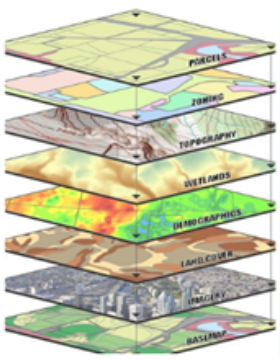
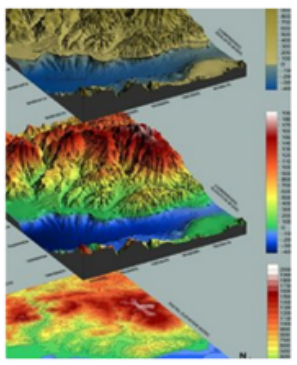
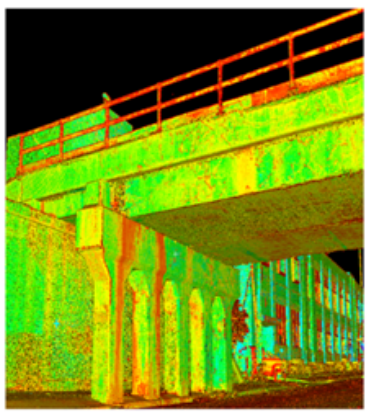
Centurion University

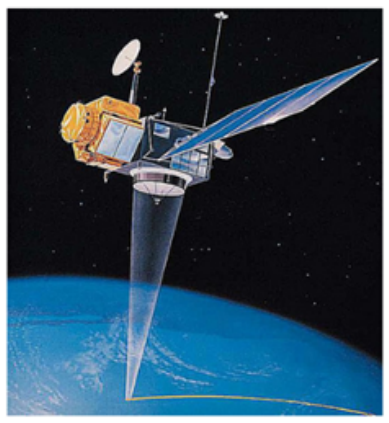
Shaping Lives...
Empowering Communities...







GIS day 2022



Organized by

Department of Civil Engineering

Centre for Data Science & Machine Learning

Centurion University of Technology and Management, Odisha, India

2nd International GIS Day

Hybrid Paper/Poster Presentation

16th November 2022

Centurion UNIVERSITY
Shaping Lives...
Empowering Communities...

Editors

Dr. Prafulla Kumar Panda

Dr. Rajib Kumar Majhi

Dr. Bibhuti Bhusan Sahoo

Prof. Sovan Sankalp

Organized by

Department of Civil Engineering
and
Centre for Data Science & Machine Learning
Centurion University of Technology and Management, Odisha, India

Supported by

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Centurion UNIVERSITY
Shaping Lives...
Empowering Communities...

ESRI

Preface

Second International Hybrid Poster/Paper Presentation on GIS Day 2022, being organized by Department of Civil Engineering and Centre for Data Science & Machine Learning of Centurion University of Technology & Management, Odisha, supported by ESRI, Pvt. Ltd., is an annual get together of Scientists, Researchers, Academicians, Practicing Engineers and Students all over the world mainly focusing on state-of-the-art technologies and applied research in the field of Geographical Information System (GIS), Remote Sensing and its beyond.

Centurion University of Technology & Management is the first multi sector private university in Odisha, established in 2010 has the core objective to 'Shape Lives and Empower Communities', creating wealth and livelihood opportunities for the underprivileged. Besides, Esri, the global market leader in GIS software was founded in 1969 in USA. Esri software is deployed in more than 350,000 organizations globally and in over 200,000 institutions in all over the world.

It is our proud privilege to welcome you all to this renowned International Event. Throughout the globe, more than 300 abstracts of the papers have been received and after thorough scrutinize, about 104 abstracts have been finally accepted. Five eminent speakers of high expertise from the nation and around delivered their expertise and knowledge in the emerging field of GIS and Remote Sensing.

The GIS Day Poster Presentation proceeding contains peer-reviewed technical abstracts covering a wide spectrum of research studies, experimental outputs, case studies related to the GIS and Remote Sensing. We are indeed happy to bring the Souvenir containing abstracts of the Keynotes and Invited talks along with the quality technical papers selected for the presentation on this occasion. We take this opportunity to express our sincere thanks and gratitude to all members of the Advisory Committee as well as the Organizing Committee along with student volunteers, authors, and reviewers.

We appreciate the untiring efforts of GIS Day organizers, generous support from ESRI, continuous guidance, and encouragement from all academic and research institutions. We strongly hope that the deliberations and discussions at the GIS Day International Poster presentation will promote useful and fruitful interactions among participants and thus help professionals working in the field of GIS, Remote Sensing applications and its beyond.

Looking forward to fruitful deliberations in the GIS Day 2022 Poster Presentation in hybrid mode.

-Editors

Prof. Ganeshi Lal
Governer, Odisha

RAJBHAVAN,
BHUBANESWAR - 751 008

Message

I am glad to know that Centurion University of Technology and Management, Odisha in association with spatial analytics world-leader ESRI Private Limited is celebrating "GIS DAY" through hybrid (online/offline) mode.

A day dedicated to Geographic Information Systems (GIS) clearly shows how much geography matters in our everyday lives and in the context of national as well as global scenario. The power of GIS technology is now tapped for various purposes thereby extending its applications to many fields from finding a location in smart phone, land use planning, business applications, scientific research, defence sector, building more resilient coastal communities to the preparedness and recovery from natural disasters. I am told the University is organising the event for the first time. The participation from various disciplines and activities like poster presentation as part of the celebration, I am sure, would make the occasion befitting and facilitate broader awareness and knowledge on exciting nature of GIS related products and services.

I wish the celebration all success.

Ganeshi Lal

Prof. (Dr.) Muktikanta Mishra
President, CUTM

Centurion University of
Technology & Management,
Odisha, India

Message

GIS is a powerful tool that can provide a picture of the communities or area's assets and weaknesses. GIS maps can be more user-friendly than other forms of data presentation, helping community-based organizations (CBOs) understand community data and facilitating a better understanding of the community. The result should be programs that can better address community needs. Our university had participated last year in GIS Day competition and were declared winners of this mega event, bringing so much of exposure to our students and faculties in an international GIS platform.

I express my best wishes to the Department of Civil Engineering and Centre for Data Science and Machine Learning for conducting this hybrid poster/paper presentation in association with, ESRI, Pvt. Ltd for the second time.

This GIS day celebration event is being hosted by many highly reputed educational institutes globally and my wishes with our university team in making it a grand victory again.

Prof. Muktikanta Mishra

Prof. D. N. Rao
Vice-President, CUTM

Centurion University of
Technology & Management,
Odisha, India

Message

It is my pleasure to know that Department of Civil Engineering and Centre for Data Science and Machine Learning in association with, ESRI, Pvt. Ltd is celebrating the "GIS Day 2022" at Centurion University of Technology & Management, Odisha, India on 16th November 2022 for the second time in hybrid mode.

On this GIS Day, let's join together to build a GIS-centric culture in our society for improving the living standards of local communities. Over the past years, the department has grown exponentially and provided quality and holistic education to students from diverse backgrounds. I am confident that with its commitment to excellence, the department will achieve newer heights in future.

I wish the organizers of GIS Day 2022 my best wishes and wish them all success in their future endeavours.

Prof. D. N. Rao

Prof. (Dr.) Supriya Pattanayak
Vice-Chancellor, CUTM

Centurion University of
Technology & Management,
Odisha, India

Message

It gives me great pleasure in sending this message to the Souvenir that is being published on the occasion of "GIS Day 2022" at Centurion University of Technology & Management, Odisha, India on 16th November 2022 for the second time in a hybrid mode.

I express my sincere thanks to the Department of Civil Engineering and Centre for Data Science & Machine Learning for conducting this event in association with, ESRI, Pvt. Ltd. I am happy to know that the organizers of this event have arranged special eminent guest lecture sessions and poster presenters not only from India but also from abroad which will motivate our students /faculty members/ industry persons/ research scholars of Engineering/Science organizations attending this occasion.

I wish and pray that the department fraternity may join hands to take the University to newer heights of outstanding excellence.

Prof. Supriya Pattanayak

Dr. Anita Patra
Registrar, CUTM

Centurion University of
Technology & Management,
Odisha, India

Message

GIS Day celebration on 16th November 2022 is to make all aware/learn about Geography and the Geographic Information System Technology. GIS technology is being used in decision making by collecting, analyzing and visualization of the geographic data. GIS has its own importance in decision making in various fields viz. disaster management, mining, civil engineering etc. We all know about the Google Maps which is the most widely GIS based tool. I congratulate our Team Centurion (students and faculty) who are celebrating this at our university for the second consecutive time after being declared last year's winner of this mega event. I am sure this will a great platform for sharing your work and experiences with GIS technology and that there will be good learning of different tools/applications of the technology. I wish that there would be much more developments in the field of GIS technology and will be widely used in the development of our nation and the world.

All the Best for the GIS Day celebration!
Best Wishes

Prof. Anita Patra

Dr. Prafulla Kumar Panda
Convenor, GIS Day, CUTM

Centurion University of
Technology & Management,
Odisha, India

Message

I am extremely happy that our Department of Civil Engineering and Centre for Data Science & Machine Learning is conducting a "Hybrid Poster/Paper Presentation" in association with ESRI, Pvt. Ltd to mark the celebration of "GIS Day" on Nov 16th, 2022, for second consecutive time. The focus is to exchange the knowledge on various aspects of current advancements in GIS around the Globe and in the Indian context. This significance of this day is very much acceptable as Geospatial Information System engineers design, build, update, upgrade, maintain, and modify GIS applications or more specialized geographically oriented utility programs. GISs are becoming routine analysis and display tools for spatial data, used extensively in applications such as land-use mapping, transportation mapping and analysis, infrastructure mapping, and multiple applications in natural resource assessment.

I would like to thank our valuable authors for contributing their quality research and my sincere thanks to the following International and National experts for agreeing to deliver expert talks.

I wish all endeavor and success to organizers of this grand event.

Prafulla Kumar Panda

Dr. Ashish Ranjan dash
Dean, SoET, CUTM

Centurion University of
Technology & Management,
Odisha, India

Message

GIS day is a worldwide event that celebrates the technology of Geographic Information Systems (GIS). On this GIS Day 2022, let's join together to build a GIS-centric culture in our society for improving the living standards in particular to the community. I would like to congratulate the Department of Civil Engineering and Centre for Data Science and Machine Learning for celebrating GIS Day for the second consecutive time in our campus (Hybrid mode). I must compliment and congratulate the Head Civil Engineering Department Dr. Prafulla Kumar Panda, Convenor of the program and Prof. Sovan Sankalp (Co-convenor) and the entire team for their untiring and dedicated efforts for conceptualizing and initiating such celebration towards awareness generation and capacity building for the future generation. I am happy to know that special lectures and poster presentations by not only from India but also from abroad lots of students /faculty members/ industry persons/research scholars of Engineering/Science organizations have been planned on this occasion.

Wish a great success for the event. From all of us at CUTM, we want to wish you and the entire GIS community a very happy GIS Day!

Ashish Ranjan Dash

Dr. Sujata Chakravarty
RC Coordinator, DSML, CUTM

Centurion University of
Technology & Management,
Odisha, India

Message

Geographical Information Systems has been a buzzword since last decade and Centurion University of Technology and Management feels proud to celebrate GIS DAY honoring ESRI. On behalf of the Center for Data Science and Machine Learning, we proudly celebrate GIS DAY with lots of posters being presented epitomizing the vast applicability of GIS in diverse sectors. The event shall focus on novel posters designed in context to celebrate GIS DAY along with celebrating modern incredible software to practically realize GIS.

This event is expected to witness core research performed by the students on recent applications of GIS in collaboration with machine learning.
I wish all the best to all the participants across the Globe for their career and academic pursuits.

Sujata Chakravarty

Sujata Chakravarty

Prof. (Dr.) I. V. Murali Krishna
Dr RAJA RAMANNA DISTINGUISHED FELLOW, DRDO
Adjunct Professor AIT, Bangkok and Director R&D, JNTUH, Hyderabad

Message

Science and Technology specialists. Planners, Environmentalists. Health professionals and geographers all gather around to celebrate the startling specific technology Day viz., Geographical Information Systems Day - GIS Day. GIS is a vitally important constituent of Geospatial technology including just emerging all powerful Geospatial AI. GIS has virtually blurred the borders between knowledge acquisition and knowledge absorption which is bounded only by the proficiency of those who put to use it. GIS scope scaled up by an order of magnitude due to availability of high-resolution remote sensing data and developed tools of AI. This scaling up has opened up more GIS applications related to uberization, real time traffic management, urban planning and utilities management, environmental pollution, forest fires, precision agriculture, epidemiology and health services, security and crime mapping etc., apart from natural resources management.

The first formal GIS Day took place in 1999. Esri president and cofounder Jack Dangremond credits Ralph Nader with being the person who inspired the creation of GIS Day. GIS is currently, on mainstream IT, so as to facilitate feasibility, desirability and viability gauging for ultimate physical and social impact assessment of earth, environment and people and attaining UN SDGs 2030. GIS in simple terms currently is a functional tool for all scholars to advance research in all domains of science, engineering, management including social geography. Cheer up GIS learners and practitioners on this GIS DAY 2022...

Prof. I. V. Murali Krishna

Prof. (Dr.) S. M. Ramaswamy
Professor of Eminence

Bharathidasan university
Tiruchirappalli-TN 620 021

Message

The phenomenal population explosion has sphere headed the competitive exploitation of resources of the mother earth. This has started causing irreparable loss in the form of disproportionate depletion of non-renewable and partially renewable natural resources, ecosystems and also triggered the natural disasters and their vulnerabilities too like seismicity, landslides, floods and tsunami vulnerabilities. The global warming incremented by the human beings is apprehended to have accelerated the sea level rise leading to the submergence of the significant and resourceful coastal zones of the world. These have triggered the scientists and the technocrats to search for newer scientific methods, technologies and tools, and one such rapidly emerged tool is 'GIS'. But the virtues and the vistas of GIS are still to be capitalized more. Under this backdrop, the initiatives taken by Dr. Prafulla Kumar Panda, Head, Civil Engineering Department, Centurion University of Technology and management need to be appreciated, I wish that his missions make meritorious impacts amongst various cross sections of the society.

Prof. S. M. Ramaswamy

Dr. Abhrankash Kanungo
Scientist, APSAC

Andhra Pradesh Space Applications
Centre (APSAC), ITE & C Dept.,
Govt. Andhra Pradesh.

Message

Geospatial Technology: A paradigm shift from Possibilism to Determinism….

Geospatial Technology has evolved as a Science with exponential growth and advancement of Information Technology, Mapping, Surveying, and Precise Measurement. Earlier days Geospatial Technology used to be confined to address countable possible solutions like Mapping at course resolution, Survey in general, etc. But in the 21st Century, has opened up new dimensions for the Geospatial Technology to determine our day-to-day activities. Be it Service Delivery, Supply Chain Management, Location Based Services, Precise Mapping, …….. lists are many, the Geospatial Technology has become a part of our daily life knowingly or unknowingly and has made our live smoother.

Let's pledge on this GIS Day that Geospatial Technology should play a vital role in our Lifeline and address the Grassroots level problem so that no one is left unaddressed.

