



Souvenir

GIS Day Celebration 2K21

17 November 2021



Organised by

**Department of Civil Engineering
Centre for Data Science & Machine Learning
Centurion University of Technology & Management**

1st International GIS Day Event

Hybrid Poster Presentation

17th November 2021



**CENTURION
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*Shaping Lives...
Empowering Communities!*

Editors

Dr. Prafulla Kumar Panda

Dr. Rajib Kumar Majhi

Prof. Sovan Sankalp

Prof. Sonam Sandeep Dash

Organised by

**Department of Civil Engineering
and**

Centre for Data Science & Machine Learning

**Centurion University of Technology and Management, Odisha,
India**



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Supported by

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Preface

First International Hybrid Poster Presentation on GIS Day 2021, being organized by Department of Civil Engineering and Centre For Data Science & Machine Learning of Centurion University of Technology & Management, Odisha, supported by ESRI, India, Pvt. Ltd., is an annual get together of Scientists, Researchers, Academicians, Practicing Engineers and Students all over the world mainly focussing 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 through an act of state legislative assembly in 2010 and duly recognized by UGC. The core objective of the University is 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. Despite the current pandemic situations throughout the globe, more than 200 abstracts of the papers have been received and after thorough scrutinize, about 58 abstracts have been finally accepted. Four 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 2021 Poster Presentation in hybrid mode.

-Editors



Prof. Ganeshi Lal
Governor, Odisha



RAJBHAVAN
BHUBANESWAR - 751 008

ରାଜଭବନ
ଭୁବନେଶ୍ୱର-୭୫୧ ୦୦୮

November 22, 2021

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, Odisha



President,
Centurion University of
Technology &
Management, Odisha,
India

MESSAGE

GIS is a powerful tool that can be used for analysis and assessment of the community or of an issue, and the planning, implementation, and evaluation of intervention or initiative. It 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.

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

It is the biggest day in the history of our University, as we have hosted one of the biggest educational and scientific poster presentation event of India. This GIS day celebration event is being hosted by 60 educational institutes in our country and in the state our university is the sole host of this grand event.

Prof. Muktikanta Mishra

Prof. D. N. Rao

Vice President, CUTM, Odisha



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*Vice President,
Centurion University of
Technology &
Management, Odisha, India*

MESSAGE

It is my pleasure to know that the Department of Civil Engineering and Centre for Data Science and Machine Learning in association with, ESRI, Pvt. Ltd is celebrating the “GIS Day 2K21” at Centurion University of Technology & Management, Odisha, India on 17th November 2021 for the first time in a 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 Celebrations my best wishes and wish them all success in their future endeavours.

Prof. D. N. Rao

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



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*Vice Chancellor,
Centurion University of
Technology & Management,
Odisha, India*

MESSAGE

It gives me great pleasure in sending this message to the Souvenir that is being published to celebrate the “GIS Day 2K21” at Centurion University of Technology & Management, Odisha, India on 17th November 2021 for the first time in a hybrid mode. Geographic Information System (GIS) is particularly about collecting, retrieving, integrating and analyzing spatial information of the real world towards its useful applications in everyday life.

I express my sincere thanks to the Department of Civil Engineering and Centre for Data Science and Machine Learning for conducting a hybrid poster presentation 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)

Prof. (Dr.) Anita Patra
Registrar, CUTM, Odisha



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*Registrar,
Centurion University of
Technology &
Management, Odisha,*

MESSAGE

The GIS Day celebration on 17th November 2021 is to make all aware/learn about Geography and the Geographic Information System Technology. The GIS technology is being used in decision making by collecting, analysing and visualisation 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. 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

Anita Patra

(Prof. Anita Patra)

Dr. Prafulla Kumar Panda
Convener, GIS Day, CUTM, Odisha



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*HOD, Civil Engineering
Paralakhemundi Campus*

*Centurion University of
Technology & Management,
Odisha, India*

Phone: 9438269572

E-mail: prafullapanda@cutm.ac.in

MESSAGE

I am extremely happy that our Department of Civil Engineering and Centre for Data Science and Machine Learning is conducting a “Hybrid Poster Presentation” in association with ESRI, Pvt. Ltd to mark the celebration of “GIS Day” on Nov 17th, 2021. Out of 60 educational institutes in our country, in particular to the state of Odisha, Centurion University of Technology and Management is the sole host of this grand event in the form of a scientific poster presentation by technical experts all over the globe.

The uniqueness of this event will have presentations of around 58 posters & 4 invited talks from the international and national level with high expertise on various applications of Geospatial technology. The focus is to exchange knowledge on various aspects of current advancements in GIS around the Globe and in the Indian context. The essence and conclusions of the deliberations will be communicated to the concerned authorities for implementation.

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, geodemographic analysis, utilities infrastructure mapping, and multiple applications in natural resource assessment. Yet, like all technologies, GIS co-evolves with the societies of which it is a part.

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

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



(Dr. Prafulla Kumar Panda, Convener)

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



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*Dean, Academics
Centurion University of
Technology & Management,
Odisha, India*

MESSAGE

Greetings!

I take great pride in welcoming all the participants to “GIS DAY Celebration” at Centurion University of Technology and Management (Odisha). GIS has been of great use to create, manage, analyze and maps all types of data, integrating location data with all types of descriptive information. It helps users to understand patterns, relationships and geographic context. I am sure the event will bring out thoughts and issues to present by practitioners, academia, researchers and students.

I sincerely hope that this event will deliberate and discuss the different facets of this exciting applications and attract researchers and students to work further.

I wish the event a great success.

Thank you all

A handwritten signature in purple ink, appearing to read 'P. K. Mohanty'.

(Prof. P. K. Mohanty)

Dr. Ashish Ranjan Dash

Dean, SoET, CUTM, Odisha



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*Dean, School of Engineering
& Technology,*

*Centurion University of
Technology & Management,
Odisha, India*

MESSAGE

Geographic Information System (GIS) is particularly about collecting, retrieving, integrating and analysing spatial information of the real world towards its useful applications in everyday life. GIS day is a worldwide event that celebrates the technology of Geographic Information Systems (GIS). On this GIS Day 2021, let's join together to build a GIS-centric culture in our society for improving the living standards in particular to the community. The GIS Day event is an amazing opportunity for our current students to network with potential employers and prospective internship coordinators to get a sense of the professional landscape in which they're training to enter.

I would like to congratulate the Department of Civil Engineering and Centre for Data Science and Machine Learning for celebrating GIS Day 2021 for the first time in the campus in hybrid mode. I must compliment and congratulate the Head Civil Engineering department Dr. Prafulla Kumar Panda, coordinator of the program and Prof. Sovan Sankalp (co-coordinator) and the entire team for their untiring and dedicated efforts for conceptualising 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!

(Dr. Ashish Ranjan Dash)

Prof. (Dr.) P. S. Rao
Dean, R&D, CUTM, Odisha



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Dean, R&D,
*Centurion University of
Technology & Management,
Odisha, India*

MESSAGE

A geographic information system (GIS) is a framework for gathering, managing, and analysing data. Rooted in the science of geography, GIS integrates many types of data. It analyses spatial location and organizes layers of information into visualizations using maps and 3D scenes.

Department of Civil Engineering and Centre for Data Science and Machine Learning, making steps for good awareness in GIS applications will be highly useful to students and faculty.

First time University is organizing this event with association ESRI, Pvt, Ltd. The event is scheduled for November 17th, 2021(9.30 am to 6 pm) through hybrid (online/offline) mode. The event is organized which focuses on the advancement of GIS and its applications on this day.

I congratulate and extend Best Wishes to the Dept. of Civil Engineering for THEIR endeavours.

A handwritten signature in blue ink, appearing to read 'P. S. Rao', with a horizontal line underneath.

(Prof. P. S. Rao)

Prof. (Dr.) S. P. Nanda
Dean, Administration, MSSSoA,
CUTM, Odisha



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*Dean, Administration,
Centurion University of
Technology & Management,
Odisha, India*

MESSAGE

I am happy to know that Department of Civil Engineering and Centre for Data Science and Machine Learning, School of Engineering & Technology, CUTM is organizing an event to celebrate GIS DAY which focuses on the advancement of GIS and its application in Engineering, Climate Change, Agriculture & allied sectors on 17th November in association with ESRI, Pvt, Ltd.

Hope this day would build awareness among all the participants on broader applications of “GIS” in today’s global scenario.

I would like to extend my wishes and congratulate both the students and faculties for the event.

A handwritten signature in green ink that reads "S. P. Nanda".

(Prof. S. P. Nanda)

Dr. Durga Prasad Padhi

Director, Administration, CUTM, Odisha



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Director, Administration,
*Centurion University of
Technology & Management,
Odisha, India*

MESSAGE

Greetings and best wishes...

Geographic Information System (GIS) is particularly about collecting, retrieving, integrating and analyzing spatial information of the real world towards its useful applications in everyday life. On this GIS Day 2021, 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 2021 for the first time in the campus in hybrid mode. I must compliment and congratulate to the Head Civil Engineering department Dr. Prafulla Kumar Panda the coordinator the program and Prof. Sovan Sankalp co-coordinator for their untiring and dedicated efforts for conceptualising 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 the 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 of the event.



(Dr. Durga Prasad Padhi)

Dr. Kamal Kumar Barik
HOD, Civil Engineering, CUTM, Odisha



*HOD, Civil Engineering,
Bhubaneswar Campus
Centurion University of
Technology &
Management, Odisha,*

MESSAGE

Today, the scientific innovations and technologies have become the hallmarks of modern society and it is capable of providing technology as the fulcrum of all the development initiatives. In spatial domain, geospatial technologies comprising of Earth Observation, Global Positioning System (GPS), Geographic Information system (GIS) and field based databases helps in analysing and disseminating geographic information's to the grass root level. With its unique ability for integration and analysis of geographically referenced spatial information, this technology has been recognized as an effective tool for planning, management and decision making process.

