with private computer support which is used with the aim to collect, preserve, process, analyse, and display geographical data, within the context of international law and national regulations.

KEY WORDS: Data, Protection of Personal Data, Geographic Information Systems

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EXODYNAMICAL PROCESSES AND GEOECOLOGICAL SITUATION RESEARCH IN GEORGIA

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ABSTRACT:

The article presents the modern research methodology of the exodynamical processes and geoecological situation to ensure the practical application of research results in efficiency. The model considers the Kakheti, as one of the example problematic region. However, this methodology is preferably used at least on the other problem areas, as a basis for sustainable development.

The research methods provide a comprehensive geoecological study of mountain areas simultaneously by geologists, geomorphologists, hydrologists, meteorologists and landscape scientists. Based on the analysis of the negative results caused by the country's geoecological situation and the exogenic processes, an observation network should be created and a permanent complex monitoring of the most difficult areas to determine the dynamics of natural disasters. As a result, the cadastre and cadastral maps of natural processes and events will be created, which will reflect the genesis of these events, their spread area and morphometric parameters. On this basis preventive measures of natural disasters will be developed.

KEY WORDS: Exodynamical Processes, Sustainable Development

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ENHANCED USE OF GIS AND REMOTE SENSING FOR THE RESTORATION MONITORING OF CONSTRUCTION FOOTPRINTS AND PREDICTION OF SOIL EROSION RISKS ALONG PETROLEUM AND GAS PIPELINES

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ABSTRACT:

The main goal of this research was to perform vegetation cover restoration and soil erosion risk assessment based on multitemporal NDVI monitoring and deterministic USLE erosion prediction model along Baku–Tbilisi–Ceyhan Oil and South Caucasus Gas pipelines. The categorization of NDVI derived from IKONOS 2007 and PLEIADES 2012 high-resolution multispectral satellite images into the bare lands, sparse and dense vegetation revealed the positive vegetation cover restoration along oil and gas pipelines. USLE model run with cover-management factor derived from PLEIADES NDVI 2012 showed higher number of polygons with predicted erosion class of '0–10 ton/ha' which is acceptable and not critical to pipelines. For higher erosion classes more than '0–10 ton/ha', USLE model run with IKONOS NDVI 2007 revealed higher number of polygons. Therefore, the predicted erosion rates more than 10 ton/ha reduced in 2012, which is a positive factor. USLE model run predicted 37 % of total number of erosion occurrences identified during 2005–2014.

KEY WORDS: NDVI, USLE, PLEIADES, IKONOS, BTC, SCP, Erosion

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DETERMINATION OF THE EFFICIENCY OF BLASTINGS IN MINING WITH AN UNMANNED AERIAL VEHICLE

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ABSTRACT:

It is called mine the minerals which is formed by internal and external natural factors on the earth's surface or which has completed its formation and has economic value. Due to their economic value and limited number of mines, the mines have been regarded as very valuable for people over history. Because the mines are the intersection of important using areas such as Scientific inventions, private consumption materials and defence industry contribute a lot of value to our world. For producers, the fact that the material is limited also increases the importance of following.

Today, technology is used in all areas of the industry. Loss of time and unnecessary cost in mining activities are important parameters that directly affect the profitability of production. The continuity of production leads to significant results both in terms of economic and stability. In order to prevent unnecessary waste of time and to provide cost control, inspection with unmanned aerial vehicles (UAVs), it can be an effective way to control the efficiency of blastings for production purposes in open mines and to create appropriate blasting patterns and reduce unnecessary costs.

In this study, after and before of production blastings made in open mines were compared with UAVs images taken with a rotary winged copter. On this aim, volume expected to be produced and actually produced volume were compared and the efficiency of the production blasting made is investigated. Due to the positive results of the measurement and the high time/cost gain, it has been found reasonable to use the efficiency control by using the UAVs. From this result it has been found out that the "Production Control System" to be made for a mine site can provide very positive results for mining enterprises.

KEY WORDS: Unmanned Aerial Vehicle, Mining, Blasting, Production Efficiency, Production Control System

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DETERMINATION OF THE STOCK VOLUME IN QUARRY BY UNMANNED AERIAL VEHICLE (DRONE)

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ABSTRACT:

Demands and researches for Unmanned Aerial Vehicles (UAVs) are increasing day by day all over the world. The UAV technology used for military purposes in the early days is now being used in areas such as agriculture, meteorology, communications, emergency management, traffic management, security, forming of production map, geodesy and mining. In recent years, the UAV has begun to be used in mining operations around the world in a variety of areas, such as mine production planning, blasting efficiency analysis, determination of equipment locations, precise calculation of ore production and stock volumes, land application, monitoring of changes in the oven and monitoring of slope conditions. There is little to be studied about the use of UAV in the mining field in our country. In the mining sector, timesaving and measurement accuracy are two very important issues. Depending on the developing technology, overcoming these two elements with a big preliminary in the field of mining will add production costs directly. The use and monitoring of the mine by UAVs in the mining saves a considerable amount of time compared to traditional methods. At the same time, the measurement accuracy is also high. The aim of this work is to explain the benefits of using the UAVs in the mining field and make it more widespread. For this purpose, it is aimed to precisely determine the volume of the material in stock by modelling with a quarry high resolution unmanned aerial vehicle images with three-dimensional (3D) images. As a result, the targets identified with high and easy accuracy in a very short period were analysed. The time and accuracy advantages of the obtained results compared to normal methods are summarized in the study.

KEY WORDS: Unmanned Aerial Vehicle, Drone, Quarry, Stock volume, Mine survey

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COMPARISON OF IMU PARAMETERS OBTAINED FROM DIGITAL AIR PHOTOGRAPS WITH DIFFERENT SPECIFICATIONS

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ABSTRACT:

Digital orthophoto maps are numerical products that combine the accuracy of maps and readability of aerial photographs. They are prepared using colored or black and white digital aerial photographs and they have a fixed scale like maps. Digital orthophotos offer more flexible, cost-effective, and higher-quality outputs than classical methods. Today, the need for up-to-date maps is increasing in almost every field, and as an alternative to classical methods, orthophoto maps meeting the criteria of accuracy and precision of a standardized map are mostly preferred in a wide range of applications. However, the geometrical accuracy of orthophoto mosaics used in geomatics applications is of even greater importance.

In this study, three different orthophoto mosaic images were produced by using digital aerial photographs of 7 cm, 15 cm and 25 cm ground sample distance taken in 2011 of Aksaray University campus area and the root mean square errors for the " ω , φ , and ξ " IMU parameters of these images were calculated after triangulation and compared with the values recommended according to international standards. For IMU values in the direct referencing system in the a-priori standard deviations during photogrammetric triangulation for photogrammetric blocks in international standards; It is recommended that root mean square error of ω , φ , $\xi \leq 0^{0}.010$. When the IMU values are calculated for three different sample distance, it is seen that the results are very close and below the recommended values. Therefore, it was seen that IMU values for orthophoto mosaic images produced at 7 cm, 15 cm and 25 cm ground sample distance gave close results to each other and these orthophoto mosaics can be used as bases in various studies where too much accuracy is not desired.

KEY WORDS: Accuracy, Ground sample distance, IMU parameters, Root mean square error

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COMPARISON OF POINT ACCURACIES ON DIGITAL ELEVATION MODEL OBTAINED FROM DIGITAL AIR PHOTOGRAPS WITH DIFFERENT SPECIFICATIONS

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ABSTRACT:

Photogrammetry is a map production technique or science applied by measurements made from terrestrial images with terrestrial cameras or more commonly used images taken with airborne cameras. With the development of technology, digital photogrammetry has been widely adopted in almost all areas of mapping. Especially digital orthophotos, which are photogrammetric products, are being intensively utilized by the private sector due to their easy interpretability. Digital photogrammetry is also a good method to automatically collect digital elevation models. Digital elevation model production is an important process in photogrammetry. A digital elevation model is an important product by itself as well as plays an important role in creating products such as orthophoto. The geometrical accuracy of digital elevation model used in geomatics applications is of even greater importance. In this study, three different digital elevation models were produced using digital aerial photographs of 7 cm, 15 cm and 25 cm ground sample distance taken in 2011 of Aksaray University campus area. Then, by using the heights measured by gps and read the same heights from the digital elevation model, root mean square errors of ground control points, check points and tie points were calculated. In the European Union countries, the accuracy of the digital elevation model is derived from the check points. The accuracy for the digital elevation model under the instruction of "Assessment of the Quality of Digital Terrain Models" issued by EuroSDR (European Spatial Data Research) is determined according to "0.53 × GSD" for heights. In the "Accuracy Standards for Digital Geospatial Data, March, 2014" issued by the American Society for Photogrammetry and Remote Sensing (ASPRS), the accuracy of ground control points is classified according to the method used and accuracy. Accordingly, it is recommended that the root mean square errors of the ground control points are less than 0.00625 × map scale formula for Class I studies that require very high accuracy. Root mean square errors were calculated for the check points, the ground control points, and the tie points in all three sample distances and the values found were compared, when the results are examined, it is seen that the values are close to and below the recommended values. Therefore, it can be seen that the digital elevation models produced with the aerial photographs taken at 7, 15 and 25 cm ground sample distances can be used for studies that do not require much sensitivity.

KEY WORDS: Accuracy, Digital elevation model, Ground sample distance, Root mean square error

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INVESTIGATION OF THE INFLUENCE OF CLIMATE CHANGES TO THE FORMATION OF SURFACE STRUCTURE OF LANDSCAPES BASED ON GIS (AJINOHUR LOWMOUNTAIN AND SURROUNDING AREAS)

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ABSTRACT:

Land surface temperature (LST) is an essential factor in many areas like global climate change studies, urban land use/land cover, geo-/biophysical and also a key input for climate models. LANDSAT 8, the latest satellite from LANDSAT series, has given lot of possibilities to study the land processes using remote sensing. In this study an attempt has been made to estimate LST over Ajinohur lowmountain and surrounding areas, using LANDSAT 8 – Operational Line Imager & Thermal Infrared Sensor (OLI & TIRS) satellite data. The variability of retrieved LST has been investigated with respect to Normalized Difference Vegetation Index (NDVI) values for different land use/land cover (LU/LC) types determined from the Landsat visible and NIR channels. The Land Surface Emissivity (LSE) values needed in order to apply the method have been estimated from a procedure that uses the visible and near infrared bands. The present study focuses on developing an ERDAS IMAGINE image processing method using the LANDSAT 8 thermal imagery of band 10 data. The difference between retrieved LST and Automatic Weather Station (AWS) data indicates that the technique works by giving an error of $\pm 3^{\circ}$ C.

KEY WORDS: Land Surface Temperature – LST, Land Surface Emissivity-LSE, Normalized Difference Vegetation Index-NDVI, Operational Line Imager & Thermal Infrared Sensor (OLI & TIRS), Remote sensing

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INDOOR SURVEYING WITH TERRESTRIAL PHOTOGRAMMETRY: A CASE STUDY FOR SIRCALI MASJID

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ABSTRACT:

Anatolian lands have many valuable cultural heritages in herited from the past to present because they have been home to many different cultures and civilizations throughout history. Nowadays restoration and documentation studies are carried out in order to keep these works alive and transfer them to next generations. For this purpose, classical or modern techniques are prefered. The terrestrial photogrammetry method, which is one of the modern measurement and evaluation techniques, offers economical, practical, accurate and 3D solutions for architectural surveys. When the 3D modeling studies are examined in the literature, it is generally observed that weight is given to external facade surveying of works. However, many of the works hosted by Anatolia are also actually rich with interior architecture. Numerous Masjid and Mosque examples can be given of these works. Inparticular, the domed interior spaces geometry of mosques and masjids provide information about the architectural and engineering knowledge of the period they were built.

In this study, indoor 3D modeling study of Sırçalı Masjid in located in the Karatay district of Konya province was carried out by using the terrestrial photogrammetry method. The Masjid was built in the single-domed masjid type of Seljuk period. The single-domed masjid type is a type of building with square or rectangular base area. However, in order for the dome design to fit in to a square or rectangular sub-structure, a transitional element is needed. The Turkish Triangle was used as transition elementst of facilitate the transition from a square-shaped sub-structure to a circular structure in Sırçalı Masjid. With this study, the dome transition elements, which are difficult to model in terms of classical architectural survey, have been modeled successfully by the terrestrial photogrammetry technique in a short time. It has also been proven that terrestrial photogrammetry can be used effectively in the indoor 3D modelling projects.

KEY WORDS: Indoor 3D Modelling, Terrestrial Photogrammetry, Indoor Architecture, Masjid or Mosque Architecture

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3D MODELLING OF GEOMETRIC TRIANGLE CONSTRUCTION ELEMENTS IN INDOOR SPACES: A CASE STUDY FOR TAHIR AND ZUHRE MASJID

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ABSTRACT:

Tahir and Zühre Masjid, which is one of the works of Konya and Anatolian Seljuk Period, serve daily from the 13th century and draw attention with its interior architecture. The Masjid is seated on a square plan and covered with a dome using triangular transitional elements. These artifacts are the most important proofs of the architectural perspectives and orientations of the past period. Demonstrating and documenting past architectural and engineering skills has become much easier with modern measurement and evaluation techniques at the present time.

In this study, interior 3D modeling study of Tahir and Zühre Masjid was made by using terrestrial photogrammetry. Also the triangular transitional elements between the square plan and the dome of the structure were picked out. As a result, it has been observed that the method of terrestrial photogrammetry for documentation and restoration works is not only successful in outdoor facade but also indoor modelling.

KEY WORDS: Terrestrial Photogrammetry, 3D Modelling, Indoor Space Modelling, Tahir and Zühre Masjid

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ECOLOGICAL CHARACTERISTICS OF OIL POLLUTED SOILS

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ABSTRACT:

Solution of today's largest economic and social problems that interest all our states and peoples in our planet is the protection of the environment. The sharp development of the industry and involvement of natural resources into economic turnover, rapidly growth of population, town-building, natural and anthropogenic factors have a negative impact to environmental ecology. From the second half of the XX century, people have realized that their economic activity violates the function of the biosphere, creates deficiencies in nature's activity, and creates serious conditions for the emergence of a global ecological crisis. As a result of the influence of anthropogenic factors, the initial state of nature is exposed to some or all of the degeneration, resulting begin the anthropogenic landscape. At the same time, the different components of the landscape, including the natural ecosystems, are degraded differently, as a result of the geo-ecosystem is degraded in general. This inconvenient situation exists in our country as well as in our country. Natural resources and mineral products of the Republic of Azerbaijan - oil, gas, ore deposits, building materials, and its production and operation has widespread. The research is the territory of Bibi-heybat OGPD. The field is smoothed out of the sea, polluted with oil and is a slick plain. This territory is polluted with 1-3% of oil. These soils are a light granulometric composition that is poorly maintained by nutritional elements and is under operated salty, saline oil-field. The oil poured into the soil negatively affects its morphology, physical, water physical, physical-chemical and biological properties, destroys the structure of the soil, and causes the soil enzymes and bacteria destruction of microorganisms. The amount of physical clay in the granulometric composition of oil-polluted soils in the area varies along the profile length of 8,20-12,60%, while the soil is sandy soil, and 26,72-18,20% in other areas, and this is a clayey layer. It is poorly provided soils with nourishment elements. Hummus is 1.21-1.16% on the top layer, 0.82-0.60% in 20-30 cm. These are saline soils. The salt content is sulfate-chlorinated-calcium. The dry residue is 1,100% -1,560%. Vegetation experiments were put on 3% soils and lucerne plant was planted. The productivity of the plant was 19-34 cm, and the wet weight was 82.53-53.72 gr.

KEY WORDS: oil pollution, physical-chemical parameters, recultivation, productivity

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ON THE IMPROVEMENT OF THE ORTOMETRIC HEIGHTS WITH GNSS LEVELING: THE CASE OF SELCUK UNIVERSITY CAMPUS AREA

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ABSTRACT:

Whether in engineering projects or for scientific purposes, the determination of point heights is one the important tast of Geomatics Engineering. The methods applied in height determination are classified as geometric leveling, trigonometric and GNSS leveling. GNSS leveling is the most recent method.

With the use of satellite-based positioning (GNSS) techniques, which have been widely used in recent years, the duration of measurement and calculations has been considerably reduced and facilitated. Cartesian coordinates of the three-dimensional geocentric coordinate system of the points are obtained with GNSS. From the Cartesian coordinates, geodesic coordinates (Latitude, Longitude and Ellipsoidal height) are transformed according to the selected reference ellipsoid (WGS84 or GR80).Ellipsoidal heights (h) obtained with GNSS need to be converted to orthometric height (H) for use in engineering projects. This conversion is done by the following formula. H=h-N

The accuracy of the orthometric height depends on the accuracy of the geoid height (N).Geoid heights also vary due to the fact that the world's mass structure is not homogeneous. Global geoid models (OSU91A, EGM96 and EGM08), astrogeodetic method, gravimetric method, regional or local geoid models are used to determine the geoid heights. In Turkey, according to the regulations (BOHHBUY ,2005) for determining the geoid heights usage of present Turkey Geoid (TG03) model or local geoid models is suggested.

For this study, a test area of 32 points including 12 control points and 20 traverse points was created within Selcuk University Alaaddin Keykubat Campus Area. Geometric leveling and GNSS measurements were made in the test area. The orthometric heights of the points are obtained by adjustment of leveling networks with TUDKA points. The ellipsoidal heights obtained with GNSS are converted into orthometric heights in two separate ways. Local geoid model was used in the first and TG03 data was used in the second. Obtained orthometric heights are compared.

KEY WORDS: GNSS Leveling, Ortometric height, Ellipsoidal heigh, TG03

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A SPATIAL APPROACH FOR PUBLIC TRANSPORTATION NETWORKS IN ANTALYA/TURKEY

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ABSTRACT:

Public transportation increases people life especially in big cities due to money and time saving. Transportation is one of the important factors of urban life. Services of city transportation are multi-faceted subjects provide to connect business-residential areas and socio-cultural areas for people. In this respect, urban transport plans are not considered separately from spatial planning. GIS, which is used for various transportation planning and visual analysis with its spatial data and data base structure, is an appropriate decision support system. GIS contribute greatly to the decision-making and applications of city managers in projects such as planning and implementation of public transport that depend on a number of criteria.

In this study, the existing public transportation network in Antalya province was analysed and the level of adequacy of the transportation network was determined by population data, university and hospital places. Spatial distribution of public bus routes in Antalya Province was determined and spatial analysis was performed with GIS. As a result of the analysis, the impact areas of public transportation were determined. Accordingly, the public transportation of Güzelbağ and Duraliler neighbourhood in Antalya was observed to be insufficient. In addition, public transportation in the city center is very complex. It is suggested that public transportation should be carried out by transfer in these regions in order to overcome this complexity.

KEY WORDS: Public transportation, spatial analyse, decision-making, GIS

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INVESTIGATION OF THE TEMPORAL CHANGE OF LAND USE BY CORINE AND LANDSAT SATELLITE IMAGES; A CASE OF KONYA

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ABSTRACT:

Satellite images are the most basic data used in remote sensing. Today, the spectral and spatial resolutions of these data have increased and parallel to this, they have gained the ability to scan very large areas. Therefore the process of change in land classes can be monitored and managed more easily, faster and more economically.

In this study Konya province was chosen as the application area. In the application, Satellite images and Corine data for 1990, 2000, 2006 and 2010 were used. The maximum likelihood method is the preferred method of classification for satellite images. The land classes derived in the Landsat were obtained with accuracy of 72%, 80%, 85% and 90% for the years respectively 1990, 2000, 2006 and 2012. Land use changes in industry, agriculture, settlement and other areas obtained in the Corine and classification process, are calculated as area and evaluated as a percentage. As a result, the values obtained by Corine and classification gave consistent results. In addition, it was observed that urbanization was towards the north of the city and industrialists advanced towards the northeast of the city for the Konya province

KEY WORDS: Land Use, Urban Development, Classification, Corine

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ANALYSIS OF THE RELIEF ROLE IN THE KUR-ARAZ LOWLAND SOILS SALINITY BASED ON GIS TECHNOLOGY

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ABSTRACT:

The reasons of the Kur-Araz Lowland soils salinity have been investigated in the article. An intensive development of the irrigative farming causes growth in agricultural crops production and strongly affects the salts migration of soils in these zones. To the most specialists' mind the large zones underwent the salinity process as a result of incorrect fulfillment of the irrigative regime, agro technical rules and water losses in irrigation system. But, besides these reasons, there is an enough impact of the relief in salinization process and this factor wasn't sufficiently investigated. One of its main causes connects with non-existence of the appropriate geoinformation technologies to perform geospatial analysis before. From this point of view the geoinformation technologies present large opportunities to investigate a relation of the soils salinization map of the Kur-Araz lowland soils was compiled on the basis of GIS to study a relief role in the soils salinization process. Then digital elevation model (DEM) was built. It was known that the relief of the research object zone changes at -28 m and +50 m intervals. A comparative analysis of the DEM with the digital salinization map of soils was performed. The obtained consequences indicate a close correlation of the relief factor with the salinization process of soils to some or other degree.