A. Kanungo

Prof. (Dr.) C. R. Rao
Adjunct Professor, CUTM

Centurion University of
Technology & Management,
Odisha, India

Message

On the occasion of GIS Day 2022, I convey my hearty greetings to the team and participants for celebrating the day and for their dedicated work in extending the applications of this knowledge to several practical uses. I sincerely hope that CUTM will achieve recognition for its untiring work from national and international agencies in the near future.

Prof. C. R. Rao

Prof. (Dr.) M. L. Narasimham
Academic Advisor, JNTU

Academic Advisor
University College of Engineering,
Kakinada

Message

Glad to note that the department of civil engineering in collaboration with ESRI is organizing "GIS Day Celebration" on 16th November 2022. It is very appropriate that the department has decided to organize the event as GIS now a days has become a tool of analysis globally in all fields of engineering, science, medicine and social activities. Water Resources is one such field of specialization of engineering, the problems associated with which can amicably resolved using the GIS platform.

I am confident the event would be successful and be useful for the student community of Centurion University who are doing commendable studies on the application of GIS for problems related to water resources management. Last year, I could not personally attend these celebrations organized by your team due to COVID restrictions, and I am glad that I will now be making myself physically present at this event and interact with the delegates. I wish to share some of my thoughts on Multi Criteria Decian Making Models in Water Resources which is the latest area of research in the field of Water Resources Management.

Prof. M. L. Narasimham

Dr. Joseph J. Kerski
Geographer – Education Manager, Esri

Esri
International Court
Broomfield CO 80021-3200 USA

Message

I would like to thank Centurion University of Technology and Management, Odisha, and Dr. Prafulla Panda and his team for inviting me to share my hands on experience over the advancement in GIS and its multiple applications in today's Global Scenario. The core objective of Centurion University of Technology & Management (CUTM) is to 'Shape Lives and Empower Communities', creating wealth and livelihood opportunities for the underprivileged. The uniqueness of CUTM is its integration of higher education with skill development in different economic sectors.

This Team of GIS Day from CUTM were last year declared as the Winners for organizing this Mega Event in 2021, which included a Poster Presentation followed by some highly renowned Expert talks including mine.

I wish them the same this year to make GIS Day 2022 a grand success again.

Dr. Joseph J. Kerski

Mayuri Bhattacharyya
GIS Consultant, Esri

Esri
Greater Houston Area, USA

Message

I am happy to express that Centurion University of Technology & Management, Odisha is organizing the hybrid poster presentation event for celebrating GIS Day on 16th November 2022.

It is my pleasure to be a part of this event and I am specially overwhelmed by presenting the keynote topic in this event.

I wish my best wishes to the organizers of GIS Day and wish them all success in their future endeavors. This GIS Day take an oath to be well informed and awaken with the Geospatial approaches in your every project's life cycle.

Mayuri Bhattacharyya

Agendra Kumar
Managing Director, Esri

10th Floor, Max Towers, Sector - 16B, Noida, Uttar Pradesh, India - 201301

Message

Centurion University of Technology & Management is a leading institution in Odisha to offer master's program in Geoinformatics. Esri India is honoured to partner with CUTM for GIS Day which is being celebrated on 16th November 2022. The themes selected for the poster competition are very inspiring. Dept. of Civil Engineering and Centre for Data Science & Machine Learning have together taken this initiative to organize GIS Day 2022 at such a large scale. GIS Day is celebrated every year for professionals to share their work and learn from each other. Adoption of GIS in India has gone up very significantly in last couple of years. GIS is supporting many new applications and is also leveraging data science and AI/ML for getting a better understanding of the world around us. It is important for students to learn GIS techniques as it offers tremendous employment opportunities as GIS professionals as well as users of GIS applications.

My compliments to CUTM – Dept. of Civil Engg. and Centre for Data Science, and all the delegates and participants on this occasion.

Agendra Kumar

Organizing Committee

Patrons:

Prof. D. N. Rao, Vice-President, CUTM

Dr. Supriya Pattanayak, Vice-chancellor, CUTM

Dr. Anita Patra, Registrar, CUTM

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Dr. P. K. Mohanty, Dean, Academics (CUTM)

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Dr. Kamal Kumar Barik, HOD, Civil (Bhubaneswar)

Dr. P. S. Rao, Dean, R&D

Dr. Sujata Chakravarty, RC Coordinator (DS &ML)

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Associate Professor, Dept. of Civil Engineering

Co- Convener

Prof. Sovan Sankalp, Assistant Professor, Dept. of Civil Engineering

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Prof. Subhadarshani Satpathy

Mr. P.Kana Rao, Mr. Prabhakar Sabar and Mrs. Hemanti Ghanta

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KEYNOTE ABSTRACTS

Integrating Design Thinking and AI into GIS Technologies

Professor Muralikrishna Iyyanki

Former Director R&D JNTU and Dr Raja Ramanna DRDO Distinguished Fellow, Hyderabad

Email ID: iyyanki@berkeley.edu

Abstract

Geospatial artificial intelligence (GeoAI) is an evolving scientific discipline facilitating seamless integration of data in geospatial science, artificial intelligence methods in machine learning, and high-performance computing to extract knowledge from geospatial big data. A specific case study related to air pollution and resulting acute respiratory infection disease is show cased, as a preliminary example for validating the process of integration of AI and GIS. Design Thinking in simple terms found to have scope for value creation through the process of designing GeoAI systems are expected to operate in any unpredictable environment with limited resources in a lean, iterative way. Design thinking being a non-linear iterative process facilitated creation of product or process to prototype, test and validate.Designing for AI requires specific route of empathy as AI is essentially data dependent and may not follow predictable rules and behaviors. A specific example of utilization of AI in GIS development is discussed in route network planning. GeoAI integrated with Design thinking is powered by theoretical advancement, big data, computer hardware viz., GPU. Broadly, there are three ways in which GeoAI has been found to be useful in literature also as per the present analysis. These are Land use classification, clustering of similar land use representing data points and prediction of land use changes. Recent years have witnessed significant advances in geospatial artificial intelligence (GeoAI), which is the integration of geospatial studies and AI, especially machine learning and deep learning methods. GIS based mapping leads to development of GeoAI system to facilitate three-dimensional data analysis skills invaluable for the Engineering student. The intersection of AI and geospatial tools is not completely new; its historical roots are well described in geography literature.

The most important questions now to be addressed and being discussed during the lecture are as follows:

Geospatial problems can now be solved better way using AI rather than simple GIS?

- What are the unresolved case studies that can now be resolved with AI?
- What are new data models, if any

The case studies related to environmental pollution, population health management and forest fires is presented which provides greater level of confidence for improved geospatial applications through Geo AI with tremendous new opportunities and challenges to geospatial research.

VIRTUES OF GIS IN CUTTING EDGE AREAS OF GEOSCIENCES

SM. RAMASAMY

(Former Vice-Chancellor, Gandhigram Rural university)

Professor of Eminence, Department of Remote Sensing, Bharathidasan University

Email ID: smrsamy@gmail.com

Abstract

The geological science is one of the frontline sciences, as it deals with origin, dynamics, natural resources, ancient to modern geological processes and the natural disasters of the planet Earth. That too, after the advent modern remote sensing technology which forms the basic input and the GIS technology, which is the potential tool for modelling, the virtues of geological sciences have phenomenally exploded in the recent decades. That too, the GIS technology has credible potentials in bring out the hidden virtues of Geological sciences. (i)The satellite FCC and the other digitally processed data sets wrapped over DEM of the terrain surface in mapping the minerals /metals bearing lithologies,(ii) shaded relief data of the terrain systems under multiple azimuths and look angle views in mapping the minerals , metals , water , geothermal resources and hydrocarbon bearing fracture systems , (iii) three dimensional visualization of deep seated ore bodies and the hydrocarbon locales,(iv)elucidation of depth extension of the fracture systems (v) spatio- linear modelling of the fracture controlled ground water flow etc. are really mind boggling front line areas that have emerged after the coming in of GIS . Similarly, the integration of multi base spatial data and spatio – statistical modelling for natural disaster vulnerability mapping and their prediction and prevention are yet other areas of giant leaps due to GIS. Similarly, beeline of virtues is there in GIS in engineering geology, especially in foundational engineering, site selection for dams and reservoirs, tunnelling, identification of geological structures for using them for tubular transports and bunkers in territorial areas etc. All these virtues are to be deservingly capitalized.

UAV Remote Sensing – The Future of Synoptic and Precise Imaging of the Earth

Dr. A. Kanungo

Scientist, Andhra Pradesh Space Applications Centre (APSAC), Govt. Andhra Pradesh

Email ID: abhrankashk@gmail.com

Abstract

UAV (Unmanned Aerial Vehicle) Remote Sensing technology is the most promising area of Scientific Research in the 21st Century which does not require any citation for the Geospatial community. It has penetrated in all the Verticals of Scientific Research, which can be segregated into either by choice or by demand. The reason behind the exponential growth in adaptation of UAV Remote Sensing by Scientific, Business and Research community is because of its versatility is addressing the customer's requirement and ease of doing business in cross-functional scenario. UAV technology is an amalgamation of many more specialised skill sets and domains like Aviation, Avionics, Communication, Electronics, Mechanical, Computer Science, Advance Computing, Imaging, Survey, etc. This is the reason why the UAV Technology is more of a convergence of many Scientific Discipline and Technology Interface. As far as UAV Remote Sensing is concerned, perhaps it is the most advancement in the area of Imaging and Precise Measurement that has happened and is a bequest being given to Geospatial Scientists. Though the Space Technology and Aerial Imaging is not new for the Geospatial Domain experts, but the UAV Remote Sensing Technology has complemented the Remote Sensing fraternity along with the Satellite Remote Sensing in all possible areas of applications and research. UAV Remote Sensing has pierced in areas of Agriculture, Land Administration & Precise Land Survey, etc. With the passage of time and understanding need of the hour, the Technocrats and Researchers are trying to explore new horizons using UAV Remote Sensing using AI, ML, LBS, etc. Thus, it is high time to adopt the UAV Remote Sensing technology and march towards a better world.

Application of Multi Criteria Decision Making Models in Water Resources Engineering

Dr. M. L. Narasimham

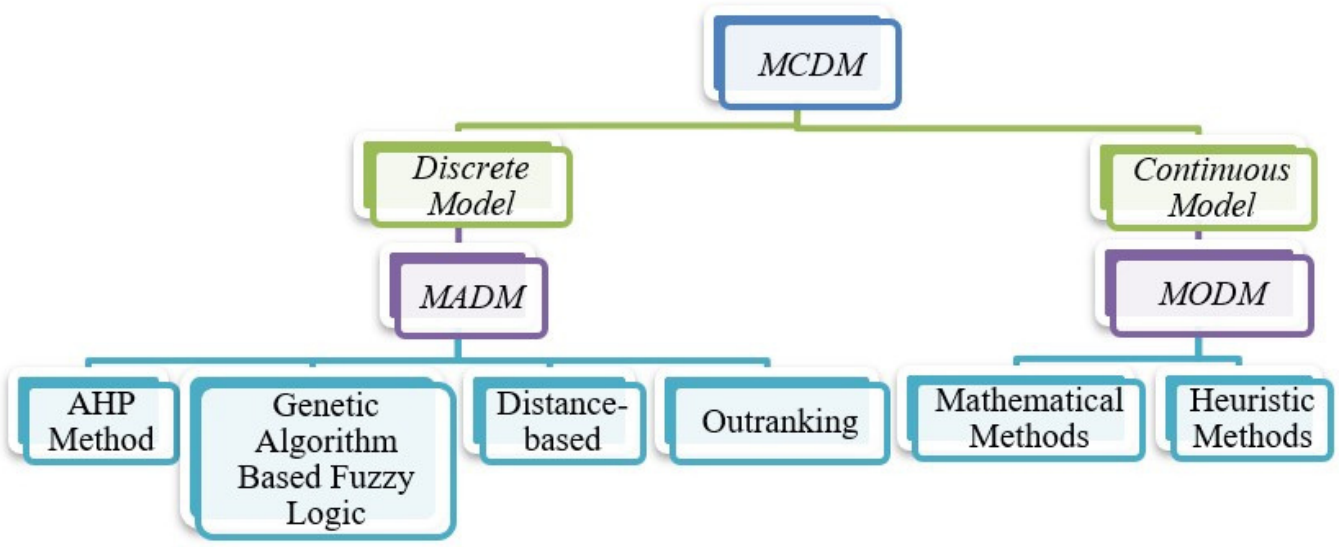
Retired Professor of Civil Engineering, Andhra University, Visakhapatnam,
Former Dean Academics, Centurion University of Technology & Management, Paralakhemundi,
Presently Academic Advisor, University College of Engineering, JNTUK, Kakinada and
Member, State Committee on Dam Safety, Govt. of Andhra Pradesh

Email ID: hammln.47@gmail.com

Abstract

Water Resources Engineering encompasses several problems related to exploring the available sources, judicial utilization of available quantity for various purposes like for drinking, irrigation, power generation etc. A matrix of issues related socio-economic, field conditions, regulations, policies will crop in in addition to technical aspects while utilizing the water in any region. The conventional methods like empirical, analytical or simulation for solving any problem related to water resources are to be preceded by a decision of how best a solution can be arrived taking in to consideration all existing constraints posed by the various criteria that influence the phenomenon, so that the risk of shortage among competing users can be minimized. With developments in Artificial Intelligence and availability of enhanced knowledge of Machine Learning in recent times, several techniques of data management and analysis have emerged out making the problem of decision making simple and effective at the same time. In almost all fields of engineering decision making has become possible by identifying all the criteria involved in a system and analyze the problem logically using the data related to the system components. This technique referred as Multi-criteria Decision Making (MCDM) has become popular in the recent times and MCDM models are proved to be effective in solving many engineering problems in general and in the field of water resources in particular.

MCDM models are basically of two types - Discrete and Continuous. The further types in these are illustrated below.



Out of all the models indicated above, the Analytical Hierarchy Process (AHP) Method and Fuzzy Logic Method are the ones mostly used in problems related to water resources management. The AHP method was first introduced by Saaty (1980) while the Genetic Algorithm Based Fuzzy Logic models have evolved over a period of more than past three decades. In the present paper the application of these two methods for addressing two problems in water resources are discussed with the help of two case studies - (i) Water Quality Assessment using AHP and (ii) Flood Risk Zoning using Genetic Algorithm Based Fuzzy Logic.

GISing in Every Project's Life Cycle

Mayuri Bhattacharyya

Geospatial Consultant, Esri, Greater Houston Area, USA

Email ID: mayuri.gis2022@gmail.com

Abstract

Geospatial technology addressing, acquiring information, and analyzing about the contemporary world's challenges so accurately, cost effectively, and in timely manner that it is the time to adopt GIS approaches in every project's life cycle.

To capture the required data using right combination of geospatial technology (GPS, Drone, Satellite, Survey Outputs); to digitally transform them into right platform (digitization, data processing, elimination, and automation); to analyze (spatially, temporally, and geostatistically) to map, monitor, model and to scalable the real world into 3D rendering (digital twinning) for appropriate database, mapping, predictions, and solutions (small to enterprise level) and to think deeper with GeoAI using location intelligence; embracing efficiently the geospatial workflow that needs to be adopted in every applications (Desktop, WebGIS, Mobile) of any project from various domains. GISing is to be well informed and awaken with the power of GIS for the success of any projects.