As a part of Geography Awareness Week, International GIS day is formally celebrated every year across the globe since 1999. GIS Day is a good initiative for people to learn about the uses of GIS, ranging to simple day to day tasks, to complex decision-making scenarios in almost every sector. We the Faculties of Centurion University of Technology and Management (CUTM) are celebrating the International GIS Day on 17th November 2021 with collaboration with ESRI. The celebration will commence with an introductory note, Theme based poster presentation followed by interaction of students from various institutes.

(Dr. Kamal Kumar Barik)

Prof. (Dr.) Sujata Chakravarty
RC Coordinator, Data Science & Machine
Learning, CUTM, Odisha



*RC Coordinator, Data
Science & Machine Learning*

*Centurion University of
Technology & Management,
Odisha, India*

MESSAGE

The goal of celebrating GIS day is to bring together members of the GIS community, promote the use of geospatial technology, and inspire new generations to enter the field. The role of Data Science and Information Technology is to demonstrate how GIS can be used for decision making in various fields.

I am very happy that Department of Civil and Data Science & Machine Learning Research Centre of Centurion University of Technology and Management, Odisha in collaboration with Environmental Systems Research Institute (ESRI), Pvt, Ltd is organizing a Poster Prestation Seminar to Celebrate GIS Day of 2021.

I wish all the best to all the participants across the Globe for their career and academic pursuits.

Sujata Chakravarty

(Dr. Sujata Chakravarty)

Dr. D. P. KANUNGO
Chief Scientist & Professor (AcSIR)
Group Head
Geo-Hazard Risk Reduction



**CSIR-Central Building Research Institute
(CBRI)**

(A Constituent Establishment of CSIR)
Ministry of Science & Technology
Government of India

Roorkee - 247667, Uttarakhand (INDIA)

Phones: 91-1332-283417 (O);

91-1332-297188 (R)

Fax: 91-1332-272272, 272543

Mobile: 91-9412073009

Web site: www.cbri.res.in

E-mail: debi.kanungo@gmail.com

dpkanungo@cbri.res.in

MESSAGE

Greetings and best wishes from CSIR-CBRI, Roorkee, Uttarakhand.

Geographic Information System (GIS) is particularly about relating, integrating and analyzing spatial information of real world towards its useful applications in everyday life. On this GIS Day 2021, let's join together to build a GIS-centric culture in our society for improving the quality of living.

I must congratulate Centurion University of Technology and Management (Odisha) in general and Department of Civil Engineering and Centre for Data Science and Machine Learning in particular for celebrating GIS Day 2021 for the first time in the campus. I must compliment the coordinators Dr. Prafulla Kumar Panda and Prof. Sovan Sankalp for their untiring and dedicated efforts for conceptualising 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 students /faculty members/ industry persons/ research scholars of Engineering/Science organizations have been planned on this occasion.

It is an occasion to demonstrate the relevance of GIS in our community by showcasing our contributions and achievements of paramount societal relevance.

Wish a great success of the event.

(DEBI PRASANNA KANUNGO)

Dr. Madan Mohan Rout
Scientist
Institute of Seismological Research,
Gandhinagar, Gujarat, India



*Department of Science and
Technology,
Government of Gujarat,
Gandhinagar.*

Email: madaniitr@gmail.com

MESSAGE

I am pleased to note that Centurion University of Technology & Management, Odisha, has organised the hybrid poster event to celebrate GIS Day on 17th November 2021.

It is my pleasure to observe that within a short span, the University has organised this event on very large scale. I am specially overwhelmed by discussing the topic selected by participants.

I am sure after see the promising work, the university will recognise nationally and internationally for its outreaching events for students and researchers.

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

Madan Mohan Rout

(Dr. Madan Mohan Rout)

Joseph J. Kerski PhD GISP
Education Manager



jkerski@esri.com
www.josephkerski.com
https://spatialreserves.wordpress.com



MESSAGE

All of the issues and problems that we are encountering from local to global scale—including population change, climate, water, natural hazards, and more—are spatial in nature, complex, and transcend disciplinary, political, and physical boundaries. Hence, GIS is the perfect tool to enable us to understand and solve these problems. GIS empowers you to be a positive change agent in your community and in your world.

Joseph Kerski

Agendra Kumar
Managing Director



*Address: 10th Floor, Max
Towers, Sector - 16B,
Noida, Uttar Pradesh -
201301*

Phone: 9811066455

*E-mail:
agendra.kumar@esri.in*



MESSAGE

Centurion University of Technology & Management is the 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 17th November 2021. 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 the GIS day 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

Mayuri Bhattacharyya
Regional Technical Manager



*Esri India Technologies Limited
Block DN-62, Sector - V, 12th
Floor, Tower II, Millennium
City Information Technology
Park, Bidhan Nagar, Salt Lake,
Kolkata – 700091
Phone: 7603033818
E-mail:
mayuri.bhattacharyya@esri.in*

MESSAGE

I am happy to express that Centurion University of Technology & Management, Odisha is organising the hybrid poster presentation event for celebrating GIS Day on 17th November 2021.

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

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

Mayuri Bhattacharyya

Dwaipayan Dighal
Industry Head- Education



*Block DN-62, Sector - V,
12th Floor, Tower II,
Millennium City Information
Technology Park, Kolkata,
West Bengal, 700091*



*E-mail:
dwaipayan.dighal@esri.in*

MESSAGE

GIS is a “scientific framework” for gathering, analysing, and visualizing geographic data to help us make better decisions.

However, COVID has shown us how GIS is paramount important tool for decision makers and its no more a specialised subject.

On GIS Day, help others learn about geography and the real-world applications of GIS that are making a difference in our society. It's a chance for you to share your accomplishments and inspire others to discover and use GIS.

Whether you are a professional cartographer, a GIS manager, or a geography newbie, everyone is welcomed and encouraged to learn and participate.

Turning data into a compelling map is about more than knowing which buttons to push. It's about knowing how to uncover stories hidden in your data. It's about telling those stories clearly, and simply.

<https://storymaps.arcgis.com/stories/a8591f1541df4846832e19dd1aabfebe>

Dwaipayan Dighal

(Dwaipayan Dighal)

Krishna Rao TVB
Head Pre-sales



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

Phone: 9871918018

E-mail: krishna.rao@esri.in



MESSAGE

GIS Day is not just an event, it's a global movement. It is a recognition of the immense value the science of geography delivers in understanding our planet, its interconnections and solving some of the greatest challenges our world is facing today. This day is also a celebration of you and your passion for GIS technology which is making a significant difference in all areas of work across industries. GIS usage is growing rapidly in India. This is and will create a huge demand for industry-ready skilled professionals.

At Esri, we are committed to empower you with best of our technology and its know-how to achieve your business outcomes. We continue to advance GIS technology by integrating latest technologies and trends - AI/ML, drones, Digital twins, Data science, 3D, IoT and much more. We continue to build a global and regional communities where we not only build a larger collective intelligence about applying GIS technology and appreciate new innovations. We are collaborating with universities like yours to promote geospatial literacy and expand its use across all departments and disciplines. Today, on the occasion of GIS Day, I urge you all, GIS professionals, to evangelize about GIS, its capabilities, your work and your achievements with a larger community and grow this movement. Talk to your colleagues, deliver a talk, organize an event, write a whitepaper, create a case study, create a story map ---- opportunities and possibilities are endless.

The change starts with you. A small action today from each of you will go a long way in shaping the future of GIS.

Happy GIS Day to you all.

Krishna RAO TVB

Prof. M. L. Narasimham

Academic Advisor, JNTU,
Kakinada



*Academic Advisor, Dept. of Civil
Engg,
University College of Engg.,
Kakinada
E-mail: hammln.47@gmail.com*

MESSAGE

Glad to note that the Department of Civil Engineering in collaboration with ESRI is organising “GIS Day Celebration” on 17th November 2021. It is very appropriate that the department has decided to organise the event as GIS now a days has become a tool of analysis globally in all fields of engineering, science, medicine and social activities. But for “COVID” restrictions I would have been personally present on that day at Parlakhemundi to contribute in person and gain more knowledge from other participants.

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. I also wish that this event be celebrated annually and bring together all researchers working in various disciplines.

I once again congratulate the organisers and wish that the celebrations be successful in disseminating the latest activities related to GIS.

(Prof. M. L. Narasimham)

Dr. Santiswarup Sahoo

Assistant Professor,
Utkal University, Odisha



*Department of Geology, Utkal
University, Vani Vihar,
Bhubaneswar*

*E-mail:
santiswarup@utkaluniversity.*

MESSAGE

It gives me immense pleasure that the Department of Civil Engineering and Centre for Data Science and Machine Learning, CUTM is celebrating GIS Day- 2021 for the first time in the campus in hybrid mode. I must compliment and congratulate the organisers, for their untiring and dedicated efforts for conceptualising and initiating such events towards awareness, generosity and capacity building for the future generation.

I am also happy to know that eminent scientists/ faculty members/engineers/young researchers and students from various Universities/Institutes across the globe will showcase their research activities through poster presentation and brain storming lectures.

Best wishes for a grand and successful event.



