

Impact of features on classification accuracy of IRS LISS-III images using artificial neural network

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ABSTRACT

The proposed research paper uses the artificial neural network with back propagation of error is used to classify the LISS-III satellite images. It is a multi-spectral images which are stacked together and there different feature are used for the classification. In this classification the comparative study is performed on two different types of training sets which are used for the classification training. The First training set consist of the R, G, B colour value of the image in this case accuracy and kappa coefficient was 95% and 0.9331 respectively. Second training set consist of R, G, B, mean, mode, median, variance and standard deviation of colour feature and in this case the accuracy and kappa coefficient was 97% and 0.9652 respectively. So after this study and comparative analysis it is observed and concluded that there is the impact of features on the classification. If the number features are less then there is fall in the classification accuracy but increase in the classification accuracy with respect to increase in the number of features in the training sets.

Keywords:- LISS-III satellite Image, mean, mode, median, variance, standard deviation, neural network, and classification.

1.INTRODUCTION

Classification is one of the data mining methods which are used to classify the object into predefined group. It is the most frequently used decision making tasks of human activity. A classification problem occurs when an object needs to be assigned into a predefined group or class based on a number of observed attributes related to that object. The classification also plays very important role in the remote sensing and satellite image classification. There are number of application i.e. encompassing reconnaissance creation of mapping products for military and civil application, evaluation of environmental damage, monitoring of land use and land cover urban planning, growth regulation, soil assessment and crop yield appraisal where image classification plays major role to study and monitor all these things[1]. Due to the advancement in the area of remote sensing, data mining tools, digital image processing and high computational computers there are number of students, academicians, research scholars and different organizations are attracted towards the remote sensing and the different application of remote sensing. They are try to find out different ways through which they can use the satellite images for various purposes either related to different resource evaluation, analysis, planning, management or monitoring purpose. So, in all these application one important application of satellite image is land use and land cover classification. Land use and land cover classification plays very important role for the development of thematic map and to study the area covered by different resources. The satellite based land use and land cover classification plays important role to map the different resources which saves the time of doing so much survey and field work. It also covers those area where the survey and field work cannot easily perform or difficult to perform. The land use and land covered classified images are also used to study the change detection which are carried out by the human or the nature. We can also study the impact of human settlement and its impact on the natural resources. There are number of classification techniques are available i.e. KNN (K-nearest neighbour), Decision tree, ANN (artificial neural network), SVM (Support vector machine), Bayesian classifier and Discriminate base classification. All these classification techniques are basically classified in two categories which are known as supervised and unsupervised classification. An unsupervised classification technique, in which the objects are classified based on its similarity which is called as cluster. On the other hand in supervised classification technique classification performed based on the training set which is called as the learning from the example. Here, in this paper artificial neural network is design to classify the IRS-P6 LISS-III satellite image for various land use and land cover classification. The artificial neural network with back propagation of error applies the supervised classification which requires the training set of data. So, here in the paper the artificial neural network based comparative analysis is performed and it is tried to find out what is the impact of feature in the case of supervised classification. In the comparative study of ANN based classification there are two types of samples are used in which one samples has three feature where as in the second one there are eight features are used for the training purposes. So, with comparative analysis of ANN based classification, it is found that there is the impact of attribute on the classification because the

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Information, Photonics and Communication Jyotsna Kumar Mandal, Kallol Bhattacharya, Ivy Majumdar, Surajit Mandal, 2019-10-15 The book includes high quality papers presented at the Second National Conference of Information Photonics and Communication 2019 organized by the Department of Electronics devices and VLSI communication systems and networks signal processing and intelligent systems it includes topics such as RF and microwave communications wireless and mobile communication satellite communications signal image and video processing deep learning and optical networks

Satellite Systems Tien M. Nguyen, 2021-04-14 This book provides a high level overview of the current state of the art and future of satellite systems satellite control systems and satellite systems design Chapters cover such topics as existing and future satellite systems satellite communication subsystems space control and Space Situation Awareness SAA machine learning methods with novel neural networks data measurements in Global Navigation Satellite Systems and much more This volume is a practical reference for system engineers design engineers system analysts and researchers in satellite engineering and advanced mathematical modeling fields

Environmental Information Systems: Concepts, Methodologies, Tools, and Applications Management Association, Information Resources, 2018-09-07 This three volume publication is an IGI Global Core Reference for 2019 as it provides over 75 chapters containing the latest research on information systems remote sensing and geographic information science that is utilized for the management of environmental data Bringing together the international perspectives of researchers in the U S Australia China Canada Italy and more this title is an ideal reference for engineers data scientists practitioners academicians and researchers interested solving conceptual methodological technical and managerial issues within Environmental Information Systems Environmental Information Systems Concepts Methodologies Tools and Applications is an innovative reference source containing the latest research on the use of information systems to track and organize environmental data for use in an overall environmental management system Highlighting a range of topics such as environmental analysis remote sensing and geographic information science this multi volume book is designed for engineers data scientists practitioners academicians and researchers interested in all aspects of environmental information systems

