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Remote Sensing and Geosciences for Archaeology - Deodato Tapete 2018-04-27

This book is a printed edition of the Special Issue "Remote Sensing and Geosciences for Archaeology" that was published in Geosciences **Rock Mechanics: Meeting Society's Challenges and Demands, Two Volume Set** - Erik Eberhardt 2007-05-17

Ore extraction through surface and underground mining continues to involve deeper excavations in more complex rock mass conditions.

Communities and infrastructure are increasingly exposed to rock slope hazards as they expand further into rugged mountainous terrains.

Energy needs are accelerating the development of new hydroelectric dams and exploit Operationalization of Remote Sensing Solutions for Sustainable Forest Management - Gintautas Mozgeris 2021-06-02

The great potential of remote sensing technologies for operational use in sustainable forest management is addressed in this book, which is the reprint of papers published in the Remote Sensing Special Issue "Operationalization of Remote Sensing Solutions for Sustainable Forest Management". The studies come from three continents and cover multiple remote sensing systems (including terrestrial mobile laser scanning, unmanned aerial vehicles, airborne laser scanning, and satellite data acquisition) and a diversity of data processing algorithms, with a focus on machine learning approaches. The focus of the studies ranges from identification and characterization

of individual trees to deriving national- or even continental-level forest attributes and maps.

There are studies carefully describing exercises on the case study level, and there are also studies introducing new methodologies for transdisciplinary remote sensing applications. Even though most of the authors look forward to continuing their research, nearly all studies introduced are ready for operational use or have already been implemented in practical forestry.

Advances in Remote Sensing for Global Forest Monitoring - Erkki Tomppo 2021-09-01

The topics of the book cover forest parameter estimation, methods to assess land cover and change, forest disturbances and degradation, and forest soil drought estimations. Airborne laser scanner data, aerial images, as well as data from passive and active sensors of different spatial, spectral and temporal resolutions have been utilized. Parametric and non-parametric methods including machine and deep learning methods have been employed. Uncertainty estimation is a key topic in each study. In total, 15 articles are included, of which one is a review article dealing with methods employed in remote sensing aided greenhouse gas inventories, and one is the Editorial summary presenting a short review of each article.

Contributions to International Conferences on Engineering Surveying - Alojz Kopáček 2020-10-19

This book presents contributions from the joint event 8th INGeo International Conference on Engineering Surveying and 4th SIG Symposium

on Engineering Geodesy, which was planned to be held in Dubrovnik, Croatia, on April 1–4, 2020 and was canceled due to COVID-19 pandemic situation. Editors, in cooperation with the Local Organisers, are decided to organize the Conference on-line at October 22-23, 2020. We would like to invite you to participation through <http://ingeo-sig2020.hgd1952.hr/index.php/2020/08/31/ingeosig2020-virtual-conference-october-22-23-2020/>. The event brought together professionals in the fields of civil engineering and engineering surveying to discuss new technologies, their applicability, and operability.

Applications of Remote Sensing Data in Mapping of Forest Growing Stock and Biomass - José Aranha 2021-09-01

This Special Issue (SI), entitled "Applications of Remote Sensing Data in Mapping of Forest Growing Stock and Biomass", resulted from 13 peer-reviewed papers dedicated to Forestry and Biomass mapping, characterization and accounting. The papers' authors presented improvements in Remote Sensing processing techniques on satellite images, drone-acquired images and LiDAR images, both aerial and terrestrial. Regarding the images' classification models, all authors presented supervised methods, such as Random Forest, complemented by GIS routines and biophysical variables measured on the field, which were properly georeferenced. The achieved results enable the statement that remote imagery could be successfully used as a data source for regression analysis and formulation and, in this way, used in forestry actions such as canopy structure analysis and mapping, or to estimate biomass. This collection of papers, presented in the form of a book, brings together 13 articles covering various forest issues and issues in forest biomass calculation, constituting an important work manual for those who use mixed GIS and RS techniques.