KEY WORDS: GIS, Soil Salinity, DEM, Digital Map Guide

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AN INDOOR POSITIONING STUDY BASED ON THE WI-FI FINGERPRINTING METHOD

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ABSTRACT:

Indoor Positioning is a very popular research area because of its wide range of applications, mainly providing location-based services. Many technologies and methods are suggested for estimating the location of the user in indoor environments where GNSS signals are mostly attenuated or completely lost. Some of these technologies are Bluetooth Low Energy, Wi-Fi, RFID, ZigBee and so on. The methods used for position estimation are various methods such as Angle of Arrival (AoA), Time of Arrival (ToA), Fingerprinting, Dead Reckoning and Map Matching. Among these methods, fingerprinting is promising and mostly preferred method.

Location fingerprinting consists of two phases:'training' and 'positioning'. In the training phase, the indoor space is divided into grid network to form points called reference or calibration points. At these points, Wi-Fi signal strength measurements are made to train the system, that is, to create a fingerprint database. A typical fingerprint database contains local or global coordinate information for a reference point along with information about the BSSID (Basic Service Set Identifier) and received signal strength information for the access points at that point. In the positioning phase (Online Phase) the received signal strength information obtained at any location in the indoor area is transmitted to the server or client-side database, where it is presented as input to the vector distance algorithm. The user coordinate is calculated as the closest match result.

Ideal IPS systems offer high location accuracy as well as low cost. For this reason, systems using existing infrastructure are preferred. Therefore, the WLAN infrastructure established in almost every building today is very convenient for this work. It can also be applied easily by fingerprinting method. However, the accuracy to be achieved without making any changes to the WLAN infrastructure will be limited if the distribution or quantity of AP's are not sufficient.

In this study, fingerprinting with Wireless LAN signals was applied in Selcuk University Faculty of Engineering and obtained accuracy was examined. Several factors have been taking into account, such as the location of access points that affect location accuracy, and the number of access points on a floor.

KEY WORDS: Indoor Positioning, WLAN, Fingerprinting, Nearest Neighbour

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AN ECONOMIC ANALYSIS OF LAND CONSOLIDATION IN THE KONYA-DOKUZ DISTRICT, KONYA

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ABSTRACT:

An economic analysis was carry out in the land consolidation project of Dokuz district in Konya, Turkey. The main target of our research is land consolidation project data of about 112 ha. The aim of work to determine to determine the current state of the enterprises after the land consolidation and contribute to the future policy to be implemented. Therefore, in the land consolidation project implementation area, the return status of the social and economic aspects was examined. Before the consolidation, the ratio of the rectangular shape parcel was 5.93 % and this ratio increased to 58.4 %. Before the consolidation, while the proportion of shapeless parcels was 79.64 % and this ratio decreased to 21.04 %. The average parcel size was increased only about 0.11 % after consolidation. Before the study, in the project area the total parcel boundary length was 386.86 km and this length was reduced to 251.79 km after the consolidation. So that the economic benefits of the consolidation projects have been expressed with clearer values.

KEY WORDS: Land consolidation, land reallocation, economic analysis, average parcel size

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GEOID HEIGHT CALCULATIONS BY DIFFERENT INTERPOLATION METHODS

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ABSTRACT:

GNSS/levelling technique is the most effective engineering method for the determination of heights and height differences. This method is based on the principal of conversion of ellipsoid heights to orthometric heights. The users need the conversion between the ellipsoidal height and orthometric height in many GNSS applications. Levelling measurements conducted with the purpose of determining the orthometric heights on points are quite arduous and time-consuming processes. To be able to use ellipsoid heights in engineering projects, their transformation to orthometric heights defined in the height datum of the region is necessary. For transformation, polynomial surface models are generally used for study region or area. The accuracy of results depends on the location and distribution of selected reference stations with known ellipsoidal and orthometric heights.

In this research, GNSS/levelling data of test area was used in order to examine different interpolation methods. It consists of total 102 points, 36 of which are benchmarks and 66 of which are traverse stations. Orthometric heights (H) of the benchmarks and traverse stations were carried out with geometric levelling method in the datum of Turkey National Vertical Network (TUDKA). The geographic coordinates including ellipsoidal heights (h) were determined in static positioning mode and referred to Turkish National Fundamental GPS Network (TUTGA). The ground control stations of the test area were classified as reference and test for the purpose of this research. Within the scope of application, benchmarks were selected as reference points and traverse stations were selected as test (ground control) points. The geoid heights of test stations were calculated by the different interpolation methods.

KEY WORDS: GNSS/levelling, Polynomials, Geoid undulations, Interpolation

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ACCURACY INVESTIGATION OF DEM BASED ON WORLDWIEW-2 STEREO IMAGES

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ABSTRACT:

The WorldView-2 (WV-2) satellite, launched by DigitalGlobe on Oct 8 2009 represents the first commercial imaging satellite to collect very high spatial resolution data in 8 spectral bands. WorldView-2 panchromatic resolution is 46cm and multispectral resolution is 1.8m. Distribution and use of imagery better than 0.50m GSD pan and 2.0m GSD multispectral is subject to prior approval by the U.S. Government. The images provided by the satellite can be used for applications such as mapping, land planning, disaster relief, exploration, defense and intelligence, visualization and simulation of environments, and classification. To use high resolution satellite images in such fields, they had to be rectified. Rectification process is done by points, which coordinates are known in both land and image. The selected points may indicate either measured points in the field or/and can be designated as visible points in images. Sometimes, these points may represent; road cross, painting objects, etc. Points which are set up in the field are either acquired from existing maps or from image matching the research site or geodetic surveys.

In order to use satellite images like a map, orthoimages are required taking care about image geometry and model configuration. Based on, Ground Control Points (GCP) a Digital Elevation Model was generated for the orthorectification.

In this study, a stereo scene orientation was made using 15*14 km sized stereo pair of WorldView-2 satellite with various, GCP and Check Point (CP) configurations. Furthermore, the accuracy of the generated Digital Elevation Model(DEM) were analyzed by heights of primary bench marks and with the heights of the stereo model.

KEY WORDS: WorldView2, Ground Control Point, Check Point, Rectification, Digital Elevation Model

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GEOINFORMATION ASSESSMENT OF EROSION RISK ON IRRIGATED LANDS

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ABSTRACT:

Irrigation reclamation requires a rigorous and detailed approach to study of territory using field research methods. Since irrigation is high risk of erosion and water logging, which depends, in particular, on nature of relief, it is necessary to carry out a comprehensive study of territory. In work, based on a topographic plan, created a digital elevation model, with the help of which calculated models of potentially dangerous erosion areas. The obtained models verified with remote sensing data, it is found out, that many erosion areas coincide with the results of geomodeling. Based on the results of the complex survey and the received materials, given recommendations on the rational and soil-conserving use of the territory in irrigation reclamation.

KEY WORDS: Irrigation Reclamation, Erosion, GIS, Digital Elevation Model

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SPATIAL VARIATION CHEMICAL AND PHYSICAL PROPERTIES OF VIRGIN AND ARABLE SOILS

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ABSTRACT:

The article discusses the features of the morphological structure, the spatial distribution of the chemical and physical properties of typical neighborhoods Irkutsk virgin and arable gray forest soils. Based on the findings made their diagnosis and classification of positions with substantively-genetic approach. For the first time in the region investigated resistivity soils. Found that the electrical parameters have certain differences in the genetic horizons of the soil profile and are dependent on the degree of differentiation of the soil profile and learn. Knowledge of these characteristics provides additional understanding of the migration processes of soil moisture and substances dissolved in it, leading to the differentiation of the soil profile on the genetic horizons and influences the chemical and physical properties, diagnostics and sample belonging soils. Application of methods of mapping the electrical resistance in the form kriking revealed a significant decrease in electrical resistance and leveling the profile of arable soil.

KEY WORDS: gray forest soils, substantively-genetic approach topoizoplety, kriking, electrical sounding and profiling

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AUTOMATED FOREST MAPPING: EFFICIENCY AND LIMITATIONS (CASE STUDY OF GEORGIA)

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ABSTRACT:

It is widely accepted that the forest mapping is one of the key issues for sustainable forest management. It is essential for researchers to define forest boundaries, tree cover and type, and many other parameters as well as a change of forest cover and its monitoring. In this regard, remote sensing and GIS are almost irreplaceable tools. It is known that Georgia is a mountainous country and a large part of our forests is presented in the complicated terrain conditions. The aim of the research is to map the forest cover using remote sensing and GIS on several study areas across the country. The main problem, however, is to choose the appropriate method for satellite image analysis. This is complicated by the different accuracy for the different type of terrain. In this paper, we apply all the widely used methods (maximum likelihood, ISO Cluster, principal components, etc.) for the Landsat 8 OLI satellite image analysis in ArcGIS. Then the same procedures have been made on Sentinel's higher resolution images. We compared the research outcomes from the both sources to the ground control points that allowed us to determine which classification method was more effective for forest mapping with GIS in the mountain and/or lowland areas. These examples illustrated the efficiency and limitations of each methods for each study area. Results provides a powerful tool for choosing certain classification method in case of various terrain. This demonstrates potential for general applicability to know exactly which classification method should be given preference in particular terrain for accurate automated forest mapping.

KEY WORDS: Remote sensing, GIS, forest, automated mapping, Georgia

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DEVELOPMENT OF 3D WEB GIS APPLICATION WITH OPEN SOURCE LIBRARY

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ABSTRACT:

Today, thanks to the internet connection, the borders are disappearing and accessing information is more comfortable. Instead of desktop applications, number of web-based applications which can be seen instant changes by all users are increasing day by day. The diversity of web-based applications that are currently used in presenting spatial information to users is also spreading. Using open source libraries, developers can develop web applications for their own purposes. Three dimensional (3D) visualization on the web is a commonly used approach in geographic information systems (GIS) applications. In this article, it is aimed to develop a 3D web application using open source library. Vector data layers containing attribute data on global, country and city levels are visualized on web application. The raster data layers produced in the most suitable site selection and mapping of land valuation process results are also visualized on the web application in three dimensional. It is pointed that the output products obtained from different studies can be accessed and visualized through the web browser without installing an additional program or add-ons on the users' computers.

KEY WORDS: GIS, Open source library, 3D

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PRECISION ANALYSIS OF THE STEREO IMAGE ORIENTATION WITHOUT GCP

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ABSTRACT:

GPS/IMU system can provide orientation parameters directly by measurements performed during the flight. However especially if direct georeferencing is performed, knowledge of the positional accuracy would be important. Positional precision is determined generally by using GCP (Ground Control Point) in photogrammetric projects. But GCP construction is cost and it is not possible to find in enough number anytime. Thus situated it is possible to compute positional precision by error propagation. In this study, photogrammetric mathematical model is viewed, positional precision is computed by implementing error propagation on collinearity equations. In this context positional precision is determined on 10 cm GSD (Ground Sample Distance) stereo images by computational practice without GCP and tested the validity of performed precision is examined and interpreted by implementing error propagation. In the study of "Kiraci et al., 2016", the orientation parameters were tested and the results were compared at 4 GCPs and the stated values were found to be close to reality. In this study a t-test was performed to determine whether there is a statistically significant difference between the calculated positional precision values and the positioning corrections computed by bundle block adjustment. It was determined that there was no statistically significant difference in the 95% confidence level between the mean errors in the comparison and the calculated sensitivities are available.

Benefits provided by this study;

- Positional precision can be determined in photogrammetric applications without GCP.

- Positional precision analyses can be performed with the prepared interface for applications with technical barriers such as cost-effective and real-time applications.

- It can be detected whether or not factory sensitivities are optimistic for the camera and IMU.

- The measurement sensitivities required to obtain the position precision desired can be computed by simulations before the flight.

- It can be the source of work for LIDAR since the same principle (the law of error propagation) can be calculated.

KEY WORDS: GPS IMU integration, error propagation, positional accuracy

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3D MODELLING AND MAPPING WITH UNMANNED AERIAL VEHICLES (UAV) – A CASE STUDY OF ALAYHAN

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ABSTRACT:

Unmanned Aerial Vehicle (UAV) or Unmanned Aerial System (UAS), commonly known as a drone, is an aircraft without a human aboard but remotely controlled by a human. UAVs have been primarily begun to produce and use for military purposes. It has become pretty attractive for photogrammetry in terms of generating Digital Terrain Model (DTM), Orthophoto and mapping with its widespread use in civilian aviation. Aerial surveillance and mapping of large areas in a short time is possible with lowcost UAVs. Surveyors are becoming much more effective in the field and collecting much more data on the objects with these systems. We present a paper about 3D photogrammetric modelling and mapping with UAV in Alayhan. It is located on the Aksaray-Nevşehir highway. Alay Han is one of the earliest caravansaries of Anatolia. It was built by II. Kılıçaslan in 1192 and is known as the first Sultan inn of Anatolia. In the field study, Ground Control Points (GCPs) have been established and measured by a Global Navigation Satellite System (GNSS) survey device in TUSAGA-Aktif CORS system to raise the accuracy of the model and map. We created several flight plans before the field study and executed these flight plans with DJI Phantom 4. The flights have been executed in 50 m above to generate the 3D model of the caravanserai. A few more flight plans have been created to generate 3D Model of the caravanserai in detail and the flights have been executed in several altitude. After the field study photographs and surveys have been processed to generate 3D modelling and mapping. This study has shown us large areas can be modelled in a short time and a low-cost so it is a pretty efficient way to mapping.

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KEY WORDS: UAV, Photogrammetry, Mapping, 3D Modelling, Alayhan

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Road Network Extraction by Using Combination of LIDAR and High Resolution Orthoimage

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ABSTRACT:

Extracting road networks from remotely sensed imageries has been considered as a problem for a long time. In many studies using satellite images, expected accuracy of road extraction has negatively affected in many aspects such as image resolution, shadows of trees, complexity of environment and material variability. However, (Light Detection and Ranging) LIDAR data is less affected by these obstacles due to straight and progressive travel of laser beam, no need to illumination to penetrate the surface and the ability to distinguish shade variability. Moreover, high accurate elevation models can be derived by means of LIDAR data. However, this data generally does not contain spectral information which is important for object detection. This study focuses on combination of LIDAR data including intensity and orthoimage for the extraction of road networks. Istanbul Technical University Ayazaga Campus was selected as the study area. In the area, high resolution photographs were taken by using an Unmanned Aerial Vehicle (UAV). Orthoimage of this area with the ground sample distance (GSD) of approximately 5 cm was produced by means of computer vision based photogrammetric software. Afterwards, pixel size of orthoimage were resampled according to LIDAR data which was fused with the multispectral data belonging to the visible region of the spectrum. Finally, this approach works independently to evaluate of sudden changes in the road direction and changes in width. However, if this method will be evaluated on complex area, reliable results can be obtained.

KEY WORDS: Feature extraction, LIDAR, Unmanned Aerial Vehicle, Multimodal Fusion.

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THE CLIMATIC EFFECTS OF NATURAL LAKES AS A POTENTIAL COOL ISLAND

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ABSTRACT:

In today's rapidly urbanized world, the heat island effect causes deterioration in the thermal comfort of cities. Therefore, this problem requires making a smart action plan to fight against it. As one of them, it is important to understand the cooling effects of natural resources. The creation or the conservation of cool-island effect can improve the climatic conditions of a region and reduce the negative effects of heat islands.

The main purpose of this study is to investigate the micro-climatic effects of natural lakes. It was carried out by the remote sensing and GIS techniques. In the study, which addressed 4 natural lakes as the sample areas, 4 consecutive Landsat TM-5 images of the summer season were used. The study was performed in the 1km periphery of each lake which was divided into 8 zones in order to improve the precision of analyses by minimizing the local effects.

In the analyses, the cross-correlations of surface temperature, land use, and distance from the coast were examined. The statistical analysis was examined in 95% confidence interval. In the analyses; the surface temperature/distance correlation of each zone and the surface temperature/distance correlation of land use for each zone were examined by the bivariate method. The results were emphasized the land-use planning and land management to protect the climatic structure of the region.

KEY WORDS: Microclimate, Land Use Planning, Cool Island, Climate Change, GIS, Remote Sensing

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APPLICATIONS OF GIS IN OIL AND GAS INDUSTRY

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ABSTRACT:

The oil and gas industry is an important sector in the world. It provides 99% of all transport and is 2.5% of GDP. Oil and gas information is closely related to geography. For example, oil exploration, pipeline construction and environment use CBS. All these features are places in nature.

Interest in GIS in oil and gas industry. GIS programs in the oil and gas industry can be used for various purposes.

The Geographic Information System (GIS) is a system for storing, collecting, translating and presenting geographical information. Oil and Gas GIS programs include oil and gas information, oil and gas pipeline and exploration plans, asset management, geological or supply routing information.

Implementation of GIS in the oil and gas industry can increase cost efficiency and provide timely information. There are several ways to implement GIS in oil and gas related sectors. For example, you can use geodatabases, remote sensing, map automation and much more. Oil and gas datasets are mostly geographically based. For this reason, GIS can provide solutions for pipeline construction, oil drilling and environmental protection.

KEY WORDS: GIS, Oilfield, Exploration, Drilling, Completion, Pipeline Routing, HSE, ArcGIS

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DETERMINATION OF GNSS STATION MOVEMENTS BY WAVELET TRANSFORM

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ABSTRACT:

Continuously Operating Reference Station (CORS) networks that consisting of multiple GNSS systems have been set up and operating in many developed countries. In Turkey, CORS-TR has been operating. The aim of CORS-TR is fast, correct, and reliable collection of all kinds of geographic data, thus, speeding up the activities of cadastre, assuring organized urbanization, constituting the spatial infrastructure for relevant works of e-government, and monitoring plate tectonics. Therefore, in this study, it has investigated that 2100 Days of spatial behaviours of AKSR, CIHA, and KLUU GNSS stations located around Tuz Gölü (Salt Lake) in the Central Anatolia region of Turkey. GNSS observations recorded from stations were evaluated and Continuous Wavelet Transform (CWT) was conducted to reveal station behaviours. Scalograms were obtained by applying CWT at different scales to GNSS coordinate time series of North, East, and Up coordinate components. Morlet wavelet was selected for CWT. As a result of the analysis, the Up signals of the stations contain more movements in comparison with their southern and northern signals. Monthly (55, 65 days etc.), seasonal (85, 92, 103 days etc.), annual (253, 296, 300 days etc.), and even biennial termed periodic movements based on various factors related to the signals have been determined.

KEY WORDS: GNSS, Tuz Gölü, Salt Lake, Wavelet Transform, Coordinate Time Series

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MONITORING THE SUBSIDENCE/OBRUK FORMATIONIN KOZAKLI GEOTHERMAL FIELD WITH UNMANNED AERIAL VEHICLES (UAV)

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ABSTRACT:

Natural disasters occurrence is increasing every year in all over the world. Disaster areas under hazard and risks vary depending on the types of disasters and expanding day by day. This case causes to more people and property damage from natural disaster. Reducing or keep under control the damage of natural disasters depends on monitoring disaster effectively. In this context, because of accurate and quick data collection capabilities, Unmanned Aerial Vehicles uses for disaster monitoring. Also, with the UAV images can be obtain relevant data about of inaccessible and unreachable areas with the impact of disasters. UAVs have been primarily begun to produce and use for military purposes. It has become attractive for photogrammetry in terms of generating Digital Surface Model (DSM). Mapping and monitoring of large areas in a short time is possible with low cost UAVs. In this study we present a paper about monitoring the subsidence/obruk formation mechanism in Kozaklı geothermal field (KGF) which is located in the Nevsehir city. KGF has the most important geothermal energy potential in central Anatolia. The primary aquifer of the Kozaklı geothermal waters (KGW) is the Premesozoic aged marbles and the second aquifer is Tertiary aged limestones. In KJA, KGW (45-96°C) is utilized for 2900 residential heating, greenhouse and thermal tourism. Subsidence/obruk has been occurred suddenly at the intersection of NW-SE and NW-SW faults in KGF on January 14, 2007. In the field study, Ground Control Points (GCPs) have been established and measured by a Global Navigation Satellite System (GNSS) survey device in TUSAGA-Aktif CORS system to raise the accuracy of the model and map. Flight plan is created before the field study and executed this flight plan with DJI Phantom 4. The flight have been executed in 20 m to generate the 3D model of the study area. After the field study photographs and surveys have been processed to generate digital surface model. Geophysical measurements in the SF indicate that the upper part of the subsidence consists of fractured-cracked limestones and continues to the thermal hotels in the NW-SE direction. The cover unit (10-15 m) consists of silt gravel and low-plasticity silt overlying travertine-like limestones with paleokarstic structure the SF.