(Dr. Santiswarup Sahoo)

ORGANISING COMMITTEE

Chief Patron:

Dr. Muktikanta Mishra President, CUTM

Patrons:

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

Dr. Supriya Pattanayak, Vice-chancellor, CUTM

Dr. Anita Patra Registrar, CUTM

Advisory Committee:

Dr. Ashish Ranjan Dash, Dean, SoET (PKD)

Dr. Durga Prasad Padhi Director, Administration (PKD)

Dr. Prafulla Kumar Panda, HOD, Civil (PKD)

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

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

Dr. Sujata Chakravarty RC Coordinator (DS &ML)

Convener

Dr. Prafulla Kumar Panda

Associate professor, Dept. of Civil Engineering

Co- Convener

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

Executive Committee:

Dr. Rajib Kumar Majhi

Prof. Sonam Sandeep Dash

Dr. Siba Prasad Mishra

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Prof. Deepak Kumar Sahu

Prof. Amit Kumar

Dr. Subrata Sarangi

Dr. Dilip Rout

Dr. Debiprasad Satapathy

Prof. Subhankar Debnath

PROGRAMME SCHEDULE SUMMARY

	17 th November 2021	
09.40-10.35	INAUGURATION & INAUGURAL ADDRESS	
09.40-09.45	Welcome Address	Prof. Sovan Sankalp
09.46-09.49	Lightening of Lamps	Dignitaries on dice
09.50-09.57	Opening Remarks by Convener	Dr. Prafulla Kumar Panda, HOD, Civil Engineering, CUTM, Paralakhemundi
09.58-10.01	Address by Registrar	Dr. Anita Patra, Registrar, CUTM, Odisha
10.02-10.05	Address by Dean Academics	Dr. P K Mohanty, CUTM, Odisha
10.06-10.09	Address by Dean SoET, Paralakhemundi	Dr. Ashish Ranjan Dash
10.10-10.13	Address by Dean (R&D)	Dr. P. Srinivas Rao
10.14-10.17	Address by Dean Administration MSSSoA	Dr. S P Nanda, CUTM, Paralakhemundi
10.18-10.21	Address by Dr. Ashok Mishra	Professor, School of Applied Science, CUTM, Paralakhemundi
10.22-10.25	Address by RC Coordinator	Dr. Sujata Chakravarty, RC Coordinator, CDML, CUTM, Odisha
10.26-10.29	Address by ESRI & Team	Joseph J. Kerski, Education Manager ESRI, USA & Mayuri Bhattacharyya, Regional Technical Manager, ESRI, India
10.30-10.33	Address by Chief Scientist & Professor	Dr. D P Kanungo, CBRI, Roorkee
10.34-10.35	Inauguration of Souvenir	Dignitaries and Convener
10.36-10.39	Vote of Thanks	Dr. Kamal Kumar Barik

Invited Talks

10.40-11.10	<p>Dr. Debi Kanungo Chief Scientist & Professor Group Leader, Geo-Hazard Risk Reduction Group (GHRR) CSIR-Central Building Research Institute (CBRI) Roorkee-247667 (Uttarakhand) INDIA <i>“Geospatial Applications for Disaster Risk Management: Landslide Mapping and Monitoring”</i></p>
11.11-11.40	<p>Mayuri Bhattacharyya Regional Technical Manager ESRI, India <i>“enerGISed yourself as geospatial maGIScian”</i></p>
02.00-02.14	<p>Dr. Madan Mohan Rout Scientist, Institute of Seismological Research, DST, Gujarat, India <i>“GIS for Seismic Hazara Assessment”</i></p>

ONLINE POSTER PRESENTATION SCHEDULE

Slot – 01 (11:50 am – 01:19 pm): Chairpersons: Dr. Sujata Chakravarty & Prof. Subhankar Debnath

Sl no	Poster title	Authors' name	Corresponding e-mail	Affiliation	Id	Timing (IST)
1	Estimation of Soil Erosion Extent using RUSLE Model Integrated with GIS And RS: The Case of Megech – Dirma Watershed of The Blue Nile Basin, Northwest Ethiopia	Habtu Worku Arkew	habtuworku3@gmail.com	Mangalore University	PR-017	11.50-11.55 AM
2	Using GIS Techniques and RULSE Model to Examine Soil Erosion. A Case Study in Assin Foso in The Central Region, Ghana	Augustine Mensah	adomaugmens14@gmail.com	CSIR - Institute for Scientific and Technological Information	PR-018	11.56-12.01 PM
3	Environmental Impact Assessment of Granite Quarry in Wayanad District, Kerala	Vimod K K	vimodkk@gmail.com	Kerala Forest Research Institute, Peechi, Thrissur, Kerala	PR-019	12.02-12.07 PM
4	Cyclone Impact Assessment in Odisha Coast (East Coast of India)	Monalisha Nayak, Sandip Ghosh, Soumya Ranjan Sahoo, Pujarani Parija	190301110009@cutm.ac.in	CUTM	PR-020	12.08-12.13 PM
5	Stock Price Prediction using Machine Learning Techniques	Sobita Das	190301120023@cutm.ac.in	CUTM	PR-021	12.14-12.19 PM
6	Assessing Spatiotemporal Dynamics of Urban Green Spaces in Chennai in Response to Rapid Urbanization.	Christina Rexlin C.J.	chris.rex73@gmail.com	SRM Institute of Science and Technology	PR-022	12.20-12.25 PM
7	Spatial Temporal Analysis of Islands- Gulf of Mannar	Surya P	suryaponnusamy05@gmail.com	Bharathidasan university	PR-023	12.26-12.31 PM
8	Skin Cancer Detection	Subhalaxmi Pattnaik	190301120055@cutm.ac.in	CUTM	PR-024	12.32-12.37 PM
9	Earthquake Vulnerability in the Himalaya by Integrated Multi-Criteria Decision Models	Sukanta Malakar	malakarsukanta031@iitkgp.ac.in	IIT Kharagpur	PR-025	12.38-12.43 PM

10	Neotectonics Study of Upper Teesta River Basin, Sikkim Himalaya using Geospatial Techniques	Irjesh Sonker	irjeshsonker12@gmail.com	University of Allahabad	PR-026	12.44-12.49 PM
11	Flood Inundation of Mahanadi River	Subham jyoti ray, Abhijeet behera, Soubhagya khatua, Malaya ku saho	190301110016@cutm.ac.in	CUTM	PR-027	12.50-12.55 PM
12	Corona Virus Recognition using Chest X Ray Images	Ankit Kumar Pradhan, A. Deepak	190301120005@cutm.ac.in	CUTM	PR-028	12.56-01.01 PM
13	Mineral Mapping using Hyperspectral Data	Soumyadip Pal, Koustav Dutta,	190301190003@cutm.ac.in, 190301190001@cutm.ac.in	CUTM	PR-029	01.02-01.07 PM
14	Tomato Leaf Disease Detection using Convolutional Neural Network	Rakesh Sharma, Ankita Panigrahi	190301120079@cutm.ac.in	CUTM	PR-030	01.08-01.13 PM
15	GIS Based Land Surface Temperature Model of Western Odisha	Alan R. Xalxo, Nalinikanta Mohapatra, Sarthak Das, Satyabrata Samal, Subhangam Choudhury	190301110007@cutm.ac.in	CUTM	PR-031	01.14-01.19 PM

ONLINE POSTER PRESENTATION SCHEDULE

Slot – 02 (02:15 pm – 03:30 pm) Chairpersons: Dr. Madan Mohan Rout, Scientist, Institute of Seismological Research, DST, Gujarat, India

Sl no	Poster title	Authors' name	Corresponding e-mail	Affiliation	Id	Timing (IST)
16	Incorporating A Geographical Information System on Abia Road Infrastructure	Moses Chinedum .C	chinedummosesfirm@gmail.com	Ministry of works, Abia state. Nigeria	PR-032	02.15-02.20 PM
17	Dynamics Of Land Use and Land Cover Change (LULC) In Mahanadi River Basin, Odisha.	Biswajit Pradhan	biswajitpradhan030@gmail.com	National Institute of Technology Rourkela	PR-033	02.21-02.26 pm
18	Geomorphic Analysis of Hirakud Reservoir	Abhisek Mishra and Chandan Kumar	abhisekmishra303@gmail.com	CUTM	PR-034	02.27-02.32 pm
19	Credit Card Fraud Detection using Machine Learning	Praveen Kumar Sah	190301120043@cutm.ac.in	CUTM	PR-035	02.33-02.38 pm
20	Hydrological Water Simulation Modelling Using Hec-Ras and Geo-Hec Ras for Watershed Management	Henry Egbejule	henryhegxy32@gmail.com	HUSSAINI Adamu federal polytechnic kazaure jigawa	PR-036	02.39-02.44 pm
21	Flood Impact Analysis of Kuzhur Panchayat, Thrissur District Kerala	Praveen P Raj	praveenprajinfo@gmail.com	Kerala Forest Research Institute Peechi Thrissur Kerala	PR-037	02.45-02.50 pm
22	Agriculture Land Suitability Analysis using GIS Techniques A Case Study of Chamarajanagar District, Karnataka.	Bhuvanesh G	bhuvaneshgbhuv@gmail.com	Jss Academy of Higher Education & Research	PR-038	02.51-02.56 PM
23	Ranking Of CMIP6 Based Global Climate Models for the Prediction of Climate Variables in Godavari River Basin	M Uma Maheswar Rao	Mahesh93.happy@gmail.com	NIT, ROURKELA	PR-039	02.57-03.02 PM
24	Breast Cancer Detection Using Different Algorithm	Sharad Kumar Urma	190301161035@cutm.ac.in	CUTM	PR-040	03.03-03.08 PM
25	Car Price Predication	Abhijit rout ray	190301120080@cutm.ac.in	CUTM	PR-041	03.09-03.14 PM