Keywords: Geospatial Technology, Project Cycle, GISing

GIS APPLICATION

A Study on Application of GIS in Disease Surveillance and Management

Sayantika Bhowmick, Tufleuddin Biswas

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Abstract

The use of Geographic Information System (GIS) has increased rapidly in the field of agriculture in recent years. It acts as a common platform for multipurpose disease detection and surveillance activity all over the world and detecting the particular disease intensity and distribution over a large area. GIS is a computer database system that provides us an excellent means of visualizing, capturing, positioning, storing, analyzing and displaying geographically referenced information based on location or a map. In this study we have tried to portray the application of GIS in agriculture disease detection in some agricultural major crops based on the previous studies. The worldwide crop loss only due to disease attack is annually 220 billion USD or 14% which is a great loss in agricultural production. The loss is mainly due to virus, fungi, bacteria, viroids and nematode which need early detection and cure in order to prevent rapid deprivation in crop production. Therefore, it is an urgent need to detect and monitor crop diseases very precisely before it leads to severe damage and thus GIS may be the best option as of now. Hence these technologies should be adapted and promoted worldwide in order to have a healthy earth by combating major problems like high food prices, starvation and abolishing malnutrition all over the globe.

Key words: Disease surveillance, Disease mapping, GIS, GPS, Smart agriculture.

Applications of GIS in Urban and Regional Planning

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Abstract

The advent of GIS technology has ushered in a sea-change development in the field of urban and regional planning. GIS technology has long been applied in the analysis stage of urban and regional planning by the planners, as the spatial data can be accumulated from numerous sources such as primary field surveys, printed maps, google satellite images and aerial photographs. Using GIS software, all the data can be integrated with the help of geo referencing that aid in providing up-to-date information. Through the medium of this paper it is endeavored to demonstrate the importance of emergent technology of Geographic Information System in the preparation of thematic maps at the various scales such as in formulating Regional Plans, Master Plans and at the Neighborhood scale as its applications vary according to the varying scales. GIS is one of the new technologies that have a colossal contribution to the sphere of urban and regional planning. This software is competent and most appropriate solution in handling both spatial and non-spatial data which is required in the effective management and analysis of the data as the better information is necessary for superior planning. It is progressively becoming an indispensable component of planning systems as it pays rich dividends to the planners.

Key words: Urban and Regional Planning, GIS

Application of GIS in Estimation of Producible Biomass for Bioenergy Production

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Abstract

The necessity for an alternative energy source like bioenergy, which has a smaller carbon impact, is brought on by the quick depletion of fossil fuels. Geographic information system (GIS) is one of the major geospatial techniques, used for capturing, analyzing, storing, manipulating, retrieving spatial data that can now be implemented to assess human's one of the major needs. In this study the application of GIS has shown the estimation of producible biomass for bio-energy production from the previous studies. GIS in integration with Remote sensing and Global Positioning System (GPS) can capture and analyse high-definition images of field crops and forest areas to estimate the biomass of the crop ratooning residue, pruning of olive groves, vineyards, biomass of abscised plant parts in forest, etc. GIS uses data like Wood-cellulosic biomasses, Land use, Digital Terrain Model, Climate, Geological substratum to assess the surplus biomass that can be used for bioenergy production. It is challenging to estimate the amount of harvest residue and forest litter in India due to the country's vast areas of farm fields and forest cover with such diverse and dense plantations. Thus, GIS could be promoted for estimating the amount of total producible biomass for such huge areas.

Key words: Biomass, Bioenergy production, Digital Terrain Model, GIS, Renewable energy source.

Geospatial Technology in Mineral Exploration

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Abstract

Mineral exploration is a task that we need to approach with maximum information. Missing out on rare metals and minerals can easily occur, and the process of searching for them is a costly risk. That is one of the reasons for remote sensing in mineral exploration being so important. Remote sensing can be used to measure, variations in acoustic wave distributions, force distributions and also electromagnetic energy distributions. The latest progress in the field of remote sensing and origin of new computer software such as Geographical Information System (GIS), ENVIS (Environmental Information Software) have transformed the world and made life much easier for mineral explorers.

Key words: Mineral exploration, Geographical Information System (GIS), electromagnetic energy distributions.

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GIS and Weed Management

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Abstract

A key problem in agriculture is weed management, which has an effect on the environment both on and off the farm. Adoption of UASs in agriculture in conjunction with spatially explicit methods may significantly lower pesticide doses, improving sustainability in weed management. Geographic Information System (GIS) is a computer programme that gathers, archives, validates, and presents data on locations on the surface of the Earth. GIS is advantageous since it displays different data, such as the location of roads, buildings, and even vegetation, on a single map. In turn, this makes it easier for people to spot, assess, and interpret patterns and correlations. In the present study, we considered an application of a recent low-cost spatially explicit approach to map weed distribution in crop fields by small, inexpensive UASs and open-source software programmes from the previous findings. Thus, the overall goal was to map the spread of weeds using affordable UASs and a repeatable workflow that is entirely built on free and open-source GIS tools and classification algorithms like Open Drone Map, QGIS, SAGA, and OpenCV. We can disseminate this technique among the farmers, so they won't be completely dependent on the workers to access the issue and determine its resolution. Even regular school or college students will be able to distinguish between dangerous and beneficial weeds.

Key words: GIS, UASs, QGIS, SAGA, OpenCV, Weed Management

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GIS is Awakening People to Geography's Power

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Abstract

Global interest in Geographical Information Systems (GIS) has been extremely high. There is saying “A finest poem shows a picture of map. Its contours and hues reflect the satisfaction of lofty ambitions”. Computer technologies, integrated systems used in practical applications, as well as a brand-new academic field, can all be referred to as GIS. According to estimates of the market's size and relevance, the GIS market is both large and important, and it is expanding quickly. Three generally accepted GIS theories place a strong emphasis on the value of spatial analysis, databases, and map processingThe COVID-19 pandemic proclamation and accompanying lockdown at various levels from the local city level to the national level have a significantly larger influence in the environment. Despite the fact that data is readily available, research employing various geospatial analysis tools to assess the effects of this ongoing epidemic and enforced lockdowns are not in depth. However, the scientific community and practitioners have been profited greatly from the use of spatial analysis tools, techniques and GIS platforms. These advantages include clearer and easier-to-understand visualisation, real-time tracking of confirmed and contact tracing, spread direction, and the ability to pinpoint hotspots to stop the spread of the disease throughout the community. Therefore, it will be a great boon to the scientists and decision-makers who could use GIS to retrieve pertinent data for future decision-making.

Key words: GIS, Covid 19, Geo spatial tools, GIS theory, Map

Importance of GIS in Civil Engineering

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Abstract

GIS is the part attached with survey and for big projects and development works in Civil Engineering. Normal procedure is no doubt exact process, but in the new era of technology it is demanding for precision and time span with innovative parts to implement equally with importance and spread outs. So, GIS system is good enough related to spatial system and modern software technology to work forward with. GIS is related to Contour survey part mainly which gives brief overview of the location and type of construction to be made idea.

Key words: contour, Spatial, innovative parts, software technology etc.

Optimum Route Analysis for Construction and Demolition Waste Management using GIS

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Abstract

India is one of the largest generators of solid waste in the world, which may not be surprising given the country's population. Debris from construction and demolition (C&D) makes up a sizable portion of municipal solid waste (MSW). The crisis in waste management in India is a complex issue. Poor practices are not only leading to the wastage of limited resources but also contributing to environmental degradation. What's concerning is that a larger portion of this material is disposed of without being treated or processed, which is a crucial step in recycling efforts. India's construction and demolition (C&D) waste production are anticipated to be 150 million tons per year, according to the Building Material Promotion Council (BMPTC). However, the stated capability for recycling is only 6,500 tons per day (TPD), or roughly 1%. This paper provides research on using a Geographical Information System (GIS) to minimize construction and demolition waste. The research work focused on open-source software QGIS in route analysis using OSM tools and buffer generated using different parameters to suggest the location for setting up new recycling unit in the city of Chennai for maximum recycling efficiency. The systematization, visual depiction, and analysis of the road routes from lawful disposal sites to the closest specified recycling facilities are all novel aspects of this study. The research on generational trends, economic values, and environmental impacts offers useful data for future waste management efforts by a variety of stakeholders, including the government, business, and academic institutions.

Keywords: Construction and Demolition waste (C&DW), Recycling Facilities, Geographical Information System (GIS), Landfill, dumping yards, Municipal Solid Waste (MSW).

Pest Infestation Management using GIS Technology

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Abstract

In this investigation, we have studied an application of Geographic Information System (GIS) GIS in pest infestation for the major agricultural crops like rice, corn & sourgam and so on. GIS is a software tool for capturing, mapping, checking, gathering, storing, displaying and analyzing geo-referenced geographic data. On a single map, it shows various information, like the locations of highways, structure, and even live things by using various type of sensors, cameras, scanners, radiometer, radars, aircraft and satellites. People will be able to recognize, assess, and analyze patterns and correlations more easily as a result. These methods allow us to precisely locate and map farms, agricultural yields, and pest populations. This technology helps in obtaining a variety of data including identifying and analyzing damage patterns, surveying and managing pest populations, projecting pest outbreaks and, movement evaluating the efficacy of treatment approaches, and optimizing their use and activities. Even GIS helps in analyzing those data and making preventive actions based on those population figures are the foundations of IPM at the correct moment using control methods. In order to protect the crops from damage and insect breakout before it results in additional losses, geospatial technology may be encouraged.

Keywords: Pest infestation, IPM, GIS, remote sensing, Pest outbreak

GEOSPATIAL ANALYSIS

Utility Mapping of Electricity Distribution of the Federal Polytechnic Ado-Ekiti

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Abstract

Utility networks like water and electricity are vital for the proper and smooth functioning of the modern society. This study focuses on proper working of electricity distribution infrastructure that can only be assessed and monitored by using Geographic Information System. To accomplish this, spatial data on electricity distribution network in the Federal Polytechnic Ado-Ekiti were acquired which involved updating the existing map of the area with DGPS observation, geo referencing and digitizing the map. Attribute data was acquired from the physical planning directorate of the institution. Designing and creation of database for electricity distribution was carried with the aid of relational database management approach.

Keywords: Geographic Information System, database management approach, modern society

Suitability of Water Quality Index Methods for Assessing Surface Water Quality in Mahanadi River Basin, Odisha

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Abstract

One of the longest rivers in Odisha, the Mahanadi River plays an important role in local economy and ecosystem. However, the rapid development of industry has caused significant pollution in this river in recent years. An attempt has been made in this work to understand the suitability of water for human consumption as well as irrigation. The parameters of pH, Electrical Conductivity (EC), Copper (Cu), Chromium (Cr), Sulphate (SO4), Iron (Fe), Nitrate (NO3), Chloride (Cl), Total Hardness (TH), Total Alkalinity (TA) and Sodium (Na) were analyzed using standard procedures. The values obtained were compared with the guidelines for drinking purpose suggested by World Health Organization and Bureau of Indian Standard. The study considered three different water quality indices (WQIs) for surface water data collected for a period of 2 years (2020-2022) and the quantitative results were justified with the globally accepted water quality guidelines. It compared the results between the Canadian WQI with the Weighted Average WQI and the Canadian WQI and Meireles WQI for drinking and irrigation purposes, respectively. The study concluded that the Canadian WQI for drinking and Mierels WQI for irrigation would deliver better results.

Keywords: Mahanadi River, Canadian WQI, Weighted Average WQI, Meireles WQI, correlation.

Flood Susceptibility Mapping using Frequency Ratio and Shannon's Entropy Models in District Ghotki, Sindh

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Abstract

The purpose of this study is to recognize the flood-prone zones in district Ghotki employing the Frequency ratio (FR) and Shannon's entropy (SE) method. To acquire the target, initially, a flood inventory map was prepared using 151 randomly sampled flood points in the study area. The sampling points of the flood are divided into two portions (70% and 30%), one for inventory formulation (70%) and the second for result validation (30%). Twelve flood conditioning parameters i.e., elevation, slope, curvature, Topographic Wetness Index (TWI), Land use and land cover (LULC), Normalized Difference Vegetation Index (NDVI), Normalized Difference Water Index (NDWI), Precipitation, soil, distance to river and distance to the road were considered. After developing and mapping the layers of flood conditioning factors in the ArcGIS 10.8 software. All the layers were resampled with the Frequency and Shannon entropy model's weightage in the MS-Excel. The area under ROC and AUC was determined and expressed the results with a reasonable score of 79.74% and 79.96% for the Frequency and Shannon entropy method. Thus, this research study explained that the Katcha area of district Ghotki along with Ubauro taluka and Ghotki taluka of the district are vulnerable and constrained resilience.

Keywords: Eco-environmental, Land use and land cover (LULC), Flood risk and damage management.

Recent Effects of Environmental Climate Change on Agriculture and Human Health

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Abstract

One of the largest threats to agricultural and human health in recent years is climate change. The greenhouse effect is causing an increase in the average world temperature. The main greenhouse gas, carbon dioxide, is rising at an alarming rate, which has increased plant productivity due to photosynthesis. However, rising temperatures counteract this effect by increasing crop respiration and evapotranspiration, increasing pest infestation, changing the flora of weeds, and shortening the duration of crops. These days, climate change has a significant negative impact on human health as a result of greenhouse gases and global warming. All islands, coastal areas, mountainous areas, and Polar Regions have a higher vulnerability to the effects of climate change than other locations. The implications of recent climate change on human health and agriculture, as well as mitigation strategies, are discussed in this paper.

Keywords: greenhouse, global warming, human health

A Forecasting Assessment During Northeast Monsoon of South India-A GIS Based

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Abstract

The south India (NE) monsoon is one of the important components of Indian climate system. The following three meteorological subdivision of India, viz Tamilnadu, Kerala, Karnataka receive significant amount of rainfall during monsoon. In the present study Chennai capital of Tamilnadu suffer at a period of northeast monsoon. By using a long data series from meteorological department and to overcome at suffered period using modern GIS techniques is studied.

Keywords: NE northeast, GIS

Mapping Groundwater Recharge Potential Zone using GIS Approach in Central Kashmir of Great Himalayas, India

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Abstract

The explosive growth and uneven distribution of population, poor irrigation practices, rapid urbanization/industrialization, large-scale deforestation, and improper land use practices create groundwater depletion. Therefore, it increases water demand for agriculture, household, and industry. In this study, the weight of different factors for potential groundwater recharge and the score under various characteristics were assessed based on the characteristics of the study area. A GIS approach was used to integrate nine contributing factors: land use/land cover, drainage density, geology, geomorphology, lineaments, soil, precipitation, altitude, and slope. The results demonstrated that about 10% of the study area is considered excellent/very high potential groundwater recharge. High and medium potential groundwater recharge areas cover 22 and 21%, respectively; the area with low and very low potential groundwater recharge covers 30 and 17%. The results indicate that the most effective groundwater recharge potential zone is located in the central valley region. The developed potential map provides decision-makers with valuable knowledge in management plans for recharging groundwater resources and preventing excessive exploitation.