KEY WORDS:UAV, Photogrammetry, Digital Surface Model, Kozaklı, Obruk

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IDENTIFICATION OF UNDERGROUND WATER LEVEL CHANGES BY SIGNAL PROCESSING METHODS IN KONYA CLOSED BASIN

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ABSTRACT:

Climate, geological and geomorphological factors have affected the changes in groundwater level in the Konya Closed Basin. Changes in groundwater level occur during the year and also period of years. In this study, monthly measurements were made in 19 wells to determine the changes of underground water level in Konya Closed Basin. In this region, there are some measurements in the wells at least 11 years and up to 49 years for 19 stations. As a result of the analysis, mean=-39.22 cm/year for 19 well, mean=-15.56 cm/year for 3 well in Konya Cihanbeyli region, mean=-63.48 cm/year for 4 well in Konya Selçuklu region, mean=-68 cm/year for 6 well in Karaman region, and mean=-19.50 cm/year in Niğde region linear changes in the decreasing direction were determined. Moreover, Continuous Wavelet transform is applied to measurements of underground water levels. As a result of the analysis, it is seen that there are some annual periodic movements (the lowest is approximately 1 year) in wells. In some wells, movements that have not yet completed its periodic motion period have been identified. The majority of the decrease in the water level of the wells in the Konya Closed Basin is statistically significant and meter level in some wells. In conclusion, it can be stated that the underground water level in this region, especially in the last decade period, there is a decrease resulting from the drought that result of the global climate change and excess water use. Particularly, it is observed that the formation of sinkholes in this region has increased in recent years. It is estimated that there is a correlation between the formation of the sinkholes and the decrease in groundwater level.

KEY WORDS: Konya Closed Basin, Underground Water, Wavelet Transform, Coordinate Time Series

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TAKBIS 2023 VISION OF TURKEY COMPARING WITH LADM

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ABSTRACT:

Land is a scarce resource that has to be managed with sustainable development goals. Appropriate land policies are required for such a land management, and they have only been developed in presence of qualified land information. Therefore, effectiveness of land administration systems by which basic land information is produced should be evaluated in the course of time, and they should be reengineered in case of need. In order to secure standardization on the basic data structure in the area of Land Administration which is traditionally called as Land Registry and Cadastre, work on spatial data modelling was initiated in the leadership of International Federation of Surveyors (FIG). This work has been continuing under the name of Land Administration Domain Model (LADM) and as ISO 19152 international standards. Basic data structure of LADM was developed to meet the needs of different Land Administration System (LAS) throughout the world. For this purpose, the model provides the capability of representing 2D, 2.5D and 3D spatial objects as well as representing objects independently from geometry. The LADM provides an abstract, conceptual model and is organized into three packages and one subpackage. The packages in LADM relate to: parties (people and organizations); basic administrative units, rights, responsibilities and restrictions (ownership rights); spatial units (parcels, and the legal space of buildings and utility networks) with the subpackage: spatial sources (surveying), and spatial representations (geometry and topology).

The increasing complexity of land use requires that cadastral systems as a core component of land administration need an improved capacity to manage the multipurpose of the land. In Turkey, it is now broadly accepted that the current cadastral data model should be improved and enriched to reflect all dimensions of the land. One of the ongoing important projects in Turkey is the Land Registry and Cadastre Information System (TAKBIS in Turkish) which is mainly aiming at providing reliable and up-to-date land information required for all land and land-related activities, transforming cadastral data to a multipurpose land information system, accomplishing cadastral services within the scope of information technologies and providing standardization in cadastral services. TAKBIS could not exactly reach its goals because of some deficiencies in monitoring and modelling temporal changes of spatial data. Therefore TAKBIS 2023 Vision of Turkey studies are carried out in order to overcome these deficiencies. Thanks to 2023 vision; the quality of the data will be improved, the temporal variation of the spatial data can be monitored, and a data infrastructure suitable for multipurpose - multidimensional cadastre will be established. In this paper, conformity of LADM in Turkey was evaluated compared approaches of TAKBIS and TAKBIS 2023 vision. As well as analysing the content of the studies carried out in our country, to see what kind of model is applied in our country.

KEY WORDS: LADM, TAKBIS, TAKBIS 2023 Vision, Cadastre, Land Registry, Land Administration

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GEOINFORMATION TECHNOLOGIES FOR THE MANAGEMENT OF WATER REGIME OF AGRICULTURAL CROPS IN IRRIGATED AGRICULTURE

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ABSTRACT:

In the article the algorithm of control of water regime of agricultural crops during irrigation is put, which consists in the fact that. The analysis of well-known and developed by the authors GIS-systems for monitoring and control of water regime of irrigated fields, mainly for acute arid conditions. The analysis of Russian and foreign developments showed that computerized systems based on GIS-technologies for monitoring irrigated agricultural land should receive and record data on humidity, soil temperature and wind speed on the irrigated area in real time. For the operational regulation of the water regime of plants in arid natural conditions requires a preliminary analysis based on adequate mathematical models of heat, salt and moisture exchange. This requires the creation of GIS-systems with blocks of mathematical processing, analysis and decision support, as well as forecasting the development of agrocenoses using the described mathematical models and the structure of the database.

KEY WORDS: Irrigation, Humidity, Temperature, Soil, GIS, Forecasting, Mathematical Models

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USING LOW-COST UNMANNED AERIAL VEHICLE IN THE TEMPORAL FOLLOW-UP OF SOLID WASTE STORAGE AREAS

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ABSTRACT:

Storage of solid wastes is important issue due to their negative effects on both human health and environment. Instead of open dump areas, nowadays solid wastes are generally accumulated in the regions called as Solid Waste Storage Area (SWSA) which is stay away from residential areas. These wastes are continuously subjected to compression process after transferred to the SWSA and volumetric calculations are made in order to determine what situation it is in relation to the life span which was previously determined. Therefore, the activities performed in the SWSAs should be monitored for policies to be implemented in decision-making. In this study, a SWSA operated in the site of Turhal Kuşoturağı in Tokat province of Turkey was monitored by means of a low-cost Unmanned Aerial Vehicle (UAV). The area covered by the selected SWSA is approximately 5 ha. In addition to the central district of Tokat province, wastes belonging to Turhal, Zile and Pazar districts are also collected in this area. Four different flights at different times were carried out by using DJI Phantom 3 Professional to determine available volume of waste after compressions. The ground control points were marked outside the collection area taking into account the continuity of the temporal follow-up. 3D models were produced by means of photographs obtained by UAV. Thereafter, volumetric calculations were performed for the solid waste deposits of different times. As a result of the study, it was proved that low-cost UAV can be used in monitoring such facilities. Inner accuracy with cm order provided by low-cost UAV is sufficient to reach desired quality in terms of both qualitative and quantitative. Also, it was determined that integration of the obtained products with GIS can help in decision making not only for compression operations but also for many factors to be controlled.

KEY WORDS: Aerial Photogrammetry, Open Dump Area, Solid Waste, Solid Waste Storage Area, Unmanned Aerial Vehicle

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COMPARISON OF TOPSIS AND VIKOR MULTI CRITERIA DECISION ANALYSIS TECHNIQUES

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ABSTRACT:

Nowadays, beside Geographical Information Systems (GIS) analysis capabilities, Multi Criteria Decision Analysis (MCDA) techniques have been applied to a large amount of spatial decision problems. MCDA techniques are widely used in different kind of site suitability analysis in the field of environmental, engineering, topographical, social and economic perpectives. When planners are giving decision to related problems, there are limitations, expectations and requirements are involved in this stage. Right decision giving require to characterize the complex criteria structure and select appropriate data. The most used MCDA techniques in GIS are Analytical Hierarchy Process (AHP), The Technique for Order of Preference by

The most used MCDA techniques in GIS are Analytical Hierarchy Process (AHP), The Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) and Vise Kriterijumska Optimizacija I Kompromisno Resenje (VIKOR). In this study, TOPSIS and VIKOR techniques are compared to each other according to the models and capabilities.

KEY WORDS: Geographical Information Systems, Multi Criteria Decision Techniques, AHP, TOPSIS, VIKOR

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USING EXPLORATORY FACTOR ANALYSIS METHOD IN THE CALIBRATION STEP OF SLEUTH URBAN GROWTH MODEL: A CASE STUDY OF ISTANBUL SANCAKTEPE DISTRICT

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ABSTRACT:

Land cover change effected by urbanization is one the main problem for urban decision makers. They want to keep urban growth under control to protect natural and environmental areas located in urban fringes. Cellular automata-based simulation models have been frequently used for this purpose. Therefore, a small number of models have been generated for many years and the most well-known model is SLEUTH Urban Growth Model among of them. The name of SLEUTH was derived from required input data such as slope, land cover, excluded areas, urban areas, transportation networks and hillshade. In SLEUTH software, urban growth simulation model is generated in three steps; test, calibration and prediction. The calibration is an important stage because it effects model accuracy, directly. For this reason, different methods have been created to calibrate simulation model. In this study, exploratory factor analysis method, which is a new approach, was used in calibration stage and promising results were obtained in Istanbul Sancaktepe District which has rapidly grown for last years.

KEY WORDS: GIS, Land Cover Change, Cellular Automata, Urban Growth, Exploratory Factor Analysis

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SIMULATING LAND COVER CHANGE BY PROTECTED AND NON-PROTECTED SCENARIOS

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ABSTRACT:

Population growth and rapid urbanization cause land cover change and determination of their impact is compulsory in terms of sustainable urban management policies. Therefore, simulation models have been densely used in planning studies. Cellular automata-based simulation models present significant contribution for monitoring land cover change analysis's and determining the urbanization effects on natural areas, in rapid growing cities. The main goal of this study is to predict urban growth and determine the probable land cover change according to protected and non-protected scenarios in Istanbul Sancaktepe district which has an enormous population growth in last years. The required historical land cover data for the model were generated from cadastral maps which have been generated since 1950s. For this purpose, change detection analysis was first made between 1961-2014 and weight coefficients were calculated to create simulation model by protected scenarios for 2050. In order to detect the damages of uncontrolled urbanization, the second simulation model was created by non-protected scenario. According to first scenario, approximately 4% of forest area will be probably transformed into settlement and agricultural area by 2050. However, if the necessary precautions are not taken, namely uncontrolled urban growth occurs, this rate will be dramatically high.

KEY WORDS: GIS, Change Detection, Land Cover Change, Cellular Automata, Urban Growth

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NECESSITY AND CONTENTS OF GEOGRAPHIC INFORMATION SYSTEMS PROGRAMS IN VOCATIONAL COLLEGES

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ABSTRACT:

To make every decision taken in terms of public administration (investment, education, strategy, ...) is accurate and sustainable, time and space-related data must be collected and processed. Developed countries have applied this method as GIS (Geographical Information System) since 1950. Such practices were implemented also in our country, in 1995 in some municipalities in the Marmara region in a simple way. Over time, an institutional structure was needed to make sure that decisions that would be taken nationwide would be successful. GIS General Directorate was established in 2011 for this purpose. The main purpose of the institution is to contribute to sustainable and planned development by providing reliable data to all relevant investor institutions and organizations. To achieve success, a trained technical worker for this purpose is required. To fulfil the need, programs have opened under the name of Geographic Information Systems Technology in the associate degree sections of universities. In this paper, a study about the courses and contents that should be taught in these programs will be presented.

KEY WORDS: Associate Degree, Geographic Information System, Spatial Query, GIS Course Content

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COMPARISON OF RGB AND NIR IMAGES FOR 3D CULTURAL HERITAGE DOCUMENTATION

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ABSTRACT:

Documentation, monitoring and preserving of historical monuments require reliable, cost-effective and accurate three dimensional (3D) object models. Close-range photogrammetry became very popular and useful technique for 3D object modelling applications due to recent developments in the field of photogrammetry. In this study, 3D model of Otag-i Humayun (Hünkar Kasrı) located in Davutpaşa, Istanbul-Turkey has been created using Structure-from Motion (SfM) method. Currently, the structure within the Yildiz Technical University, Davutpasa Campus was built by Grand Vizier Koca Davut Pasha in 1483. At that time, location of the Otag-i Humayun was on the caravan road (Via Egnita) connecting Istanbul to Edirne. Otag-i Humayun was demolished and rebuilt during the reign of Sultan Süleyman the Magnificent. In this study, besides RGB images, NIR images have also been used for cultural heritage documentation purpose in the case study of Otagi Humayun. NIR and RGB images of monument have been taken separately to create 3D facade model. Thus, the effect of NIR and RGB images to obtain accurate point cloud has been investigated. All images have been taken in the same day. Therefore they has the same illumination change effect. Statistical Outlier Removal filter has been employed for both point cloud data. The obtained results have been compared with terrestrial laser scanner (TLS) data. Open source CloudCompare software has been used for comparison. 3D façade model of the Otag-i Humayun has been generated using SfM method. RGB images and NIR images of the structure were taken by a Canon EOS 600d digital camera with 18 megapixel resolution and a NIR camera with 12 megapixel resolution, respectively. The control points have been obtained from TLS. According to obtained results, NIR images allowed to create more accurate point cloud data rather than RGB images.

KEY WORDS: Cultural Heritage, Historical Buildings, Point Cloud, SfM, 3D Reconstruction

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AZERWIS A WEB BASED GEOGRAPHIC WATER INFORMATION SYSTEM FOR AZERBAIJAN

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ABSTRACT:

The floods along the Kura-Araz river system in 2010 emphasized the necessity for an information system enabling a quick response to the dynamics of the water system. Next to this disaster the growing demand for fresh water for cities like Baku and the (re) development of the agricultural sector raised the necessity for a good overview of the status of the water system for Azerbaijan. Due to the difficult times in the past detailed information on the natural system is highly scattered and in some cases outdated. Therefore an extensive data collection program for water and water related data was conducted late 2014 covering all domains of importance for Azerbaijan, i.e. ground water, surface water and irrigation, both quality and quantity aspects. The survey was part of a project called Water Resources Inventory of the Republic of Azerbaijan. The aim of the project is to prepare an inventory of water resources and water demand and to present an analysis of the development of resources and demand under different scenarios and management strategies. The current, first stage of the project focuses on data collection and storage in an information system, field work, preparation of monitoring plans, hydrological modelling of surface water, demand analysis and an initial water resources analysis focusing on surface water. A second stage was foreseen, including drilling of exploration boreholes, groundwater modelling coupled with surface water modelling and a water resources analysis including both groundwater and surface water resources and use. However this second stage has not been conducted upon this day.

Phase 1 of this project mainly focussed on making archives accessible (in a modern GIS based data platform) to gain better understanding of the historical data for the domain surface water as well as gaining knowledge about that status of the irrigation system and groundwater reserves of Azerbaijan. Several extensive field campaigns were organised to acquire new as well as historical data. Hydrological yearbooks from 1971 – 2015 where converted into a more robust data structure in order to be used in hydrological analysis. These data where georeferenced and made available via a web portal called AzerWIS Azerbaijan Water Information System). Ground water quality and ground water suitability maps from geological surveys were compiled and made accessible via the AzerWIS. The data was completed by data from the surveys carried out to gain insight in the status of the irrigation works. This 'classic' approach was enriched by analysis from satellite imagery via Google Earth Engine, GeoEye, Landsat series. The Google Earth Engine platform allows analysis on all publically available data from NASA and ESA satellites (and more). For 2 lakes (Mingachevir reservoir and Shamkir) data is extracted from Landsat 8 imagery over the period 2000-2016. The algorithm used yields the maximum bank full situation per year for the lakes under investigation. The corresponding outlines have been stored in a geodatabase which is exposed as OGC-WMS (OpenGeospatial Consortium Web Mapping Service) service to the AzerWIS visualising the trend (animated bank full situation) of these lakes to end users.

AzerWIS is a complete geographical data management system based on open source components and highly modular. AzerWIS consists of at least 3 layers of functionality and can be easily extended with, as in this case was done, a hydrological times series data management system called Delft-FEWS (Forecast Early Warning System). This management system is used in a variety of projects and makes it possible to operate models in an operational mode to carry out Forecasts that are part of Early warning systems. The basis of Delft-FEWS in non-forecast mode can be a database with historical data as used for this project to enable easy data analysis. Delft-FEWS is one of the modules of AzerWIS. The other modules are a geographical web based interface, a geodatabase and several services to enable data flows via OGC services which are used to either visualise geographic data as well as extract data from the database for the numerous locations where time series data is available for to present these via time series plots. The OGC services are also used to make data exchange much easier for end users for modern GIS systems are all capable of using these services.

The web interface is highly configurable and flexible in terms of configuration of the look and feel, but also with respect to possible extensions. The web interface has a framework capable of accessing so called OGC-WPS (OpenGeospatial Consortium Web Processing Services). This innovative solution enables easy addition of custom functions on data made available within a project. Examples are access to time series of data via a clear web interface and profiles or 3D functions on the data of the Water Resources Inventory of Azerbaijan.

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Phase 2 of the project would further focus on the (re)construction of an operational monitoring system for water quantity and quality, including groundwater, surface water and drainage systems. This data should then be available via telemetry and being available in near real time mode for operational use in dashboards for operators and as time series via a web portal. With an extended comprehensive AzerWIS system which links the interdependencies between groundwater, surface water and climate this platform would be an essential tool in the future strategic development of agriculture plans as well as assess the future potable water demand and flood safety for all governmental bodies in Azerbaijan. The modular setup of AzerWIS and the use of OGC services throughout the complete architecture makes the AzerWIS a useful source for geographic and time series information on the status of the hydrological system of the Republic of Azerbaijan.

KEY WORDS: AzerWIS, OGC services, Hydrological Yearbooks, Historical data, Google Earth Engine, FEWS, Flood, Geohydrologicy, Irrigation, Natural System, Forecast Early Warning System, Landsat, Survey

INVESTIGATION OF USING THE RADAR SATELLITE IMAGES TECTONIC MOVEMENTS IN THE EASTERN PART OF GEDIZ GRABEN; FIRST RESULTS

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ABSTRACT:

Presently, pre-determination and monitoring of natural disasters is very important. Scientists have been working extensively on researching and identifying natural disasters such as earthquakes, landslides and volcanoes using space radar images. The PSI technique has been used in recent years to determine the deformations caused by earthquake, the displacements in the volcanic areas and the collapses in the hydrological, geological, mining or urban areas. In this study, it is aimed to determine the deformation of the region between Alaşehir and Sarıgöl in the eastern part of Gediz Graben using the PSI method. TERRASAR-X satellite radar images 153 numbered 2013-2015 for the study area were evaluated using STAMPS software. According to the results obtained from the PSI results, it is understood that in Gediz Graben, collapses are observed in the part where the graben is located, and in the north and south part of the graben are elevations in the graben.

KEY WORDS: Gediz Graben, InSAR, PSI, Tectonic Movement

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ANALYSIS OF SHORELINE WITH DIFFERENT INDEX METHODS USING MULTI-SPECTRAL AND MULTI-RESOLUTION DATA SET

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ABSTRACT:

The mapping of the coastline is important for coastal resource management, sustainable coastal development, coastal tourism and safe navigation. Especially in recent years the correct mapping of the shoreline has become more important for touristic purposes due to increased coastal tourism in Turkey. Monitoring of the large coastal areas with remotely sensed images is an ideal analysis method due to identification capacity in a faster and less costly way. In this research, the Akyaka district of Mugla province, which has different coastal characteristics, has been determined as the study area. The wetlands with different characteristics, the shoreline areas and the island areas have been determined by different methods in the region. Moreover, the effects of spatial resolution on shoreline detection was also investigated in this study. The freely available Landsat 8 OLI satellite image with 30 m. spatial resolution and acquired on April 17, 2016, Sentinel 2 MSI satellite image with 10 m spatial resolution and acquired on April 5, 2016 and high resolution SPOT 6-7 satellite image that acquired on April, 2016 were used for that purposes. All images have been converted the same coordinate system to compare shoreline detection from different satellite images. Coastal areas with different characteristics are subsetted from the satellite images. Object and pixel-based classification methods in addition to spectral indices were used to determine the shoreline. Shoreline detection efficiency of satellite images with different spatial resolution was investigated by accuracy assessment of the results. Additionally, the effects of the red-edge band in the Sentinel 2A data for shoreline detection was discussed. It has been suggested that multi-spectral and multi-resolution data can be used in different coastal areas for determining the shoreline.

KEY WORDS: Shoreline, Sentinel 2A, Landsat 8 OLI, multi-spectral, multi- resolution

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A SPECIAL MAP BASE OF THE MILITARY GEOGRAPHIC INFORMATION SYSTEM

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ABSTRACT:

Since the early days of geographical information systems (GIS), it has been widely used in civilian areas for extensive technical capabilities. Despite very similar links between each other, in the article explored the various aspects of the GIS and the geospatial database (GDB), which represents electronic spatial information about economic sectors. At the same time, in the article also indicated the necessity and feasibility of establishing a GIS for military purposes. When establishing a GIS for military purposes, it is necessary to take into account that it is necessary to enrich the topographic database (TDB), with the materials of special maps and aerospace photo documents that are widely used in the troops. In comparison with other civilian variants in GIS for military purposes, it is necessary to establish an additional functional bloc, called - "Special subbase map". This article is devoted to this particular problem.