Remote Sensing of Geomorphology - 2020-05-04
Remote Sensing of Geomorphology, Volume 23, discusses the new range of remote-sensing techniques (lidar, structure from motion photogrammetry, advanced satellite platforms) that has led to a dramatic increase in terrain information, and as such provided new opportunities for a better understanding of surface morphology and related Earth surface

processes. As several papers have been published (including paper reviews and special issues) on this topic, this book summarizes the major advances in remote sensing techniques for the analysis of Earth surface morphology and processes, also highlighting future challenges. Useful for MSc and PhD students, this book is also ideal for any scientists that want to have a single volume guideline to help them develop new ideas. In addition, technicians and private and public sectors working on remote sensing will find the information useful to their initiatives. Provides a useful guideline for MSc and PhD students, scientists, technicians, and land planners on the use of remote sensing in geomorphology Includes applications on specific case studies that highlight issues and benefits of one technique compared to others Presents future trends in remote sensing and geomorphology

3D Remote Sensing Applications in Forest Ecology - Hooman Latifi 2019-11-19

Dear Colleagues, The composition, structure and function of forest ecosystems are the key features characterizing their ecological properties, and can thus be crucially shaped and changed by various biotic and abiotic factors on multiple spatial scales. The magnitude and extent of these changes in recent decades calls for enhanced mitigation and adaption measures. Remote sensing data and methods are the main complementary sources of up-to-date synoptic and objective information of forest ecology. Due to the inherent 3D nature of forest ecosystems, the analysis of 3D sources of remote sensing data is considered to be most appropriate for recreating the forest's compositional, structural and functional dynamics. In this Special Issue of Forests, we published a set of state-of-the-art scientific works including experimental studies, methodological developments and model validations, all dealing with the general topic of 3D remote sensing-assisted applications in forest ecology. We showed applications in forest ecology from a broad collection of method and sensor combinations, including fusion schemes. All in all, the studies and their focuses are as broad as a forest's ecology or the field of remote sensing and, thus, reflect the very diverse usages and directions toward which future research and practice will be directed.

Terrigenous Mass Movements - Biswajeet Pradhan 2012-04-02

Terrestrial mass movements (i.e. cliff collapses, soil creeps, mudflows, landslides etc.) are severe forms of natural disasters mostly occurring in mountainous terrain, which is subjected to specific geological, geomorphological and climatological conditions, as well as to human activities. It is a challenging task to accurately define the position, type and activity of mass movements for the purpose of creating inventory records and potential vulnerability maps.

Remote sensing techniques, in combination with Geographic Information System tools, allow state-of-the-art investigation of the degree of potential mass movements and modeling surface processes for hazard and risk mapping.

Similarly, through statistical prediction models, future mass-movement-prone areas can be identified and damages can to a certain extent be minimized. Issues of scale and selection of morphological attributes for the scientific analysis of mass movements call for new developments in data modeling and spatio-temporal GIS analysis. The book is a product of a cooperation between the editors and several contributing authors, addressing current issues and recent developments in GI technology and mass movements research. Its fundamental treatment of this technology includes data modeling, topography, geology, geomorphology, remote sensing, artificial neural networks, binomial regression, fuzzy logic, spatial statistics and analysis, and scientific visualization. Both theoretical and practical issues are addressed.

Proceedings of the International Conference on ISMAC in Computational Vision and Bio-Engineering 2018 (ISMAC-CVB) - Durai Pandian 2019-01-01

These are the proceedings of the International Conference on ISMAC-CVB, held in Palladam, India, in May 2018. The book focuses on research to design new analysis paradigms and computational solutions for quantification of information provided by object recognition, scene understanding of computer vision and different algorithms like convolutional neural networks to allow computers to recognize and detect objects in images with unprecedented accuracy and to even understand the relationships between them. The proceedings

treat the convergence of ISMAC in Computational Vision and Bioengineering technology and includes ideas and techniques like 3D sensing, human visual perception, scene understanding, human motion detection and analysis, visualization and graphical data presentation and a very wide range of sensor modalities in terms of surveillance, wearable applications, home automation etc. ISMAC-CVB is a forum for leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of computational vision and bioengineering.

Intelligent Systems for Crisis Management - Orhan Altan 2019-02-06

In the past several years, there have been significant technological advances in the field of crisis response. However, many aspects concerning the efficient collection and integration of geo-information, applied semantics and situation awareness for disaster management remain open. Improving crisis response systems and making them intelligent requires extensive collaboration between emergency responders, disaster managers, system designers and researchers alike. To facilitate this process, the Gi4DM (GeoInformation for Disaster Management) conferences have been held regularly since 2005. The events are coordinated by the Joint Board of Geospatial Information Societies (JB GIS) and ICSU GeoUnions. This book presents the outcomes of the Gi4DM 2018 conference, which was organised by the ISPRS-URSI Joint Working Group ICWG III/IVa: Disaster Assessment, Monitoring and Management and held in Istanbul, Turkey on 18-21 March 2018. It includes 12 scientific papers focusing on the intelligent use of geo-information, semantics and situation awareness.