Key words: Groundwater recharge potential, Central Kashmir, GIS approach, Contributing factors

Geospatial Technology for Hydrocarbon Locales Model of an Unexplored Basin- A Case Study of Cauvery Basin

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Abstract

Geospatial technology (GIS) has provided the platform for storing, manipulating, modeling, visualizing and integrating the huge number of geospatial databases. Duly realizing these potentials, a research study was taken up towards bringing the architectural characteristics of Cauvery basin, India from surface to subsurface as a part of the study in visualizing the surface and subsurface geological processes as it has direct bearing over the natural resources like hydrocarbon, groundwater, minerals and metals, etc. and natural disasters like seismicity, flooding, saltwater intrusion, etc. All the synthesis has been done using of surface signature, subsurface signature and deep surface signature in geospatial environment which has finally enabled in bringing out the total architecture of the Cauvery basin. An analysis was carried out resulting in the identification of the surficial structures using the fluvial, coastal geomorphic and drainage anomalies, the shallow subsurface structures using the resistivity anomalies and deep subsurface structures using the gravity anomalies have shown good correlation. Further, the present comparative study suggested that both shallow subsurface and deep subsurface geological processes control over the surface architecture of the Cauvery basin. Amalgaming the surface, subsurface, deep subsurface highs inferred from the above study a model has been derived for hydrocarbon locales that can be adopted for the unexplored sedimentary basin.

Key words: Hydrocarbon, Remote Sensing, Cauvery Basin

Solar Radiation and Photovoltaic System Specifications for Installations of Solar Project Across Different Campuses of Centurion University

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Abstract

Renewable energy sources like solar energy are prime importance in this current scenario. Photovoltaic system installation requires lot of calculative measurement using satellite data, GIS data, location and various parameters to considered. In this research work, Solar radiation and Photovoltaic system specifications for installations of solar project across two campuses of Centurion University i.e., Bhubaneswar campus and paralakhemundi campus calculated by using satellite GIS map data provided by National renewable energy laboratory (NREL). This data provides basic idea of average per day in a month solar radiation annually with AC energy calculations, Location and station identifications, pv system specifications and the performance metrics of the location.

Key words: Solar radiation, Photovoltaic system, solar project, GIS, AC energy, location

Delineation of Groundwater Potential Zone using an Integrated Approach – A case study on Parts of Ganjam coast, Odisha, India

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Abstract

The present study attempts to find out and delineate favorable groundwater potential zones in some coastal parts of Ganjam district, Odisha using Geospatial technology and space inputs with an integrated approach. Satellite IRS-1C (LISS III), Landsat TM and SRTM data have been used in this case study to prepare various thematic maps like Lithological, geomorphological, hydro geomorphological, lineament density and drainage density. Further each of the thematic layers has been analyzed using ARCGIS 10.4 to find out the pockets of the groundwater within the study area. By using the above mentioned various thematic maps the groundwater potential zones have been selected. Ranking has been made for each thematic map for better knowledge. Geospatial technology used for computing the ground water potential index by considering all thematic maps. It has been also identified that Geology and hydro geomorphology played a vital role for the assessment of groundwater. Finally, based on cumulative weighted value, groundwater recharge zones have been selected and classified into very good, good, poor, and very poor zones, respectively. The result depicts that major portions of the study area have "Very Good" as well as "Good" prospects while a few scattered areas have very poor prospects.

Key words: Delineation, thematic maps

Water Budget Assessment for Tel River Basin using Remote Sensing Approach

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Abstract

Estimating water budget within a river basin is essential for sustainable water resources management. This work has been carried out for water budget estimation in the Tel River basin using remote sensing. Water budget assessment for any river basin depends upon various factors like precipitation, evaporation, transpiration, infiltration, surface and groundwater storage, and runoff. Different satellite observation data have been used to estimate the water budget over Tel River basin. This study aims on amounts of precipitation, evapotranspiration, storm surface runoff and change in terrestrial storage in the river basin for dry and wet seasons and were calculated from remote sensing-based GPM IMERG, MODIS, and GRACE/GRACE-FO-derived GLDAS-CLSM model during the wet and dry seasons for the period 2020-2021 in Tel River basin. Precise estimation of water budget continues to be a challenge for a variety of reasons such as climate change, land cover dynamics, water diversions, etc. The spread of estimates can be used for assessing the uncertainty.

Keywords: River Basin, Water Budget, Q-GIS, remote sensing, Precipitation

Spatio-temporal Meteorological Drought Mapping and Forecasting over Selected Districts of Maharashtra

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Abstract

The study focused on the 13 flood-affected districts of Maharashtra to understand the alteration in the drought phenomenon for future scenarios. Spatial variation of drought from the Satellite view involved Landsat data collected from the United States Geological Survey (USGS web platform, during 1991–2021 in 5-year intervals. The dataset was analyzed to build yearly time series of the Normalized Difference Vegetation Index (NDVI), Normalized Difference Water Index (NDWI), Normalized Difference Moisture Index (NDMI), and Vegetative Condition Index (VCI). These raster indices have been analyzed to study the spatial patterns of drought occurrence in this region. Again, drought analysis was implemented with precipitation & temperature grid level daily data from the India Meteorological Department. The dataset was implemented to estimate the Standardized Precipitation Index (SPI), Standardized Precipitation Evapotranspiration Index (SPEI), Standardized Anomaly Index (SAI), and Rainfall Anomaly Index (RAI). IDW Interpolation method was utilized to visualize maps of these meteorological indicators' temporal patterns of drought occurrence in the region. A comparative analysis of these spatial &temporal indicators has been done to analyze the pattern of drought occurrence over the last few years.

Key words: SPI, SPEI, Rainfall Anomaly Index, NDVI, NDWI, NDMI

Landslide Hazard Zonation using GIS and Remote Sensing

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Abstract

In the present study, multi-criteria analysis technique is used for landslide hazard zonation mapping. Various thematic layers, namely slope, rainfall distribution map, lineament density, drainage density, slope aspect, geology, land use/land cover and soil map, were integrated in a GIS platform (ArcGIS 10.1) to delineate landslide hazard zone. Analytic hierarchy process was used to determine the weight values of different factors. Relative rating values are assigned for the subclasses of each thematic layer based on their corresponding impact on the landslide triggers, and within a thematic layer, each class was assigned an ordinal rating from 0 to 9. The landslide hazard zonation map of Namchi region was produced based on weighted overly techniques. The landslide hazard map of Namchi region is divided into five vulnerable zones, namely very low-, low-, moderate-, high- and very high-hazard zones. Resulted landslide hazard zonation map was further validated with field study and geospatial technology-based analysis. The findings demonstrate high-landslide-hazard zones are associated with areas of active erosive processes (steep slopes/cut slopes/lineaments). The results indicate the villages Bomtar, Jorethang, Kopchey, Donok, Namthang, Sumbuk, Longchok, Mamring, Turung, Mikkhola, etc. are highly prone to landslides. The final landslide hazard zonation map can be used for the landslide hazard prevention, proper planning of future infrastructure and environmental development in Namchi region.

Key words: Landslide, Analytic hierarchy, multi-criteria analysis

Change Detection of Wetland Mapping Using Remote Sensing Approach

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Abstract

Wetlands are very important for many reasons, but maybe most importantly because they recharge aquifers, retain moisture, function as pollution filters, and provide habitat for a variety of wildlife. Wetland resources were impacted to varied degrees by the expansion of human habitation and the global economy. The scientific basis for wetland protection and restoration is established by accurately mapping different wetland types and tracking their dynamic changes. Using LANDSAT TM and LISS III pictures, the primary goal of this project is to map and change-detect the wetlands along the west coast of Karnataka from the mouth of the Nethravathi River to the Sharavathi River. In this work, wetlands are extracted from the study region using thresholding techniques and indices like NDWI (Normalized Difference Water Index) and NDVI (Normalized Difference Vegetation Index). LANDSAT pictures from 1998 and LISS III images from 20018–19 are the sources of the data. The process involved categorizing satellite images, creating spectral indices, and integrating and analyzing GIS data. NDVI, NDWI, and water bodies were extracted once unsupervised classification was completed using the ArcGIS software. The thematic layers were then combined to create an integrated land use and wetland map. Finally, a change detection analysis was performed to determine how the study area's land use and land cover had changed.

Key words: Wetlands, Extraction, Remote sensing and GIS, Change Detection

Identification of Ground Water Potential Zones using Remote Sensing & GIS over Gajapati District, Odisha

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Abstract

Ground Water plays a vital role in the development of activities in an area. The surface water resources are inadequate to fulfil the water demand. Productivity through groundwater is quite high as compared to surface water, but groundwater resources have not yet been properly exploited. Keeping this view, the present study attempts to select and delineate various groundwater potential zones for the assessment of groundwater availability in the coastal part of Gajapati district, Odisha using remote sensing and GIS technique. Landsat 8 & 9 and SRTM data have been used in the present study to prepare various thematic maps, like: Geological, slope, drainage density, lineament density map. On the basis of this final weight and ranking, the ground water potential zones have been delineated. In Gajapati district it is observed that an integrated approach involving remote sensing and GIS technique can be successfully used in identifying potential groundwater zones in the study area. Five categories of groundwater potential zones, excellent, very good, good, moderate and poor have been demarcated. Major portions of the study area have “good” as well as “Moderate” prospect while a few scattered areas have poor prospect. The use of suggested methodology is demonstrated for a selected study area in Gajapati district of Odisha. This groundwater potential information will be useful for effective identification of suitable locations for extraction of water.

Key words: Ground Water, Landsat

Spatial Prediction Models for Landslide Hazards: Review, Comparison and Evaluation

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Abstract

The predictive power of logistic regression, support vector machines and bootstrap-aggregated classification trees (bagging, double-bagging) is compared using misclassification error rates on independent test data sets. Based on a resampling approach that takes into account spatial autocorrelation, error rates for predicting "present" and "future" landslides are estimated within and outside the training area. In a case study from the Ecuadorian Andes, logistic regression with stepwise backward variable selection yields lowest error rates and demonstrates the best generalization capabilities. The evaluation outside the training area reveals that tree-based methods tend to overfit the data.

Keywords: support vector machines, bootstrap-aggregated classification trees

Flood Susceptibility Mapping using Geospatial Approach

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Abstract

Flood susceptibility mapping is essential for characterizing flood risk zones and for planning mitigation approaches. Flooding can have catastrophic effects on human lives and livelihoods and thus comprehensive flood management is needed. Flood susceptibility mapping and assessment is an important element of flood prevention and mitigation strategies because it identifies the most vulnerable areas based on physical characteristics that determine the propensity for flooding.Aims to define the flood susceptibility zones for the territory of Slovakia using a multi-criteria approach, particularly the analytical hierarchy process (AHP) technique, and geographic information systems (GIS). Such management requires information on the hydrologic, geotechnical, environmental, social, and economic aspects of flooding. Mapping the susceptible areas helps us to understand flood trends and can aid in appropriate planning and flood prevention. In this a combination of bivariate probability analysis and multivariate logistic regression was used to produce flood susceptibility maps. The main aim of this was to overcome the weakness of logistic regression regarding bivariate probability capabilities.

Keywords: Flood, AHP, logistic regression

Geo informatic Support for Multi-scale Environmental Monitoring of Arid Delta

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Abstract

Direct comparison of the space images using a well-known changes detection technique is conflicted with some peculiarities of the studied area - complicated hydrological structure, superposition of the various morphogenetic patterns and a big scatter in the sizes of homogeneous patches. All these features are typical for riparian ecosystems, but Northern part of Amudaria delta also manifests temporal instability. To overcome these difficulties, we use object-oriented changes monitoring using both space image processing of various resolutions and spatial database of the terrestrial ecosystem parameters and water objects dynamic information. We made analysis of the biodiversity and plant communities' resilience for the non-irrigated part of the Amudarya delta using geoinformatic approach with various spatial scales and generalisation conditions. Our results confirm importance of geoinformatics approach to use ecosystem-dependent spatial analysis for the diverse landscape patches monitoring through remote sensing data and spectral indexes interpretation.

Key words: Geoinformatics, Environmental Monitoring, Combined GIS and RS approach.

A Comparison of Different Interpolation Techniques for ET Mapping

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Abstract

Accurate mapping of the spatial distribution of evapotranspiration is important for many applications such as irrigation management, water resources planning and management, agricultural planning. In this study, we compared 7 different regression techniques to predict spatially the average annual evapotranspiration of Illinois, USA using data from different stations. The methods compared were Ordinary Kriging (OK), Generalized Linear Model (GLM), Generalized Additive Model (GAM), Random Forest (RF), GLM + OK, GAM + OK, RF + OK. The primary data has been acquired of year 2020, from Illinois State Water Survey and average annual evapotranspiration is calculated for each year. Three auxiliary variables were considered as candidates to model the variation of evapotranspiration. A 10-fold cross validation has been used while training the models and root mean square error (RMSE) acted as the evaluation metric for carrying out the comparing the different regression kriging (RK) algorithms. The results obtained from this study concludes that RK models gives better results as compared to sole use of regression techniques or OK. Furthermore, among Generalized Linear Model (GLM), Generalized Additive Model (GAM), Random Forest (RF), GAM based RK method outperforms the other RK based models used in this study.

Keywords: Potential Evapotranspiration, Ordinary Kriging, Regression Kriging, Cross validation, Root Mean Square Error, GLM, GAM, RF.

Ground Water Prospect of Bhubaneswar Municipality Corporation (BMC)

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Abstract

Ground water prospective (GWP) map is a systematic effort and has been prepared considering major controlling factors, such as geology, geomorphology, drainage pattern, drainage density, lineaments, lithology etc. The 30cm resolution data (drone image) is studied by changing its band to FCC (false colour composite). Drainage and water bodies are identified and marked in the beginning, the tonal variation in the image makes it easier for identifying water bodies. After that geomorphology and various patterns are studied and ground water prospective map is made.

Keywords: Ground water prospective, False color composite

Spatio-temporal Trends and Variability of Rainfall in the Mahanadi River Basin, India

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Abstract

Rainfall is an important factor for many hydrologic applications. This study examined the spatial-temporal trends and variability of seasonal and annual rainfall for 40 stations over Mahanadi river basin, India. For this purpose, 115 years (1901 to 2015) gridded rainfall data of India Meteorological Department (IMD) were analyzed using Mann-Kendall (MK).The analysis revealed the significantly decrease in annual rainfall and seasonal rainfall at the various stations over the Mahanadi river basin. Rainfall variability was very high in some the stations for pre-monsoon and post-monsoon seasons. The trends and variability analysis of rainfall in the Mahanadi river basin along with its maps would be useful for the local stakeholders for better planning and management of available water resources.

Keywords: Spatio-Temporal Trends, Man-Kendall, Mahanadi River Basin

Soil Properties Analysis using Geospatial Approach

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Abstract

Digital soil mapping is the generation of geographically referenced soil databases and prediction of soil classes or properties from point data using a statistical algorithm. It represents a quantitative relationship between spatially explicit environmental data and measurements in the field and laboratory. The digital soil map is a raster composed of 2-dimensional cells (pixels) organized into a grid in which each pixel has a specific geographic location along with soil data. In this mapping, the core concept is well defined with variation expressed across the landscape. The main aim of this study is to identify spatial temporal variability of Soil. To develop digital Soil Health Map. The study area is R. Sitapur Gajapati District. It will help to find out the element very easily in the particular area due to that it will be easy for growing different crops in different season. Digital soil map will provide information for crop productivity and soil health.