KEY WORDS: Military geographic information system, geospatial data base, topographic data base, spacial sub-base map, spacial maps

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ADVANTAGES OF REMOTE SENSING AND GIS ON THE ASSESSMENT OF URBAN DENDROFLORA

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ABSTRACT:

The development of urban areas is related to the construction of its territory, i.e. planning. One of the parts of planning consists environmental issue.

Urban construction is increasingly focusing on the environment, especially, distribution of green spaces. Urban parks are the important indicator of green spaces. Green spaces play an important role in the urban ecosystem, they provide to improve quality and health of the resident's life in the cities. Greening is the most effective way to improve the urban environment, and one of the key condition for health and recreation of the urban population. In this regard, a study of dendroflora which plays a major role in urban greenery, and determination of its species composition is of particular importance.

According to the information and based on GIS technologies in this article discusses the accessibility of the study area using traditional (visual) and remote sensing methods.

Remote sensing is a process that serves to get information about the object being explored and the main distinctive feature is that information about objects, processes and so on is obtained without direct contact with the object being investigated. Remote sensing as an integral part of the GIS analyzes satellite observation data (digital images) from the Earth's surface together with the data obtained from other sources and achieves optimal results. GIS can serve an important role in the monitoring of climate change, forest degradation, as well as assessing the other impacts of climate change on the natural environment.

The main advantages of GIS technology and terrestrial space imagery are the ability to regularly update digital cartographic materials and semantic databases, to model different land development variants.

Another advantage of GIS is obtaining information about the objects, and visualization of various cartographic objects, thematic maps and plans.

Recently, great attention is paid to 3D technologies used in GIS. The 3D model gives a wider and more imaginative view about urban green space areas than the usual map.

KEY WORDS: GIS, remote sensing, urban green spaces, dendroflora, satellite observation

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GIS SUPPORT FOR RESEARCH ON AESTHETIC VALUE OF NATURAL LANDSCAPES

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ABSTRACT:

Various methods of assessing the aesthetic value of the landscape is currently actively used in the field of recreational activities. It may be the development of tourist routes, the design of tourist infrastructure, etc. The use of GIS opens up extensive opportunities for research in this area. It can be used to provide tools for the data collection, data analysis for assessing the aesthetic properties of landscapes and visualization of the results. The aim of the research is to develop a concept and description of the main functions of the GIS project, designed to assess the aesthetic value of natural landscapes. As a result of the analysis of existing works, 3 approaches to the assessment of the aesthetic value of landscape parameters are revealed:

1. The assessment is carried out automatically by a certain algorithm,

2. The assessment is conducted visually by the researcher: on the ground, or indirectly (by photography, virtual model, etc.),

3. The assessment is carried out using the data of opinion polls.

GIS support of the research on this subject involves function of geospatial analysis and program evaluation of aesthetic value of landscape parameters, analysis of evaluative expert opinions, calculation and visualization of the integral assessment of the aesthetic value of the landscape for the given points. The novelty of the developed GIS project is in its universality, i.e. in the possibility to choose the parameters for assessment and adaptation of evaluation algorithms for different methods or their combinations.

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KEY WORDS: GIS support, aesthetic value, natural landscape.

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OBJECT-BASED CROP TYPE IDENTIFICATION USING MULTI-TEMPORAL SATELLITE IMAGERY

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ABSTRACT:

Crop type identification on specific parcels and the assessment of soil management practices are important issues in agricultural management. Traditional pixel-based analysis techniques of remotely sensed data results in inaccurate identification of some crops due to pixel heterogeneity, mixed pixels, spectral similarity, and crop pattern variability. These problem can be overcome using object-based image analysis (OBIA) techniques and multi-temporal imagery. OBIA incorporate spectral, textural and semantic features of image objects. In this research, we combined OBIA and Random Forest (RF) algorithms to develop a methodology for identification of crop types using multi-temporal Azersky satellite imagery in study area.

KEY WORDS: Image classification, Object-based image analysis, Random Forest, Crop type identification

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DEVELOPING A GENETIC ALGORITHM FOR SOLVING SHORTEST PATH PROBLEM IN RASTER NETWORK

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ABSTRACT:

The shortest path problem is widely applied in transportation, communication and computer networks. It addresses the challenges of determining a path with minimum distance, time or cost from a source to the destination. In all researches, a connected graph that contains nodes and edges is assumed as vector network and the process of finding shortest path is performed on this graph. Most of the Algorithms for finding shortest path between two points are performed based on vector network. Genetic Algorithm is a kind of Algorithm that has a lot of efficiency and it can be used for solving many kinds of problems. One of these problems is solving shortest path problem in raster network that other Algorithms are inefficient for this problem. This paper introduces a novel Genetic Algorithm (GA) approach to solve the shortest path problem in raster network. A raster network is assumed as a basic network then a few pre-processes are performed on this network. All parameters of Genetic Algorithm will be defined based on the problem. In order to evaluate the proposed algorithm, a raster map as an urban road map is selected. In all case studies, the algorithm was successful in determining the shortest path. The details of the experimental results are discussed and presented in the paper.

KEY WORDS: Raster Network, Genetic Algorithm, Shortest path problem, Mutation, Crossover

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THE MOUNTAINOUS TERRAIN DIGITAL ELEVATION MODEL MAKING BY GIS USING

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ABSTRACT:

The various types of electron-optical supervisory control systems (SCS) have been used in Armed Forces of many advanced countries. The mission of these SCS is to supervise day and night enemy troops, technics and weapon systems, frontier intruders with high precision a great and middle distance. The SCS optimal deployment in mountainous terrain makes possibility to use rationally SCS number, because SCS has very much costs. Using the rationally SCS number we can reduce a necessity of the specialist number. Also, it accelerates comander's correct decision making. In paper the topographic map of selected terrain of Azerbaijan Republic with area of 6 km2 on a scale of 1 to 50 000 has been used for investigation by GIS using. The lowest heght of this terrain is 920 m, the highest point has 1710 m. The ArcGIS and Global Mapper softwear of ESRI company have been used for the horizontal lines digitization, the grid model of investigated terrain construction and the elevation map making. The mathematical model of the rationally deployment of technical observing systems in mountainous terrain has been developed and offered. The determination method of visibility level between selected terrain points has been developed.

KEY WORDS: GIS, Mountainous Terrain, Grid Model, Elevation Map, Supervisory Control Systems

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ASSESMENT OF SETTLEMENT SUITABILITY ANALYSIS FOR URBAN AREA: THE CASE OF IGDIR PROVINCE

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ABSTRACT:

Official records indicate that when the population density of the rural settlement is compared to that of the urban areas, rural areas prove to be more populated 50 years ago. due to the increasing migration from rural areas to urban areas in the course of time, population density has increased in urban settlements. As a result, the ratio of urban population to rural population has increased to over 50% in the last 10 years. According to scientific researches, it is stated that this ratio will increase to 60% in 2050s. The increasing population density in cities inevitably leads to the increase in the construction productivity, exceeding the land carry capacity of the urban settlements and destruction of urban ecology. At the same time, pressure of population upsurge affects expansion direction of cities. The study area, city centre of Igdir province, geographically lies between 39°56'33"N & 39°53'29"N latitudes and 44°5'14"E & 44°0'58"E longitudes. In this study, land use maps, slope index maps, topographic maps, aspect maps, proximity to water bodies maps and geological maps were digitized by using Arc-GIS software to settlement suitability analysis. By the use of suitability analyses results, the potential settlement area and existing settlements were compared and evaluated between each other. Study reveals that current 38% of built-up land and settlement in Igdir province is unsuitable for settlement; in addition, results of this study will be a good guidance to Municipal Corporation for urban expansion.

KEY WORDS: Arc-GIS, Settlement Suitability, Potential Settlement

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3D OBJECT RECOGNITION WITH KEYPOINT BASED ALGORITHMS

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ABSTRACT:

Object recognition is important in many practical applications of computer vision. Traditional 2D methods are negatively affected by illumination, shadowing and viewpoint. 3D methods have the potential to solve these problems, because 3D models include geometric properties of the objects. In this paper, 3D local feature based algorithms were used for 3D object recognition. The local feature was keypoint. This study aimed to research facilities of keypoints for 3D object recognition. Keypoint is feature of object that is detected by detector algorithms according to certain mathematical base. A recognition system was designed. For this purpose, a database that includes 3D model of objects was created. The algorithms were improved in MATLAB. The keypoints on the 3D models were detected using keypoint detectors. These keypoints were described by keypoints descriptors. The descriptor algorithms detect geometrical relation between each point of point cloud and create a histogram. In the third step, the keypoints in different point clouds are matched using the feature histograms obtained. Statistical methods are used to compare generated histograms. Thus, the two closest similar points between the different point clouds are matched. It is expected that the models with the most corresponding points belong to the same object. Euclidean distance between corresponding keypoints in the two point cloud is calculated. It has been accepted that the points are shorter than 10 mm. The positional accuracy of the matched points has been examined. Iterative Closest Point (ICP) was applied to the matching point clouds for this purpose. As a result, the graphics were generated that showed correct matching ratio and root mean square error. As a result, there are different approaches about 3D object recognition in literature. This study aimed to compare different keypoint detector and descriptor algorithms. Instrinsic Shape Signature (ISS) and Local Surface Patches (LSP) are keypoint detector algorithms. Point Feature Histogram (PFH) and Fast Point Feature Histogram (FPFH) are keypoint descriptor algorithms. It is expected that ISS-PFH combination has better performance than ISS-FPFH, LSP-PFH and LSP-FPFH combinations. The results of this study will provide guidance for future studies.

KEY WORDS: 3D model, Recognition, Local Feature, Object

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DSM PRODUCTION WITH THIN PLATE SPLINE ALGORITHM AND ACCURACY ANALYSIS

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ABSTRACT:

The Digital Surface Model (DSM) is a three-dimensional representation of all objects on the surface. DSM is produced by different methods, the most popular production method is aerial photogrammetry. Models produced by this method are widely used in many areas such as topographic map production, land use planning, archaeological studies, basin analysis, energy transmission line control and so on. Today, Unmanned Aerial Vehicles (UAVs) have started to be widely used for DSM production by photogrammetric method. Image matching is a popular subject in image processing and computer vision. In this study, image matching algorithm was examined to evaluate their performance. Thin Plate Splines algorithm which is though to give better results was tested in order to create a three dimensional digital surface model with the images obtained through UAV. TPS and photogrammetric software were compared in the paper. DSM was produced with both TPS and photogrammetric software. In both methods, the 3D coordinates of the ground control points was calculated. The ground control point coordinates was compared. This study aims to provide a fast, distortion-free and high-precision algorithm that can be used for image matching with TPS algorithm. Thus, it is aimed to shorten the processing time of the data collected in mapping works with the UAV and to increase the sensitivity.

KEY WORDS: Digital Surface Model, Thin Plate Spline, UAV, Image matching, Photogrammetry

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VISUAL ANALYSIS OF HUMAN MIGRATION ACTIVITIES TO EUROPE USING GIS

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ABSTRACT:

Migration means moving from one area to another permanently or temporarily. Migration is not only exclusive to humans but some animals migrate depending on climatic factors as well. Although it has different means for different eras, today, the human migration phenomenon caused by economic, social, political or environmental reasons, as wars and natural disasters. In addition to these reasons, in general, there are some driving factors catalyzing the migration periods, as security problems, high crime rates, crops fail especially in rural areas, floods, poverty, and wars.

European countries have always been favored by immigrants because they provide high standards of living to citizens. During last decade, as a result of the changing political conditions in middle eastern and some Arabic countries the, Western European Countries have received significant illegal immigration and during these movement Turkey was also affected as transit or destination country of migration. Therefore, the state of migration activities became more important and illegal migration monitoring has had a critical role for states political activities. Geographic Information System (GIS) technology can be considered as a powerful tool for monitoring and the analyzing the migration activities since the overall process based on spatial characteristics.

The aim of this study is to provide a multidimensional examination of migrations to Europe and the routes used for migration using GIS technology. The migration data published by Frontex and IOM (International Organization for Migration) and geometric data of world counties and migration routes were used as the input data of established GIS. Each migration route used to arrive at Europe were analyzed based on the spatial characteristics of the movement and driving forces of the migrations. Results of the study were presented as GIS maps in the paper.

KEY WORDS: Migration, GIS, Visual Analysis

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DEVELOPMENT OF SUITABLE CRITERIA FOR URBAN PLANNING IN HILLY AREA OF NEPAL

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ABSTRACT:

Identifying suitable criteria for urban development is one of the critical issues of urban planning in hilly areas of Nepal. The study illustrates the use of GIS suitability criteria for selection of suitable areas for urban development in hilly areas of Nepal. The main objectives of this research is to develop the suitable criteria for urban planning in hilly areas of Nepal. For this purpose panchromatic and multispectral satellite image data were used to generate for land use land cover map using digitalization and visual interpretation method in ArcGIS software. The five parameters and suitability criterions as geology, elevation, slope, aspect, and Land Use Land Cover (LULC) were used for urban development. The eight categories of LULC used were Agriculture, Commercial, Forest, Industrial, Public Use, Residential, Road and Water Bodies. The data files comprised the various parameters like geology, elevation, slope, aspect, and land use land cover parameters used for suitable criteria for urban planning. A rule base was developed by using multiple-criteria on the basis of research knowledge for land use planning. The ArcGIS 10.2 software was used for GIS analysis. The process for identifying the suitable areas map begins with ensuring all data are in the appropriate raster format. The polygon shapefile such as geology buffer, forest area buffer, drainage/water bodies' buffer, residential area buffer, commercial area buffer, industrial area buffer and road area buffer should be converted from vector to raster using Feature to raster tool. A slope raster was created with the elevation raster using spatial analyst tool. All raster files were reclassified using reclassify tool. The appropriate distance values were binned into four classes based and favourability values were assigned. All criterions were assigned to correct favourability classes, which is as: 1= not suitable, 2= least suitable, 3= moderately suitable and 4= highly suitable. Urban growth and land use study is very useful in local government as well as in urban planners for the appropriate plans of land use planning in sustainable urban development. Urban development provides the knowledge for the planners and decision makers, the required information about the current state of development and the nature of changes that have occurred, physical conditions, public service accessibility, economic opportunities, local market, population growth, and government plans and policies are the driving forces of planning process. GIS and Remote Sensing provides spatial analysis tools which can be applied at the municipality, city and district level urban development planning.

KEY WORDS: Site Suitability, Land Use Land Cover, GIS, Suitability Criteria, Urban Planning

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A MULTI-OBJECTIVE DECISION MAKING APPROACH FOR REHABILITATION OF DEGRADED RANGELAND WITH ORDERED WEIGHTED AVERAGING METHOD

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ABSTRACT:

Rangelands consisting of native vegetation, play a crucial role in livestock feed, carbon sequestration, environmental function, water balancing and etc. Nonetheless, many rangelands are degraded due to grazing intensity, removal of vegetation for fuel and for authorizing of rangeland ownership as well as climatic and anthropogenic effects that resulted in shift of species composition, loss of range biodiversity, reduction in biomass production, lowering ruminant productivity, reducing plant canopy cover and consequently soil erosion. This phenomenon leads to food insecurity, poverty to the extent of food aid, expansion of aridity and the need for alternative livelihood and income diversification. Therefore, we need to improve rehabilitation of rangeland to avoid these incongruous consequences. Multi-objective decision making is common tool for environmental management. In this research a compromise solution to the multi-objective approaches of rangeland rehabilitation under conditions of conflicting objectives with GIS-based Ordered Weighted Averaging (OWA) method as a relatively new Multi-Criteria Evaluation (MCE) method, is investigated based on several criteria to define the decision sets including furrowing and seedling. In OWA method, both criteria weights and order weights are considered. In this regard, calculation of order weights based on Orness, and construction method of comparison matrix for criteria weights based on analytical hierarchy program (AHP), are done. Finally, the proposed suitable area for each of objectives are depicted and characteristics of each criterion for proposed area are extracted and compared. Some advices are proposed for the rehabilitation of the study area after comparing different scenarios of decision making.

KEY WORDS: Rangeland restoration, Decision making, OWA, Multi-objective decision making, Gandoman

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WEB GIS FOR PUBLIC PARTICIPATION IN URBAN REGENERATION

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ABSTRACT:

Cities are constantly changing depending on factors such as population growth, disasters, migrations and economic fluctuations. In addition, due to the rapidly increasing urban population, uncontrolled and unplanned urbanization, a regeneration or transformation is needed to improve both the physical infrastructure as well as the social, environmental and economic context. Most of the urban regeneration projects are managed through a top-down procedure, in which the powerful hold the decision making process. Amongst the key stakeholders, citizens living in the neighbourhood of the regeneration project -who are going to be affected the most- are usually the least powerful; hence, their experience and comments are overlooked. On the other hand, research evidence suggests that the participation of citizens in the planning and decisionmaking processes in an urban regeneration project is necessary to build sustainable cities. Recent studies; therefore, focus on increasing public participation in urban regeneration projects. Various methods, including on-street events, polls or web based tools are used to collect information from citizens so that they could have their fair share of say. Geographical Information Systems play a key role in this context, especially regarding web based participation, since any urban regeneration project is indeed a spatial event. Most of the existing studies; however, tend to ignore the spatial aspect of an urban regeneration project, since it is not ideal for anyone to have an idea in any urban regeneration project. Likewise, coherent integration of the different and often conflicting views of different stakeholders including legal bodies, private sector and citizens in an urban regeneration project have yet to be achieved. This paper outlines the conceptual model regarding how public participation could be achieved in a meaningful and effective way in an urban regeneration project. A web based framework is proposed in which different stakeholders have different views, all of which are determined through a relational database design by utilising PostgreSQL and by relying on open OGC standards such as Web Map Service (WMS) or Web Feature Service (WFS).

KEY WORDS: Urban regeneration, web GIS, public participation

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EMERGENCE OF PRECISION AGRICULTURE IN AZERBAIJAN

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ABSTRACT:

Precision agriculture has been practiced in many countries around the world in the last decade and has proved to be an effective and efficient system. However, in Azerbaijan the concept is still new and largely unexplored. Precision agriculture refers farm management based on modern technologies to optimise all the processes of the agricultural life cycle, ultimately reducing production costs, environmental pollution and increasing harvest. The aim of this experimental study was to apply precision agriculture principles in a pilot test site and to use various modern technologies such as remotely sensed imagery from satellites and Unmanned Aerial Vehicles (UAV) which allow to monitor the health of the crops; soil testing for sustainable management and Global Navigational Satellite Systems (GNSS) to drive agricultural machinery in straight lines thus saving on seeds, fuel, pesticides and increasing crop production. For this purpose, the soil samples were collected from the test site for chemical analyses. Thereafter, soil properties were modelled and mapped based on multi-spectral data obtained by UAV. Further focus was given to find relationships between soil properties and satellite imagery data. All the data were collected and stored in an agricultural Geographic Information System (GIS), which effectively serves as a farm management system. The data including thematic maps, soil property maps, remotely sensed imagery and crop yields, is stored as layers in the GIS and can be examined by a farmer anywhere including in the field on a tablet, thus allowing them to make correct decisions based on the latest data.

KEY WORDS: Precision Agriculture, UAV, NDVI, Machine Guidance, Variable Rate Technology.

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URBAN RENEWAL WORK AS AN ALTERNATIVE SOLUTION TO THE PROBLEMS OF THE CADASTRE OF TURKEY

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ABSTRACT:

Cities which are living organisms living with the communities on them has changed and shaped depending on the factors such as anticipation of demographic structure, migration, industrialization and disaster. Healthy and sustainable change in urban life depends on the development planning and application process based on cadastral data, which is a large scale of spatial information systems. Recently in Turkey the creation of quality content has been aimed and successful projects have been produced by urban renewal work.

Since property cadastre work hasn't been completed yet in Turkey land registry and cadastral data are in short of presenting actuality. Nowadays, urban renewal applications as an effective tool in planned urbanization will provide solutions to current cadastre problems while updating the title and cadastral archives.

In this study, the reason why urban renewal work in Turkish Cadastre which is in the process of becoming information society will be put forth and it will be emphasised that urban renewal applications should be considered as an opportunity to solve the existing problems.

KEY WORDS: Problems of Turkey Cadastre, Cadastral Updating, Urban Renewal.