Human Remains: Another Dimension - Tim Thompson 2017-02-16

Human Remains - Another Dimension: The Application of 3D Imaging in the Funerary Context brings together scattered literature on the topic, assimilating disparate pieces that relate to the novel use of non-invasive three-dimensional imaging techniques in the forensic context. All chapters are written by specialists in the field who use these types of imaging

techniques within their research, bringing an engaging and comprehensive view that demonstrates the current use of 3D non-invasive imaging techniques using case studies. In addition, the advantages for using such methods, their current limitations, and possible solutions are also reviewed. Includes three dimensional imaging techniques presented from a forensics point-of-view Written by well-renowned specialists in the field Assimilates disparate pieces that relate to the novel use of non-invasive three-dimensional imaging techniques [Proceedings of the 13th International Scientific Conference](#) - Eugeniusz Rusiński 2017-03-27 These proceedings of the 13th International Conference on Computer Aided Engineering present selected papers from the event, which was held in Polanica Zdrój, Poland, from June 22 to 25, 2016. The contributions are organized according to thematic sections on the design and manufacture of machines and technical systems; durability prediction; repairs and retrofitting of power equipment; strength and thermodynamic analyses for power equipment; design and calculation of various types of load-carrying structures; numerical methods for dimensioning materials handling; and long-distance transport equipment. The conference and its proceedings offer a major interdisciplinary forum for researchers and engineers to present the most innovative studies and advances in this dynamic field.

Structural Health Monitoring Based on Data Science Techniques - Alexandre Cury 2021-10-23

The modern structural health monitoring (SHM) paradigm of transforming in situ, real-time data acquisition into actionable decisions regarding structural performance, health state, maintenance, or life cycle assessment has been accelerated by the rapid growth of “big data” availability and advanced data science. Such data availability coupled with a wide variety of machine learning and data analytics techniques have led to rapid advancement of how SHM is executed, enabling increased transformation from research to practice. This book intends to present a representative collection of such data science advancements used for SHM applications, providing an important contribution for civil engineers, researchers, and

practitioners around the world.

Land Resources Monitoring, Modeling, and Mapping with Remote Sensing - Ph.D., Prasad S. Thenkabail 2015-10-02

A volume in the three-volume Remote Sensing Handbook series, Land Resources Monitoring, Modeling, and Mapping with Remote Sensing documents the scientific and methodological advances that have taken place during the last 50 years. The other two volumes in the series are Remotely Sensed Data Characterization, Classification, and Accuracies, and Remo

Innovative Methods and Materials in Structural Health Monitoring of Civil Infrastructures - Raffaele Zinno 2021-09-02

In the past, when elements in structures were composed of perishable materials, such as wood, the maintenance of houses, bridges, etc., was considered of vital importance for their safe use and to preserve their efficiency. With the advent of materials such as reinforced concrete and steel, given their relatively long useful life, periodic and constant maintenance has often been considered a secondary concern. When it was realized that even for structures fabricated with these materials that the useful life has an end and that it was being approached, planning maintenance became an important and non-negligible aspect. Thus, the concept of structural health monitoring (SHM) was introduced, designed, and implemented as a multidisciplinary method. Computational mechanics, static and dynamic analysis of structures, electronics, sensors, and, recently, the Internet of Things (IoT) and artificial intelligence (AI) are required, but it is also important to consider new materials, especially those with intrinsic self-diagnosis characteristics, and to use measurement and survey methods typical of modern geomatics, such as satellite surveys and highly sophisticated laser tools.

Sensor Signal and Information Processing II - Wai Lok Woo 2020-12-29

In the current age of information explosion, newly invented technological sensors and software are now tightly integrated with our everyday lives. Many sensor processing algorithms have incorporated some forms of computational intelligence as part of their core framework in problem solving. These algorithms

have the capacity to generalize and discover knowledge for themselves and learn new information whenever unseen data are captured. The primary aim of sensor processing is to develop techniques to interpret, understand, and act on information contained in the data. The interest of this book is in developing intelligent signal processing in order to pave the way for smart sensors. This involves mathematical advancement of nonlinear signal processing theory and its applications that extend far beyond traditional techniques. It bridges the boundary between theory and application, developing novel theoretically inspired methodologies targeting both longstanding and emergent signal processing applications. The topic ranges from phishing detection to integration of terrestrial laser scanning, and from fault diagnosis to bio-inspired filtering. The book will appeal to established practitioners, along with researchers and students in the emerging field of smart sensors processing.