Computational Intelligence and Information Technology Vinu V Das, Nesity Thankachan, 2011-12-10 This book constitutes the proceedings of the First International Conference on Computational Intelligence and Information Technology CIIT 2011 held in Pune India in November 2011 The 58 revised full papers 67 revised short papers and 32 poster papers presented were carefully reviewed and selected from 483 initial submissions The papers are contributed by innovative academics and industrial experts in the field of computer science information technology computational engineering mobile communication and security and offer a stage to a common forum where a constructive dialog on theoretical concepts practical ideas and results of the state of the art can be developed

Remote Sensing Techniques and GIS Applications in Earth and Environmental Studies Santra, Abhisek, Mitra, Shreyashi

Santra,2016-11-29 Emerging technologies have enhanced the various uses of geographic information systems This allows for more effective analysis of available data to optimize resources and promote sustainability Remote Sensing Techniques and GIS Applications in Earth and Environmental Studies is a critical reference source for the latest research on innovative methods for analyzing geographic data and utilizing sensor technologies for environmental monitoring Featuring extensive coverage across a range of relevant perspectives and topics such as land use geospatial analysis image interpretation and site suitability analysis this book is ideally designed for engineers professionals practitioners upper level students and academics actively involved in the various areas of environmental sciences

Artificial Intelligence Perspectives and Applications Radek Silhavy,Roman Senkerik,Zuzana Kominkova Oplatkova,Zdenka Prokopova,Petr Silhavy,2015-04-25 This volume is based on the research papers presented in the 4th Computer Science On line Conference The volume Artificial Intelligence Perspectives and Applications presents new approaches and methods to real world problems and in particular exploratory research that describes novel approaches in the field of artificial intelligence Particular emphasis is laid on modern trends in selected fields of interest New algorithms or methods in a variety of fields are also presented The Computer Science On line Conference CSOC 2015 is intended to provide an international forum for discussions on the latest high quality research results in all areas related to Computer Science The addressed topics are the theoretical aspects and applications of Computer Science Artificial Intelligences Cybernetics Automation Control Theory and Software Engineering

Artificial Intelligence and Evolutionary Algorithms in Engineering Systems L Padma Suresh,Subhransu Sekhar Dash,Bijaya Ketan Panigrahi,2014-11-25 The book is a collection of high quality peer reviewed research papers presented in Proceedings of International Conference on Artificial Intelligence and Evolutionary Algorithms in Engineering Systems ICAEES 2014 held at Noorul Islam Centre for Higher Education Kumaracoil India These research papers provide the latest developments in the broad area of use of artificial intelligence and evolutionary algorithms in engineering systems The book discusses wide variety of industrial engineering and scientific applications of the emerging techniques It presents invited papers from the inventors originators of new applications and advanced technologies

Sensors and Image Processing Shabana Urooj,Jitendra Virmani,2017-10-03 This volume comprises the select proceedings of the annual convention of the Computer Society of India Divided into 10 topical volumes the proceedings present papers on state of the art research surveys and succinct reviews The volumes cover diverse topics ranging from communications networks to big data analytics and from system architecture to cyber security This volume focuses on Sensors and Image Processing The contents of this book will be useful to researchers and students alike

Exploiting the Spatial Information in High Resolution Satellite Data and Utilising Multi-Source Data for Tropical Mountain Forest and Land Cover Mapping Anke Gleitsmann,2012-02-24 Die Cordillera Central der Dominikanischen Republik ist eine Quelle wichtiger nat rlicher Ressourcen vor allem Wasser f r dieses karibische Land Im oberen Einzugsgebiet des R o Yaque del Norte wurde im Laufe des 20 Jahrhunderts ein gro er Teil der

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Multi-Sensor and Multi-Temporal Remote Sensing
Anil Kumar,Priyadarshi Upadhyay,Uttara Singh,2023-04-17 This book elaborates fuzzy machine and deep learning models for single class mapping from multi sensor multi temporal remote sensing images while handling mixed pixels and noise It also covers the ways of pre processing and spectral dimensionality reduction of temporal data Further it discusses the individual sample as mean training approach to handle heterogeneity within a class The appendix section of the book includes case studies such as mapping crop type forest species and stubble burnt paddy fields Key features Focuses on use of multi sensor multi temporal data while handling spectral overlap between classes Discusses range of fuzzy deep learning models capable to extract specific single class and separates noise Describes pre processing while using spectral textural CBI indices and back scatter coefficient Radar Vegetation Index RVI Discusses the role of training data to handle the heterogeneity within a class Supports multi sensor and multi temporal data processing through in house SMIC software Includes case studies and practical applications for single class mapping This book is intended for graduate postgraduate students research scholars and professionals working in environmental geography computer sciences remote sensing geoinformatics forestry agriculture post disaster urban transition studies and other related areas