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26	Assessing The Spatial Variability of Soil Nutrients Distribution Through GIS-Based Interpolation Techniques	Chiranjit Singha and Kishore C. Swain	singha.chiranjit@gmail.com	VISVA BHARATI, SANTINIK ETAN	PR-042	03.15-03.20 PM
27	Social Distancing Detection	Nandini Tripurana, Binodini Kar, Aishwarya Ankush Sawant	190101120053@cutm.ac.in, 190101120047@gmail.com	CUTM	PR-043	03.20-03.25 PM
28	Site Suitable for Solar Panel Establishment	Narendra Kumar Sahu, Soumya Prakash Puhan	190301110004@cutm.ac.in, 190301110013@cutm.ac.in	CUTM	PR-044	03.25-03.30 PM

ONLINE POSTER PRESENTATION SCHEDULE

Slot – 03 (03:30 pm – 04:53 pm), Chairpersons: Prof. Sonam Sandeep Dash and Dr. Dillip Rout

Sl no	Poster title	Authors' name	Corresponding e-mail	Affiliation	Id	Timing (IST)
29	Geospatial Techniques in Assessing Soil Loss Among Different Land Uses in Nagavangala Micro-Watershed	Anand S	anand007subramanyan@gmail.com	Keladi Shivappa Nayaka University of Agricultural and Horticultural sciences, Shivamogga	PR-045	03.30-03.35 PM
30	Real Time Face Mask Detection	Pratik Bose, Kalpita Patra, Rudra Madhab Jena, Sanity Sethy	190301120009@cutm.ac.in	CUTM	PR-046	03.36-03.41 PM
31	How GIS Can Inform Disaster Risk Reduction and Climate Change Adaptation Planning Process	Kamil Peter Korisa	peterkorisa911@gmail.com	National Disaster Management Office	PR-047	03.42-03.47 PM
32	Rate of Land Use Land Cover Changes of Setema District Jimma Zone South West, Ethiopia	Tadesse Leta	tadeleta61@gmail.com	Ethiopian Biodiversity Institution	PR-048	03.48-03.53 PM
33	Covid-19: Positive Impacts on Environment and Biodiversity	M d. Monjurul Hasan	mhshihab.hasan@gmail.com	Bangladesh Fisheries Research Institute	PR-049	03.54-03.59 PM
34	Investigating Land Use-Cover Changes and Relationship Between Land Surface Temperature & Vegetation Indices in Dadu District, Pakistan	Shoukat Ali Shah1, Madeeha Kiran2	sarkar.sain151@gmail.com	Mehran University of Engineering & Technology Jamshoro Pakistan	PR-050	04.00-04.05 PM
35	Evaluating the impact of land-use and land-cover change on the land surface flow in Budhabalanga river	Asit Kumar Dandapat	asit80t@gmail.com	NIT Rourkela	PR-051	04.06-04.11 PM
36	The Expansion of Coal Mines in Western Part of the Paschim Bardhaman District From 1998 to 2021	Mr. Uday Das	uday.geography@gmail.com	Teacher Govt. of WB	PR-052	04.12-04.17 PM

37	Used Car Price Prediction Based on ANN	Sujeet Kar	190301120070 @cutm.ac.in	CUTM	PR-053	04.18-04.23 PM
38	GIS Applications in Water Resources Management	K. Rupesh	191801120010 @cutmap.ac.in	CUTM	PR-054	04.24-04.29 PM
39	Drainage Density and Streamflow	Sudhir Kumar Tudu	190301110012 @cutm.ac.in	CUTM	PR-055	04.30-04.35 PM
40	Locational Analysis of Solid Waste Management Sites in Bhubaneswar using GIS	Brijesh Kumar Nayak, Uma Shankar, Rajnish Kumar, Prabhas Kumar Mahato	190301110002 @cutm.ac.in	CUTM	PR-056	04.36-04.41 PM
41	Potato Leaf Disease Detection	Jagruti Hota, Kusuma Pediredla	190301120100 @cutm.ac.in	CUTM	PR-057	04.42-04.47 PM
42	Impact of Ground Water in Mining Area. (Joda, Barbil)	Jyoti Prakash Dutta, Hemant Kumar Patra, Chinmayshre e Mohanta, Satyabrata Palei	190301190008 @cutm.ac.in	CUTM	PR-058	04.48-04.53 PM



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OFFLINE POSTER PRESENTATION SCHEDULE

Slot – 04 (05:00 pm – 06:00 pm): Chairperson: Dr. Kamal Kumar Barik and Dr. Ashish Ranjan Dash

Sl no	Poster title	Authors' name	Corresponding e-mail	Affiliation	Id	Time (IST)
1	GIS for Agriculture	Amitabha Bandyopadhyay	200804130021@cutm.ac.in	CUTM	PR-001	05.00-06.00 PM AUDITORIUM
2	A review on Role of Remote Sensing in Earthquake Science and Engineering	Sudhir Kumar, Digambar Ray, Md Perwez Alam	190101110042@cutm.ac.in	CUTM	PR-002	
3	Change Detection Study for Gajapati District using GIS and Remote Sensing	Swastik Gouda, Alok Kumar	190101110024@cutm.ac.in	CUTM	PR-003	
4	Coastal Zone Management using GIS and Remote Sensing	MD Zaid Hussain, Anil Kumar, Manish Kumar Chourasia	190101110020@cutm.ac.in	CUTM	PR-004	
5	Role of Remote Sensing in Delineation of Groundwater Potential Zone	Arun Kumar, Bablu Kumar	190101110030@cutm.ac.in	CUTM	PR-005	
6	A review on Landslide Susceptibility Mapping using Different Approaches	Lokesh Kumar, Gautam Kumar, Rohit Mallick	190101110037@cutm.ac.in	CUTM	PR-006	
7	Hydrological Modelling Simulation using SWAT: A Case Study of Vamsadhara River Basin, Odisha	Pradip Kumar Sharma, Arvind Kumar, Md Gulam Raza, Suhaila Ghulami	190101110018@cutm.ac.in	CUTM	PR-007	
8	Land Use Land Cover Mapping of Gajapati District	Dibya Ranjan Mishra, Sthitapragyan Mohanty, Suchet Kumar Patel	180101170036@cutm.ac.in	CUTM	PR-008	
9	Land use Land Cover Change Dynamics and Prediction of Ganjam District	Avijeet Raj, Chitranjan Kumar, Kundan Kumar	190101110039@cutm.ac.in, 190101110012@cutm.ac.in	CUTM	PR-009	
10	Estimation of Land Surface Temperature	Bhaskar Banerjee, Samrat Mukhopadhyay, Amulya Ratna Das	180101170005@cutm.ac.in	CUTM	PR-010	
11	Land Surface Temperature Mapping of Titlagarh Municipality, Odisha- A Geospatial Approach	Sridhar Kumar Panda, Sai Soumya Shubhankar	180101110001@cutm.ac.in	CUTM	PR-011	



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12	Technique of Remote Sensing and GIS in Forest Fire Damage Estimation	Deepti Patro, Kinley Wangmo, Prasanna Ch.	180101111010 @cutm.ac.in	CUTM	PR-012
13	Application of Remote Sensing Data Product in Regional Evapotranspiration Mapping	Bhakti Bisoi, Soumya Ranjan Sahoo, N. Gourav Patro	180101170010 @cutm.ac.in	CUTM	PR-013
14	Effect of DEM Resolution on Watershed Mapping	Subham Panda	180101170035 @cutm.ac.in	CUTM	PR-014
15	Estimation of Average Annual Rainfall of Odisha using Thiessen Polygon Method	Arindam Chattaraj, Sonu Saw	193001170001 @cutm.ac.in	CUTM	PR-015
16	Spatial Identification of Bangalore City Applying Various Remote Sensing Sensors	Preeti Patnaik, Kanhaiya Kumar, Nitesh Kumar Patel	180101111009 @cutm.ac.in	CUTM	PR-016



Abstracts





GIS Education

Joseph Kerski

Education Manager, Esri

Corresponding Email: jkerski@esri.com

Abstract

GIS provides educational policymakers with tools to see patterns in educational achievement and where to target new programs. In instruction, GIS in the hands of students helps them to understand content in a variety of disciplines, not only in geography, but in history, mathematics, language arts, environmental studies, chemistry, biology, civics, and many other disciplines. GIS is used as an inquiry-driven, problem-solving, set of tasks that adhere to national educational standards that incorporates fieldwork and provides career pathways that are increasingly in demand. It helps students think critically, use real data, and connects them to their own community. It does so in informal, primary, secondary, and university settings and appeals to today's visual learners. Geotechnologies, along with biotechnologies and nanotechnologies, are three rapidly expanding technologies of great value to societies around the world. GIS-based questions begin with the "whys of where"—why are cities, ecoregions, monsoons of India, and earthquakes located where they are, and how are they affected by their proximity to nearby things and by invisible global interconnections and networks? After asking geographic questions, students acquire geographic resources and collect data. They analyse geographic data and discover relationships across time and space. Geographic investigations are often value-laden and involve critical thinking skills. Students investigate the relationship between altitude, latitude, climate, and cotton production. After discovering that cotton is grown in regions that must be irrigated, they can ask "Is this the best use of water and other natural resources?" GIS helps students to act on their investigations, to put their recommendations in place, to improve the quality of lives of people and the health of the planet. Students present the results of their investigations using GIS and multimedia. Their investigations usually spark additional questions, and the resulting cycle is the essence of geographic inquiry.

Keywords: GIS; Enquiry-driven; Problem-solving.