3D Digital Geological Models - Andrea Bistacchi
2022-04-05

3D DIGITAL GEOLOGICAL MODELS Discover the practical aspects of modeling techniques and their applicability on both terrestrial and extraterrestrial structures A wide overlap exists in the methodologies used by geoscientists working on the Earth and those focused on other planetary bodies in the Solar System. Over the course of a series of sessions at the General Assemblies of the European Geosciences Union in Vienna, the intersection found in 3D characterization and modeling of geological and geomorphological structures for all terrestrial bodies in our solar system revealed that there are similar datasets and common techniques for the study of all planets—Earth and beyond—from a geological point-of-view. By looking at Digital Outcrop Models (DOMs), Digital Elevation Models (DEMs), or Shape Models (SM), researchers may achieve digital representations of outcrops, topographic surfaces, or entire small bodies of the Solar System, like asteroids or comet nuclei. 3D Digital Geological Models: From Terrestrial Outcrops to Planetary Surfaces has two central objectives, to highlight the similarities that geological disciplines have in common when applied to entities in the Solar

System, and to encourage interdisciplinary communication and collaboration between different scientific communities. The book particularly focuses on analytical techniques on DOMs, DEMs and SMs that allow for quantitative characterization of outcrops and geomorphological features. It also highlights innovative 3D interpretation and modeling strategies that allow scientists to gain new and more advanced quantitative results on terrestrial and extraterrestrial structures. 3D Digital Geological Models: From Terrestrial Outcrops to Planetary Surfaces readers will also find: The first volume dedicated to this subject matter that successfully integrates methodology and applications A series of methodological chapters that provide instruction on best practices involving DOMs, DEMs, and SMs A wide range of case studies, including small- to large-scale projects on Earth, Mars, the 67P/Churyumov-Gerasimenko comet, and the Moon Examples of how data collected at surface can help reconstruct 3D subsurface models 3D Digital Geological Models: From Terrestrial Outcrops to Planetary Surfaces is a useful reference for academic researchers in earth science, structural geology, geophysics, petroleum geology, remote sensing, geostatistics, and planetary scientists, and graduate students studying in these fields. It will also be of interest for professionals from industry, particularly those in the mining and hydrocarbon fields. *Landslides and Engineered Slopes. Experience, Theory and Practice* - Stefano Aversa 2018-04-17 *Landslides and Engineered Slopes. Experience, Theory and Practice* contains the invited lectures and all papers presented at the 12th International Symposium on Landslides, (Naples, Italy, 12-19 June 2016). The book aims to emphasize the relationship between landslides and other natural hazards. Hence, three of the main sessions focus on Volcanic-induced landslides, Earthquake-induced landslides and Weather-induced landslides respectively, while the fourth main session deals with Human-induced landslides. Some papers presented in a special session devoted to "Subareal and submarine landslide processes and hazard" and in a "Young Session" complete the books. *Landslides and Engineered Slopes. Experience, Theory and Practice* underlines the importance

of the classic approach of modern science, which moves from experience to theory, as the basic instrument to study landslides. Experience is the key to understand the natural phenomena focusing on all the factors that play a major role. Theory is the instrument to manage the data provided by experience following a mathematical approach; this allows not only to clarify the nature and the deep causes of phenomena but mostly, to predict future and, if required, manage similar events. Practical benefits from the results of theory to protect people and man-made works. Landslides and Engineered Slopes. Experience, Theory and Practice is useful to scientists and practitioners working in the areas of rock and soil mechanics, geotechnical engineering, engineering geology and geology.

Advances and Trends in Geodesy, Cartography and Geoinformatics II - Soňa Molčíková 2020-04-01

This volume contains a selection of peer-reviewed papers presented at the International Scientific and Professional Conference Geodesy, Cartography and Geoinformatics 2019 (GCG 2019). The conference provided a forum for prominent scientists, researchers and professionals from Slovakia, Poland and the Czech Republic to present novel and fundamental advances in the fields of geodesy, cartography and geoinformatics. Conference participants had the opportunity to exchange and share their experiences, research and results solved within scientific research projects with other colleagues. The conference was focused on a wide spectrum of actual topics and subjects areas in Surveying and mine surveying, Geodetic control and geodynamics and Cartography and Geoinformatics collected in this proceedings volume. The Book Series "Advances and Trends in Geodesy, Cartography and Geoinformatics" is, in line with its long tradition, devoted to the publication of proceedings of peer-reviewed international conferences focusing on presenting technological and scientific advances in modern geodesy, geoinformatics, cartography, photogrammetry, remote sensing, geography, and related sciences. It plays an extremely important role in accelerating the development of all these disciplines, stimulating advanced education and training through the wide dissemination of new

scientific knowledge and trends in Geodesy, Cartography and Geoinformatics to a broad group of scientists and specialists.