Urban Expansion, Land Cover and Soil Ecosystem Services
Ciro Gardi,2017-04-07 More than half of the world population now lives in cities and urban expansion continues as rural people move to cities This results in the loss of land for other purposes particularly soil for agriculture and drainage This book presents a review of current knowledge of the extension and projected expansion of urban areas at a global scale Focusing on the impact of the process of land take on soil resources and the ecosystem services that they provide it describes approaches and methodologies for detecting and measuring urban areas based mainly on remote sensing together with a review of models and projected data on urban expansion The most innovative aspect includes an analysis of the drivers and

especially the impacts of soil sealing and land take on ecosystem services including agriculture and food security biodiversity hydrology climate and landscape Case studies of cities from Europe China and Latin America are included The aim is not only to present and analyse this important environmental challenge but also to propose and discuss solutions for the limitation mitigation and compensation of this process *World Bamboo Resources* Maxim Lobovikov,Lynn Ball,María

Guardia,2007-01-01 Bamboo a major non wood forest product is an ancient woody grass widely distributed in tropical subtropical and mild temperate zones It is an integral part of forestry but is also widely spread outside forests including farmlands riverbanks roadsides and urban areas Bamboo is quickly changing its image from the poor man s tree to a high tech industrial raw material and substitute for wood This study prepared by FAO jointly with the International Network for Bamboo and Rattan is an initiative to incorporate bamboo into the FAO Global Forest Resources Assessment FRA program A total of 22 countries responded to the FAO INBAR call for information and submitted national reports Although data availability and quality are often weak the main value of the study is that it has established a systematic methodology and has launched the most comprehensive assessment of global bamboo resources to date Publisher s description *Spaceborne Synthetic Aperture Radar Remote Sensing* Shashi Kumar,Paul Siqueira,Himanshu Govil,Shefali Agrawal,2023-03-31 This book provides basic and advanced concepts of synthetic aperture radar SAR PolSAR InSAR PolInSAR and all necessary information about various applications and analysis of data of multiple sensors It includes information on SAR remote sensing data processing and separate applications of SAR technology compiled in one place It will help readers to use active microwave imaging sensor based information in geospatial technology and applications This book Covers basic and advanced concepts of synthetic aperture radar SAR remote sensing Introduces spaceborne SAR sensors Discusses applications of SAR remote sensing in earth observation Explores utilization of SAR data for solid earth ecosystem and cryosphere including imaging of extra terrestrial bodies Includes PolSAR and PolInSAR for aboveground forest biomass retrieval as well as InSAR and PolSAR for snow parameters retrieval This book is aimed at researchers and graduate students in remote sensing photogrammetry geoscience image processing agriculture environment forestry and image processing

Hydroinformatics, Proceedings Of The 6th International Conference (In 2 Volumes, With Cd-rom) Shie-yui Liong,Kok Kwang Phoon,Vladan Babovic,2004-06-18 Hydroinformatics addresses cross disciplinary issues ranging from technological and sociological to more general environmental concerns including an ethical perspective It covers the application of information technology in the widest sense to problems of the aquatic environment This two volume publication contains about 250 high quality papers contributed by authors from over 50 countries The proceedings present many exciting new findings in the emerging subjects as well as their applications such as data mining data assimilation artificial neural networks fuzzy logic genetic algorithms and genetic programming chaos theory and support vector machines geographic information systems and virtual imaging decision support and management systems Internet based technologies