EnerGISed Yourself as Geospatial MaGIScian

Mayuri Bhattacharyya

Regional Technical Manager, Eastern Region, Esri India

Corresponding Email: mayuri.bhattacharyya@esri.in

Abstract

With the power of location intelligence various Engineering disciplines like Civil, Mining, Environmental, Computer and Data Science, Natural Resource Studies, Agriculture, Geology, Geography, etc. leads a strong direction in spatial and data analysis, in predicting using geostatistical principles, and in building up spatial modelling. All these important works, research further needs proper maintenance in terms of storage either in clouds or internally to access appropriately by the user, or within organisations, or among the interested group of people with the right privilege and in the right time. The modern GIS also makes users flexible to access data using multiple devices. So, the data is now more useful as services, maps are more popular as apps, and one single point work is more efficient as the enterprise. We need to build up our youth as much responsive and responsible as possible. Through web GIS using various citizen portals and services we can deploy information rightly and in a timely manner. When a road accident happened in a location, a geospatially aware citizen will think to connect nearest blood bank and collect the blood he needs at the same time while reaching the hospitals to facilitate the successful recovery of the patient. A geospatially intelligent civil engineer when sees a dangerous fracture on a bridge pillar of a road can alert the central system from his GPS enabled smart phone using citizen portals for immediate response and avoid hazards. A modern mining engineer prior to start the mine operations should facilitate a slope analysis using geospatial technology to determine whether the hulk road is capable to carry overload burden in his surface mine site planning assessment in no time and at minimum cost. A coastal hazard is much more under control to avoid human loss and damage by proper mitigation and restoration plan which is driven by geospatial approaches. An agricultural economy is much near to accurate with the prediction when geospatial techniques are implemented. This is how and so goes on with no limitations and hugely at various intensity depending on the user's level of perception. Therefore, it is required to build up the visionary leadership in every discipline using GIS. The nation needs geospatial maGIScians in the form of Engineers, Scientists, Researchers, Planners, Educators, and Analysts to address, acquire information, and analyse data for a sustainable world.

Keywords: GIS; MaGIScian; GPS; Coastal hazard.



Cyclone Impact Assessment in Odisha Coast (East Coast of India)

Monalisha Nayak, Sandip Ghosh, Soumya Ranjan Sahoo, Pujarani Parija

Centurion University of Technology and Management, Odisha

Corresponding email: 190301110009@cutm.ac.in

Abstract

Odisha and hazards are just like two sides of a coin. Cyclone is one of the most common natural hazards in Odisha. Every year there is a cyclone on the Odisha coast. The east coast of Odisha covers around 480km in total, which is nearly 18% of the Indian coastline, nearly about 35% of cyclonic storms with hurricane winds have crossed this stretch. In this paper, we have considered the Fani cyclone, which landfall on Puri on 3rd May at 8 am. The cyclone is created in Sumatra, one of western Indonesia on 26th April. Vertical wind shear at first hindered the storm. Conditions became more favourable for Fani on 30 April. It reduced its peak intensity on 2nd May and it disappear on 5th May. The wind speed was around 215km/hr and it also damaged 8.1 billion in total. The Fani cyclone-affected Odisha, West Bengal, Andhra Pradesh, Bangladesh, Bhutan, Srilanka. Here we have considered the Odisha coast and have calculated the vegetation loss, chlorophyll concentration and sea surface temperature (SST). We have considered Puri, Khordha and Cuttack districts for the vegetation loss in the land part and the Bay of Bengal for chlorophyll concentration and SST. We have considered the Sentinel 2 data for land part vegetation loss, MODIS-Aqua/Terra data for chlorophyll concentration and NOAA AVHRR for SST.

Keywords: Sentinal 2; MODIS-Aqua/Terra data; NOAA AVHRR; Landfall; Vertical wind shear.



GIS for Agriculture

Amitabha Bandyopadhyay

Centurion University of Technology and Management, Odisha

Corresponding email: 200804130021@cutm.ac.in

Abstract

GIS application in agriculture has been playing an increasingly important role in crop production throughout the world by helping farmers in increasing production, reducing costs, and managing their land resources more efficiently. GIS application in agriculture such as agricultural mapping plays a vital role in monitoring and management of soil and irrigation of any given farm land. GIS agriculture and agricultural mapping act as an essential tool for management of agricultural sector by acquiring and implementing the accurate information into a mapping environment. GIS in agriculture is not a new phenomenon anymore. The agricultural sector is the mainstay of the rural Indian economy around which socio-economic privileges and deprivations revolve, and any change in its structure is likely to have a corresponding impact on the existing pattern of social equality. No strategy of economic reform can succeed without sustained and broad-based agricultural development, which is critical for raising living standards, alleviating poverty, assuring food security, generating a buoyant market for expansion of industry and services and making a substantial contribution to the national economic growth. The future growth in agriculture must come from new technologies which are not only cost-effective but also in conformity with natural climatic regime of the country; technologies relevant to rain-fed areas specifically; continued genetic improvements for better seeds and yields; data improvements for better research, better results, and sustainable planning; bridging the gap between knowledge and practice; and judicious land use resource surveys, efficient management practices and sustainable use of natural resources.

Keywords: GIS; Natural Resources; Agriculture; Sustainable.



A review on role of Remote Sensing in Earthquake Science and Engineering

Sudhir Kumar, Digambar Ray, Md Perwez Alam

Centurion University of Technology and Management, Odisha

Corresponding email: 190101110042@cutm.ac.in

Abstract

An earthquake is a sudden movement of the earth, caused by the abrupt release of strain that has accumulated over a long time. Earthquake science and engineering are experience-driven fields in which lessons are learned after each significant earthquake. Remote sensing represents a suite of technologies that can play a significant role in documenting the effects of earthquakes and lead to important developments in our understanding of earthquakes. Remote sensing data is useful for post-earthquake damage assessment in improved spatial and temporal resolution. High temporal resolution is important for getting information in the time of emergency, while higher spatial resolution can provide damage information at building level. Structural characteristics of the settlements are the main determinant of the selection of resolution for urban remote sensing studies. As the size, densities and contrast of urban areas around the world are not same so we cannot determine the exact resolution for every application. Narrow streets and compact structures require higher spatial resolution for urban damage assessment. In this article we have critically reviewed and presented the methodological approach of different researchers of recent times in producing creative ways to handle earthquake pre and post effects using remote sensing applications for different study zones. It was seen that each approach was unique and can be implemented to any part of this world if followed proper estimation technique.

Keywords: Earthquake; Damage assessment; Urban studies; Remote sensing; Spatial resolution.



Change Detection Study for Gajapati District using GIS and Remote Sensing

Swastik Gouda, Alok Kumar

Centurion University of Technology and Management, Odisha

Corresponding email: 190101110024@cutm.ac.in

Abstract

Land use and land cover change were among the most substantial perceptible changes that are happening around us. Land use and land cover information in the form of maps and statistical data is very significant for spatial planning, land management and land utilization. With the changing times and growing demand on the availability of land use and land cover information, a standard classification system, precise description of land use and land cover and its categories, standardized data collection and mapping procedures across Indian region on different scales becomes relevant. Detection of digital change is the mechanism that helps to assess changes related to land use and land cover properties with respect to geo-referenced multi-temporal remote sensing data. It helps in recognizing changes that are uncharacterized by natural variability between two or more dates. An investigation was carried to define and measure the land use and land cover changes that have occurred in Odisha District Gajapati over the last 25 years using remote sensing and GIS technologies. Land is a natural resource of prime importance. A city not only increases by population but also by changes in the spatial dimensions. The development of rural areas has led to dramatic changes in land use and land cover. The importance of spatial data technology has been widely used in recent years, in particular the application of remotely sensed and geographic information systems (GIS). this study explores land use and land cover in the district of Gajapati, Odisha using Landsat satellite images for the years 1991, 1995, 2000, 2005, 2010 and 2015. Supervised classification scheme is used to classify the different groups within the area of study. The study showed that during the study period the built-up area in the district of Gajapati grew by more than fifty percentages on average. At the other hand, areas under forest, agricultural land, and open fields have decreased respectively by around thirty-eight and thirteen percentages.

Key words: Land use/Land cover; spatial data; satellite; remote sensing; Image classification.



Coastal Zone Management using GIS and Remote Sensing

MD Zaid Hussain, Anil Kumar, Manish Kumar Chourasia

Centurion University of Technology and Management, Odisha

Corresponding email: 190101110020@cutm.ac.in

Abstract

This paper reviews methods and tools of spatial analysis, their integration and application to coastal zone management. The features of a database and information system, which includes GIS as a tool of data management, are presented as components of an integrated approach to coastal zone management. The objective of this paper is to outline the importance of GIS technology for coastal zone management. Following a definition of the coastal zone, and, short description of its peculiarities and the urgency of its management, the paper describes the use of GIS technology in coastal zone management, its advantages and the consideration for accuracy. This followed by information and data required for coastal zone management and the application area in coastal management. Coast is a remarkable link in which the atmosphere, the hydrosphere, and the lithosphere meet. Coastline is one of the most important direct highlights on the surface of the earth, showing a special existence. Information on rates and trends of shoreline change can be used to improve the understanding of the underlying causes and potential effects of coastal erosion which can support informed coastal management decisions. In this paper, the changes in the recent positions of the shoreline of the Balasore coast for the 30 years from 1990 through 2020. Eight scenes of Landsat Multispectral Scanner, Thematic Mapper, Enhanced Thematic Mapper Plus, and Operational Land Imager sensors, covering the period between 1990 and 2020, were used to demarcate shoreline positions and estimate shoreline change rates of the Medjerda delta coast, north-eastern Tunisia. The method relies on image processing techniques using the Digital Shoreline Analysis System, a free extension for ArcGIS software, which provides a set of tools permitting transects-based calculation of shoreline displacement.

Key words: Coastal vulnerability score; Coastal areas; Coastline extraction; remote sensing Shoreline change; Landsat imagery; Digital shoreline analysis system; Shoreline Change.