Keywords: Digital Soil Mapping, Soil Health

Quantification of Soil Loss in the Mahanadi River Basin using Revised Soil Loss Equation

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Abstract

Land surface temperature (LST) is a crucial component in several areas, including environmental issues, urban growth with respect to land use and land cover balance analyses, and also a significant input for climate models. LANDSAT data has opened up a wide range of opportunities for studying land processes through remotely sensed data. Land surface temperature calculation is possible with the aid of remotely sensed images and digital image processing. In the present study, LST for Titlagarh Municipality, Odisha, was obtained using the SW algorithm and Landsat 8 Optical Land Imager (OLI) data with a resolution of 30 m and Thermal Infrared Sensor (TIR) data with a resolution of 100 m. The LST has been computed using the Normalized Difference Vegetation Index (NDVI) values from the Red and Near Infrared bands. The Land Surface Emissivity (LSE) is primarily obtained from the Thermal Infrared bands. The research work focused on ArcGIS Raster processes and Raster analysis using LANDSAT 8 December (2019) and May (2020) (thermal Bands (10 & 11). TIR bands 10 and 11 were used to calculate the spectral radiance. Emissivity was calculated using the NDVI threshold technique and OLI bands 2, 3, 4, and 5 were used for said proposes. The findings indicate that LST was high in the barren regions but low in the hilly regions due to vegetative cover. The results show that it is possible to determine NDVI, LSE, and LST with adequate precision.

Key words: Erodibility, RUSLE, Arc-GIS, Mahanadi River Basin

Investigation of the Watershed Hydro-morphometric Characteristics through Morphometric Analysis

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Abstract

The study of morphometric parameters helps us to estimate exact scenario about the geomorphic characteristics and the hydrological behavior of a river basin. It will be particularly helpful in areas where hydrological data are unavailable due to the absence of a gauging station. The present study is to investigate the hydro-morphological characteristics of the Kangsabati river basin India. By using Arc-GIS we analyzed the morphometric parameters of the study area. The geological, geomorphological, hydrological characteristics have been marked out under linear, areal and relief aspects of morphometric parameters. A distinctive topographic diversity is also depicted by the basin's Topographic Positioning Index (TPI). A significant spatial variation of water availability in this basin is indicated by the Topographic Wetness Index (TWI); the depressed areas of the basin have higher TWI compared to the steep-sloped high land. The basin's hypsometric integral (HI) is inferred youthful stage. This basin has a good potentiality of water which can be sustainably used by the people of the lower reaches of the basin. This study will be helpful to assess the hydro-geomorphic characteristics of a drainage basin where hydrological data are not available.

Key words: Arc-GIS, morphometric parameters, kangsabati river basin

Natural Forest Loss Mapping and its Impact on Climate Change over KBK Districts of Odisha

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Abstract

Information required to support policies and actions to conserve, protect, and manage forests sustainably is provided via monitoring of forest cover and forest functions. With numerous environmental, economic, and social advantages, forests are significant worldwide resources. They support the livelihoods of rural communities by offering a range of valued products, including lumber, fuelwood, fibre and other wood and non-wood forest products. Deforestation is the full removal of trees so that the forest can be used for something else, such as agriculture, mining, or settlements and cities. As a result, the forest is permanently transformed into a different land use. It is unlikely that the trees will grow again. Rain is brought on by planting additional trees because they transpire. During photosynthesis, the aerial parts of plants lose water as water vapour through a process called transpiration. This water is added to the air's usual moisture content, causing the air to become saturated more quickly and produce rain. National forest monitoring systems that are capable of accurately assessing forest cover, forest cover change, and carbon stock change are crucial, particularly in the tropics where forests are rapidly disappearing. Since many tropical nations lacked the institutional capacity to implement such a system in the past, capacity building initiatives are currently being carried out to improve the technical and political skill sets required.

Keywords: Transpiration, forest products etc.

Landslide Hazard Zonation and Vulnerability Mapping of Devikulam Taluk - Kerala

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Abstract

Over decades Kerala faced severe number of floods, landslides which make Kerala as a disastrous state. Over ½ of Landslides had been occurred in the district of Idukki especially in Devikulam taluk. It leads to several deaths, losses of properties, losses of families etc. Landslides are one of the dangerous calamities which need a proper mitigation measure and some prevention to avoid losses of lives. As a human we can't stop those disasters but we can prevent the losses of lives and properties. In order to prevent and to save lives there is a need to find the risk zones of landslides and their main causes. We had given weightage of several causes of landslides by preparing and analyzing several thematic maps listed below base map, slope map, aspect map, elevation map geomorphology map, lithology map, lineament map, rainfall map, soil map, LULC map, road network map, drainage map, population map in-order to find the main causes and triggers of landslides and also, we had prepared vulnerability for showing the vulnerability over humans and properties so that people can become safe over those disasters.

Keywords: land slide, maps etc

Identifications of Aluminous Laterite and Bauxite ore Deposits using Remote Sensing Approach, Koraput - India

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Abstract

The Eastern Ghats mobile belt is one of the oldest groups of rocks (average age of about 2900 million years) of Indian Peninsula. The present study area located east of Koraput town in the southern part of Odisha province with latitude 18°45' N to 19° 05' N and longitude 82° 50' E to 83° 05' E. Spectral signature of any material depends upon its composition and molecular structure and hence spectral signatures are unique to each material. As remote sensing deals with spectral reflectance of the objects in a spatial domain, there may be the chance that reflectance from the closer objects is mixed. Again, geological Remote Sensing in most of the cases is based on indirect evidence, as natural rock exposures are scanty and patchy in occurrences. Therefore, spectral unmixing is required to separate target material from the background by estimating approximate sub-pixel. Landsat TM data of 3rd march, 2000 (mid dry season) was acquired for this study. All bands were used in this study except band number 6. All the image processing and spectral processing were done in ENVI 5.2 and ILWIS 2.2. Image processing approaches (such as Logical, and Spectral with image calibration) have been considered for the finding out the abundance of bauxite minerals, spectral processing results are displayed in the form of separate images corresponding to each group of pixels (endmembers). MTMF method applied on Landsat TM images gave three score (abundance) images for three different classes (endmembers) such as Laterite/bauxite, vegetation and red soil respectively. It was found from the study that laterite and bauxite capping's could be very well identified in the satellite images with the help of spectral processing techniques. This is because of their unique spectral signature and high contrast with the surrounding region. Analysis of spectral signatures of laterite/bauxite, vegetation and red soil showed that in TM band 7 vegetation gives low reflectance and laterite/ bauxite gives high reflectance whereas in band 4 it is vice versa. Therefore, it is concluded that this technique can be extrapolated to similar areas for identification of aluminous laterite and bauxite ore deposits.

Key words: Landsat, Bauxite, spectral Signature, endmembers, etc.

Determination and Impact of Urbanization on Soil and Water Body in Bhubaneswar Municipality using Geospatial Approach

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Abstract

Social-economic the terms land use and land cover is often used interchangeably but each term has its own unique meaning. Land cover refers to the surface cover on ground like vegetation, urban infrastructure, bare soil etc. Identification of land cover establishes the baseline information for activities like thematic mapping and change detection analyzing. Land use refers to the purpose the land serves, for example, recreation, wildlife habitat or agriculture. When used together with the phrase Land Use/Landover (LULC) generally refers to the categorization or classification of human activities and natural elements on the landscape within a specific time frame based on established scientific and statistical method of analysis of appropriate source materials. Land cover is the physical material at the surface of the earth. Land use is the description of how people utilize the land for the activities.

Key words: social economy, LULC

Delineation on Mahanadi River Basin Using SWAT Model

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Abstract

In this study, Soil Water Assessment Tool (SWAT) model was employed to simulate the monthly stream flow in upper mahanadi river The model has been simulated for a period of 24 years (1988- 2011) by considering first 3 years (1988-1990) as warm up and next 16 years (1991-2006) for calibration and the last 5 years (2007-2011basin. The basin was divided into 27 sub-basins comprising 178 Hydrological Response Units (HRUs).) used for validation. Monthly calibration and validation of SWAT model has been performed using the observed discharge data at Champua outlet. The most sensitive parameters in the study region were examined through sensitivity analysis. The stream flow estimates were statistically analyzed by computing p-factor, r-factor, R2 and NS (Nash – Sutcliff) coefficients. The values obtained in the simulation for these coefficients respectively are 0.38, 0.30, 0.88, 0.87 during calibration and 0.48, 0.40, 0.88, 0.87 during validation. The model results also indicate that the SWAT model could simulate stream flow successfully at Champua outlet with less difference between the observed and computed values. The outcomes of the present study can be useful for water resource planning and management of the study area.

Keywords: SWAT, HRU

Bauxite Ore Mining survey using DGPS and UAV techniques – A Case Study of Doraguda, India

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Abstract

Over the past decade, Unmanned Aerial Vehicles (UAVs) have been used in the mining industry for various applications from mineral exploration to mine reclamation. This study aims to review academic papers on the applications of UAVs in mining by classifying the mining process into three phases: exploration, exploitation, and reclamation. Differential Global Positioning System (DGPS) is an enhancement to Global Positioning System that provides improved location accuracy, from the 15-meter nominal GPS accuracy to about 10 cm in case of the best implementations. DGPS refers to using a combination of receivers and satellites to reduce/eliminate common receiver based and satellite based errors reduce orbit errors reduce ionospheric and tropospheric errors.

Keywords: DGPS, UAV techniques, ionospheric

Forest Fire Monitoring and Assessment of Mayurbhanj District - Odisha

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Abstract

It is critical for sustainable forest resource management to analyze the spatial extent and distribution of forest fires. There is no comprehensive data on forest fires that occur on a regular basis in India's Biosphere Reserves. The current study using sentinel data and fire frequency to locate and estimate the spatial extent of forest burnt areas in the Simlipal biosphere reserve from 2019 to 2021.

Keywords: spatial extent, comprehensive data

Mining Planning using UAV Techniques -A Case Study of Bainibasa Graphite Mines, Odisha

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Abstract

In an open-pit mine or quarry, a drone survey refers to the use of a drone (or UAV – unmanned aerial vehicle) equipped with a downward-facing RGB camera to capture images of a site from different vantage points. The Ministry of Mines launched MSS (Mine Surveillance System) based on the vision of our Hon`ble Prime Minister of India, Mr. Narendra Modi who emphasized on the role of Space Science for achieving good governance. To curb illegal mining in the country, the mines ministry is promoting use of drones and has asked states/public-sector undertakings (PSUs) to consider using unmanned aerial vehicles (UAVs) For mining PSUs3D modeling and digital elevation modeling of mines for efficient mine planning. Volumetric analysis of the extractions and dumps. Reclamation studies using the ortho-photography. Lease boundary fixation using the on-board GPS of drones. For exploration work Carrying out initial aerial survey of the area to help in planning for taking up exploration Activities. Physical terrain mapping and segregation of land use. Surveying and mapping of forests. Detailed study like contour mapping and etc. For States and IBM Lease boundary verifications and geo-referencing of the leases. Carrying out aerial surveys at regular interval to study the difference in patterns which in turn can be used for analyzing the mining activities."

Keywords: UAV, ortho-photography, IBM

Determination of R factor in Revised Universal Soil Loss Equation (RUSLE) using R Studio

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Abstract

The most widely used empirical model for estimating and preventing erosion worldwide is the Revised Universal Soil Loss Equation (RUSLE). In R studio package, Rainfall Erosivity Factor was developed as a tool for the study of precipitation data and the determination of the R-factor, which play an important role in predicting soil loss by water erosion. This package contains a user friendly for importing huge rainfall datasets into the R modeling environment and processing information into eroded and non-eroded events. Then, rainfall erosivity values are computed using erosive rainfall occurrences. This report describes the design of the program with the goal of demonstrating how amount of rainfall may be correctly, quickly, and effectively examined. In five droughts district in Odisha, India, is used as an example, and a rainfall dataset covering 21 years with ten-minute gaps between readings is used.

Keywords: Rainfall Erosivity Factor, R software, Soil erosion, Rainfall data analysis, Erosion model prediction.

Assessment of Drought Monitoring in Odisha by using MODIS Derived Indices and Google Earth Platform

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Abstract

Drought is one of the frequently observed natural hazard resulting from precipitation deficit and increased evapotranspiration caused by high temperatures. In this study, we analyzed the spatiotemporal distribution of drought conditions in in Odisha state from 2010 to 2020 by using different drought indices produced from MODIS satellite data in Google Earth Engine (GEE) platform. Vegetation Health Index (VHI), Normalized Multiband Drought Index (NMDI) and Normalized Difference Drought Index (NDDI) maps in state level for different years were utilized to assess the drought conditions. Precipitation has analyzed for 10 years from Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS) for Odisha region. Time series were also created for drought prown districts of Odisha such as Bolangir, Bargarh, Nuapada, Kalahandi, Kandamala locations to deeply analyze the drought conditions in 10-year period which are identified as drought prone area by Odisha State Disaster Management Authority (OSDMA). Our results show that MODIS derived drought indices provide useful geospatial information to assess drought conditions in state level. Moreover, GEE platform is very handy and rapid tool to reach related satellite images and conduct remote sensing analysis of huge and long-term date efficiently.

Keywords: Drought monitoring, Drought Indices, Google Earth Engine

Spatial Distribution of Rural Amenities in Yelandur Taluk of Chamarajanagar District, Karnataka, India

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Abstract

The rural amenity is one of the major challenging issue close to planners, policy makers and academicians in all region.The current study observed on basic amenities to determine the level of spatial distribution of backward regions in the Yelandur taluk of Chamarajanagar district. Improved amenities has an combined impact on income and economic growth. This study aimed to evaluate the basic amenities to interpret the spatial development ofbackwardness. For the same, 18 sub criteria under 4 groups such as Education, Health, Economic and Communication sectors and its divided into three categories according to the value of the aggregate score with the help of GIS platform. The regional development index reveals that some villages are significantly developed. The result revealed that the overall regional development lies among different villages of yelandur.

Keywords: Regional Disparity, LocationQuotient, Lorenz Curve,Aggregate Weightage Score, GIS

Mineral Estimation in Joda\Barbil using Geospatial Approach

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Abstract

The steel industry plays an essential role in strengthening the economy of the country. Iron oxide ore minerals such as magnetite (Fe304), hematite (Fe203), goethite (FeO(OH)). limonite (FeO(OH), nH2O) are mainly used in steel industry. As the demand for Iron oxide Ore is soaring, so is the necessity for the adoption of techniques for rapid and accurate approaches for identification of Iron ore depositional zones. Several geoscientists have used multispectral, hyperspectral, and in-situ data to detect the various minerals present in the earth surface. Iron Ore depositional mapping has been performed through ASTER data and the extracted ore potential map has further been validated through field studies.