This book provides an excellent reference to researchers graduate students practitioners and all those interested in the field of hydroinformatics **Artificial Intelligence in Remote Sensing for Disaster Management** Neelam Dahiya, Gurwinder Singh, Sartajvir Singh, Apoorva Sharma, 2025-05-28 Invest in Artificial Intelligence in Remote Sensing for Disaster Management to gain invaluable insights into cutting edge AI technologies and their transformative role in effectively monitoring and managing natural disasters Artificial Intelligence in Remote Sensing for Disaster Management examines the involvement of advanced tools and technologies such as Artificial Intelligence in disaster management with remote sensing Remote sensing offers cost effective quick assessments and responses to natural disasters In the past few years many advances have been made in the monitoring and mapping of natural disasters with the integration of AI in remote sensing This volume focuses on AI driven observations of various natural disasters including landslides snow avalanches flash floods glacial lake outburst floods and earthquakes There is currently a need for sustainable development near real time monitoring forecasting prediction and management of natural resources flash floods sea ice melt cyclones forestry and climate changes This book will provide essential guidance regarding AI driven algorithms specifically developed for disaster management to meet the requirements of emerging applications *International Journal of Advanced Remote Sensing and GIS* Cloud Publications, 2012-01-01 International Journal of Advanced Remote Sensing and GIS IJARSG ISSN 2320 0243 is an open access peer reviewed scholarly journal publishes original research papers reviews case study case reports and methodology articles in all aspects of Remote Sensing and GIS including associated fields This Journal commits to working for quality and transparency in its publishing by following standard Publication Ethics and Policies **Remote Sensing of Soils S.** Dharumarajan, Kaliraj Seenipandi, Kabindra Adhikari, Lalitha Manickam, Nirmal Kumar, 2023-11-28 Remote Sensing of Soils Mapping Monitoring and Measurement covers the basic theoretical and scientific concepts of multidisciplinary subjects including sections that relate to soil sciences remote sensing geoinformatics geomatics civil and water resource engineering geography agriculture disaster management and the earth and environmental sciences The book consists of defined elements to help guide the reader including an abstract introductions a literature review methodology results and discussions findings recommendations and conclusions Each chapter includes theoretical information that is illustrated with flow charts tables figures diagrams and other related illustrations Site specific research and case studies are described throughout with geographical and demographical data current scientific issues impacts solutions and societal benefits thus providing readers from multi disciplinary backgrounds the tools they need to successful map analyze and monitor soils Covers multispectral hyperspectral and SAR remote sensing analysis of soil properties soil moisture soil salinity and soil organic matters etc in spatio temporal scale Includes a section on digital soil mapping including integrated RS GIS and insitu surveyed data analysis for digital soil mapping using widely accepted models and approaches Ideal for readers in the soil sciences remote sensing geoinformatics geomatics civil and water resource engineering geography agriculture disaster management and earth and

environmental sciences **Visualization Techniques for Climate Change with Machine Learning and Artificial Intelligence** Ashutosh Kumar Dubey, Abhishek Kumar, Sushil Kumar Narang, Moonis Ali Khan, Arun Lal Srivastav, 2022-11-11 Visualization Techniques for Climate Change with Machine Learning and Artificial Intelligence covers computer aided artificial intelligence and machine learning technologies as related to the impacts of climate change and its potential to prevent remediate the effects As such different types of algorithms mathematical relations and software models may help us to understand our current reality predict future weather events and create new products and services to minimize human impact chances of improving and saving lives and creating a healthier world This book covers different types of tools for the prediction of climate change and alternative systems which can reduce the levels of threats observed by climate change scientists Moreover the book will help to achieve at least one of 17 sustainable development goals i e climate action Includes case studies on the application of AI and machine learning for monitoring climate change effects and management Features applications of software and algorithms for modeling and forecasting climate change Shows how real time monitoring of specific factors temperature level of greenhouse gases rain fall patterns etc are responsible for climate change and possible mitigation efforts to achieve environmental sustainability *Sundarban Mangrove Wetland (A UNESCO World Heritage Site)* Santosh Kumar Sarkar, 2022-04-13 Sundarban Mangrove Wetland A Comprehensive Global Treatise provides an illustrative account of the ecology biology conservation and management strategies of this endangered UNESCO World Heritage Site The book offers a comprehensive and accessible guide to a variety of wetland ecosystems including endangered flora and fauna the ecology and diversity of pelagic and benthic biota the impact of multiple stresses on the biota inorganic and organic pollutants in biotic and abiotic matrices and their remedial measures the impact of climate change on mangrove plants and their conservation and management strategies Divided into seven chapters the book presents a realistic summary of the wetland environment and its resources citing individual case studies considering a host of topics of particular interest Analysis of this unique wetland provides crucial comparisons with other wetlands and their status environmental challenges and possible remedial measures Sundarban Mangrove Wetland is an in depth and up to date account ideal for the student teacher or researcher in marine biology ecology environmental science marine geochemistry marine pollution and ecotoxicology and wastewater treatment Covering both fundamental and advanced aspects the book is also useful for policy makers and those involved in coastal resource conservation and management Presents an in depth and illustrative accounting of an iconic tropical mangrove wetland in an intelligible and easy to understand manner Provides a unique look at the ecology biodiversity and conservation and management of the Sundarban wetlands along with the emerging ecological issues that may affect long term sustainability Focuses on several case studies considering microzooplankton and trace metals in the Sundarban wetlands **Advances in Photogrammetry, Remote Sensing and Spatial Information Sciences: 2008 ISPRS Congress Book** Zhilin Li, Jun Chen, Emmanuel Baltsavias, 2008-07-01 Published on the occasion of

the XXIst Congress of the International Society for Photogrammetry and Remote Sensing ISPRS in Beijing China in 2008
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