Role of Remote Sensing in Delineation of Groundwater Potential Zone

Arun Kumar, Bablu Kumar

Centurion University of Technology and Management, Odisha

Corresponding email: 190101110030@cutm.ac.in

Abstract

Assessment of groundwater potential zones is extremely important for protection of water quality and management of groundwater systems. Groundwater Potential Zones (GPZ) are demarcated with the help of geospatial techniques. The parameters, considered for identifying the GPZ such as geology, geomorphology, slope, drainage density, lineament density, rainfall, soil and land use and land cover (LULC) are generated using satellite data and toposheet. Later, they are integrated with each other applying weighted overlay in ArcGIS. Suitable ranks are assigned for each category of these parameters. For various geomorphic units, weight factors are decided based on their capability to store groundwater. This procedure is repeated for all other layers and resultant layers are reclassified. The groundwater potential zones are classified into three categories like Poor, Good and Excellent. The use of aforesaid methodology is demonstrated in a selected study area in Baliguda block of Kandhamal district in Odisha.

Keywords: Groundwater potential zone; Geospatial techniques; land use and land cover; Drainage; Lineament.



Locational Analysis of Solid Waste Management Sites in Bhubaneswar using GIS

Brijesh Kumar Nayak, Uma Shankar, Rajnish Kumar, Prabhas Kumar Mahato

Centurion University of Technology and Management, Odisha

Corresponding email: 190301110002@cutm.ac.in

Abstract

Uncontrolled growth of the urban population in developing countries in recent years has made solid waste management an important issue. Very often, a substantial amount of total expenditures is spent on the collection of solid waste by city authorities. Optimization of the routing system for collection and transport of solid waste thus constitutes an important component of an effective solid waste management system. This paper describes an attempt to design and develop an appropriate storage, collection and disposal plan for the Bhubaneswar Municipality Corporation (BMC) of Odisha State (India). Spatial data analysis are multidisciplinary process, having data on soils, water, rainfall, infiltration, land use, topography, forestry, administrative boundaries, population, etc., and often available at different scales in different coordinate systems at various levels of text maps, charts, ground information, organisation, aerial photographs and satellite imagery. The management and analysis of such large volumes of spatial data require a computer- based system called Geographic Information System (GIS), which can be used for solving complex geographical and spatial problems. The present study aims at analysing existing status of generation, collection, storage, transportation, treatment and disposal activities of SWM of Bhubaneswar City. This paper portrays Geographical Information System as a decision support tool for Municipal solid waste management. This model will help to get rid of solid waste as per the study area.

Keywords: Urban, Population, Solid Waste, Management, Model, GIS, Landfill, SWM, Spatial Data.



A Review on Landslide Susceptibility Mapping using Different Approaches

Lokesh Kumar, Gautam Kumar, Rohit Mallick

Centurion University of Technology and Management, Odisha

Corresponding email: 190101110037@cutm.ac.in

Abstract

A landslide susceptibility map identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map takes into account where the landslides occur and what causes them (slope, soil type and the impact of the flow of water in an area). The aim of this mapping is to identify areas predisposed to landslides. To produce the map the following factors were considered: Where do landslides occur and recognize the extent of problem, what triggers landslides and when did they occur i.e., document archived data sources and recent events. Landslide susceptibility assessment forms the basis of any hazard mapping, which is one of the essential parts of quantitative risk mapping. For the same study area, different susceptibility maps can be achieved depending on the type of susceptibility mapping methods, mapping unit, and scale. In this article we have critically reviewed and presented the methodological approach of different researchers of recent times in producing these maps for different study zones. It was seen that each approach was unique and can be implemented to any part of this world if followed proper estimation technique.

Keywords: Landslides; Geospatial mapping; Risk mapping; Mapping unit.



Potato Leaf Disease Detection

Jagruti Hota, Kusuma Pediredla

Centurion University of Technology and Management, Odisha

Corresponding email: 190301120100@cutm.ac.in

Abstract

Potatoes are a well-known vegetable to all of us. If the other countries are taken into consideration, it can be easily concluded that potatoes are the number one vegetable all over the world, which has been increasingly claimed by many Agricultural departments. Despite the hype, potato leaf disease causes significant damage to the potatoes. Various types of diseases such as early blight and late blight will attack potato plants. The farmer would not face incurring major economic losses if these outbreaks are detected at the primary stage and sufficient action is taken. The proposed model will strongly identify and detect diseases of potato leaf stand on image processing methods in this project. Machine Learning includes several algorithms, but the CNN model is used for this project to detect the disease from images of the potato leaf because in CNN is used for image classification. Adam is used as the optimizer, and cross entropy is used as the model analysis basis. SoftMax is used as the final judgment function. The convolution layer and resources are minimized usage amount while maintaining high accuracy. The experimental results show that the parameter usage is 183,747 and the accuracy of the disease judgment can reach 99% under the present model which is proposed in this project.

Keywords: Potato disease; Image Processing; CNN.



Tomato Leaf Disease Detection using Convolutional Neural Network

Ankita Panigrahi, Rakesh Sharma

Centurion University of Technology and Management, Odisha

Corresponding email: 190301250002@cutm.ac.in

Abstract

Tomato is India's most important vegetable crop. It is cultivated in large quantities as it has the highest commercial value. India is having the 2nd position when it comes to the production of tomatoes. Due to different natural and man-made issues the crop gets harmed by various kinds of diseases which lead to a great fall in quantity and quality of the production. Diseases are something which affects the health of any organism. Diseases destroy the production on a very large scale. So, in order to minimize the loss, there is a need of a model which detects and classifies the diseases at a very early stage which will help in taking the necessary preventive measures. This paper proposes a model to detect and classify various diseases which affects the tomato leaf. For the detection and classification of the disease an approach based on Convolution Neural network is applied. The resultant accuracy is 93.14 % when applied on the proposed model working on 10000 leaf images dataset classified under 9 diseases and 1 healthy class.

Keywords: Tomato; Convolutional Neural Network; Leaf; Disease; Machine Learning; Prediction.



Social Distancing Detection

Nandini Tripurana, Binodini Kar, Aishwarya Ankush Sawant

Centurion University of Technology and Management, Odisha

Corresponding email: 190101120047@gmail.com

Abstract

Social distancing is deliberately increasing the physical space between people to avoid spreading illness. Staying at least six feet away from other people lessens the chances of contracting COVID-19. We can use OpenCV and YOLO to monitor/analyze whether people are maintaining social distancing or not. This project presents a methodology for social distancing detection using deep learning to evaluate the distance between people to mitigate the impact of this corona virus pandemic. The detection tool was developed to alert people to maintain a safe distance with each other by evaluating a video feed. The video frame from the camera was used as input, and the open-source object detection pre-trained model based on the YOLOv3 algorithm was employed for pedestrian detection. Later, the video frame was transformed into top-down view for distance measurement from the 2D plane. The distance between people can be estimated and any noncompliant pair of people in the display will be indicated with a red bounding box. The proposed method was validated on a pre-recorded video of pedestrians walking on the street. The result shows that the proposed method is able to determine the social distancing measures between multiple people in the video. The developed technique can be further developed as a detection tool in real-time application.

Keywords: OpenCV; YOLO; Social distancing; Deep learning; Bounding box.



Stock Price Prediction using Machine Learning Techniques

Sobita Das

Centurion University of Technology and Management, Odisha

Corresponding email: 190301120023@cutm.ac.in

Abstract

Stock price movement is non-linear and complex. Several research works have been carried out to predict stock prices. Stocks are derived from the long-term development of the market economy, and the issuance and trading of stocks are directly related to the development trend of the market economy. The stock of a corporation constitutes the equity stake of its owners. Stock market data has been collected from Yahoo Finance. The proposed models include 17 years data from 26 March 2000 to 09 September 2017 of Edwards Lifesciences Corporation (EW). The financial data: Open, High, Low and Close prices of stock are used for creating new variables which are used as inputs to the model. The Machine Learning models used in this project are Linear Regression (LR), Decision Tree (DF), Random Forest (RF) and Artificial Neural Network (ANN) to predict stock values. The models are evaluated using standard strategic indicators: Root Mean Square Error (RMSE) and Mean Absolute Percentage Error (MAPE). The low values of these two indicators show that the models are efficient in predicting stock closing price.

Keywords: Stock Price Prediction; Linear Regression; Decision tree; Random Forest; Neural network.



Skin Cancer Detection

Subhalaxmi Pattnaik

Centurion University of Technology and Management, Odisha

Corresponding email: 190301120055@cutm.ac.in

Abstract

The disease that doesn't have a proper curable treatment yet is cancer. It is of many types and here we are discussing about skin cancer which refers to the damaging or abnormal growth of skin cells and most often it develops on the part of skin which are exposed to sunlight. Basically, cancer is of two types which are malignant and benign. Benign cancer is most dangerous but malignant is normal one it does not harm our body. Skin cancer is of three types are basal cell carcinoma, squamous cell carcinoma and melanoma. The parts of body on which the symptoms of skin cancer develop, includes scalp, ears, chest, eyes, hands, arms, lips and legs in case of women. It rarely forms on the body part which does not expose to light. Skin cancer affects peoples of all the types of skin tones. It does not matter whether it is dark or fair complexion, where melanoma affects most on darks skin tones people. Well, this disease has discovered many methods or techniques and diagnosis for curing the disease at primary or first stage. The technique includes biopsy, MRI, radiation therapy, chemotherapy, Mohs surgery, etc. But now also there are huge amount of people dying because of cancer. This does not have any proper symptoms which is recognizable at first stage. Many people are victims of this disease because of not recognizing this at very primary and not even in secondary stage.

Keywords: Skin Cancer Detection; Machine Learning; Logistic Regression; Decision tree; Random Forest; Neural network.