Keywords: ASTER, multispectral, hyperspectral, and in-situ data

Investigation of the Watershed Hydro-Morphometric Characteristics through Morphometric Analysis

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Abstract

The study of morphometric parameters helps us to estimate exact scenario about the geomorphic characteristics and the hydrological behaviour of a river basin. It will be particularly helpful in areas where hydrological data are unavailable due to the absence of a gauging station. The present study is to investigate the hydro-morphological characteristics of the Kangsabati river basin India. By using Arc-GIS we analysed the morphometric parameters of the study area. The geological, geomorphological, hydrological characteristics have been marked out under linear, areal and relief aspects of morphometric parameters.A distinctive topographic diversity is also depicted by the basin's Topographic Positioning Index (TPI). A significant spatial variation of water availability in this basin is indicated by the Topographic Wetness Index (TWI); the depressed areas of the basin have higher TWI compared to the steep-sloped high land. The basin's hypsometric integral (HI) is inferred youthful stage. This basin has a good potentiality of water which can be sustainably used by the people of the lower reaches of the basin. This study will be helpful to assess the hydro-geomorphic characteristics of a drainage basin where hydrological data are not available.

Keywords: Arc-GIS, morphometric parameters, kangsabati river basin

Flood Vulnerability Assessment of Thrissur district, Kerala state

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Abstract

Floods are now the most prevalent natural disaster in recent years. In a worldwide study of the major calamities, it was ranked first out of 16 natural disaster types responsible for either one million dollars in damages or injuries. In light of the fact that the event may reoccur, we must adopt the strategy of preparedness for an emergency rather than searching for solutions in the aftermath. Geospatial technologies offer a great deal of help in monitoring and reducing the vulnerability to natural hazards. Flood zoning using GIS, a non-structural method is an efficient tool for flood damage mitigation and management. The present study aims to develop a flood risk map of Thrissur district in Kerala state based on multi criteria analysis using free and open-source software QGIS. Vulnerable areas and the factors that are relevant to current and future floods will be focused on to devise suitable strategies for flood mitigation. On top of identifying the high-risk areas, the study also aims to propose an emergency action plan for the district in case of a flood.

Key words: Flood mapping, QGIS, Disaster risk management

Delineation on Baitarini River Basin using SWAT Model

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Abstract

In this study, Soil Water Assessment Tool (SWAT) model was employed to simulate the monthly streamflow in upper Baitarani river basin. The basin was divided into 27 sub-basins comprising 178 Hydrological Response Units (HRUs). The model has been simulated for a period of 24 years (1988- 2011) by considering first 3 years (1988-1990) as warm up and next 16 years (1991-2006) for calibration and the last 5 years (2007-2011) used for validation. Monthly calibration and validation of SWAT model has been performed using the observed discharge data at Champua outlet. The most sensitive parameters in the study region were examined through sensitivity analysis. The streamflow estimates were statistically analyzed by computing p-factor, r-factor, R2 and NS (Nash – Sutcliff) coefficients. The values obtained in the simulation forthese coefficients respectively are 0.38, 0.30, 0.88, 0.87 during calibration and 0.48, 0.40, 0.88, 0.87 during validation.The model results also indicate that the SWAT model could simulate stream flow successfully at Champua outlet with less difference between the observed and computed values. The outcomes of the present study can be useful for water resource planning and management of the study area.

Key words: SWAT, HRUs, Nash – Sutcliff

Flood Assessment in the Tel River Basin using AHP

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Abstract

Flood has been considered as one of most frequent and damaging disaster in the eastern region of India. Flood damage can be reduced through proper management practices and policy implementation. Henceflood assessment is crucial for better water resources management in a river basin. This study aims to assess the flood mapping in the Tel River basin India using analytical hierarchy process (AHP). The Tel river basin covering an area of 2756k and lies between 19°17 and 20° 00′ N latitude and 82° 30′ and 82° 59′E longitude. For this analysis total eight influencing factors such as Land Use Land Classification, Drainage density, Slope, Aspect, Soil, Contour, Hill shade, Precipitation maps has been prepared in GIS software by assigning relative weights through the AHP approach. As a result of this study, a final flood map has been prepared and the regions having very high flood potentiality are identified. The resultant map has inferred that a significant area of Tel River basin has a frequent flood prone. The AHP method proposed in this study is capable to provide an accurate result for flood mapping and can be easily applied to other regions around the world for the management and prevention of the flood hazard.

Keywords: - Flood, AHP, Arc-GIS

Iron Ore Discrimination using Remote Sensing– A Study on Keonjhar District, Odisha

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Abstract

Keonjhar is part of the Singhbhum-Keonjhar-Banei iron belt which stretches about 50 km and around 14.5 km lie within Keonjhar District. Daitari hills that border Keonjhar and Jajpur district is home to high grade of Iron ore. The present study focuses on this area for the iron ore identification using Hyperspectral remote sensing (HRS). HRS provides spectral bands with distinctive spatial/spectral information for the mineral identification. The techniques available for classification of different features present in the satellite imagery widely useful. The hyperspectral image analysis utilizes the atmospheric correction (FLAASH), Spectral Angle Mapper (SAM), Minimum Noise Fraction (MNF), techniques to discriminate iron ore. The high accuracy mineralogical map may be developed by the integration of remote sensing and field investigations.

Key words: Hypersectral, Mineral Mapping, Keonjhar, Remote Sensing

LAND USE LAND COVER APPLICATIONS

An Assessment of Land Use Land Cover Change and its impact on Land Surface Temperature for Odisha, India

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Abstract

Land surface temperature (LST) is an important parameter related to surface–atmosphere interactions and plays a key role in different scientific studies, such as monitoring drought and ecological, agricultural , and meteorological processes on the Earth's surface . Therefore, LST data can be used as an input for many models at both regional and global scales to improve and refine global hydro climatic and meteorological predictions. In this study spatio-temporal analysis of Land surface temperature for Odisha has been analyzed using MODIS data. Further this study evaluated different LULC categories and its impacts on land surface temperature (LST). The results indicate that there is a significant expansion in vegetation and built-up area replacing barren land. The different LULC evolution in Odisha clearly indicates their effects on the thermal environment, with an increasing LST trend. This study provides a baseline reference to urban planners and policymakers for informed decisions.

Keywords: land use, LST ,LULC etc

Analysis of Land Use and Land Cover Dynamics: Inter-comparison of different Hybrid Machine Learning Models for Bhubaneswar Smart City, Odisha

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Abstract

Land use and land cover (LULC) change is a major issue of global environmental change. The changes in LULC explain how the ecosystem is modifying its capacity to provide services including biodiversity and other resources such as food, fiber and water for human society with respect to both present and future. Changes in Land use can be due to urban expansion and the loss of agriculture land, changes in river regimes, and effect of shifting cultivation, the spread of erosion and desertification and so on."

Key words: LULC, land use

Estimation of Land Use and Land Cover Change in the Mahanadi River Basin, India

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Abstract

Mahanadi River is called the lifeline of the two states i.e., Odisha and Chhattisgarh. Around 52.42% area of the basin is present in Chhattisgarh and 47.14% area in Odisha. The LULC of the basin is broadly reclassified into five classes i.e., forest, agriculture, built-up, wastelands and water bodies. Considering LULC of 1985 as the base period the decadal changes in LULC were estimated. The study suggested that out of the 1,41,589 km2 basin area, agriculture accounts for around 59.37% area while forest cover is present over 34.78% area. The rest of the basin area is covered with 1.48% build-up land, 0.64% barren lands, 3.72% water bodies. The LULC change detection with respect to the base period revealed a decrease in forest cover tune to 1.71%, 2.34% and 2.74% during 1995, 2005 and 2015, respectively. The deforested lands were mostly converted into the agricultural area which showed an increase of 1.43%, 1.99% and 2.25% over the base period, respectively. It was further observed that the built-up area was increased, the wasteland area was marginally decreased, and the water spread area was also marginally increased over the base period.

Keywords: LULC, Mahanadi, Agriculture, Forest

Impact of LULC Change on Seasonal Cloud Amount Mapping over New Delhi

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Abstract

Cloud amount is significantly impacted by urbanization's massive changes in land use and land cover (LULC) in rapidly expanding megacities. This study used Landsat TM/OLI satellite images to first identify the pattern of the LULC changes and then explore their effects on cloud in new Delhi for the years 1990, 2000, 2010and 2020 and used seasonal cloud data from power NASA for analyses changes in cloud amount. Urban planners and environmental engineers can use this study to better understand how LULC change (such as the loss of plant cover, agricultural land, and water bodies to support substantial urban growth) affects cloud and to suggest appropriate policy actions to control it.

Keywords: LULC change , cloud amount etc

Land Use and Land Cover in Khorda

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Abstract

India is a country with a very high population. There is a huge need of construction planning. Here Land Use and Land Cover comes into picture. Land cover refers to the surface cover on the ground, whether vegetation, urban infrastructure, water, bare soil or other. Identifying, delineating and mapping land cover is important for global monitoring studies, resource management, and planning activities. Identification of land cover establishes the baseline from which monitoring activities (change detection) can be performed, and provides the ground cover information for baseline thematic maps. Land use refers to the purpose the land serves, for example, recreation, wildlife habitat, or agriculture. Land use applications involve both baseline mapping and subsequent monitoring, since timely information is required to know what current quantity of land is in what type of use and to identify the land use changes from year to year. This knowledge will help develop strategies to balance conservation, conflicting uses, and developmental pressures. The aim of land use and land cover detection is to study the removal or disturbance of productive land, urban encroachment, and depletion of forests. The study area on which we are working is the administrative boundary of the Khorda district of Odisha. We are working on satellite data taken from Sentinel-2 satellite over a period of 6 years from 2016 to 2021 with cloud coverage less than 10%. The objective of this project is to detect what are the changes occurred geographically in the area of interest.

Key words: Satellite, LULC, Sentinel-2, Khorda

Land Use Land Cover Change Detection using Google Earth Engine

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Abstract

In the present research Google Earth slides were used to study change in land use and land cover pattern of Cuttack in Odisha. As a matter of fact, Classification of land use/land cover mapping (LULC) through high spatial resolution datasets is too expensive for many pilot projects mainly due to the cost of satellite images. Google earth slides are free and can be used in LULC mapping at micro regional level. Google Earth data of 10th May 2005 and 10th May 2020 was saved and georeferenced. Georeferenced images were classified into five major land use using supervised and maximum likelihood classification technique. Overall classification accuracy and Kappa statistics for 2005 was calculated as 80% and 72% respectively. While overall classification accuracy and Kappa statistics for 2020 was calculated as 82% and 72% respectively. The result shows that during the period 2005 to 2020 there is an increase in the area of settlement, forest and the area of agriculture land and grazing land been decreased.

Keywords: Earth Engine, LULC, Unsupervised Classification, Maximum Likelihood Classification

LULC Analysis and its Impact on Flood in Vellar Basin

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Abstract

Flood is the most destructive disaster which causes loss of human life and economy. 9,924 natural disasters worldwide occurred between 1990 and 2019, with floods accounting for 42 per cent (source: EM-DAT). According to data presented in the Rajya Sabha, in 2018, India lost 1,808 lives and suffered losses worth an estimated Rs. 957 billion (Rs. 95,736 crores) due to floods across the country. Recently Tamilnaduhas been facing floods frequently. Chennai and Cuddalore districts were affected heavily by the 2015 flood. Cuddalore district comes under the vellar basin. This paper will analyze natural (rainfall) and anthropogenic (land use landcover change) reasons for the flood. A statistical regression and trend analysis were carried out. Based on the land use land cover map, land use land cover change is identified and related to flood. The paper deals with study of rainfall statics and the impact of land use land cover on flood. The five rain gauge stations which are located at lower velar basin has increasing trend.

Key words: Flood, Disaster, trend analysis, Land use land cover, etc.

Predicting the future Land Use and Land Cover for the Urban Space using Markov Chain Predictive Model at Alipurduar in India

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Abstract

The gradual demographic movement and rising growth have substantially led impact on the land use and land cover (LULC) ambulation. Monitoring of LULC is considered one of the most important drivers in measuring the global change across the world, which collaborates to play a crucial role in the management and sustainable development planning for urban spaces. This study aims to develop LULC map of urban area of Alipurduar, India which was studied during the years 2001 and 2021 and to forecast and establish the potential land-use changes in the years 2030 and 2035 by using Land Change Modeller of TerrSet based on the principle of Markov Chain. Satellite imagery datasets, mainly comprising LANDSAT 7&8 were accessed from USGS Earth Explorer for performing Supervised Classifications which was later used in predicting the future land-use change. The four criteria, such as DEM, slope, distance from roads and distance from waters, were used up in creation of spatial variables for running the MLP-ANN transition sub model to predict their influence for the years 2001 and 2021. From the analysis, it is expected to witness the shift of vegetation lands, waterbodies, etc and several other parameters. From the expected results, a comparative study would be drawn to study the differences vegetation lands, waterbodies, bare lands in the designated area.

Keywords: Markov Chain, MLP-ANN, LULC, Land Use Land Cover

Regionalization in Khorda: A Remote Sensing Based LULC Mapping

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Abstract

Identification of land cover establishes the baseline from which monitoring activities (change detection) can be performed and provides the ground cover information for baseline thematic maps. Land use refers to the purpose the land serves, for example, recreation, wildlife habitat, or agriculture. Land use applications involve both baseline mapping and subsequent monitoring, since timely information is required to know what current quantity of land is in what type of use and to identify the land use changes from year to year. This knowledge will help develop strategies to balance conservation, conflicting uses, and developmental pressures. The aim of land use and land cover detection is to study the removal or disturbance of productive land, urban encroachment, and depletion of forests. The study area on which the work is carried upon includes the administrative boundary of the Khorda province of Odisha. The work entailed the use of Sentinel-2 photogrammetry technique so as to perform diverse supervised learning tasks performed to present the land use land cover.The data aggregated from Sentinel-2 satellite was over a period of 6 years from 2016 to 2021 with cloud coverage less than 10%. Thus, the objective fulfilled through this project is to detect the changes occurred geographically in the area of interest.

Key words: Land Use Land Cover; Remote Sensing; Sentinel-2.

Impact of Land Use and Land Cover Change on Hydrology of Rib River Catchment in Upper Blue Nile, Ethiopia

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Abstract

Land use and land cover (LU/LC) change is one of the key human-derived changes, and the management of water resources must consider how a watershed responds to this dynamic change. We conducted this research to investigate how land use and land cover changes affect the Rib watershed's hydrological response. ArcGIS and ERDAS Imagine 2014 software were used for map preparation and to develop land use and land cover maps from satellite image of Landsat7 ETM 2001 and Landsat8 OLI/TIRS2017. Stream flow data from 1990 to 2001 was used for calibration, and 2002–2008 for validation. R2 and NSE were used to examine the SWAT model's performance during calibration and validation. According to both calibration and validation results, observed and simulated stream flow were very well agreed upon with 0.87 R2 and 0.7 NSE during calibration and 0.89 R2 and 0.74 NSE during validation, respectively. As a result, it is urgently necessary to take action in order to be able to control the land use land cover change and reduce its impact on the hydrological components of the Rib River catchment.

Key word: Land use/Land covers, Rib River catchment, ERDAS Imagine14, SWAT Model

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

AI-Based Resume Parsing for Recruitment

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Abstract

Finding acceptable applicants for a vacant job might be a difficult process, especially when there are many prospects. The manual process of screening resumes could stymie the team's efforts to locate the right individual at the right moment. The laborious screening may be greatly aided by an automated technique for screening and ranking applicants. In our work, the top applicants might be rated using content-based suggestion, which uses cosine similarity to find the curriculum vitae that are the most comparable to the job description supplied and KNN algorithm is used to pick and rank Curriculum Vitaes (CV) based on job descriptions in huge quantities. Experimental results indicate the performance of the proposed system as an average text parsing accuracy of 85% and a ranking accuracy of 92%.