Modern Technologies for Landslide Monitoring and Prediction - Marco Scaioni 2016-10-06

Modern Technologies for Landslide Investigation and Prediction presents eleven contributed chapters from Chinese and Italian authors, as a follow-up of a bilateral workshop held in Shanghai on September 2013. Chapters are organized in three main parts: ground-based monitoring techniques (photogrammetry, terrestrial laser scanning, ground-based InSAR, infrared thermography, and GNSS networks), geophysical (passive seismic sensor networks) and geotechnical methods (SPH and SLIDE), and satellite remote-sensing techniques (InSAR and optical images). Authors of these contributes are internationally-recognized experts in their respective research fields. Marco Scaioni works in the college of Surveying and Geo-Informatics at Tongji University, Shanghai (P.R. China). His research fields are mainly Close-range Photogrammetry, Terrestrial Laser Scanning, and other ground-based sensors for metrological and deformation monitoring applications to structural engineering and geosciences. In the period 2012-2016 he is chairman of the Working Group V/3 in the International Society for Photogrammetry and Remote Sensing, focusing on 'Terrestrial 3D Imaging and Sensors'.

Image Analysis and Recognition - Fakhri Karray 2017-06-19

This book constitutes the thoroughly refereed proceedings of the 14th International Conference on Image Analysis and Recognition, ICIAR 2017, held in Montreal, QC, Canada, in July 2017. The 73 revised full papers presented were carefully reviewed and selected from 133 submissions. The papers are organized in the following topical sections: machine learning in image recognition; machine learning for medical image computing; image enhancement and reconstruction; image segmentation; motion and tracking; 3D computer vision; feature extraction; detection and classification; biomedical image analysis; image analysis in ophthalmology; remote sensing; applications.

Sustainable Buildings and Structures: Building a Sustainable Tomorrow - Konstantinos Papadikis

2019-09-26

Sustainable Buildings and Structures: Building a Sustainable Tomorrow collects the contributions presented at the 2nd International Conference on Sustainable Buildings and Structures (Suzhou, China, 25-27 October 2019). The papers aim at sharing the state-of-the-art on sustainable approaches to engineering design and construction, and cover a wide range of topics: Sustainable Construction Materials Sustainable Design in Built Environment Green and Low Carbon Buildings Smart Construction and Construction Management Sustainable Buildings and Structures: Building a Sustainable Tomorrow will be of interest to academics, professionals, industry representatives and local government officials involved in civil engineering, architecture, urban planning, structural engineering, construction management and other related fields.

Earth Observations for Geohazards - Zhenhong Li 2018-07-05

This book is a printed edition of the Special Issue "Earth Observations for Geohazards" that was published in Remote Sensing)

Remote Sensing of Natural Resources - Guangxing Wang 2013-07-12

Highlighting new technologies, Remote Sensing of Natural Resources explores advanced remote sensing systems and algorithms for image processing, enhancement, feature extraction, data fusion, image classification, image-based modeling, image-based sampling design, map accuracy assessment and quality control. It also discusses their applications for

Precision agriculture '13 - John V. Stafford 2013-07-01

Precision agriculture is now 'main stream' in agriculture and is playing a key role as the industry comes to terms with the environment, market forces, quality requirements, traceability, vehicle guidance and crop management. Research continues to be necessary and needs to be reported and disseminated to a wide audience. This book contains peer reviewed papers presented at the 9th European Conference on Precision Agriculture, held in Lleida, Spain. The papers reflect the wide range of disciplines that impinge on precision agriculture: technology, crop science, soil science, agronomy, information

technology, decision support, remote sensing and others. The broad range of research topics reported will be a valuable resource for researchers, advisors, teachers and professionals in agriculture long after the conference has finished.

Computational Science and Its Applications

- **ICCSA 2021** - Osvaldo Gervasi 2021-09-10

The ten-volume set LNCS 12949 - 12958 constitutes the proceedings of the 21st International Conference on Computational Science and Its Applications, ICCSA 2021, which was held in Cagliari, Italy, during September 13 - 16, 2021. The event was organized in a hybrid mode due to the Covid-19 pandemic. The 466 full and 18 short papers presented in these books were carefully reviewed and selected from 1588 submissions. Part VII of the set includes the proceedings of the following workshops: International Workshop on Geomatics for Resource Monitoring and Management (GRMM 2021); International Workshop on Geomatics in Agriculture and Forestry: new advances and perspectives (Geo-for-Agr 2021); 12th International Symposium on Software Quality (SQ 2021); 10th International Workshop on Collective, Massive and Evolutionary Systems (IWCES 2021); International Workshop on Land Use monitoring for Sustainability (LUMS 2021); International Workshop on Machine Learning for Space and Earth Observation Data (MALSEOD 2021); International Workshop on Building multi-dimensional models for assessing complex environmental systems (MES 2021); International Workshop on Ecosystem Services: nature's contribution to people in practice. Assessment frameworks, models, mapping, and implications (NC2P 2021).