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APPLYING AN OBJECT-BASED CLASSIFICATION APPROCH THROUGH A CELLULAR AUTOMARA-MARKOV METHOD IN LAND-COVER/LAND-USE CHANGE DETECTION PROCEDURE, "CASE OF THE URMIA LAKE"

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ABSTRACT:

The main aim of the present research was to reveal changes on Land-Cover/Land-Use Changes (LC/LUC) patterns in the in the northern coast of the Urmia Lake by applying an object-based image analysis (OBIA) process. Accordingly, in the image process procedures stage, spatial changes on the Urmia Lake surfaces were carefully acquired from the Landsat imageries, since 1987 to 2016. Then, in the second stage, LC/LUC change patterns have been precisely delineated, for the southern hillsides of the Misho Mountain. The resulting models showed an overall accuracy of nearly about 92.54% and a Kappa coefficient of 91% in the image classification procedures. In the final stage, by introducing a Cellular Automata-Markov (CA-Markov) method and setting a transition matrix, the spatial changes on the LC/LUC patterns have been progressively simulated for the approaching years till year 2020 inside the study area.

The final models illustrate a meaningful significant decrease in the Urmia Lake surface, accompanying by certain water volumes diminishing tendency, highlighting the fact that the amount of salty lands are meaningfully increasing. This harmful inclination has successively causes a critical diminishing on the vegetation's types by emerging the most recent changes on LC/LUC types accompanying by a critical hyper-saline condition mainly around the coastal parts of the Urmia Lake. Implementations of the current significant changes strongly pointing up that the majority of local biotic and abiotic components are in imitate dangers with serious environmental negative observations. Such rapidly occurring revolutionized changes on LC/LUC will impose various critical effects on the existing in danger ecosystems and vulnerable climatic subsystems in immediate prospect.

KEY WORDS: Urmia Lake, Landuse Changes, Object-Based Approach, CA-Markov Method

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OBJECT-BASED WATER BODIES EXTRACTION METHOD BY PROCESSING OF SENTINEL SATELLITE IMAGERY

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ABSTRACT:

Satellite imageries are increasingly being processed to map landcover/landuse at local, regional, and global scales. More impotently, monitoring of open water bodies accurately is a main and essential application in remote sensing, as this issue is significant for monitoring the environment, ecosystems, climate and other applications. In this paper, Sentinel-2 spectral bands with different resolutions, including visible spectrum and Near-Infra-Red (NIR) bands in 10 m and Short-Wavelength InfraRed (SWIR) bands in 20 m, were processed to extract surface water information of Baku, the capital city of Azerbaijan. Extracting of urban surface water bodies from Landsat satellite images with NDWI index cannot separate other objects that have a low albedo, such as shadows. Consequently, in current research, we applied combined pixel-based and object-based methods on Sentinel-2 satellite images by introducing of multi-resolution segmentation and threshold classification methods inside of the eCognition software. The final accuracy assessment results show that, among many of classification algorithms, Normalized Difference Water Index (NDWI) and Modified NDWI (MNDWI) are more suitable for enhancing and extracting of water bodies. In addition, these methods suppress built-up features more efficiently than traditional approaches; demonstrating seasonal and yearly persuaded fluctuations on the water surfaces around or inside the Baku Metropolitan. Moreover, this method successively could show diminishing of shorelines and changing on the landcover and landuse types by depletion or even restoration of wetlands, as implementations of a modern remote sensing technology. Distinctively an object-based approach provides a new avenue to the classification of remotely sensed imagery and has demonstrated its advantages over the pixel-based approach in various remote sensing studies.

KEY WORDS: Baku City, Object-based Classification Indices, Water Body Extraction Process, Sentinel-2 Images

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VISUALIZIN OF WIDESPREAD SEVERE THUNDERSTORM EVENTS APPLYING A CLIMATOLOGICALL – GIS ORIENTED APPROCH

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ABSTRACT:

The main purpose of the current research was visualizing the major concurrent and widespread severe thunderstorms events (STE) inside the Greater Sydney Metropolitan Area (GSMA), observed from 1998 to 2016. The most important STE producing hails, rains, winds and tornados were intuitively selected to characterize their spatial distribution, based on a few criterion applied to the main database. Accordingly, first STE were derived from the severe storm archive of the Australian Bauera of Meteorology. Then, other relevant data-sets such as: Lightning Imaging Sensor (LIS), the Tropical Rainfall Measuring Mission (TRMM) satellites and Australian Gridded Daily Rainfall data were exclusively referenced to the STE to determine their concurrent spatial distributions. Accurately 246 events, observed in 33 days, have been differentiated in three dissimilar single, paired and multi-STE types throughout the study area. To acquire spatial distribution patterns a climatologically-GIS oriented was intently applied in the observing, examining, integrating and mapping procedure of the main database for averages and every single individual widespread STE inside the GSMA.

Initial analysis on the STE frequency shows that damaging hail events (more than 2 cm) with 49 percent have the highest chance of occurrence in the region followed by flash flooding rains (with 28 %), destructive speedy winds (19 %) and hazardous tornadoes (3.7 %) respectively. The outcome models demonstrate three main spatial patterns inside GSMA, indicating Sydney Metropolitan, coastal area and topographic effects. These patterns may expose the interplay of a strong effect of Tasman Sea, dense urban areas (particularly inner Sydney and CBD areas) and a wide-ranging topographic effects in controlling of the wide-extend STE in more than 80 percent of observations. In addition, the development of severe storms suggested that there are at least four different synoptic weather types mainly: low pressures, east coast lows, easterly throughs and cold frontal systems which likely cause (or initiate) such widespread STE activates over the study area. The concluding outcomes might well highlight the concurrent influence of synoptic weather systems and regional topographic parameters, as major controlling mechanisms in the developing and initiating of severe thunderstorms in the region. In reality, such storms have catastrophic and significant expensively impacts upon the natural environment and social community in the region, specifically upon the Sydney Metropolitan's highly populated areas in the current climate change circumstances.

KEY WORDS: Concurrent Widespread STE, GSMA, Spatial Distribution, Synoptic Weather Patterns

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ASSESSMENT OF FOREST COVER CHANGES BY APPLYING OBJECT-OREINTED PRECEDURES INSIDE THE KARABAGH OCCUPIED REGIONS

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ABSTRACT:

Occupation of neighbour countries lands not only could cause grieving socio-trajectories and human disaster but also significant changes on Land-Cover/Land-Use (LC/LUC) patterns, especially pasture and forest stands. This study aimed to provide forest-cover changes with the highest accuracy inside the Azerbyazan occupied lands after the Nagorno-Karabakh conflict. In the meantime, woodlands monitoring requires more advance analyses regarding the remote sensing technology structures and complexity; other than more trustworthy and inexpensive image processing methods which are nowadays accessible to researchers community. Hence, multi-temporal Landsat imageries were purposely provided from 1987 to 2017 (with 5 years interval) that consist of Landsat 5, Landsat 7 and Landsat 8 series. Subsequently, a fuzzy object-oriented process, including other reliable image processing procedures such as dissimilar types of vegetation indexes have been respectively applied in the forest change assessment inside recent eCognition software along with a Markov Chain Model (CA-Markov).

The commence results illustrate that land occupation undertaking can have substantial unconstructive impacts on the forestcover prototypes, particularly this downbeat action could cause major changes in woodland stands even distant from the actual battlegrounds. In addition, armed conflicts appear to be a foundation in the transition of the LC/LUC system into discarded circumstances, parallel to other drastic environmental disasters such as combat-intentional forest fires. Considering of these wide variations in recent years, continuous monitoring and predicting of the forest-cover changes, based on roundabout capabilities of advance remote sensing, is a necessary and fundamental assignment for Azeri and international geographers and environmentalists.

KEY WORDS: Karabakh Occupied Lands, Object-Based Classification, CA-Markov, LC/LUC, Forest-Cover Changes

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GIS BASED ACCURACY ASSESSMENT OF MULTI-RESOLUTION SEGMENTATION

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ABSTRACT:

Pixel-Based Classification (PBC) and Object-Based Classification (OBC) have been frequently used for different types of image data to obtain information for earth. Nowadays, OBC is more preferred than PBC due to the widespread use of high spatial resolution imageries. Thematic maps and vector products obtained by OBC are important data for studies on Geographical Information System (GIS) and the most important step of OBC is the segmentation which directly affects the both qualitative and quantitative accuracy of the classification. In this study, accuracy of Multi-Resolution Segmentation (MRS) was investigated in GIS environment. Orthophoto of the Tokat Gaziosmanpasa University which has the pixel size of 30 cm was subjected to the MRS by means of several scale, shape and compactness parameters. Objects which are totally adjacent to the surface like roads were taken into consideration in the accuracy assessment. Boundaries of several image objects belonging to the roads in the study region were extracted and compared with the reference vectors obtained by manual digitization from another orthophoto with the pixel size of 5 cm. Orthophoto used in order to derive reference dataset was generated from aerial photographs obtained by an UAV. Comparisons were performed by means of proximity analysis which indicates the minimum distances between these features. Basic statistical values such as mean, median and standard deviation were calculated depending on the distance differences. As a result of the study, MRS gave more accurate results as the shape factor increases while others are constant. Variability of the compactness did not affect the distance differences considerably. Increase in scale and shape values together led to the confusion of the roads with the building roofs due to similar material properties. However, it was evaluated that obtained results are sufficient to prove efficient use of MRS technique.

KEY WORDS: Accuracy, GIS, Multi-Resolution Segmentation, Object-Based Classification, Orthophoto

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DESIGNING A SPATIAL DATA INFRASTRUCTURE MODEL FOR AN INTEGRATED AND SUSTAINABLE URBAN REGENERATION

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ABSTRACT:

Depending on the latest land regulations and regeneration implementations in Turkey, reorganization of unplanned, slummed, legal or illegal areas that have inadequate and unqualified infrastructure areas for earthquake disaster preparedness becomes an issue of increased importance. From this point of view, urban regeneration projects should be considered primarily to provide the housing needs of cities, starting with the buildings that are not disaster resistant and/or have not received engineering services. At this point durability, value, ownership and usage assessments should be made regarding the current housing situation and in addition to property analysis throughout the city, general inventory of immovable property needs to be taken into account in urban regeneration projects. However, problems arising from the lack of institutional structure in regeneration applications, lack of legislation and differences in the application approaches from local administrations constitutes the main problems that prevent the realization of integrated applications at the desired target.

In order to implement urban regeneration projects to be created in the integration of legislation, design, valuation, financing and data management parameters accurate data and information are needed. The most important component for the holistic and sustainability of urban regeneration applications is data management. Due to this; it is necessary to create a functional data management model in order to realize urban transformation processes with a comprehensive approach.

Within the scope of this study, urban regeneration processes have been introduced and Data/Function (D/F) matrix of work items have been formed. The inputs and outputs of the processes were clearly demonstrated within the context of urban regeneration main process steps, the used/produced (U/P) data were determined and the functional classification of data is provided for an efficient spatial data infrastructure for recommended data management model for urban regeneration projects. In this way, it can be ensured that the audit procedures in urban regeneration process have been ceased from being coincidental in the future regeneration applications and also data integration and up to date protection will be ensured as a result of the evaluated geographical data infrastructure.

KEY WORDS: Urban regeneration, Data management, Spatial data infrastructure

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DETERMINATION OF SITE SELECTION CRITERIAS FOR SOLAR POWER PLANTS USING ANALYTIC HIERARCY PROCESS

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ABSTRACT:

Today, countries are shifting their energy policies towards to renewable energy sources. The main reasons for this can be summarized as the reduction of fossil fuel resources, resulting in cost increase and their harmful effect on the ecological balance. Since renewable energy sources are both economical and eco-friendly, for countries which have high solar energy potential such as Turkey, it is reasonable to direct their energy policies to solar energy which is a renewable energy source. In today's conditions, countries with high energy consumption should use alternative energy sources such as solar energy. International examples have been examined and it has been observed that solar energy is being used very effectively even in geographical conditions with limited potential.

In this study, firstly, application steps have been revealed by examining the development of renewable energy legislation in Turkey, from past to present. During the implementation, a project planning process was established for a solar power plant that could be constructed in a selected pilot area and 13 impact factors to be used to determine the most suitable location were selected among the most intensively preferred criteria in the literature. In the study, the impact factors determined for the solar power plant location selection process were weighted using Analytical Hierarchy Process (AHP) from Multi-Criteria Decision Analysis methods. Concurrently, the weights of these determined impact factors were compared with the weights obtained by evaluating the results of the "Evaluation of Solar Energy Power Plant Site Selection Factors" survey conducted during the study. The results show that the weights determined by AHP are coherent with the weights obtained using results of the survey for solar power plant site selection and using this method in future projects can have successful results.

KEY WORDS: Geographical Information Systems (GIS), Analytical Hierarchy Process (AHP), Renewable Energy, Solar Power Plant

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ETHICAL PRINCIPLES ON VALUATION

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ABSTRACT:

The ethics as a concept is broadly called the moral principles theory, discipline of philosophy " which criticizes or even convicts the life of the society in which the age and the age of the society is struggling to pass the ideals of a certain life, puts alternative values instead of existing values, defines life rules clearly. Primarily, ethics is the search and understanding of a life that is desirable. In other words, ethics is guidelines, principles and standards that help people to determine how " things should be done ". In order to institutionalize ethics within an organization, there must be the mechanism that defines the system and objectives of the general values of organization, and guiding the decisions made to comply with these principles. In a broader aspect, it is to know all activities and objectives are put into place, what is to be done or not, what is to be asked or not, what is to be possessed or not to be.

The goal to be attained or to be achieved by ethical codes of conduct is to prevent corruption in general and to dominate honesty in the state and society. In society generally there is a tendency to see all occupations as professions. However, in the western world, the professions are classified as:

Specialist Jobs

Skill-Based Jobs

according to the level of education and the quality of the duties.

The profession as one of the most important sources of identity is an area of activity that allows one to be respected in society, to establish relationships with others, to gain a place in society and to live a sense of being useful. A profession should meet the inevitable need of society.

The sum of the ethical principles and standards that guide the behaviour in business is called professional ethics. Professional ethics is the whole set of professional principles that restricts personal tendencies of a certain profession group, profession members, compels them to act with certain rules, excludes inadequate and unprincipled members from the profession, regulates professional competition and aims to preserve service ideals. Occupational ethics; is the rewriting of general moral principles in the context of the profession. Establishing ethical standards is a very difficult process. This challenge includes fundamental questions about how ethical standards will be based and how these standards will be applied when specific situations are encountered.

What a profession member does is closely related to his colleagues after a certain point. Wrong behaviour does not only humiliate a person, but it can destroy all confidence in the profession.

KEY WORDS: Valuation, Valuation Ethical Principles, Cadastre and Ethics Relations.

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VITALITY OF BIM FOR 3D CADASTRE IN TURKEY

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ABSTRACT:

What expected from future cadastre is to show complete legal situation of land including public rights and restrictions. Nowadays, all these rights and restrictions are often located top of each other. Therefore, two dimensional (2D) cadastral systems have shown limitations in some situations. Especially in urban areas, as a result of rapid increase in population, different property units are intersecting, located top of each other or even constitute more complex situations. The growing interest for three dimensional (3D) cadastre has caused by limitations of 2D cadastre for registering and representing complex situations which occur modern world. Cadastre needs to be structured so that it can handle all the information of the land in order to meet the expectations expected from the modern cadastre of the future. With respect to all information relating to land, the most important data are buildings in urban areas. Management of buildings throughout their lifecycles starting from their construction can be carried out more easily and more effectively by means of information technologies. In this context, building information modelling (BIM) concept have been proposed which is constituted according to interdisciplinary work conditions, which enables seeing the problems beforehand and which can contribute to developing solutions. Increasing complexity of rapidly growing cities requires that GIS should contain indoor models in addition to altimetric (3D) and temporal dimensions.

In this study; firstly, information on the transition process of 3D Cadastre based on legal, institutional and technical aspects in answering expectations from future modern cadastre are given and then the new project of 3D Cadastre studies by General Directorate of Land Registry and Cadastre (TKGM) is emphasized. Finally, 3D Cadastre Studies in Turkey and the integration of the BIM are explained.

KEY WORDS: 3D Cadastre, BIM, TKGM, CityGML, LOD

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3D CITY MODELS AND 3D CADASTRE IN TURKEY

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ABSTRACT:

General Directorate of Land Registry and Cadastre (GDLRC), an institution which uses current information technology effectively, citizen-focused, gives public-private sector cooperation importance, aims to make a land registry and cadastral data in 3D and to reach citizen actual and correct information about real estate with the 3D City Models and 3D Cadastre Project fast and safely.

To achieve these goals, Oblique aerial camera and environment components have been provided and point cloud, digital survey models, digital terrain models, true orthophotos and 3D city models have been produced taking aerial images in 50 km². Also, 3D city models and 3D independent parts of buildings models production has been completed by screening and vectorization existing architectural projects in these areas. Integration studies of all of the products with the land registry and cadastre data have been continuing.

After the all of these studies aim of the GDLRC is to complete 3D city model production and integration with the land registry and cadastre data has been 40.000 km^2 where is residential all living areas of Turkey in 3 years.

In this paper experience of the pilot study, used software and hardware, production stages of the project planned to be completed in Turkey, intermediate and resulting products will be presented.

KEY WORDS: Land Registry, Cadastre, 3D City Model, Real Estate, Integration

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THE STRONG HAILSTORM EVENTS, OCCURED IN THE WESTERN PART OF AZERBAIJAN IN JUNE 2017

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ABSTRACT:

Due to their physical and geographical conditions and climatic characteristics each year the territory of Azerbaijan is exposed to the negative effects of various dangerous hydrometeorological events (strong showers, hail, mudflows, floods, etc.). In recent years, the frequency and intensity of these events is increasing year after year due to global and regional warming. Sometimes these events are accompanied by serious consequences, which greatly damages the economy of the country. Therefore, the comprehensive study of such events, including the study of modern methods of research, their reliable forecasting and the organization of weather modification measures against them, is of great scientific and practical significance. The article is devoted to the complex research of strong lightning-hail processes in western regions of Azerbaijan on 10 and 20 June 2017. As it is known, the intensive and large hail storm has caused a great destruction in some areas of Gazakh, Agstafa, Tovuz, Goygol, Ganja and Goranboy regions in those days. According to the radar data of Agstafa and Goygol radiometeorological stations, the dynamics of the formation and development of both hailstorm processes, also movement trajectories were analyzed, the main factors affecting the process according to aerosynoptic data and physical-geographical conditions of the area were investigated. Suggestions have been made to improve shortterm forecasting of strong hail events.

KEY WORDS: Hailstorm, Radiometeorological station, Radar data, Lightning hail processes, Damages

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ASSESSMENT AND COMPARISON OF THE LOCATION OF SIX UNIVERSITIES IN TEHRAN CITY USING GIS AND MULTI CRITERIA DECISION MAKING METHODS

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ABSTRACT:

Universities are the engine of science in any country. Thus improvement of a university led the country to development. Location of the university is one of the factors which are effective on the quality of research and educational activities at the university. Crowded or polluted areas are not proper places for the universities. There are also the other criteria such as quality of transportation system which may affect the satisfaction of the people who deal with the university. GIS has powerful tools to spatially analyze the location and produce the outputs to be considered as the indexes of properness of a location for a specific activity.

In Iran most of the major universities have been constructed in the capital: Tehran. Tehran is a crowded, polluted and large metropolis which contains various neighborhoods with various conditions. This research aims to assess and compare the spatial conditions of six important universities in Tehran. To extract the effective factors more than 500 students were interviewed. The extracted factors were categorized into two main categories of spatial and environmental and then were divided into five subcategories, namely: greenness, air pollution, noise pollution, accessibility and compatibility of surrounded land-uses. Using GIS analyzes the quantitative values extracted from the maps, satellite images and statistical data. Then Multi-Criteria Decision Making (MCDM) methods were used to combine the factors. The results revealed that Amirkabir University of Technology achieves the highest score while Allameh Tabataba'i University is ranked below among the considered six universities.

KEY WORDS: GIS, MCDM, University, Location, Tehran

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SOIL ORGANIC CARBON POOLS ESTIMATION BASED ON DIGITAL MAP OF ORGANIC CARBON STOCK IN 30-CM SOIL LAYER OF RUSSIA

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ABSTRACT:

Digital map of organic carbon stock in 30-cm soil layer of Russia was created for GSOC-17 FAO project. Our objective was developing and testing algorithms for soil organic carbon (SOC) mapping on the basis of information accumulated in the Information System "Soil-Geographic Database of Russia", i.e. vectorized different-scale soil maps, analytical characteristics of reference profiles and attribute data from regular monitoring surveys. Calculation of main SOC map performed in the form of synthesis of two types of source data: a map of the entire territory of the Russian Federation based on the Soil Map of RSFSR (ed. V.M. Fridland, 1988) at the scale of 1:2.5 M combined with sparse and irregular grid of about 2000 soil profiles and maps of separate agricultural areas based on the large- and medium-scale soil maps and a dense grid of regular soil observations. Both maps were merged into one grid. The SOC map for litter is calculated on the base of previously published map adapted to the GSOC17 requirements. The SOC map for duff and peaty litter horizons of semi-hydromorphic soils was calculated by using the averaged expert estimations of bulk density values. The final version of the SOC map of Russia is a per pixel sum of above maps. Our calculations indicate that the total carbon stock in 30-cm soil layer of Russia is about 150 Pg, and nearly half of these stocks (45%) are concentrated in organogenic horizons.