Keywords: Automated technique, KNN algorithm, performance

Document similarity using Text Summarization and Image Captioning

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Abstract

An automated approach for producing a condensed version of the several source documents is text summarization. Automatic text summarization is a new area of study that has recently attracted a lot of attention from academics. Manual text summarizing requires a considerable number of qualified unbiased professionals, higher budget and considerable time. In order to address the aforementioned issues, automated text summarization is a current study area in the science of natural language processing. Furthermore, the extractive summarization finds more frequently used terms and scores the sentences from a different angle. In this work we employed various machine learning techniques like; Extractive summarization, Latent Dirichlet Allocation, and image captioning using LSTM. The achieved results are promising.

Keyword: LSTM, Natural Image Processing

Stock Price Prediction Based on Multiple Data Sources

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Abstract

The Stock Price Prediction process is full of uncertainty, expectations and is affected by many factors. Hence the Stock Price prediction is one of the important factors in finance and business. There are two types of analysis possible for prediction, technical and fundamental. In this paper just, technical analysis is considered. Technical analysis is done using historical data of stock prices of different companies by applying machine learning algorithms. The method involves collecting data sets and extracting sentiments expressed by individual. Then the output which will get after applying algorithms will analyze and the stock values are analyzed. The learned application can then be used to make future predictions about stock values.

Key words: Stock Price Prediction process, machine learning algorithms, technical analysis

Paraphrase Identification using Machine Learning Approach

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Abstract

This paper presents a machine learning approach for paraphrase identification. We present machine learning approach to deciding whether two sentences hold a paraphrase relationship. We employ a generative model that generates a paraphrase of a given sentence, and we use probabilistic inference to reason about whether two sentences share the paraphrase relationship. Paraphrase identification is to classify whether 2 sentences are close enough in meaning. The concepts which we used is based on natural processing language for this we use CNN as it extracts the features by using multiple types of pooling. Then the comparison between 2 sentences is done using similarity metrics. This model takes into the account of similarity and dissimilarity by decomposing and composing of each word and each word are represented as vectors. Semantic interaction between text segments has been cleared by neural networks those are bidirectional long short-term memory and gated relevance network and then aggregated using a pooling layer. A new deep learning architect has been used i.e., Bi-CNN-MI for identification. We uses specify data sets to extract the similarity between 2 sentences, images.

Key words: Paraphrase, CNN, Bi-CNN-MI

Face Recognition for Resume Parsing Python

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Abstract

Python is becoming increasingly popular programming language. It is a free, high-level language that has a very flat learning curve. It has a wide set of freely available libraries. In this paper computer vision libraries are first discussed. Then Face detection and Face recognition capabilities of libraries available are analyzed. The basic description of the algorithm used in the libraries is given. For each major step an example of the resulting image is pro-vided. Although just two sample images are given in the paper, the algorithm was analyzed on many images. The analysis confirmed that Python is re-ally the tool of choice for face detection and recognition tasks.

Key words: Python, face recognition, high-level language

Plant Disease Detection using Deep Neural Network

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Abstract

The fundamental necessity for each country is agricultural products. This affects agricultural productivity in the country and its financial opportunities if plants are afflicted with illnesses. Plant diseases can lead to reduced quality and output of agricultural products. This is highly important for the early detection of plant diseases for global health and well-being. The automatic identification of plant disease becomes an important area of research. It offers benefits in the monitoring of vast fields of crops and helps identify the indications of the illness on the leaves. The leaves contain texture and visual resemblances that are attributable to disease type identification. Therefore, deep learning with computer vision gives way for this problem to be resolved. The article is largely on the determination of plant diseases, reducing crop loss and thus improving the efficiency of production. Our study identifies signs of plant illnesses and diagnoses plant diseases by utilizing the Deep Neural Network (DNN) method based on these symptoms at the very first stage. A hybrid CNN model was utilized to identify plant illness and was demonstrated to outperform it in comparison with standard styles such as AlexNet and LetNet. We have built a web-based AI tool to identify plant disease using this model.

Key Words: Deep Neural Network, CNN, AI

Novelty Text Processing in Virtual Assistant

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Abstract

Today, practically all tasks are done digitally. With a smartphone in our hands, the entire world is literally at our fingers. Virtual assistants are computer programmes that make it easier for you to complete daily tasks like checking the weather, setting reminders, generating shopping lists, etc. They increase user productivity by handling repetitive tasks for the user and by giving the user information from internet sources. The wake word for our task is VABH. VABH is simple to operate. Call the command and the wake word "VABH." And it is carried out immediately. Voice searches have dominated over text search. Text searches have lost ground to voice searches. Only recently have mobile device web searches surpassed computer-based ones, and researchers already expect voice searches to account for 50% of all searches in the near future. Our module is capable of a variety of functions, including intent detection, information selection, process automation, and customized response delivery.

Key words: Text processing, VABH, Virtual assistant

Image Captioning Segmentation

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Abstract

In the present IoT (Internet of Things) sectors and methods like artificial intelligence, data science, and machine learning, image captioning segmentation has become highly popular. Many study and research fields in data science and artificial intelligence are working on the identification of images, extracting data, and identifying contextual text from related images. In the manuscript, we have created an effective hybrid method for capturing text in the Subject-Verb-Object format, segmenting images by objects, and classifying images using edge detection, object detection and instance techniques. We used CNN and LSTM Deep Learning algorithms to complete the challenge. The outcomes are highly encouraging and helpful for extracting text with meaning from images and segmenting data in many dimensions.

Key words: CNN, LSTM Deep Learning Algorithms, IoT, Internet of Things, AI

Handwritten Character Recognition in English

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Abstract

Handwriting recognition has been one of the active and challenging research areas in the field of image processing and pattern recognition. It has numerous applications which include, reading aid for blind, bank cheques and conversion of any hand written document into structural text form. In this paper an attempt is made to recognize handwritten characters for English alphabets without feature extraction using multilayer Feed Forward neural network. Each character data set contains 26 alphabets. Fifty different character data sets are used for training the neural network. The trained network is used for classification and recognition. In the proposed system, each character is resized into 30×20 pixels, which is directly subjected to training. The results show that the proposed system yields good recognition rates which are comparable to that of feature extraction-based schemes for handwritten character recognition The handwritten character recognition has been applied in variety of applications like Banking sectors, Health care industries and many such organizations where handwritten documents are dealt with. Handwritten Character Recognition is the process of conversion of handwritten text into machine readable form. For handwritten characters there are difficulties like it differs from one writer to another, even when same person writes same character there is difference in shape, size and position of character. Latest research in this area has used different types of method, classifiers and features to reduce the complexity of recognizing handwritten"

Key words: Machine Learning, Character Recognition

Data Insight App Development

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Abstract

For helping organization in a such a way that they clear all the queries through the virtual piece of software for that We are developing a hybrid web app contains the different types of chatbot with all the effective manner. By this the customers or students or members of any organization can clear their quires through the response of the chatbots Also Here we are adding, voice bot and conventional chatbot, rule based chatbot to get responses through these chatbots and also a multivariate dashboard for a graphical visualization of dataset.

Keywords: Arc-GIS, morphometric parameters, kangsabati river basin

E-mail Spam Classification using ML Techniques

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Abstract

The growing volume of unsolicited bulk e-mails (also known as spam) has created a demand for dependable anti-spam filters. Machine learning techniques are now widely used to successfully filter spam e-mail. Spam is prevalent on the Internet because electronic communications have a much lower transaction cost than any other form of communication. Many spam filters use various methods to identify incoming messages as spam, such as white list blacklist, Bayesian analysis, keyword matching, mail header analysis, postage, legislation, and content scanning, among others. Even though we are still bombarded with spam emails on a daily basis. This is not due to the filters being insufficiently powerful; rather, it is due to spammers' rapid adoption of new techniques and spam filters' inability to adapt to the change. In this paper, we will look at some of the most popular machine learning methods (Bayesian classification, k-NN, ANNs, SVMs, Artificial immune system, and rough sets) and their application to the problem of spam Email classification. We used supervised machine-learning techniques to filter email spam messages in our work. For learning the features of spam emails, widely used supervised machine learning techniques such as C 4.5 Decision tree classifier, Multilayer Perceptron, and Nave Bayes Classifier are used, and the model is built by training with known spam emails and legitimate emails."

Key words: spam emails, machine learning etc

Parkinson Disease Prediction Using Machine Learning

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Abstract

Parkinson Disease Prediction" System based on classification framework and ANN model. It is a major disease that can make people more vulnerable to serious and life-threatening infections. It classifies the symptoms that the user has and according to that, it suggests the user go for health check-ups. Early detection of the disease and prevention of it can be the only way to make people fit for all ages long. So, for that the system analysis the symptoms the user gives as inputs and tries to give an output by implementing many classification algorithms. This system also used the ANN model to build an efficient medical diagnosis solution system for huge amounts of data. Implemented models are SVM and ANN. The best accuracy got for the Parkinson's disease model of ANN as compared to other models and that is 90%, whereas SVM got a result of 82%. For the future development of our system, we are thinking to make a website platform where a single user can detect his/her own disease by putting the input symptoms.

Key words: ANN, Classification, SVM

Classification - Weather Prediction

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Abstract

In this paper, we are predicting the weather by analyzing features like maximum and minimum temp and wind parameters. We have taken some historical data of the year and predict the future atmosphere conditions. Here we use various ml algorithms classification techniques like Decision Tree, and Gaussian naive Bayes model and Based on the results obtained a comparative study is done concerning the accuracy we can predict weather. Here we use the models bayes model and decision tree model had best accuracy value.

Keywords: Temperature, Decision tree etc

PCOS Detection using Machine Learning Techniques

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Abstract

There are many women all over the world suffering from PCOS (Polycystic Ovary Syndrome). PCOS is an endocrine disorder which is normally faced by teenagers and women of reproductive age. Pcos can cause many health issues like infertility, insulin resistance, obesity, and cardiovascular problems. Depending on diagnostic criteria, there are 6% to 20% of reproductive aged women who are affected by PCOS. It is essential to establish criteria to achieve an exact diagnosis of PCOS, especially among adolescent patients because of the overlap between features of PCO syndrome and physiological findings in puberty. Day by day the technology of ultrasonography is improving, and accuracy is increasing, but it depends on the specific equipment. In this study, different attributes have been taken to detect PCOS using machine learning models.

Keywords: PCO, PCOS etc

Earthquake Prediction

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Abstract

By avoiding the traditional measures of predicting through irregular animal behavior observation with low or zero accuracy, here we are letting our machines learn and observe from the huge seismic data we have faced till now. These earth tremors have demised, bruised, and dislocated many, also many were found mislaid and homeless. Monitoring these tremors can really help those livelihoods getting a shield, which will rescue them from monetary misfortunes, harmful effects, and many other assets. Through the statistics collected, we have contrived an artificial intelligent prediction system based on artificial neural network, multi-linear regression, Support vector regression and Decision tree regression which can be used to forecast the magnitude of future earthquakes. A magnitude corresponding to 5 and above is classified as deadliest. Our proposed model is leveled up through various pre-processing, feature extraction, and neural network training and testing and here we came up with a fine precision to implement. With the large amount of amassed data here we have tried to safeguard the peril zones from the seismic waves in the form of earth convulsions. The simple units of ANN (Artificial neural network) are linked by sets of weighted connections. The nonlinear learning of ANN is quite error-free. Therefore, by using neural networks reversely, we have come with 94% model training accuracy, 0.43 RMS and 0.31 mean absolute error. Here, our intense focus is to maximize the rescue level from these tremors.

Keywords: Prognostication, Earthquake, Support vector regression, Multi linear regression, Decision tree regression, artificial neural network.

Wine Quality Prediction

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Abstract

Nowadays people tried to lead a luxurious life. They tend to use the things either for show off or for their daily basis. These days the consumption of wine is very common to all. So, this research basically deals with the quality prediction of the wine using its various attributes. Dataset is taken from different sources. Various performance measures are calculated, and the results are calculated, and the results are compared among training set and testing set and accordingly the best out of the applied techniques depending on the training set results is predicted.

Keywords: wine, Dataset etc

Multiple Crops Price Prediction

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Abstract

A crop is a plant that can be grown and harvested extensively for profit or subsistence. When the plants of the same kind are cultivated at one place on a large scale, it is called a crop. Due to day-to-day growth in population, it is very essential to maintain the crops in respective of population. For this we analysis certain crops price using Time series model and forecasting so that it will help others to analyze the price of crops for future. And it will help different agro-based companies to cultivate the certain number of crops that will required by future generation. This survey paper represents the forecasting techniques in the field of Agricultural. Paper shows all the past research development of forecasting in all areas. The major forecasting models are Statistical and Mathematical in the field of Agricultural Yield. And it shows compact combination of all these models. In our model the price is taken as per the USD metric ton. And the forecasted value shows the price for future. Basically, we analyze on wheat, pulse, maize and coconut oil.

Keywords: Artificial Neural Network (ANN), Neurons, Back Propagation (BP) Algorithm, activation function, Network Performance, Mean Square Error (MSE) and RMSE.

Credit Score Prediction

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Abstract

Credit scoring is a way of analyzing statistical data used in financial organizations and banks to acquire a person's creditworthiness. The bestowers generally manipulate it to decide to widen or retract credit. The score plays a significant role in determining the creditworthiness of a person and if he/she can be sanctioned a loan or not. Machine learning techniques help us to predict the credit score more accurately using classification algorithms. Few base and ensemble classification algorithms were used in this research to perform a comparative analysis. The ensemble method incorporates several base classification algorithms like Decision trees, Logistic Regression, Nearest neighbor, Support Vector Machine, etc. to achieve better results. The objective of this paper is to predict the credit score based on different classifier models and evaluate the performance of each model based on the metrics. A comparative analysis is done to identify the best classifier to predict the credit score. The evaluation metrics used for evaluating the model are Recall, Precision, F-measure, and Accuracy. Error measures like MAE and RMSE of the model were also used to evaluate the model. This helps us to improve the decision in identifying the more accurate classifier model. The dataset used for this analysis is the Australian credit dataset from the UCI Machine learning repository. Experimental results prove that the Random Forest and Extra tree classifier model produces better accuracy in ensemble classifiers and the SVM model furnishes better accuracy in the base classifier.

Key words: vector machine, decision tree etc

Maize Price Prediction using Artificial Neural Network

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Abstract

Maize is one of the most important cereal crops in the world. In India, maize is emerging as the third most important crop after rice and wheat. It is important to have some idea about future harvest prices before sowing. Its main objective is to analyze the behavior of maize crops on year-wise, to develop the machine learning model of maize data series. Maize or corn is an important cereal crop in the world. It is a source of nutrition as well as phytochemical compounds. Phytochemicals play an important role in preventing chronic diseases. Maize is grown all over the world in more than 100 countries. The United States produces near about 40 percent of the world's harvest. China, Brazil, Mexico, Indonesia, India, France, and Argentina are other top maize-producing countries. Indian agriculture depends heavily on rainfall. It not only influences agricultural production but also affects the prices of all agricultural commodities. Due to its exogenous nature, it is beyond farmer's control. It has been observed that fluctuation in rainfall brings about fluctuation in output leading to price changes. In this study, 30 years data has been taken into consideration. The mostly used machine learning technique i.e., Artificial Neural Network (ANN) model has been used to predict the future prices. ANN design helps in early detection & management of problems associated with maize yield and can increase yield in agricultural production.