Natural Hazards - Ramesh Singh 2018-03-22

Over the years, the interactions between land, ocean, biosphere and atmosphere have increased, mainly due to population growth and anthropogenic activities, which have impacted the climate and weather conditions at local, regional and global scales. Thus, natural hazards related to climate changes have significantly impacted human life and health on different spatio-temporal scales and with socioeconomic bearings. To monitor and analyze natural hazards, satellite data have been widely used in recent years by many developed and developing

countries. In an effort to better understand and characterize the various underlying processes influencing natural hazards, and to carry out related impact assessments, *Natural Hazards: Earthquakes, Volcanoes, and Landslides*, presents a synthesis of what leading scientists and other professionals know about the impacts and the challenges when coping with climate change. Combining reviews of theories and methods with analysis of case studies, the book gives readers research information and analyses on satellite geophysical data, radar imaging and integrated approaches. It focuses also on dust storms, coastal subsidence and remote sensing mapping. Some case studies explore the roles of remote sensing related to landslides and volcanoes. Overall, improved understanding of the processes leading to these hazardous events will help scientists predict their occurrence. Features Provides information on the physics and physical processes of natural hazards, their monitoring and the mapping of damages associated with these hazards Explains how natural hazards are strongly associated with coupling between land-ocean-atmosphere Includes a comprehensive overview of the role of remote sensing in natural hazards worldwide Examines risk assessment in urban areas through numerical modelling and geoinformation technologies Demonstrates how data analysis can be used to aid in prediction and management of natural hazards

Data Analytics for Smart Cities - Amir Alavi
2018-10-26

The development of smart cities is one of the most important challenges over the next few decades. Governments and companies are leveraging billions of dollars in public and private funds for smart cities. Next generation smart cities are heavily dependent on distributed smart sensing systems and devices to monitor the urban infrastructure. The smart sensor networks serve as autonomous intelligent nodes to measure a variety of physical or environmental parameters. They should react in time, establish automated control, and collect information for intelligent decision-making. In this context, one of the major tasks is to develop advanced frameworks for the interpretation of the huge amount of information provided by the emerging testing and monitoring systems. Data

Analytics for Smart Cities brings together some of the most exciting new developments in the area of integrating advanced data analytics systems into smart cities along with complementary technological paradigms such as cloud computing and Internet of Things (IoT). The book serves as a reference for researchers and engineers in domains of advanced computation, optimization, and data mining for smart civil infrastructure condition assessment, dynamic visualization, intelligent transportation systems (ITS), cyber-physical systems, and smart construction technologies. The chapters are presented in a hands-on manner to facilitate researchers in tackling applications. Arguably, data analytics technologies play a key role in tackling the challenge of creating smart cities. Data analytics applications involve collecting, integrating, and preparing time- and space-dependent data produced by sensors, complex engineered systems, and physical assets, followed by developing and testing analytical models to verify the accuracy of results. This book covers this multidisciplinary field and examines multiple paradigms such as machine learning, pattern recognition, statistics, intelligent databases, knowledge acquisition, data visualization, high performance computing, and expert systems. The book explores new territory by discussing the cutting-edge concept of Big Data analytics for interpreting massive amounts of data in smart city applications.

Gravel-Bed Rivers - Daizo Tsutsumi 2017-04-27
With contributions from key researchers across the globe, and edited by internationally recognized leading academics, *Gravel-bed Rivers: Processes and Disasters* presents the definitive review of current knowledge of gravel-bed rivers. Continuing an established and successful series of scholarly reports, this book consists of the papers presented at the 8th International Gravel-bed Rivers Workshop. Focusing on all the recent progress that has been made in the field, subjects covered include flow, physical modeling, sediment transport theory, techniques and instrumentation, morphodynamics and ecological topics, with special attention given to aspects of disasters relevant to sediment supply and integrated river management. This up-to-date compendium is essential reading for geomorphologists, river

engineers and ecologists, river managers, fluvial sedimentologists and advanced students in these fields.

Applications of Geomatics in Civil Engineering - Jayanta Kumar Ghosh 2019-06-19

This book comprises select proceedings of the First International Conference on Geomatics in Civil Engineering (ICGCE 2018). This book presents latest research on applications of geomatics engineering in different domains of civil engineering, like structural engineering, geotechnical engineering, hydraulic and water resources engineering, environmental engineering and transportation engineering. It also covers miscellaneous applications of geomatics in a wide range of technical and societal problems making use of geospatial information, engineering principles, and relational data structures involving measurement sciences. The book proves to be very useful for the scientific and engineering community working in the field of geomatics and geospatial technology.