KEY WORDS: Organic carbon stock, Digital map, Soil mapping, Soil-geographic database, Bulk density.

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CONTRIBUTE TO TURKEY ECONOMY OF IMPROVEMENT AND MANAGEMENT OF CADASTRAL DATA

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ABSTRACT:

Production and management of cadastral data is implemented by General Directorate of Land Registry and Cadastre (TKGM) in Turkey. All the cadastral work from the past to the present day was carried out by different methods and different coordinate systems according to past time requirements. Today, the necessity of combining and managing all cadastral data in a single coordinate system is accepted by all stakeholders. Therefore, at the end of the collected statistics and studies, TKGM projects are being carried out to improve the 40% of the total parcel amount (\approx 23 million) in the country and to present them to the ITRF coordinate system. These projects are carried out in two different ways (22/a article and Annex-1 article of the Cadastre Law no 3402). These methods are planned to be implemented by TKGM through its own possibilities and private sector services. It is envisaged that the data produced in ITRF coordinate system will be transferred to MEGSIS under the control of TKGM and shared with stakeholder institutions and web services, real and legal persons via web applications and e-government portal in secure electronic environment.

In this study, it is planned to prevent the technical and legal problems caused by the cadastral datas in expropriation, land consolidation, development applications and similar projects carried out by investment companies with the projects carried out in accordance with article 22/a and article Annex-1 of Cadastre Law. Moreover, in light of the technological developments of today, the benefits and profit of providing quick and reliable access to the correct cadastral data of the real estate sector, municipalities, private sector and citizens have been discussed at national level.

KEY WORDS: 22/a of Cadastre Law, MEGSIS, Cadastre, TKGM, Annex-1 of Cadastre Law

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THE ROLE OF CLGE IN ENHANCING PROFESSIONALISM OF GEODETIC AND CADASTRAL SURVEYORS

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ABSTRACT:

Geodetic and cadastral surveyors, are one of the most important professions for the sustainable development of prosperous society and modern economy, because it provides spatial data necessary for implementation of economical and infrastructure development programs.

In order enhance the geodetic surveying profession in Europe the Council of European Geodetic Surveyors CLGE (Comité de Liaison des Géometres Européens) was formed in 1972 by the nine member-countries of the EEC (currently, the CLGE includes 39 countries as members and two countries as observers).

The main CLGE mission is to represent and promote the interests of the geodetic surveying profession in the private and public sector in Europe, especially: the creation of permanent forum for European geodetic surveyors, who are committed to European co-operation; the promotion and exchange of technical, scientific, educational and organisational know-how with the European states; provision of assistance to member countries, to national associations and EU institutions on request.

In order to accomplish its missions CLGE works in close cooperation with other organizations: The International Federation of Surveyors (FIG), National Association of geodetic and mapping services of European countries, The EU Permanent Committee on Cadastre (PCC) and national associations.

Since surveyor's ethical principles and code of conduct are fundamental for the surveyors, CLGE has issued the Code of conduct for European geodetic surveyors. Some of the important features included in the code of conduct are also listed in this paper.

Important part of CLGE is the interest group PARLS (Publicly Appointed and Regulated Liberal Surveyors) that are uniting the European Private Surveyors working in countries where the state delegates specific roles and responsibilities to the profession. PARLS participated in elaboration of Dynamic Professional Knowledge Base over Europe for profession and provide support for other CLGE projects.

This paper pretends to demonstrate that professional organizations play an important role to enhance professionalism of geodetic and cadastral surveyors. It also identified the existing rules and regulations for issuing license to the surveyors in which the provision to issuing license is limited to a certain group of surveyors. This paper could be useful and interesting for developing countries organizations where the license system is just applied or where it is going to be applied.

KEY WORDS: Geodetic surveyor, Cadastral surveyor, Appointed surveyor, Regulated liberal surveyor, Code of conduct.

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MONITORING THE LONG TERM URBAN EXPANSION OF ZANJAN CITY USING REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS

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ABSTRACT:

The growing phenomenon of urbanization, especially in developing countries, has led to the enlargement of urban areas. Due to the complex structure of cities, changes in the boundaries of a city, whether horizontally or vertically, affects the ecosystem and the quality of life of the corresponding communities. It is also important for the urban planners from the perspective of sustainable development to identify land use/cover changes. The purpose of this paper is to study and evaluate the spatiotemporal expansion of Zanjan city in five time periods. In this research, aerial photographs of 1973, 1982, 1998 as well as satellite images of 2008 and 2016 of the Zanjan city were used. After data preparation in GIS environment, each produced map was classified into two classes of built and not built. Two spatial distribution indexes (PD and CONTAG) as well as land surface and class level measurements were used to determine the characteristics of urban physical development in Zanjan. The results revealed that during the assessed time period, the city has become more sprawled, discontinuous, and in terms of variety of land uses has become more diversified. These results warn that if the urban expansion continues with the existing trend, historical contiguity and compactness of Zanjan city will loss in the near future. This trend may cause several problems.

KEY WORDS: GIS, Remote Sensing, Urban Expansion, Zanjan

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TOWARDS A REAL WORLD 3D TERRAIN GENERATION AND REAL TIME VISUALIZATION FRAMEWORK USING GAME ENGINE

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ABSTRACT:

Applications of Real world 3D terrain generation and visualization is widespread in various domains i.e. Geographic information systems, strategic mission planning systems, flight simulators, exploration missions, and entertainment etc. 3D Globe engines are specialized frameworks for 3D rendering of Geographic information system data for both desktop and web environments. 3D Game engines are frameworks providing generic constructs for design and development of user interactive, distributed, real time, rich graphics rendering entertainment applications using virtual environments.

This paper describes the design and development of a generic framework for 3D real world scene generation and visualization based on game engine i.e. Unity 3D. Framework design consist modules for online geospatial data acquisition and management, real time terrain model generation and management, acquisition of offline or online flight data path, navigation of 3D scene using path information, and display of user information. Proposed Framework software design is flexible, extendable, scale able and portable for different execution environments i.e. desktop, web, mobile etc. This framework can be used for developing real world, real time, and user interactive entertainment or flight simulation applications while its design can be extended for real world detailed ground rendering. The framework provides real world scene generation and visualization layer for game engines environment which can be used and extended for real world entertainment and simulation applications very easily.

KEY WORDS: Geographic Information System, 3D Terrain Generation, 3D Scene Generation, Framework, Unity 3D

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DIFFERENT SOFTWARES USING IN EVALUATING IMAGES OBTAINED FROM UNMANNED AERIAL VEHICLE

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ABSTRACT:

Nowadays, usage of Unmanned Aerial Vehicles (UAV) has become widespread in photogrammetric studies that need higher precision. Computer vision approaches and related algorithms are used in the evaluation of high resolution images obtained by the UAV. These approaches are based on the principle of automatic operation and reduce the error rate related to the person who performing the evaluation to the lowest by minimizing the need for specialist personnel. By the increase in technological developments have also led to differences in the software used in photogrammetry. In this study, the rectorate building of Aksaray University was 3 dimension modelled with the images obtained from the DJI Phantom 4 model unmanned aerial vehicle by using Agisoft Photoscan, Limapper Photogrammetry Software, Pix4D and Correlator 3D software. 3D models that produced from different software have been verified with field works by using GNSS receivers. Along with the results obtained, optimum software suggestions have been made by making price-performance evaluations of the used software.

KEY WORDS: Unmanned Aerial Vehicle, 3D Model, Software

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INTEGRATION OF UAV-BASED PHOTOGRAMMETRY AND TERRESTRIAL LASER SCANNING DATA IN 3D MODELING STUDIES

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ABSTRACT:

The reconstruction of object surfaces by means of digital photogrammetry and terrestrial laser scanning has been a research topic for long time. The studies have led to great progress in these systems, allowing reliable and dense 3D point cloud data collection of object surfaces. Because of the speed and efficiency of data acquisition using the terrestrial laser scanners, it was thought that the terrestrial photogrammetry would be replaced by the terrestrial laser scanning method. Later, many researchers have stated that similar results can be achieved with less cost using dense image matching algorithms. However, it has become more obvious that the combined use of both techniques would assure complete and consistent results, particularly in the case of complex objects. This combination allows the exploitation of the benefits of both measurement methods. In this study, we investigated the possible integration of point clouds obtained by Terrestrial Laser Scanner (TLS) with the photogrammetric 3D model collected based on images captured by Unmanned Aerial Vehicle (UAV). For this purpose, the Rectorate building of the Aksaray University was chosen as a case study. While all four facades of the building were scanned with a Topcon scanner GLS-1000, the dense point cloud model of the roof of the building was obtained based on images captured by DJI Phantom 4 Quadcopter. Then these two point cloud data were combined with the help of common points. The marked control points were then used to georeference the 3D model, which was obtained by combining the laser scanner and the photogrammetric data. In line with the obtained results, the integration of the point clouds produced from the terrestrial laser scanning and UAV data was discussed.

KEY WORDS: Unmanned Aerial Vehicle, Terrestrial Laser Scanning, Photogrammetry

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GIS TECHNOLOGIES FOR STUDYING OF ERODED SOILS OF MOLDOVA

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ABSTRACT:

Moldova is the unique world country that possesses the most fertile soils – chernozems that occupy 75% of its area. But, ill-considered soils' use led to intensive degradation of their ecological functions: energetic, biogeochemical, hydrological, gas-atmospheric, geological etc.

Water erosion in Moldova's conditions is the most wide-spread soil-destructing process. Averagely and strongly washed-off soils make more than 275 thousands of hectares. It should be noted that the more eroded soils is, the easier it is exposed to further washing off, because lower horizons have less anti-erosion resistance.

Digital soil mapping is the key part of soil cover's study. Modern computer technologies allow identifying all degrees of erosion and help developing certain measures for sustainable developing cert

KEY WORDS: Soil, Mapping, Erosion

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DEVELOPMENT OF SPATIAL METHOD FOR MONITORING AND ANALYSING RAINFALL IN THE CATCHMENT AREA OF LAKE URMIA BASED ON ENVIRONMENTAL FACTORS

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ABSTRACT:

Spatial diversity of rainfall is due to spatial factors such as position, altitude and topographical characteristics such as slope and so on. With the help of these features, researchers can determine rainfall patterns of spatial behaviour. For this reason, understanding the spatial behaviour of rainfall and its mechanism is a very important issue in climate studies. Therefore, the first in this study, the rainfall was interpolated in the catchment area of Lake Urmia with the use of available synoptic databases and traditional and geostatistical interpolation techniques. Then, the ordinary kriging method was identified as the best method using cross validation technique. In addition, a general regression models were fitted to the rainfall data and latitude was determined as influential dependent variable on the rainfall. Also with the help of spatial statistical analysis such as cluster analysis, the south and southwest of the lake were identified as the hot and rainy points.

KEY WORDS: Rainfall, Interpolation, Spatial Relationships, Cluster, Lake Urmia

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GEOSPATIAL ANALYSIS OF ACTIVE FAULTS IN THE LESSER CAUCASUS: A REGIONAL COMPARISON

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ABSTRACT:

Seismotectonics in the Lesser Caucasus region is generally evaluated in a structural framework related to the continental collision between the Arabian and Eurasian plates and following N-S-trending convergence. The spatial distribution of active faults in the region represents variations. Orientations, lengths and activities of the active faults, thrusts, and fissures in the Lesser Caucasus seem to be consistent with the suggested general scene of simply N-S-compression. We analysed the geometric and kinematic variations of the mentioned seismically active structures statistically to understand the seismotectonics and driving factors in the region. Our results indicate the dominance of dextral strike-slip faults, particularly in Armenia. Thrusts and reverse faults represent the second major structural elements driving the active tectonics, especially in Azerbaijan. Almost all these types of faults can be grouped as NW-trending structures. On the other hand, according to the mapped normal faults and sinistral strike-slip faults in the region, these structures are relatively very few. Similar structural variations are also valid for eastern Turkey and northwestern Iran. Available focal mechanism solutions of earthquakes in each of these regions also support the higher activity of dextral strike-slip faults and thrust/reverse faults during the last century. Regional comparison of spatial variations of active faults in the region indicate more northwardly-oriented active structures with more thrust/reverse components increasing towards Caspian Sea that could be related to the rigid block structure of the South Caspian basin. Besides the main effect of the convergence between the Arabian and Eurasian plates in the region, the mentioned structural characteristic of the South Caspian basin is also highly effective on the seismotectonics in the Lesser Caucasus region.

KEY WORDS: Lesser Caucasus region, active tectonics, seismicity, Geographic Information Systems, Azerbaijan, Armenia

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TRACING TEMPORAL CHANGES WITH GOOGLE EARTH ENGINE: LAKE ULUABAT, SOUTHERN MARMARA REGION, TURKEY

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ABSTRACT:

With the developments in technology, remote sensing and geographic information systems methods have become standard approaches frequently used in various disciplines ranging from geosciences, medical imaging studies, engineering applications to sociological researches. This widespread use of methods leads to more visual processing, more data generation and storage. In particular, the need to use multiple image frames for a time interval in the course of monitoring temporal changes in large-scale areas, and the implementation of many processes, makes these methods cumbersome nowadays with the greatest advantages of saving time and cost. 'Google Earth Engine' is a remote sensing and spatial data information system developed by Google to meet this demand worldwide. This system, which is used as an online system, enables to reach all the images and to process them on the day when they start their activities of many different platforms such as Landsat, Sentinel and MODIS. In this study, areal changes of Lake Uluabat, which is located in the southerm Marmara region in Turkey, were monitored *via* Google Earth Engine and discussed the benefits of the program. The last 25 years of the lake, which has a current area of approximately 140 km², were monitored using images belonging to different Landsat sensors, and the rate of shrinkage in the lake was calculated by the controlled classification, NDVI (normalized difference vegetation index) and NDWI (normalized difference water index) methods.

KEY WORDS: Google Earth Engine, shoreline detection, remote sensing, geographic information systems, lake level

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A MULTI-CRITERIA DECISION MAKING APPROACH TO PLAN A PATH FOR OIL PIPE LINE IN GEOGRAPHICAL SPACE

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ABSTRACT:

The path of pipe lines used to conduct the energy containers such as oil, is under technical and financial effects as well as the environmental adaptability considerations. The numerous criteria from such considerations make researchers handle a comprehensive system like GIS to contribute all of them.

In this paper Fuzzy Analytical Hierarch Process in accordance with spatial analyses in GIS is exploited for planning an optimum path for a 12 inches oil pipe line from Shirgah to Sabzab in Khuzestan province in Iran. The applied approach handles and aggregates the opinions of experts as well as the different data types in a geographical space.

The weighted spatial layers from technical to environmental criteria are overlaid and resulted to an appropriate corridor for laying down the oil pipeline. To discuss on appropriateness of results, some different scenarios are compared.

KEY WORDS: GIS, MCDM, Pipe Line, Iran

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INVESTIGATION OF THE ACCURACY OF THE SATELLITE IMAGES CLASSIFICATION METHODS IN EVALUATING URBAN LAND USE CHANGES

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ABSTRACT:

Using satellite imagery, various phenomena and extraction of necessary information for planning land resources or other purposes are easily investigated, identified and evaluated, and the use of these new technologies in the evaluation of urban land use changes requires recognition of the efficiency of these tools and also best methods for their applications. The research method is analytical-descriptive provided with practical nature. The aim of this study is comparison of the efficacy of seven common methods of supervised classification of satellite data (maximum likelihood algorithm, box algorithm, the shortest distance method, the method of SAM, by SID, Mahalanobis method and neural network method) in the diagnosis and evaluation of use changes and land cover of Ardabil city using TM and OLI images of Landsat satellite. Initial research data and information have been collected with two documentary and field research methods. Digital processing of satellite imagery and geographic information systems in 1998 and 2016 was evaluated utilizing advanced methods. Training samples in five application classes and cover were created by software ENVI. Then each image separately were classified using seven methods listed and, the efficacy of each classification method was investigated by calculation of the parameters of overall accuracy and kappa coefficient. The results indicate that the accuracy of any of the classification methods. In this study, neural network classification method with average overall accuracy of 94.475 and mean kappa coefficient of 92.095 was chosen as the most accurate method between the classification methods.

KEY WORDS: land use, classification, satellite images, evaluation of changes, the city of Ardabil.

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GIS APPLICATION IN PREDICTING THE DIRECTION OF URBAN DEVELOPMENT

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ABSTRACT:

Increase of population and the development of non-principal cities, especially in developing countries, Consequences such as the loss of resources, lack of compatibility with the existing infrastructure of urban growth, changing agricultural land suitable for urban use and is followed increased costs Such as housing, transport. So according to the above mentioned issues can be predicted future development of the city, the city adopted an optimal plan. The aim of this study was to predict the future development direction of of Ardabil is using multi-temporal satellite images of 1987 and 2013 is. In this study, using Bayesian theory and 14 natural and man-effective benchmark in urban development(Elevation, vegetation, land units, main roads, secondary roads, dirt, away from the river, the earthquake happened, geology, industrial zone, steep terrain, airports, land use and distance to fault), Urban Expansion zoning map was produced for the city of Ardabil. Then, using Bayes' probability theory, the relationship between metrics and developed areas (two-thirds of developed areas) was specified to determine the weight of each class of parameters. Implementation and enforcement of the weight of the layers was done using Arc GIS software Urban Development and the map was classified into five classes. According to the obtained map as well as the weight classes each criterion, the land use layer. Irrigated and dryland regions with 58/64, at layer away from class town of 5,000 to 10,000 feet above sea level, in the low-density layer vegetation density classes, The layer distance of the River class of 1000 to 2000 m, in a single layer plain territorial scope of the class, the class of zero-layer dip to 2°, Class of 1000 to 2000 meters away from the main road in the layer, the layer is greater than 1,500 meters away from the road subclass, the class of 1350 to 1400 meters altitude layer Greatest impact on urban development and weight have to Codex.Accurately map urban development using a third developed areas were evaluated. Evaluation results show that the model is capable of predicting the class with the ability to develop 8/98 high and very high Reasonable accuracy in measuring and forecasting the future development of the city.

KEY WORDS: urban development, GIS, satellite imagery, Ardabil city.

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DETERMINATION OF LOCAL QUASI-GEOID IN CENTRAL ANATOLIA FOR ENGINEERING AND GIS PURPOSES

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ABSTRACT:

Requirement for a high resolution geoid model has increased substantially during the last few decades especially with the advent of Global Positioning System (GPS). Many countries across the world have already developed their own geoidal model which serve as the means of deriving orthometric heights from GNSS observations. On the other hand, the need for transformation of the ellipsoidal heights derived from GNSS observations to the physical orthometric heights has forced geodesists to determine the high precision local geoid heights. Besides, because orthometric heights are used in engineering and GIS applications, local quasi-geoid determination studies have become especially important.

As it is well known, Turkey is situated on a tectonically very active region and earthquakes occurring in different times cause deformations in heights of levelling points of Turkish National Vertical Network. On the other hand, National Mapping Agency of Turkey (GDM: General Directorate of Mapping) which is responsible for the establishment and maintenance of national geodetic networks compute geoid models for whole Turkey and release them for public use in different periods. These GDM-computed geoid models are called "hybrid geoid" models. Hybrid geoid models are computed with the combination of gravimetric geoid models and geoid heights on the GPS_levelling points. And it is also known that the absolute accuracies of these geoid models are nearly at the 10 cm level or even worse. But, the requested accuracy is about better than 5 cm. Hence, in order to prove that the required accuracy levels can be achieved, A local gravimetric and quasi-geoid determination project using the resources of Selçuk University was initiated. Project area has been planned to cover a limited part of Central Anatolia including Konya.

Necessary basic data (gravity, levelling etc.) for this Project have been obtained in the field by performing observations/measurements. Some other necessary data such as absolute gravity values have been obtained from GDM. And as the next phase, high accuracy (better than 5 cm) local gravimetric and quasi-geoid models will be computed for the limited part of Central Anatolia using the above mentioned data. In order to be able to reach this goal suitable geoid computations softwares must be used. In this project, we will use DFHRS software developed by the Karlsruhe Applied Sciences. The principle of the DFHRS software is based on the parametric model of $N(\varphi, \lambda, h)$ as a continuos polynomial height reference surface (HRS). Following the quasi-geoid computation, when we reach the requested accuracy level, namely better than 5 cm, then it will have been shown that the GNSS based determination of orthometric heights (H) is much faster, easier to handle and much more economic, in comparison to classical geodetic levelling.