Keywords: ANN, Maize, Machine learning model

Asthma Disease Classification

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Abstract

Asthma is a major noncommunicable disease (NCD), affecting both children and adults, and is the most common chronic disease among children. Inflammation and narrowing of the small airways in the lungs cause asthma symptoms, which can be any combination of cough, wheeze, shortness of breath and chest tightness. Now a days, it is very useful for post covid contactless system in mainly in the rural health service. Provide access to medical specialist. Enhance quality of health care. Asthma is chronic disease which mainly affects lungs. All over the world 300 million people are suffering from asthma. Every year 255,000 people are losing their lives around the world because of this chronic disease. Asthma is a disease that causes the airways of the lungs to swell and narrow, leading to wheezing, shortness of breath, chest tightness, and coughing. Asthma is caused by inflammation (swelling) in the airways. When an asthma attack occurs, the lining of the air passages swells and the muscles surrounding the airways become tight. This reduces the amount of air that can pass through the airway. In persons who are sensitive airways, asthma symptoms can be triggered by breathing allergens or triggers. However, understanding an individual's disease phenotype, endotype, and co morbidities is necessary for asthma treatment, with appropriate consultation with asthma specialists required for those with severe asthma.

Keywords: NCD, Asthma etc.

House Price Prediction

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Abstract

In this paper, we are predicting the sale price of the houses using various machine learning algorithms. Housing sales price are determined by numerous factors such as area of the property, location of the house, material used for construction, age of the property, number of bedrooms and garages and so on. This paper uses machine learning algorithms to build the prediction model for houses. Here, machine learning algorithms such as logistic regression and support vector regression, Lasso Regression technique and Decision Tree are employed to build a predictive model. We have considered housing data of properties. Logistic Regression, SVM, Lasso Regression and Decision Tree show the R-squared value respectively. Further, we have compared these algorithms based on parameters such as MAE, MSE, RMSE and accuracy. This paper also represents significance of our approach and the methodology.

Key words: Machine learning algorithms, SVM

Heart Failure Prediction & Apple stock Price Prediction

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Abstract

The advancement in medicine, management of heart failure (HF), which usually presents as a disease syndrome, has been a challenge to healthcare providers. This is reflected by the relatively higher rate of readmissions along with increased mortality and morbidity associated with HF. In this review article, we first provide a general overview of types of HF pathogenesis and diagnostic features of HF including the crucial role of exercise in determining the severity of heart failure, the efficacy of therapeutic strategies and the morbidity/mortality of HF. We then discuss the quality control measures to prevent the growing readmission rates for HF. Finally, we discuss the appropriate utilization/documentation and medical coding based on the severity of the HF alone and with minor and major co-morbidities. In this work a Framework is proposed to predict the price and movement direction by using multiple datasets that includes news sentiment, social sentiment, company earnings announcement, and technical indicators. A case study was applied on the Apple Inc. stock using Long short-term Memory Neural Networks (LSTM) and Deep Neural Networks (DNN). Results showed superiority of the LSTM model in both predicting stock value 85.1% classification accuracy.

Key words: HF pathogenesis, LSTM model

Stock Price Prediction using Artificial Neural Network

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Abstract

In Stock Market Prediction, the aim is to predict the future value of the financial stocks of a company. The recent trend in stock market prediction technologies is the use of machine learning which makes predictions based on the values of current stock market indices by training on their previous values. Machine learning itself employs different models to make prediction easier and authentic. The paper focuses on the use of ANN and LSTM based Machine learning to predict stock values. Factors considered are open, close, low, high and volume.

Key words: ANN, LSTM

Foreign Exchange Rate Prediction

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Abstract

Foreign exchange transaction means simultaneous selling of one currency and buying of another currency. Foreign exchange market is one of the largest financial markets in the world. Hence it is essential for currency trading in the international market. This project uses Artificial Neural Network (ANN) based forecasting model using Standard Back propagation (SBP) for forecasting foreign exchange rates. The model was trained using 10 years historical data to predict foreign currency exchange rates against INR. The forecasted performance of the proposed system is evaluated by Root Mean Square Error (RMSE). Experimental results demonstrate that ANN based model can closely forecast the forex market with a RMSE of 0.00047263.

Keywords: ANN, SBP

Breast Cancer Classification

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Abstract

Breast cancer remains one of the top diseases that lead to thousands of deaths in women every year. Artificial intelligence (AI) has been utilized for diagnosis early, rapidly, and accurately breast tumors. The objective of this paper is to review recent studies for classifying these tumors. Machine learning algorithms such as Support Vector Machine (SVM), K-Nearest Neighbour (K-NN), and Random Forest (RF) are used to classify medical images into malignant and benign. Moreover, deep learning has been employed recently for the same purpose, among them, Artificial Neural Network (ANN) is one of the most popular techniques. The results showed that the SVM achieved high accuracy, about 97%, therefore, the researchers utilized various functions for this algorithm and added more features such as bagging and boosting to increase its efficacy. In addition, deep learning obtained high accuracy using ANN which is higher than 98%.

Keywords: SVM, AI, KNN, ANN

Stock Price Prediction using Deep Learning

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Abstract

An important topic in stock price prediction finance and economics which has promoted the interests of Researchers take years to develop better predictive models. Stock market trading is an activity that requires fast and accurate information for investors to be effective. Decision Stock prediction has always been a hot and profitable area of study. Deep learning applications have been proven to have better accuracy and return in the field of financial prediction and forecasting.

Keywords: LSTM, CNN

Rainfall Prediction using Artificial Neural Network

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Abstract

The forecasting of heavy rain presents a significant challenge to the meteorological service because it has a direct impact on both human life and the economy. It is the root cause of yearly natural catastrophes like floods and droughts that affect people all over the world. For nations like India, whose economy is heavily dependent on agriculture, the accuracy of rainfall forecasts is extremely important. Over the last few decades, weather, especially rain has become much more unexpected with primarily the blame being climate change. The dynamic nature of the atmosphere makes it difficult for statistical tools to predict rainfall with a high degree of precision. The main area covered in this work is meteorological data, Ensemble models, regression including Neural Networks, Support vector machine (SVM), and Decision trees. Artificial Neural Network is a better technique since rainfall data is nonlinear.

Keywords: ANN (Artificial Neural Network); SVM (Support Vector Machine); Decision Tree; RF (Random Forest)

Lettuce Leaf Disease Classification using Convolutional Neural Network

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Abstract

There are a lot of diseases prevailing in day-to-day society, everyone needs good immunity and organic food. In organic food, nothing beats lettuce. It attracts many other creatures from miles around. And those creatures spread diseases on lettuce leaves. In this project, the focus is given to detect diseases of lettuce leaves by using image processing and Convolutional Neural Network (CNN). Different parameter measures have been taken to check the efficacy of the model. Simulation results show that CNN produces better results as compared to other models like Support Vector Machine and Random Forest. Hence, it can be used in the real time implementation.

Keywords: Lettuce Leaf; Convolutional Neural Network (CNN); Support Vector Machine; Random Forest

Credit Card Fraud Detection using Artificial Neural Network

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Abstract

One of the fastest growing technical advancement is on the basis of online exercises. In a leading process to this we have entrenched on online transactions resulting in various trickeries causing immense financial loss. Besides, deceivers are progressing towards a new course of action every day through SMS, calls, masquerading attacks, phishing attacks and so on. With the enlarging technology, the growth of fraud cases is also rising high, which exacted us to possess an indestructible fraud detection algorithm that could finely pick out the difference between fraudulent and genuine transactions. In this study, different machine learning algorithms such as naive bayes, KNN, logistic regression, and ANN have been used to detect the credit card fault. Simulation results shows that ANN outperform other models. Thus, ANN can be used to invigorate a model that could actually detect the grifters and cut out their negative intent in the real life application.

Keywords: credit card; logistic regression; naive bayes; KNN; ANN

Heart Disease Detection using k-nearest Neighbor Algorithm

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Abstract

Day by day the cases of heart diseases are increasing at a rapid rate and it's very important and concerning to predict any such diseases beforehand. We prepared a heart disease prediction system to predict whether the patient is likely to be diagnosed with a heart disease or not using the medical history of the patient. We used KNN algorithm to predict and classify the patient with heart disease. The dataset contains 14 parameters for the prediction of heart disease that includes heart rate, chest pain, cholesterol level, blood pressure, age, etc. The aim of this model is to predict whether the patient has a heart disease or not using KNN model. We have achieved 87.00 % as the classification accuracy.

Keywords: Heart disease; KNN; ANN

Currency Exchange Rate Prediction

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Abstract

Foreign exchange transaction means simultaneous selling of one currency and buying of another currency. Foreign exchange market is one of the largest financial markets in the world. Hence, it is essential for currency trading in the international market. This project uses an Artificial Neural Network (ANN) based forecasting model using Standard Back Propagation (SBP) for forecasting foreign exchange rates. The model was trained using 10 years of historical data to predict foreign currency exchange rates against INR. The forecast performance of the proposed system is evaluated by Root Mean Square Error (RMSE). Experimental results demonstrate that ANN based model can closely forecast the forex market with low RMSE value.

Key words: ANN: Artificial Neural Network; SBP: Standard Back Propagation; INR: Indian Rupee; RMSE: Root Mean Square Error

Survival Prediction in Marine Ship using Computational Intelligence Techniques

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Abstract

Marine Ship Disaster was a British liner aforementioned to be the most important liner ever created within the history of the globe. It collided with AN iceberg throughout its maiden journey across the Pacific from Southampton to the big apple town. With quite 2200 passengers on board, nearly 1/2 of them died once of the unexampled mishap. The well-known incident compels researchers to probe the dataset. This analysis is aimed toward achieving a preliminary knowledge to analyze likelihood of survival and learn what features have a correlation towards survival of passengers and crew. The survival prediction has been done by applying various algorithms like Logistics Regression, Support vector Machines, Linear SVC, Random Forest and Artificial Neural Network. Simulation results shows that ANN outperform other models.

Keywords: Logistics Regression; Support vector Machines; Linear SVC; Random Forest; Artificial Neural Network; Titanic

Early Detection of Diabetes using Deep Neural Network

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Abstract

Diabetes is a group of metabolic disorders in which there are high blood sugar levels over a prolonged period. Symptoms of high blood sugar include frequent urination, increased thirst, and increased hunger. It should not be ignored, if left untreated, diabetes can cause many complications like heart related problems, kidney problem, blood pressure, eye damage and it can also affect other organs of human body or cause death. Diabetes can be controlled if it is predicted earlier. To achieve this goal, different Machine Learning and Deep Learning techniques have been used in this study. These techniques Provide better result for prediction by constructing models from datasets collected from UCI repository.

Keywords: Diabetes; Machine Learning; Deep Learning techniques

Bitcoin Price Prediction using deep Learning Techniques

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Abstract

As a new type of electronic currency, bitcoin is more and more recognized and sought after by people, but its price fluctuation is more intense, the market has certain risks, and the price is difficult to be accurately predicted. The main purpose of this study is to use various machine learning techniques and deep learning method to predict the price of bitcoin. We have used three techniques: Linear Regression, Support Vector Machine (SVM) and artificial Neural Network (ANN). Simulation results show that deep learning produces better results as compared to other models considered in this study.

Keywords: Linear Regression; Support Vector Machine (SVM); artificial Neural Network (ANN)

Extractive Text Summarization using Neural Networks

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Abstract

Text summarization is an automatic system for generating a condensed version of the multiple original documents. In recent times, automatic text summarization has been an emerging research topic and also showed great interest among the researchers. Manual text summarization needs a considerable number of qualified unbiased professionals, higher budget and considerable time. Therefore, automatic text summarization is an active research topic in the field of natural language processing for overcoming the above-mentioned concerns. Generally, the text summarization is done in two dissimilar ways such as extractive and abstractive. The abstractive summarization simplifies the contents that enhance the coherence among the sentences by reducing the redundancies. Additionally, the extractive summarization identifies more used-words and then score the sentences from a dissimilar perspective. In this work we employed various machine learning techniques like, Extractive summarization, neural networks, Lex rank algorithm. The achieved results are promising.

Keywords: Automatic text summarization, lexrank algorithim,

Image Classifier

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Abstract

Deep Learning has emerged as a new area in machine learning and is applied to a number of signal and image applications. The main purpose of the work presented in this paper, is to apply the concept of a Deep Learning algorithm namely, Convolutional neural networks (CNN) in image classification. The algorithm is tested on various standard datasets, like cats and dog images from database. The performance of the algorithm is evaluated based on the quality metric known as Mean Squared Error (MSE) and classification accuracy. The graphical representation of the experimental results is given on the basis of MSE against the number of training epochs. The experimental result analysis based on the quality metrics and the graphical representation proves that the algorithm (CNN) gives fairly good classification accuracy for all the tested datasets.

Keywords: Deep Learning, Mean Squared Error, Convolutional neural networks.

Environmental Impact Assessment on Kolleru Lake water by Using Remote Sensing & GIS -A Model Study

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Abstract

An assessment for physico-chemical and biological quality of kolleru lake waters and surrounding area was carried out. Rapid Industrialization and pesticide usage in the agricultural practices has led to contamination of waters in the kolleru lake waters. The study of kolleru lake water quality was assessed during three months. The study included physico-chemical and biological parameters for water and suitable remediation methods. A low value of Dissolves Oxygen and a high value of BOD were observed during all three months.

Considerable amount of data was generated between the various parameters was done using Geographical Information System GIS 10.5 version software. It was found that the pollution occurred generally in two zones one concentrated in the sampling points nearer the industrial side. Environmental changes taking place in the lake should be monitored with the help of GIS and Satellite based image maps should be used as a basic input parameter for environmental mapping & monitoring of the lake environment

Key words: Satellite Map, Remote Sensing, GIS, Pollution

About the University

Centurion University of Technology & Management (**CUTM**) is the first multi sector private university in Odisha, established through an act of state legislative assembly in 2010 and duly recognized by U.G.C. The core objective of **CUTM** is to 'Shape Lives and Empower Communities', creating wealth and livelihood opportunities for the underprivileged.

About Civil Engineering Department of CUTM

Department of Civil Engineering of SoET, that offers B. Tech programme in Civil Engineering and M. Tech pro-gramme in Structural, Transportation and M.Sc. (Geoinformatics) has plentiful infrastructure to cater to the academic needs of its students. The department is supported by both senior faculty with vast experience and young qualified faculty who not only disseminate knowledge but also motivate the students and raise their aptitude of learning and become knowledgeable and wise as well. The distinctiveness of CUTM in general and the department of civil engineering in particular is its curriculum planned under Choice Based Credit System (CBCS) as well as offers Domain project (Aerial Surveying and Remote sensing applications) which enable the students to choose the subjects that match their interest of professional career.

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The Centre for Data Science and Machine Learning focuses on the research activities like Multispectral and Hyperspectral Image Processing, Plant Disease Detection, Natural Language Processing, Geomatics and Its Application, Big Data Analysis using Hadoop and MangoDB, Extract, Transform and Load (ETL).