Springer Handbook of Geographic

Information - Wolfgang Kresse 2012-02-21

Computer science provides a powerful tool that was virtually unknown three generations ago. Some of the classical fields of knowledge are geodesy (surveying), cartography, and geography. Electronics have revolutionized geodetic methods. Cartography has faced the dominance of the computer that results in simplified cartographic products. All three fields make use of basic components such as the Internet and databases. The Springer Handbook of Geographic Information is organized in three parts, Basics, Geographic Information and Applications. Some parts of the basics belong to the larger field of computer science. However, the reader gets a comprehensive view on geographic information because the topics selected from computer science have a close relation to geographic information. The Springer Handbook of Geographic Information is written for scientists at universities and industry as well as advanced and PhD students.

Topographic Laser Ranging and Scanning - Jie Shan 2018-02-19

Topographic Laser Ranging and Scanning, Second Edition, provides a comprehensive discussion of topographic LiDAR principles,

systems, data acquisition, and data processing techniques. This edition presents an introduction and summary of various LiDAR systems and their principles and addresses the operational principles of the different components and ranging methods of LiDAR systems. It discusses the subsequent geometric processing of LiDAR data, with particular attention to quality, accuracy, and meeting standards and addresses the theories and practices of information extraction from LiDAR data, including terrain surface generation, forest inventory, orthoimage generation, building reconstruction, and road extraction. Written by leaders in the field, this comprehensive compilation is a must-have reference book for senior undergraduate and graduate students majoring or working in diverse disciplines, such as geomatics, geodesy, natural resources, urban planning, computer vision, and computer graphics. It is also vital resource for researchers who are interested in developing new methods and need in-depth knowledge of laser scanning and data processing and other professionals may gain the same from the broad topics addressed in this book. New in the Second Edition: A comprehensive array of new laser ranging and scanning technologies. Developments in LiDAR data format and processing techniques. Regrouping of surface modeling, representations and reconstruction. Enhanced discussions on the principles and fundamentals beyond small-footprint pulsed laser systems and new application examples. Many new examples and illustrations.

Service-Oriented Mapping - Jürgen Döllner 2018-06-07

This book gathers various perspectives on modern map production. Its primary focus is on the new paradigm of "sharing and reuse," which is based on decentralized, service-oriented access to spatial data sources. Service-Oriented Mapping is one of the main paradigms used to embed big data and distributed sources in modern map production, without the need to own the sources. To be stable and reliable, this architecture requires specific frameworks, tools and procedures. In addition to the technological structures, organizational aspects and geographic information system (GIS) capabilities provide powerful tools to make modern geoinformation management successful.

Addressing a range of aspects, including the implementation of the semantic web in geoinformatics, using big data for geospatial visualization, standardization initiatives, and the European spatial data infrastructure, the book offers a comprehensive introduction to decentralized map production. .

Spatial Big Data, BIM and advanced GIS for Smart Transformation - Sara Shirowzhan
2020-12-02

This book covers a range of topics including selective technologies and algorithms that can potentially contribute to developing an intelligent environment and smarter cities. While the connectivity and efficiency of smart cities is important, the analysis of the impact of construction development and large projects in the city is crucial to decision and policy makers, before the project is approved. This book also presents an agenda for future investigations to address the need for advanced tools such as mobile scanners, Geospatial Artificial Intelligence, Unmanned Aerial Vehicles, Geospatial Augmented Reality apps, Light Detection, and Ranging in smart cities. Some of selected specific tools presented in this book are as a simulator for improving the smart parking practices by modelling drivers with activity plans, a bike optimization algorithm to increase the efficiency of bike stations, an agent-based model simulation of human mobility with the use of mobile phone datasets. In addition, this book describes the use of numerical methods to match the network demand and supply of bicycles, investigate the distribution of railways using different indicators, presents a novel algorithm of direction-aware continuous moving K-nearest neighbor queries in road networks, and presents an efficient staged evacuation planning algorithm for multi-exit buildings.