On the other hand, it is possible to obtain a gravimetric geoid better than 10 cm accuracy by using global models and gravity data with 1-2 mGal accuracy. And you can only check such geoid only with GNSS/Levelling heights which provide better accuracies. Thus, according to the results to be obtained from this Project, a more comprehensive project will be launched and the project area will be expanded. Thus, additional gravity, levelling and GNSS measurements will be carried out in the new Project area for the determination of a high accuracy regional gravimetric geoid. Consequently, in this paper, all works carried out within the framework of this project and the reached preliminary results will be presented.

KEY WORDS: GNSS, GIS, Gravitmeric geoid, quasi geoid, ellipsoidal height, orthometric height

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FUZZY OBJECT-BASED LANDCOVER/USE MAPPING OF THE KARABAGH REGION BY PROCESSING OF SENTINEL SATELLITE IMAGERIES

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ABSTRACT:

Accurate information on landuse and landcover (LULC) changes is crucial for ecosystem monitoring and in the environmental investigations. At the present time, with the rapid development of remote sensing technology a large amount of spatial data is being available, such as Sentinel satellite imageries which could be regarded the fastest and cheapest way for many of researchers in LULC mapping procedures. The present study was accordingly conducted to evaluate the effectiveness of a fuzzy object-oriented technique in assessing of the southern parts of Karabakh LULC changes; mainly forest prototypes located in the occupied region of Zangilan, Qubadi and Jabravili counties during a 4-year period from 2015 to 2018. Subsequently, available satellite images with high spatial resolution of Sentinel 2A (through 10-meter resolution) including a Digital Elevation Model have been analyzed inside an ENVI software, mostly for pre-processing purposes, and then an eCognition Developer software which accomplished in the processing and post-processing of LULC types recognition. All raster images with a scale of 130, shape coefficient of 0.5 and a compression factor of 0.4 were assigned and segmented applying a fuzzy method in the object-based classification of forest, agriculture, bare-land, water, rangeland types with a general accuracy of 96% and a kappa coefficient of 94% in the final output maps. The ultimate results indicated that changes in forest and rangeland types are meaningfully significant regarding the last four-year image series. Based on findings it is logically possible to predicate future landuse scenarios by introducing a Markov Chain Model (CA-Markov) with a high acceptable accuracy. In consequence, combination of a fuzzy object-oriented image processing technique with high resolution images could be indisputably regarded an important implementation of in progress investigations on LULC changes.

KEY WORDS: Karabakh occupied regions, Fuzzy Object-Oriented Classification, LULC Changes, Sentinel-2A Images

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GEOHERITAGE AS THE BASIS OF GEOTOURISM DEVELOPMENT IN GEORGIA

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ABSTRACT:

After the turbulent years of the Soviet Union collapse, the wars in Abkhazia and South Osetia, the economic stabilization finally came to Georgia and led to the rapid development of tourism in this area. The tourist influx forced local authorities to invest in the tourist leisure base and take steps to develop less popular specialist and cognitive tourism. New objects were quickly prepared and made available to visitors. The natural heritage of this area was certainly a great advantage and facilitation in this processes. Georgia, as a country with a high geodiversity, boasts an infinite variety of landscapes, wealth of geological formations and surface water systems. These attributes have also a significant influence on the development of geotouristic potential. Unfortunately, many interesting places are not sufficiently well utilized, what makes them difficult to access. There is also a failure to provide or disseminate information about these places to visitors.

An inventory, valorisation and assessment of geotourism potential was carried out. The inventory was based on public sources. Cataloged geosites are located in all regions and they are diverse by the character of objects. Each object was assigned a point value based on the bonitation method. The assessment of the potential tourist use considered 13 criteria – each criterion was scored separately. The valorisation determined two regions with an exceptionally huge attractiveness and geodiversity on a national scale. The advantages and disadvantages of geotourism in Georgia have been also detected. To use the geotouristic potential dormant in Georgia based on its geodiversity, it is necessary to undertake activities aimed at eliminating the identified shortcomings.

KEY WORDS: geotourism, valorisation, GIS, Caucasus

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COMPARISON OF METHODS FOR THE COAL-WASTE DUMPS MONITORING

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ABSTRACT:

Landfilling becomes an increasing environmental problem all over the world. It is very difficult to find a proper place for wastes, because processes that take place in the stored material are very dangerous. In Poland, it mainly applies to spontaneous fires, which occur especially on the coal-waste dumps built near the Polish mines. They affect the condition of natural environment (the atmosphere, soils and water) and most of all - the health of society. Unfortunately, the phenomenon of coal-waste fires is not well recognized yet, so we are not able to control or stop it. The prevention of hazard relies primarily on regular and complex monitoring, but there is no flawless monitoring method, so it is very difficult to predict the direction and strength of fire development.

The aim of the presentation is to compare popular methods for coal-waste dumps monitoring in the Upper Silesian Coal Basin (Southern Poland). The monitoring was carried out on a small 25-year-old coal-waste dump in Ruda Śląska (Czarny Las district), which has been burning since 1995. Landsat satellite imagery and data collected during the fieldwork were used. The measurements were made using a pyrometer with a 1-meter probe and laser, a terrestrial thermal imaging camera and unmanned aerial vehicle equipped with camera, thermographic camera and GPS. The data analysis showed a widespread fire, but its range varies depending on the instrument and the method of measurement. The advantages and disadvantages of each method were noticed, proving that none of them is perfect. The necessity to develop a new method that will be able to detect self-heating much earlier, was proved.

KEY WORDS: self-ignition, coal-waste fires, Upper Silesian Coal Basin

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DESIGNING A REAL ESTATE VALUATION MODEL AS AN EXTENSION OF USING NATIONAL GDI

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ABSTRACT:

In effective land management concept, key component is to provide sustainable, reliable and definitive information about real property, land and all related factors. Standardised and interoperable land and real property related data helps to promote geographic enablement and sustainable land development in both rural and urban areas. Thus, successful land administration and applications can be performed. Also, governments need reliable and accurate land and real property related information for performing many legal practices such as expropriation, taxation, rural-urban transformation and land consolidation. In Turkey, the demand for reliable and affordable real estate valuations has increased within the sector especially with the densely performed urban transformation applications. Because of these reasons, in order to perform objective and accurate value estimations, different datasets used in the valuation process produced from different sources should be interoperable. For the solution of the interoperability issues, geographic data infrastructures (GDI) concept has emerged with the purpose of developing geographic data standards and ensuring data interoperability. Within the land administration concept, once different data sets are produced in cooperated way, various applications like valuation, expropriation, urban transformation and zoning reformations can be performed reliably. In this study, a real estate valuation model will be designed as an extension model to the Turkish national GDI (TUCBS) for performing reliable real estate valuation by using standardised and interoperable data produced by public institutions. With this purpose, national and international standards will be examined and legal, physical and environmental factors effecting the real estate value will be determined. In model design TUCBS, Infrastructure for spatial information in Europe (INSPIRE) and ISO/TC211 standards, such as ISO 19103 - Conceptual Schema Language, 19109 - Rules for Application Schema, 19110 - Feature Cataloguing and 19118 - Encoding will be taken into consideration. In addition, a country profile of real estate valuation process in Turkey will be presented with the proposed valuation model. Because the model will be designed in order to provide a base model for managing data concerning the main objects of real estate valuation process.

KEY WORDS: Real Estate Valuation, Geographical Data Infrastructures (GDI), Data Modelling, Interoperability, Data Standards.

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INVESTIGATION OF IMPORTANT SLOPES STABILITY ALONG THE TASKENT – ALANYA HIGHWAY BY USING GIS PROGRAM TECHNIQUES

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ABSTRACT:

Landslides are leading natural disasters occurring in the Black Sea and Mediterranean Region, which is one of the regions that receiving great amount of rains and the roughest in Turkey particularly the Eastern Black Sea. In this region the damage caused by landslides is greater than that caused by earthquakes in the long term. This area contains the most mass movement observed in Turkey, so the present study aims to investigate the mechanism of the landslides and the controlling factors that caused of landslide occurrence along Taskent- Alanya highway and then try to find appropriate ways to reduce these landslides. In this study data on geological and topographical factors related to landslide occurrence in the investigated area were collected. According to the effect of sliding on the highway, the landslide susceptibility map was prepared for the study area. Initially, this map was created on 37 different types of landslides. Based on initial field investigations, the factors of lithology-weathering degree, slope angle, slope aspect, slope elevation, attitudes of the main and secondary joint sets and land cover were evaluated and taking into account as the main parameters causing the slope instability. By following the damage caused by landslide occurrence nearby the study area, it was found that an impending failure was occurred because of the developed tensile cracks and deformations on the ground. The observed results of the kinematic analyses showed that planar and wedge failures were prevalent landslide on the slope surface along studied highway and less degree with soil creep respectively. However, the limit equilibrium analysis showed the planar wedge and circular failures expected to occur on the portal slope. Also the numerical stability analyses were performed to determine occurrence possibility of circular failure in the slopes. Due to highly effect of faulting and heavily joint sets on the exiting rocks with different directions, and according to the numerical stability analyses the failure mode for the portal slope in the future is composite and overlapping with a circular surface and wedge failures. The parameter maps were created in Geographical Information Systems (GIS) by using topographical and thematic maps which have been performed the landslide susceptibility. Also the Strength Reduction Factors (SRF) of the slopes were determined too. Accordingly, the studied highway landslide susceptibility map has been classified into three groups as "low, moderate, and high susceptible area".

KEY WORDS: Landslides, Taskent- Alanya highway, landslide susceptibility, slope instability, Geographical Information Systems (GIS)

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ANALYSING THE IMPACT OF VEGETATED AREAS ON LAND SURFACE TEMPERATURE USING REMOTELY SENSED DATA

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ABSTRACT:

Industrial areas, high-rise buildings, anthropogenic activities, settlements and artificial surfaces have been associated with Urban Heat Island (UHI) phenomena. This phoneme has negative impact on air quality, heat stress and it is related with heat related mortality and morbidity. Thermal Infrared (TIR) remote sensing have been widely used in global and regional scale climate and climate change studies. Land Surface Temperature (LST) calculated from remotely sensed data, is a key parameter for UHI studies. The aim of this study is to investigate and evaluate the impacts of vegetated areas on land surface temperature of Istanbul, Turkey using freely available 2017 dated Landsat 8 OLI & TIRs data. Istanbul is a huge metropolitan city where the population and artificial surfaces increases rapidly every year. Land surface temperature (LST) distribution was derived from Landsat 8 OLI&TIRs images using a mono-window algorithm. To determine the vegetated areas of Istanbul, Normalized Difference Vegetation Index was calculated and various transects were selected. Different regression analysis was conducted to analyse the relationship between LST and NDVI transects. The relationship between NDVI and LST indicates that the vegetated areas have an ability to decrease the land surface temperature.

KEY WORDS: land surface temperature, NDVI, Landsat 8 OLI&TIRs, İstanbul

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EVALUATION OF SENTINEL-2 MSI DATA FOR LAND USE / LAND COVER CLASSIFICATION USING DIFFERENT VEGETATION INDICES

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ABSTRACT:

Accurate determination of Land Use/Land Cover (LULC) categories has very important role for environmental monitoring and management applications. Classification of remotely sensed data is one of the popular method to determine LULC information in different scale. Many methods have been developed and applied to classify satellite images. Freely available Sentinel-2 MSI data is new generation remotely sensed data which can be used efficiently to determine the land use and land cover categories for environmental monitoring applications. Sentinel-2 MSI data contains blue, green, red, and near-infrared-1 bands at 10 m; red edge 1 to 3, near-infrared-2, and SWIR 1 and 2 at 20 m; and three atmospheric bands (band 1, band 9, and band 10) at 60 m. In this study, the three atmospheric bands were removed. Sentinel-2A level 1C data acquired in 2018 were downloaded from Earth Explorer web page. In this study, Catalca District of Istanbul, Turkey was selected as the study area. Çatalca is very important district for İstanbul because of its valuable agricultural fields. Different land use/cover types have been defined in the selected study area such as; water surfaces, forest areas, agricultural fields (sunflowers), open mining area, settlements, and road. Sentinel-2 data gathered in 2018, was classified by maximum likelihood classification (MLC) method to investigate the potential of the data to determine the LULC types in selected region, as the first data set. Beside the original bands, different vegetation indices such as Normalized Difference Vegetation Index (NDVI), Green-red normalized difference vegetation index (GRNDVI), and Normalized difference red-edge index (NDRE) were calculated for Sentinel-2 data. These calculated indices were added to the original bands, and classified as the other data sets. The results of these 4 data sets of Sentinel-2 image were compared based on the field collected ground control data and error matrix.

KEY WORDS: Sentinel-2 MSI, LULC, MLC, NDVI, GRNDVI, NDRE

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GEOSTATISTICS ANALYSIS TO DETERMINE THE USER PROFILE OF A SOCIAL MEDIA PLATFORM

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ABSTRACT:

Social media platforms have started to be used in various social and working disciplines. Defining any activity with location in social media means that the distribution of social media users can be analyzed geographically to determine user profiles. This study determines user profiles of social media platforms with the example of an online dating site. Data about active users of this platform was retrieved and analyzed in GIS environment using geostatistics techniques. The distribution and outliers of the data were determined by using exploratory spatial data analysis tools. User profiles were analyzed by examining socio-demographic relationships. Target areas were determined by using cluster analysis, while the relations of the data were analyzed by using regression techniques. Results contribute to the research about social media as a new developing discipline and give a perspective of user profiles in view of education and occupation by using geostatistics approaches.

KEY WORDS: Geographic Information Systems (GIS); geostatistics; social media, regression analysis

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DETERMINATION AND MAPPING OF PLANT COVER PROPERTIES AND QUALITY CLASSES OF KARASU BASIN (ERZURUM) RANGELANDS USING GIS AND RS

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ABSTRACT:

Geographic Information System (GIS) and remote sensing (UA) are widely used in soil inventory, erosion control and pasture vegetation surveys as well as many other fields. These techniques, which are rather fast and sensitive compared to traditional methods, provide opportunities to work in large areas and provide very realistic results when combined with field studies. The acquisition of these data has great importance in the rational use and development of meadow, pasture and forest areas covering large areas. This study was planned to reveal the effects of some topographic factors such as soil properties and altitude, slope and stiffness on the pasture quality of the rangelands in the Karasu Basin (Erzurum) and also to map the mounds using UA and GIS techniques and to determine the quality classes entered by the meral. In this study, soil properties and rangeland quality degrees of Karasu area in Erzurum Province were determined using Resource and Environmental Data Interpretation System (REDIS). The effects of soil properties and topographic factors (altitude and position) on rangeland quality degree were also determined. The rangeland area and its distribution were determined by ARCGIS 8.1 and ERDAS IMAGINE 8.5 programs via Remote Sensing (RS) and Geographic Information System (GIS). Vegetation sampling was carried out on these sampling points, and topographical properties such as slope, altitude, position and stony were measured. In addition, the distance of the rangelands from villages and grazing intensity were also determined. According to RS and GIS analysis results, it was found that total rangeland area was 379.428,1 ha. Very high, high, moderate and poor quality rangelands were found as 30.043,89 ha, 86.357,16 ha, 172.433,4 ha and 90.589,59 ha, respectively. It can be concluded that rangeland quality of the area studied mainly placed in medium quality rangeland class.

KEY WORDS: Topographic Factors, Rangeland, Geographic Information System, Remote Sensing

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SIMULATION OF ACCUMULATED SOIL CONTAMINANTS IN THE IMPACT ZONE OF NOVOCHERKASSK POWER PLANT USING GIS TECHNOLOGIES

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ABSTRACT:

The indicator-factor model of pollutants accumulated in the soil due to air emissions is considered as a set of models for the distribution (atmospheric transfer), precipitation, transformation, and removal of pollutants interacting in time and space. The stage of pollutant accumulation in the surface soil layer is considered as interaction of the model for calculating the averaged concentration in the atmospheric air and the model of land topography. Algorithms are proposed for the implementation of the model for the raster presentation of local neighborhood in GIS using geomorphological analysis. Methods are reviewed for the geomorphological analysis and determination of morphometric parameters used in the development of indicator-factor model for predicting the transformation and removal of pollutants.

KEY WORDS: Geoinformation Technologies, Digital Soil Mapping And Simulation, Indicator-Factor Model, Accumulated Air Pollution, Geomorphological Analysis, Soil Survey Archives.

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USING GRIDDED NETWORK DATA TO ANALYSIS OF DYNAMICAL MODELS FOR PRECIPITATION PREDICTION IN AZERBAIJAN PROVINCE

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ABSTRACT:

Since long time ago, prediction of precipitation status and investigation of drought hazards in catchment areas of North West of Iran, due to the critical importance of discharge rate of related catchments for Lake Uromia, has been one of the most important challenging issues in efficient management of water resources; management of vast capital of water resources and energy production of the country is highly affected by the aforesaid factors. Therefore, application of dynamic methods may play significant role in adjustment of such conditions concerning the frequencies of climate parameters and occurrence of imbalance behaviors in precipitation pattern of the country. Regarding improper distribution of observed data, this research firstly completes post-processing operation using precipitation data of Aphrodite network, and Model Output Statistics(MOS) post-processing methods on the output of dynamic prediction model MRI-CGCM3 in a 28-year period(1980-2007), the precipitation grid of post-processed model and upon weighting output climate variables of dynamic model for each cell of data network and also, determining statistical model coefficients of multivariable correlation; output systematic error of the model highly reduced to be used in small scale applications. Then, post-processed prediction data of dynamic model were applied for computing Standardized Precipitation Index (SPI) provided in order to predict drought. Capabilities of selected post-processing method were assessed using evaluation criteria. Findings showed that application of statistical postprocessing on direct output of dynamic model results in developing the monthly prediction of precipitation up to 29% in selected post-processing method. Accuracy of Standardized Precipitation Index (SPI) predicting may increase up to 22.3% than no post-processing mode, in a way that this value reaches to 79.5% after the implementation of post-processing operation.

KEY WORDS: Post-Processing, Drought, Dynamic Models, Seasonal Prediction

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RELATIONSHIP BETWEEN CADASTRE VALUE OF LAND AND BONITET SCOREOF SOILS OF STAVROPOL TERRITORY

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ABSTRACT:

The soil cover of the Stavropol Territory is complex and diverse. The most common are chernozems, chestnut soils, solonetzes with solonetsous complexes. In the Stavropol territory there are 4 climatic zones: extremely arid with a hydrothermal coefficient (GTK) 0.4-0.7, arid (GTK 0.7-0.9), insufficient moistening (STC 0.9-1.1), and sufficient moisture (SCC 1.1-1.3). They compared the cadastral value of land, the soil quality score, the average productivity of winter wheat for the last 5 years, and determined the availability of 1 point of soil quality in the amount of winter wheat yield. It was established that the cadastral value of land does not always coincide with the soil quality score. Very often a higher cadastral value corresponds to a lower cadastral value. The average cadastral value of land and the average yield of winter wheat have a low correlation (0.31), which indicates a low level of interrelation between these factors. In an extremely dry climatic zone, 1 point of soil quality is provided by the production of winter wheat in 2 times higher than in the zone of sufficient moisture, which indicates the imperfection of the method of soil classification. In the territory, it is necessary to update the cadastral value of land and develop a more advanced methodology for soil classification.

KEY WORDS: Stavropol Territory, cadastral value, soil classification, winter wheat, correlation.

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SEGMENTATION QUALITY ASSESSMENT FOR VARYING SPATIAL RESOLUTIONS OF VERY HIGH RESOLUTION SATELLITE IMAGERY

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ABSTRACT:

Over the last two decades, the use of object-based image analysis (OBIA) has noticeably increased in remote sensing literature. Segmentation, the first stage of OBIA, has a direct influence on the quality of final classification accuracy. Ideally, created segment boundaries should overlap perfectly with the real earth surface objects. Due to the complex nature of remotely sensed imagery, it is difficult to construct meaningful image objects by segmenting a landscape features in an image. Because many factors including parameter selection, band weights, spectral resolution, spatial resolution and textural information affect the quality of the segments to be produced, a comprehensive analysis is required to assure high quality image objects. While there are many studies in the literature investigating the effect of various factors on the segmentation quality, a limited number of studies exist about the effect of spatial resolution on the constructed segments. In this study, the influence of the spatial resolution on segmentation quality was analyzed using Worldview-2 satellite image at five different spatial resolutions (0.5, 2, 4, 8, 16 meters). The multiresolution segmentation algorithm, the most widely used method and available in eCognition software, was utilized for the segmentation processes in this study. In the process setting, all eight bands of Worldview-2 imagery were utilized and weights of the spectral bands were set equally. The impact of spatial resolution on the segmentation quality was investigated on three specific land use/cover types namely, urban, pasture and road by using quality measures of shape index, area fit index and quality rate. It has been observed that resampling the image from 0.5 to 2, 4, 8, 16 meters remarkably reduced the quality of the segmentation results. Using a 16-m spatial resolution instead of the original 0.5m, the quality rate decreased by about 43%, and number of under-segmented objects increased by more than 37%. The results of this study revealed that the use of 8 meters or higher resolutions (i.e. 2 and 4 meters) would produce acceptable results in terms of segmentation quality metrics. When the lower resolution is preferred, the quality of the segments decreases considerably, thus the created image objects become too coarse, indicating an increase in undersegmentation.