Hydrological Modelling Simulation using SWAT: A Case Study of Vamsadhara River Basin, Odisha

Pradip Kumar Sharma, Arvind Kumar, Md Gulam Raza, Suhaila Ghulami

Centurion University of Technology and Management, Odisha

Corresponding email: 190101110018@cutm.ac.in

Abstract

Soil erosion is the major cause of land degradation and reservoir sedimentation. Therefore, modelling of runoff and sediment yield at a watershed level is very important. A conceptual, distributed and continuous time, SWAT_2012 (Soil and Water Assessment Tool) model was selected for estimating the hydrological processes and simulation of the runoff and sediment yield of Vamsadhara watershed which is placed in parts of Odisha and Andhra Pradesh. The Vamsadhara watershed originates in the Thuamul Rampur in the Kalahandi district and Kalyansinghpur in Raygada district of Odisha and runs for a distance of about 254 kilometres and joins the Bay of Bengal at Kalingapatnam, Andhra Pradesh. Its total catchment area is about 10,830sq.km. The objectives of the study are to build and calibrate a hydrological model of Vamsadhara River Basin using SWAT, to quantify the water resources availability in Vamsadhara River Basin and to simulate at the basin scale water and nutrients cycle in landscapes whose dominant land use in agriculture. It will also undergo different processes, which will help to predict the long-term impacts in large basins of management and also timing of agricultural practices within a year. To set up the model for simulation a 2.5m DEM (Digital Elevation Model), 30m spatial resolution of the LANDSAT 8 data have been taken for the area of the year 2020 to prepare DEM map, LULC map and watershed delineation map and 10 km spatial resolution of the soil map have been taken into account. The stream flow data was available from 2018 to 2020 which has been obtained for estimating the sediment yield. The calibration for sediment was conducted for the whole period for which the sediment data was available. The model was not validated for sediment yield as there was not enough length of data to do so.

Keywords: Geospatial modelling; DEM; SWAT Model; Surface runoff; Hydrological modelling.



Land Use Land Cover Mapping of Gajapati District

Dibya Ranjan Mishra, Sthitapragyan Mohanty, Suchet Kumar Patel

Centurion University of Technology and Management, Odisha

Corresponding email: 180101170036@cutm.ac.in

Abstract

Land Use / Land Cover (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 methods of analysis of appropriate source materials. LULC plays a vital role in planning and supervising the utilisation of the natural resources based on the gradual increase in the anthropogenic demands in the current ecosystem. We picked Khordha as our study area because it is the most urbanised region of Odisha. The Maximum Likelihood Classification method which is a type of supervised classification approach is adopted in the present study. This study focuses on the classification and identification of the changes in LULC of the Khordha for the period of 2000 to 2020 based on images gathered from USGS Earth Explorer. The experimental results indicated that over the specified period of study the rate of increment and decrement in the built-up area, rate of waterbodies, forest bodies that may demonstrate a significant impact on the environmental ecosystem.

Keywords: Land Use/Land Cover; Urbanization; Maximum Likelihood Classification; Supervised Classification; USGS Earth Explorer.



Land use Land Cover Change Dynamics and Prediction of Ganjam District

Avijeet Raj, Chitranjan Kumar, Kundan Kumar

Centurion University of Technology and Management, Odisha

Corresponding email: 190101110039@cutm.ac.in

Abstract

Land use and land cover change were among the most substantial perceptible changes that are happening around us. Land use and land cover information in the form of maps and statistical data is very significant for spatial planning, land management and land utilization. With the changing times and growing demand on the availability of land use and land cover information, a standard classification system, precise description of land use and land cover and its categories, standardized data collection and mapping procedures across Indian region on different scales becomes relevant. Detection of digital change is the mechanism that helps to assess changes related to land use and land cover properties with respect to geo-referenced multi-temporal remote sensing data. It helps in recognizing changes that are uncharacterized by natural variability between two or more dates. An investigation was carried to define and measure the land use and land cover changes that have occurred in Odisha District Ganjam over the last 30 years using remote sensing and GIS technologies. Land is a natural resource of prime importance. A city not only increases by population but also by changes in the spatial dimensions. The development of rural areas has led to dramatic changes in land use and land cover. The importance of spatial data technology has been widely used in recent years, in particular the application of remotely sensed and geographic information systems (GIS). The present research explores land use and land cover in the district of Ganjam Odisha using Landsat satellite images for the years 1990, 2000, 2010, 2020. Supervised classification scheme is used to classify the different groups within the area of study. The study showed that during the study period the built-up area in the district of Ganjam grew by more than fifty percentages on average. At the other hand, areas under forest, agricultural land, hill it is constant, water bodies and barren land have decreased respectively by around thirty-eight and thirteen percentages.

Keywords: Land use/Land cover; Landsat image; Satellite; Remote sensing; Image classification.



Estimation of Land Surface Temperature

Bhaskar Banerjee, Samrat Mukhopadhyay, Amulya Ratna Das

Centurion University of Technology and Management, Odisha

Corresponding email: 180101170005@cutm.ac.in

Abstract

Land Surface Temperature (LST) is an essential factor in many areas including global climate change studies, urban land use/land cover, geo/bio-physical. The LANDSAT8, which is a latest satellite version of the LANDSAT series, has given a scope of exploring many possibilities using remote sensing. The thermal conditions have been deteriorating since many years; thereby the present study assumes a approach to estimate the global surface temperature accurately. In this study an attempt has been made to estimate LST over the Gajapati District, Odisha, India using the LANDSAT 8 Operational Line Imager & Thermal Infrared Sensor (OLI & TIRS) satellite data. We have chosen the Gajapati district as our study area because the thermal imagery datasets are not easily available. The variability of retrieved LST's has been investigated with respect to Normalized Difference Vegetation Index (NDVI) values for different land use/ land cover types determined from the Landsat visible and NIR channels. The present study focuses on developing an image processing method using the LANDSAT 8 thermal imagery of band 10 data. The LST map, along with the legends will provide the exact range of land temperature along the whole stretch of the concerned district.

Keywords: Land Surface Temperature (LST); Normalized Difference Vegetation Index (NDVI); LANDSAT-8 (Land Remote-Sensing Satellite); Operational Line Imager & Thermal Infrared Sensor (OLI & TIRS).

GIS and its Application in Transportation Network

Uma Shankar Raj

Centurion University of Technology and Management, Odisha

Corresponding email: 190301110025@cutm.ac.in

Abstract

Many applications in GIS are characterized by data network representing and analysis. Network analysis is based on linear structures. The fields where these types of analysis are used are different, such as: roads network, electric networks, hydrographic network and so on. For example, a hydrographic network is characterized by a one-way direction (the water will flow in the same direction) with no return. Instead, a road network can be crossed in both directions. A line from a network is characterized by: length, direction, connectivity and information about the outflow for crossing the network. The ways of representation that can include all these features are graphs. The subject of this paper involves the identification of the minimum cost of a route between 2 localities by using the land use between them. In order to solve these problems, we used a GIS software which allows such an analysis, specifically ArcGIS v10. For finding the easiest way to get from a source point (locality) to a destination point (locality) by using the characteristics of the land we will consider land use meaning how difficult is moving on it depending on what is on the surface and the slope. The steeper the slope, the harder the movement will be. The Euclidian distance and the Cost distance represent 2 main methods to accomplish a distance analysis in ArcGIS Spatial Analyst. The Euclidian distance functions measure the shortest distance between every cell until the closest source point. In this way we can determine the allocation, distance and direction towards the closest source point. The Cost distance evaluation function modifies the Euclidian distance by adding a variable associated with the displacement between any 2 given cells. For example, the distance to destination point could be shorter by climbing a mountain, but it could be faster going around the certain mountain. The cost allocation function identifies the source cell for which a minimum cost will be determine based on the accumulated cost of the displacement. This function creates a map of the routes identifying the necessary route from any cell to the closest source point. It also can create a raster representing the distance and the direction, and it can as well calculate the minimum cost or the shortest route from a source point to destination point.

Keywords: GIS; Network; Transportation; Minimum route.



Land Surface Temperature Mapping of Titlagarh Municipality, Odisha- A Geospatial approach

Sridhar Kumar Panda, Sai Soumya Shubhankar

Centurion University of Technology and Management, Odisha

Corresponding email: 180101110001@cutm.ac.in; 180101170023@cutm.ac.in

Abstract

Land use and land cover change have been among the most important perceptible changes taking place around us. Information on land use/land cover in the form of maps and statistical data is very important for spatial planning, management and utilization of land. With the changing times and increasing demand on the availability of information on land use/land cover, it becomes necessary to have a standard classification system, precise definition on land use/land cover and its categories, uniform procedures of data collection and mapping on different scales over Indian region. Digital change detection is the process that helps in determining the changes associated with Land use and Land cover properties with reference to geo-referenced multi-temporal remote sensing data. It helps in identifying change between two or more dates that is uncharacterized of normal variation. A study was conducted with a view to identify and quantify the changes in land use and land cover occurred during the last 20 years at Titlagarh Municipality of Odisha using remote sensing and GIS technologies. Land is one of the prime natural resources. A city grows not only by population but also by changes in spatial dimensions. The growth of rural areas has resulted in sharp land use and land cover changes. In recent years, the significance of spatial data technologies, especially the application of remotely sensed and geographical information systems (GIS) has been widely used. The present study investigates the land use and land cover of Titlagarh Municipality, Odisha using Landsat satellite images for the year 1991, 2005 & 2015. Supervised classification method is used to classify the different classes under the study area. The study has revealed that the built-up area in Titlagarh Municipality expanded by more than fifty percent during the study period. On the other hand, areas under vegetation, agricultural land and open fields have decreased about thirty-eight and thirteen percent respectively.

Keywords: Land use/Land cover; Spatial data; Satellite; Remote sensing, Image classification.