Morphological Plant Modeling: Unleashing Geometric and Topological Potential within the Plant Sciences - Alexander Bucksch
2017-10-13

An increasing population faces the growing demand for agricultural products and accurate global climate models that account for individual plant morphologies to predict favorable human habitat. Both demands are rooted in an improved understanding of the mechanistic origins of plant development. Such

understanding requires geometric and topological descriptors to characterize the phenotype of plants and its link to genotypes. However, the current plant phenotyping framework relies on simple length and diameter measurements, which fail to capture the exquisite architecture of plants. The Research Topic "Morphological Plant Modeling: Unleashing Geometric and Topological Potential within the Plant Sciences" is the result of a workshop held at National Institute for Mathematical and Biological Synthesis (NIMBioS) in Knoxville, Tennessee. From 2.-4. September 2015 over 40 scientists from mathematics, computer science, engineering, physics and biology came together to set new frontiers in combining plant phenotyping with recent results from shape theory at the interface of geometry and topology. In doing so, the Research Topic synthesizes the views from multiple disciplines to reveal the potential of new mathematical concepts to analyze and quantify the relationship between morphological plant features. As such, the Research Topic bundles examples of new mathematical techniques including persistent homology, graph-theory, and shape statistics to tackle questions in crop breeding, developmental biology, and vegetation modeling. The challenge to model plant morphology under field conditions is a central theme of the included papers to address the problems of climate change and food security, that require the integration of plant biology and mathematics from geometry and topology research applied to imaging and simulation techniques. The introductory white paper written by the workshop participants identifies future directions in research, education and policy making to integrate biological and mathematical approaches and to strengthen research at the interface of both disciplines.

Guidelines for the Use of Mobile LIDAR in Transportation Applications - Michael James Olsen 2013

" TRB's National Cooperative Highway Research Program (NCHRP) Report 748: Guidelines for the Use of Mobile LIDAR in Transportation Applications presents guidelines for the application of mobile 3D light detection and ranging (LIDAR) technology to the operations of

state departments of transportation. Mobile LIDAR uses laser scanning equipment mounted on vehicles in combination with global positioning systems (GPS) and inertial measurement units (IMU) to rapidly and safely capture large datasets necessary to create highly accurate, high resolution digital representations of roadways and their surroundings. " -- Publisher's description.

Laser Scanning Applications in Landslide Assessment - Biswajeet Pradhan 2017-05-04

This book is related to various applications of laser scanning in landslide assessment.

Landslide detection approaches, susceptibility, hazard, vulnerability assessment and various modeling techniques are presented.

Optimization of landslide conditioning parameters and use of heuristic, statistical, data mining approaches, their advantages and their relationship with landslide risk assessment are discussed in detail. The book contains scanning data in tropical forests; its indicators, assessment, modeling and implementation.

Additionally, debris flow modeling and analysis including source of debris flow identification and rockfall hazard assessment are also presented.

Laser Scanning - Belén Riveiro 2019-10-18

This book provides an overview on the evolution of laser scanning technology and its noticeable impact in the structural engineering domain. It provides an up-to-date synthesis of the state-of-the-art of the technology for the reverse engineering of built constructions, including terrestrial, mobile, and different portable solutions, for laser scanning. Data processing of large point clouds has experienced an important advance in the last years, and thus, an intense activity in the development of automated data processing algorithms has been noticed. Thus, this book aims to provide an overview of state-of-the-art algorithms, different best practices and most recent processing tools in connection to particular applications. Readers will find this a comprehensive book, that updates the practice of laser scanning for researchers and

professionals not only from the geomatic domain, but also other fields such as structural and construction engineering. A set of successful applications to structural engineering are illustrated, including also synergies with other technologies, that can inspire professionals to adopt laser scanning in their day-to-day activity. This cutting-edge edited volume will be a valuable resource for students, researchers and professional engineers with an interest in laser scanning and its applications in the structural engineering domain.

Structure from Motion in the Geosciences - Jonathan L. Carrivick 2016-07-15

Structure from Motion with Multi View Stereo provides hyperscale landform models using images acquired from standard compact cameras and a network of ground control points. The technique is not limited in temporal frequency and can provide point cloud data comparable in density and accuracy to those generated by terrestrial and airborne laser scanning at a fraction of the cost. It therefore offers exciting opportunities to characterise surface topography in unprecedented detail and, with multi-temporal data, to detect elevation, position and volumetric changes that are symptomatic of earth surface processes. This book firstly places Structure from Motion in the context of other digital surveying methods and details the Structure from Motion workflow including available software packages and assessments of uncertainty and accuracy. It then critically reviews current usage of Structure from Motion in the geosciences, provides a synthesis of recent validation studies and looks to the future by highlighting opportunities arising from developments in allied disciplines. This book will appeal to academics, students and industry professionals because it balances technical knowledge of the Structure from Motion workflow with practical guidelines for image acquisition, image processing and data quality assessment and includes case studies that have been contributed by experts from around the world.