KEY WORDS: Object-based image analysis, Segmentation quality, Spatial resolution, multi-resolution segmentation

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STUDYING THE IMPACT OF TOURISM DEVELOPMENT WITH THE APPLICATION OF GIS TECHNOLOGIES ON THE QUALITY OF POPULATION LIFE OF GABALA DISTRICT

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ABSTRACT:

Mountain regions of the planet are rich in their potential for successful sustainable development. If the development and living standards of coastal zones depend almost entirely on the sea or the ocean, then a greater number of diverse factors affects the quality of life of mountain regions. From geography position, they are presented as a set of conditions necessary for the development of favorable living conditions for people. In this work, this aggregate is assessed through the indicators of tourism development in the Gabala region.

There were applied the modern geoformation technologies and satellite images from the Azersky satellite to analyze the dynamics of the increase in tourist facilities in the Gabala region. A geoformation database for the study territory was constructed, maps of tourism facilities dynamics were compiled and social and economic development of the region was assessed depending on the development of tourism business.

KEY WORDS: Tourism, Quality, Satellite, Geounformation, Socialeconomic

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SPATIAL PROPERTY SYSTEM AS A BASIC INDICATOR OF GEOSPATIAL MATURITY IN TURKEY

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ABSTRACT:

Within the framework of developing spatial technologies, cadastral systems are evolving, undertaking new vision and roles. Twenty years ago, we only talked about tax cadastre, multipurpose cadastre and legal cadastre, but nowadays land administration and sustainability are in our agenda. In today's understanding, cadastre has become a part of economy, society, justice and social life.

Our society today is being challenged by issues of global scale: economic development, social conflicts, urban growth, rural development, climate change, global warming, carbon credit management, or disaster management, are just a few issues that need careful assessment and sustainable action. In one way or another, all those issues are linked to location, as "everything happens somewhere", i.e. there is a need for effective and efficient geo-information.

There are essentially six key elements required to help realize the vision of spatially enabled society. These are legal framework, data integration, positioning infrastructure, spatial data infrastructure, land ownership information, increasing availability of free to re-use geospatial data. When organizations, cities, and regions understand how mature their geospatial data and processes are, they can begin to meet their objectives-opening up more data, ensuring better transparency, and reducing costs.

This article summarizes spatial maturity as an indicator of the institutional spatial maturation process, and explains the "spatial property system" inquiries completed directly by citizens and other institutions, which have reached 100.000.000 a month on average.

KEY WORDS: Spatial Property System, Map Services, e-Government Services, Orthophoto Services, Spatial Maturity

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SATELLITE AND DRONE IMAGERIY FOR HOUSING DETECTION AND URBAN IMPROVEMENT OF AN INFORMAL SETTLEMENT IN ULAANBAATAR.

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ABSTRACT:

Mongolia has been facing an onslaught of rural migration to the urban areas. Gers or felt tents are the traditional dwelling of nomads in Mongolia. In rural areas they are sustainable structures very well adapted for a rural nomadic society. However, when they are located in high-density unplanned urban slums, they face many issues. These informal urban areas produce pollution, lack sanitation, adequate vehicular access, and other services.

With the advancement of remote sensing technologies, it is possible to understand better this challenge. This research uses satellite imagery of Ulaanbaatar from 2007 and 2017 in order to auto-detect structures using machine learning techniques. Drone imagery produced by the author is used to build a detail map of a specific neighbourhood of the city. Finally, 150 householders surveys recollected by the author are analysed to describe the social and housing conditions in a selected area of the capital. The research found how fast the city is growing as what are the most important housing and urban challenges it is facing. As a conclusion this project propose models of future sustainable growth that will help the concerned authorities to improve the living conditions of its inhabitants.

KEYWORDS: Remote Sensing, Satellite imagery analysis, Ulaanbaatar ger districts, Drone imagery analysis, Householder surveys.

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THE ANALYSIS OF PUBLIC PROPERTY APPLICATION PRINCIPLES AND REGISTRY PROBLEMS IN LAND CONSOLIDATION WORKS IN TURKEY

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ABSTRACT:

This study was conducted to determine the processes that were performed before and after the Land Consolidation (LC) on meadows, summer pastures, winter quarters, pastures and prairies, which are still ongoing in Tomek Neighborhood of Selcuklu County in Konya. In this study, the viewpoints, problems of the actors that played active roles in LC applications (Agricultural Reform General Management (ARGM), land owners, and the companies that run the processes) were investigated; and solution offers were made. The LC works performed in Tomek Neighborhood are run by the Konya Pronuncial Food, Agriculture and Animal Husbandry Management in ERGM under the title of Konya 1 Project. The parcel information of the public properties in these neighborhoods were received from Konya Cadastral Management and the LC data were received from Konya Provincial Food and Animal Husbandry Management. Land Consolidation was performed in an area of 4996 hectares within Tomek neighborhood borders. A total of 821 cadastral parcels and 1888 farmers (businesses) were included in the Land Consolidation. A total of 16 village common properties that had the quality of being meadow were included in the consolidation as 3559763 m² area. After the consolidation project was applied, it was observed that the 16 parcels were converted into 10 parcels. The official correspondence between the relevant institutions for the purpose of shrinking the meadow areas and changing their places were also examined and analyzed in the present study.

KEY WORDS: Meadow, Prairie, Land Consolidation, Characteristics Change, Institution

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INFLUENCE OF RIVERBED CHANGE ON A POSSIBILITY OF FLOODING DURING WATER LEVEL RISE OF THE RIVER KURA

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ABSTRACT:

The study of floods by remote sensing data and GIS technology is necessary for the rapid detection of floods in the populated areas, provision of an early evacuation of the population and implementing correct response measures. This paper has been dedicated to studying the methodology of flood mapping by GIS technology on the basis of processing the taken by Earth observation satellite "AZERSKY/SPOT-6" for the period of 2014-2016. Flood-prone areas at river Kura, Khrami and Debed were identified using software package ENVI 5.2 and ArcGIS version 10.4.1. The initial images have been received in the project «Promotion of Earth remote surveillance services for the sake of sustainable development of Azerbaijan» of Azercosmos OJSCo. This research has been carried out on the basis of software and methodological support of «Processing of the aerospace information» sector of «Aerospace Monitoring» within «Aerospace Monitoring of the Environment» department of National Aviation Academy.

KEY WORDS: RS, DEM, aerospace monitoring, satellite image, freshet, flood, floodplain, riverbed.

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GEOINFORMATION MODELING OF PRODUCTIVITY OF AGRICULTURAL CROPS FOR THE PLANNING OF INNOVATION DEVELOPMENT PURPOSES OF REGIONS OF REPUBLIC OF AZERBAIJAN

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ABSTRACT:

In this work were used methods of geoinformation modeling with using of GIS MAPINFO software, which reflects the dynamics of the development of agriculture on the basis of the annual values of the yield of individual agricultural crops in the regions of Azerbaijan in the digital map form.Geoinformation technologies are successfully used in geographic research to quickly compile natural and socio-economic thematic maps of provinces, regions and republics, which often need updating, due to the nature of the management of natural resources and production.Geoinformation maps are capable of changing at any time, in contradistinction to_traditional maps. This feature of geoinformation maps that allows to quickly solve the problems of agricultural management.The use of a digital cartographic model to study the spatial variability of yields of agricultural crops for the purpose of innovative development of agriculture reveals new opportunities for agricultural development of the territory. Since earlier agriculture developed on the basis of normative documents of land tenure.Thus, the innovative development of agriculture requires a premature consideration of the extreme characteristics of all natural factors in space and time. Taking into account these requirements for innovative development of agriculture, we compiled geoinformation cartographic models for yields of agricultural crops for the territories of all regions of Azerbaijan on the basis of the data of the State Statistical Committee of the Republic of Azerbaijan and the Ministry of Agriculture of the Republic of Azerbaijan for the period 2006-2016:

KEY WORDS: Geoinformation Modeling, Agriculture, Innovative Development, Digital Map, GIS.

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PREDICTION OF HYDRAULIC CONDUCTIVITY IN RELATION TO INFILTRATION RATE IN THE NILE DELTA SOILS

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ABSTRACT:

The vertical and lateral movement of soil water by gravitational forces in the plant-root zone occurs principally through the macro-pores, while the redistribution and upward flow occur in the capillary soil matrix pores. The purpose of this study is to apply derived equations to predict the hydraulic conductivity $K(\theta)$ into capillary-matrix and non-capillary macro pores of soils as well as to predict the capillary-sorption potential (ψ) at moisture adsorption capacity (Wa) and water content (Wi) in cultivated and uncultivated soils. The proposed equations are based on field basic infiltration rate (Ib), water sorptivity (S), and saturated hydraulic conductivity (Ks). Five alluvial (saline and non-saline clay) and calcareous soil profiles were investigated for applying the assumed equations. Water sorptivity was determined at steady infiltration and un-saturation conditions where a decrease in S value was observed with an increase in soil water content. At steady infiltration, S decreased by 35-40% in calcareous soils and by 45-60% in alluvial clay soils. The $K(\theta)$ has been discriminated into saturated macro-pore $K(\theta)$ RDP saturated matrix $K(\theta)$ sh, matrix unsaturated $K(\theta)$ h and lateral $K(\theta)$ L. The value of $K(\theta)$ RDP for macro pores remained higher than those fore soil matrix pores in the studied soils. The highest value of $K(\theta)$ L and $K(\theta)$ h was in calcareous soil profiles, while the lowest value was existed in saline clay soil. The contribution of $K(\theta)$ L to $K(\theta)$ sh was evident in alluvial clay soils with markedly values in non-saline clay soil profiles. The predicted values of capillary-sorption potentials in calcareous cultivated soil with Zea mays were higher than those of uncultivated soil at the same water content.

KEY WORDS: Infiltration, Hydraulic Conductivity, Matrix and Macro Pores, Soil Moisture Potential

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GIS-MAPPING OF SALINE SOILS IN THE BAIKAL REGION

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ABSTRACT:

In the past ten years, saline soils have been increasing in Eastern Siberia, due to global warming and climate aridization. GIS mapping of soils has become a very relevant method for studying the structure of soil cover and saline soils. It determined the need of usage GIS for the processing of remote sensing data, soil maps and field research results. The purpose of our study is the usage of GIS in mapping the saline soils of the Baikal region (Russia, Irkutsk region). Saline soils in the Baikal region are fragmented, most of them are formed in the valleys of large and small rivers of the Angara river basin. Solonchak, solonetz and solod are often found among saline soils. Areas of solonchaks are spread along the shores of saline lakes in the Tazheran steppe in Olkhon region and on the island of Olkhon (Lake Baikal). Since saline soils in the study area are spread locally, their mapping was carried out in key areas: the Kudinskaya depression, the valleys of the Zalarinka and Nukutka rivers, the Tazheranskaya steppe. In Tazheranskaya steppes and on Olkhon the solonchaks are formed around the salt lakes. The qualitative composition solonchaks: Sulfate, Chloride-sulfate, Sulfate - chloride, Chloride. The area of solonchak varies depending on the area of saline lakes. This is also related to the geographical location of the territory and especially to the climatic factor. We analyzed the space images within the study area for the period from 1975 to 2017, using the MapInfo Professional program and various interpretations of the combinations of Landsat data channels. Currently, many lakes have significantly decreased in size or dried out, this has caused an increase in the area of solonchaks. Total allocated 26 lakes total area of 2.03 km². The area of solonchaks is 1.03 km², which is 0.28% of the total area of the Tazheran steppe. In the valley of the river Kuda saline soils: solonchaks and other soils with salt content. They are formed on the lowered elements of the relief in the fallen, hollows of floodplains. Their area is 1,540.38 hectares. Mapping in this area was carried out by digitizing soil maps. Solonchaks and solonetzes are common in the valleys of the Zalarinka and Nukutka rivers. Other saline soils are found in high humidity areas. Places with high humidity are the bottoms of the falls, the outskirts of the marshes, here the ground waters come close to the surface. By creating a map of saline soils in the Baikal region, we are able to monitor the salinity process, considering the primary data as the "point of the report". In the future, the map can be supplemented with data on soils, you can also monitor the change in the area of saline soils and create thematic maps.

KEY WORDS: Soil, Salinization, GIS

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THE USING OF GIS TOOLS ON THE DISTRIBUTION OF SCORPIONS IN SOUTHERN PARTS OF IRAN

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ABSTRACT:

The study in the 9 provinces of Ilam, Khuzestan, Bushehr, Chaharmahal and Bakhtiari, Lorestan, Hormozgan, Kohgiluyeh-Boyer Ahmad, Fars and Kerman was carried out using global positioning system (GPS) location and status of different species Scorpio been determined, then the dispersion map was drawn using ArcGIS 9.3 software. Data layers such as topography, geology, climate (temperature, rainfall and humidity), soil, land cover and users of the provinces were prepared and overlay these maps with the distribution map of various species of scorpions of the influence of each factor the scorpion was found in the peripheral geographical distribution. 32 species collected from the 9 provinces. The species of Kerman, Fars, Kohgiluyeh and Boyer-Ahmad, Bushehr, Hormozgan and Khuzestan reported more species has collected in this study. Maps based on ecological factors indicate that the scorpion Hottentotta saulcyi in Lorestan province, Mesobuthus eupeus phillipsii in the provinces of Khuzestan and Kohgiluyeh and Boyer, M.eupeus persicus in the provinces of Hormozgan and Kerman, Hemiscorpius lepturus in Chaharmahal and Bakhtiari, Buthacus macrocentrus in the province, Odontobuthus bidentatus in Fars province, Compsobuthus matthiesseni in Ilam province in a wide range of classified maps of slope, temperature, precipitation, soil texture, elevation and geology, land cover and scattered. In this study, the effect of environmental parameters on the distribution of various species, and database has been developed that can be used as effective tools in modeling and used to determine associations between species and environment.

KEY WORDS: Ecological Factors, Geographic Information Systems (GIS), Scorpions, Distribution

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GEOGRAPHIC INFORMATION SYSTEMS USE IN ENVIRONMENTAL IMPACT EVALUATION

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ABSTRACT:

This article deals with the geographical information systems and their role in assessing and protecting the environment. When it comes to GIS environmental modelling applications, in many respects GIS software can be considered comparable to a programming language. Unfortunately, however, the typical environmental GIS users are focused on environmental issues and only rarely do they have the additional technical knowledge necessary to develop new GIS applications. As a consequence, most domain experts are forced to work with GIS that have predefined underlying data structures and 'standard' interfaces.

KEY WORDS: GIS, Analysis Systems, Comparison of Alternatives, Technical Knowledge, Environmental Impact, Domain Experts, Crisis Management

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EFFECTS OF THE LAND LOCATION AND TOPOGRAPHY IN THE SOLAR POWER PLANT INSTALLATION: THE EAST MEDITERRANEAN EXAMINATION

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ABSTRACT:

Besides the dependence on foreign energy in Turkey, the Kyoto protocol should have been accelerated in the whole world and our country's greenhouse gas emission reduction efforts. For these reasons, in recent years Turkey has also made serious studies on the evaluation process that began with renewable clean energy resources .. hydro power plants, wind power plants and continues with solar power plants.

While hydroelectric power plants and wind power plants do not contain much land use, solar energy plants are subject to less land planning legislation than solar power plants, while solar power plant facilities require a facility spread over the land and use of large land parts. For this reason, it is a project work that deals with many public institutions. Agriculture, Forestry, National real estate, municipality, many institutions are institutions related to solar energy power plant operation.

Turkey is a country with high potential for solar energy in particular, it is encouraged by the state investments this issue and are given power purchase guarantee. For this reason, the private sector is increasing its investment in this subject.

In this study, the project which is being done in three different regions in the Eastern Mediterranean region of Adana and Osmaniye provinces is examined from the high potential areas of solar energy. solar energy plant plants to be installed; the land slope, the distance to the transformer center and the geometric shape of the distance parcel were compared according to the evaluations and an idea was made about the idea of the location of the solar energy power plant project.

KEY WORDS: Eastern Mediterranean, Solar energy plant, Osmaniye, Adana

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REVIEWING "THE ACT ABOUT TRANSFORMATION OF THE AREAS UNDER DISASTER RISK (LAW NO. 6306)" OF TURKIYE IN TERMS OF ITS CONTENT AND PRACTICE PROBLEMS

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ABSTRACT:

Law No. 6306, which is named as Act about Transformation of the Areas Under Disaster Risk, is the last legislation enacted in order to regulate urban transformation projects in Turkiye. The law became valid after being published in Resmi Gazete (Official Gazette) numbered 28309 on May 31th, 2012. In literature aside from the term 'transformation', there are several others to describe the process that the cities undergone such as renaissance, rejuvenation, renewal, revitalization, regeneration. In all these forms of urban transformation, if the process involves any kind of exclusion or displacement, the practice turns out to be a gentrification which is not a desired result of the transformation projects. Although the Law No. 6306 appears as a regulation towards the areas prone to disasters as highlighted in its title, its extent is beyond that as stated in the first and second articles of the law. In this study, at first some explanations have been given to clarify what is meant by urban transformation. Following that, some papers published on urban transformation projects have been discussed. In the ongoing sections, the issues open to criticism in Law No. 6306 have been argued and solution recommendations have been given. Law No. 6306 have been criticized regarding its content and practice problems, mainly for the provisions about urgent expropriation decisions, owners' rights, authorized bodies to decide on the buildings under risk, and the powers that the Ministry of Environment and Urbanization of Turkish Republic have on urban transformation projects.

KEY WORDS: Urban Transformation, Regeneration, Disaster, Gentrification, Urgent Expropriation, Law No. 6306

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MEASURES AND PROPOSALS ON TURNING THE VALUE INCREASE TO THE PUBLIC ON URBAN RENEWAL AREAS BY URBAN SETTLEMENT PLAN

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ABSTRACT:

Real Estate as a means of social wealth has an important place in terms of spatial usage diversity and is shaped by urban planning tools and is subject to maturity and value increase. It is the public tools which provide increasing value, and the public should get a share from this increase. Transferring the value increase to the public instead of giving it to the parcel owner is important either for strengthening the local administrations by creating land stock or raising the welfare of the society. However, it is still a controversial issue on Turkey's agenda how this obtained value increase should be transferred to the public.

In this paper, turning the value increase to the public on urban renewal areas of existing settlement units by changing development plan has been studied.

KEY WORDS: Urban Settlement, Urban Renewal, Value Increase.

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ASSESSMENT OF FLOOD POTENTIALS OF RIVER BASINS IN SW TURKEY USING HYDROMORPHOMETRIC INDICES

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ABSTRACT:

The flood potentials of the Namnam, Dalaman and Esen river drainage basins located in southwest Anatolia and reaching to the Mediterranean Sea have been evaluated using hydromorphometric approach. Digital elevation models (DEMs) obtained from ASTER GDEM and SRTM data were used for the implementation of these methods, and index calculations were performed in Geographic Information Systems (GIS). The studied drainage basins cover an area of approximately 8600 km2 in southwest Turkey within the provinces of Muğla, Denizli, Burdur and Antalya. According to the meteorological data, mean precipitation values are as 80.6 mm/m2 for the Dalaman river basin, 89.7 mm/m2 for the Namnam stream drainage basin and 68 mm/m2 for the Esen river basin. In spite of these rates, it is known that the region has been flooded with intense floods in the past and today. The most important feature of this region in terms of socioeconomics is the importance of tourism and agriculture. For these reasons it is necessary to assess the flood and deluge potential of the region. As a result of the hydromorphometric analyses we conducted within the scope of the study, it was evaluated that the flood risk was relatively high for the Namnam stream drainage basin because the values were lower than the mean bifurcation rates in the 4th and 6th grade streams according to the Strahler classification. While this risk is seen in the 4th grade streams for the Esen river basin, was found in the 6th and 7th grade streams for the the Dalaman river drainage basin. However, the existing 4 dams constructed on the Dalaman river control the streamflow. In addition, we suggested the risk of flooding in the upper part of the Dalaman river basin decreases due to relatively low amount of precipitation. Roughness, length and circularity ratios and hypsometric integral values calculated for basins also supported these results. As a result, when geologic, climatologic and hydromorphometric data are evaluated together; the decrease in precipitation in the upper parts of the Dalaman river drainage basin and the dams built on the river reduce the flood risk. The Esen river basin is more suitable for torrents than floods due to the high relief rate on the main stream channel. It can be said that the Namnam stream basin has relatively high potential flood risk within the scope of hydromorphometric analyses.

This study was supported by the Scientific and Technological Research Council of Turkey (TÜBİTAK, Project No: 117Y017).

KEY WORDS: Hydromorphometry, southwest Anatolia, fluvial geomorphology, Geographic Information Systems

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