Site Suitability for Solar Panel Establishment

Narendra Kumar Sahu, S P Swain, Soumya Prakash Puhan, Asish Routray

Centurion University of Technology and Management, Odisha

Corresponding email: 190301110013@cutm.ac.in

Abstract

According to Indian Renewable Energy Industry Report of IBEF (Indian Brand Equality Foundation) Indian renewable energy sector is the fourth most attractive renewable energy market in the world with an installed capacity of 44.3GW as of 31 August 2021. For the installation main objective is selection of suitable land. Determining suitable site for this given project which will socially be satisfactory and financially doable stands apart to be very entrusting on the grounds that it generally relies upon many factors like natural, economic and social. The principal objective of this review is to investigate and recognize a suitable area for solar panel establishment to be associated with the public framework utilizing multi-measures dynamic technique in the GIS space. The methodology for the exploration considers many variables which were ordered into two principle classes as ecological and economical, where most extreme power yield and least expense of the undertaking will be achieved. In this review the Bhubaneswar BMC region is considered as the study area. Ecological elements turnout to be of most extreme significant for distinguishing ideal area in which sun-oriented power plant can enhance the public matrix because of occasional variety during that time round.

Keywords: LULC, Slope, Aspect, DEM.



Mineral mapping using Hyperspectral Data

Soumyadip Pal, Koustav Dutta, Anirban Mondal, Akashdeep Chatterjee, Bibhuti Bhusan Behera

Centurion University of Technology and Management, Odisha

Corresponding email: 190301190003@cutm.ac.in

Abstract

The application of remote sensing techniques to differentiate rock and soil classes can aid a wide range of tasks, including environmental characterization, mineral prospecting, and so on. Although images with low spectral resolution can be used to mapping of classes with discrete spectral features, the advent of new Hyperspectral sensors such as Hyperion has created new challenges in the field of mineral mapping. This study looked on the usefulness of EO1 Hyperion data collected from mined areas for iron ore discrimination in the Keonjhar district of Odisha, India. Routine processes were used to do atmospheric correction and other pre-processing activities on the Hyperspectral images. The findings of the spectral matching approach provide the most accurate sites for mineral differentiation using Hyperion data.

Keywords: Hyperion; Spectral angle mapper; Identification of mineral; Remote sensing etc.



Technique of Remote Sensing and GIS in Forest Fire Damage Estimation

Deepti Patro, Kinley Wangmo, Prasanna Ch.

Centurion University of Technology and Management, Odisha

Corresponding email: 180101111010@cutm.ac.in

Abstract

The use of remote sensing techniques for the study of forest fires is a subject that started several years ago and whose possibilities have been increasing as new sensors were incorporated into earth observation international programmes and new goals were reached based on the improved techniques that have been introduced. In this way, three main lines of work can be distinguished in which remote sensing provides results that can be applied directly to the subject of forest fires: risk of fire spreading, detection of hot spots and establishment of fire parameters and, finally, cartography of affected areas. Natural disasters are inevitable and it is impossible to fully recoup the damage caused by the disasters. But to some extent it is possible to minimize the potential risk by developing early warning strategies for disasters, preparing and implementing developmental plans to provide resilience to such disasters and to help in rehabilitation and post disaster reduction. Climatic, phenology variations and topography, apart from local factors are some of the main causes of frequent occurrence of wild forest fires in Garhwal Himalayas. Understanding the importance of forest in the national economy (12% of global plant wealth), conservation of environment and biodiversity, Forest Survey of India (FSI) as a central monitoring agency is assessing and estimating forest resources in a two years cycle. India is one of the few countries in the world to carry out the forest cover assessment and mapping using satellite data in a two years cycle period. Keeping in view the role of forest in national development, a Central Sector scheme has been implemented that includes- development of Early Warning system for forest fires, mapping of forest fire affected areas, development of a fire danger rating system, monitoring the impact of the scheme and its evaluation, identification and mapping of all fire prone areas, compilation and analysis of data-base on forest fire damage, development and installation of 'Fire Danger Rating System' and 'Fire Forecasting System'. Remote sensing and GIS technology could be effectively used in fire risk zonation. The technology has proved to be a valuable tool in identifying different fire risk zones based on appropriate parameters such as fuel load, slope, aspect, altitude, drainage, distance from roads and settlements.

Keywords: Geospatial; Rainfall Data; DEM; CARTOSAT Data; LULC; Slope, SWAT Model; Surface runoff; Sediment Yield; Hydrological Modelling.



Impact of Ground Water in Mining Area of Joda, Barbil

Jyoti Prakash Dutta, Hemant K. Patra, Chinmayshree Mohanta, Satyabrata Palei

Centurion University of Technology and Management, Odisha

Corresponding email: 190301190008@cutm.ac.in

Abstract

A preliminary study was undertaken to assess the impact of mining activities on groundwater in Joda and Barbil area of Odisha. Water samples from the wells, hand pump and Baitarani River located in the study area were collected and analyzed for hydro-chemical characteristics. A methodology of groundwater assessment and modelling with Modflow Surfact was simulating the project's impacts on the groundwater regime.

Keywords: Mining; Groundwater assessment; Hydro-chemical characteristics; Modflow Surfact.



Corona Virus Recognition Using Chest X Ray Images

Ankit Kumar Pradhan, A. Deepak

Centurion University of Technology and Management, Odisha

Corresponding email: 190301120005@cutm.ac.in, 190301120069@cutm.ac.in

Abstract

The novel coronavirus 2019 (COVID-2019), which first appeared in Wuhan city of China in December 2019, spread rapidly around the world and became a pandemic. It has caused a devastating effect on both daily lives, public health, and the global economy. It is critical to detect the positive cases as early as possible so as to prevent the further spread of this epidemic and to quickly treat affected patients. The need for auxiliary diagnostic tools has increased as there are no accurate automated toolkits available. Recent findings obtained using radiology imaging techniques suggest that such images contain salient information about the COVID-19 virus. Application of advanced artificial intelligence (AI) techniques coupled with radiological imaging can be helpful for the accurate detection of this disease, and can also be assistive to overcome the problem of a lack of specialized physicians in remote villages. In this study, a new model for automatic COVID-19 detection using raw chest X-ray images is presented. The proposed model is developed to provide accurate diagnostics for binary classification (COVID vs. No-Findings). Our model produced a classification accuracy of 97% for binary classes. The VGG16 model was used in our study as a classifier. Our model can be employed to assist radiologists in validating their initial screening, and can also be employed to immediately screen patients.

Keywords: Coronavirus (COVID-19); Deep learning; Chest X-ray images; Radiology images.



Flood Inundation of Mahanadi River

Subham Jyoti Ray, Abhijeet Behera, Soubhagya Khatua, Malaya K Sahoo

Centurion University of Technology and Management, Odisha

Corresponding email: 190301110016@cutm.ac.in

Abstract

All the major rivers of Odisha after attaining their old stage in the coastal plain fall into the Bay of Bengal. Most often the rivers including the biggest river Mahanadi brings flood calamity in the region. The coastal districts of Odisha particularly the Mahanadi Delta region has been victimised in the flood in terms of loss of lives of human being and domestic animals, damage of house properties, roads and bridges, crops etc. The article discusses the causes of the floods and management practices for controlling them.

Keywords: Mahanadi River; Flood calamity; Flood management;



GIS Based Land Surface Temperature Model of Western Odisha

Alan R. Xalxo, Nalinikanta Mohapatra, Sarthak Das, Satyabrata Samal,
Subhangam Choudhury

Centurion University of Technology and Management, Odisha

Corresponding email: 190301110007@cutm.ac.in

Abstract

Land surface temperature (LST) is an important factor in many areas like climate change, urban land use/land cover, heat balance studies and also a key input for climate models. LANDSAT Data has given a lot of possibilities to study the land processes using remote sensing. This study has been made to estimate LST using Arc GIS over Western Odisha, India, using LANDSAT 8 satellite data. The LST has been estimated with respect to Normalized Difference Vegetation Index (NDVI) values determined from the Red and Near Infrared bands. The Land Surface Emissivity (LSE) is retrieved directly from the Thermal Infrared bands. The present study focuses on ArcGIS Raster functions and Raster calculation using the LANDSAT 8 April and November, thermal Bands (10 & 11). The results are feasible to Calculate NDVI, LSE, and LST with appropriate accuracy. LST (Land Surface Temperature) is the earth surface temperature which is directly in contact with the measuring instrument (usually measured in Kelvin). LST is the surface temperature of the earth's crust where the heat and radiation from the sun are absorbed, reflected and refracted. LST changes with a change in climatic condition and other human activities where the exact prediction becomes challenging. Worldwide urbanization has significantly increased in greenhouse gases and reshaped the landscape, which has important climatic implications across all scales due to the simultaneous transformation of natural land cover and introduction of urban materials i.e., anthropogenic surfaces. Ground surveys would permit a highly accurate Land Use Land Cover (LULC) classification, but they are time-consuming, burdensome and expensive, which highlights remote sensing an evident and preferred alternative.

Keywords: Remote sensing, GIS, Land Surface Temperature (LST), Land Surface Emissivity (LSE), Normalized Difference Vegetation Index (NDVI), Land Use Land Cover (LULC), Operational Land Imager (OLI), Thermal Infrared Sensor (TIRS).



Geomorphic Analysis of Hirakud Reservoir

Abhisek Mishra and Chandan Kumar

Centurion University of Technology and Management, Odisha

Corresponding email: abhisekmishra303@gmail.com

Abstract

In geomorphology, morphometry is a quantification of morphology. Indices of watershed morphometry can interpret the shape and hydrological characteristics of a river basin. Morphometric analysis of watershed is the best method to identify the relationship of various aspects in the area. It is a comparative evaluation of different watersheds in various geomorphological and topographical conditions. Watershed is a natural hydrological entity from which surface runoff flows to a defined drain, channel, stream or river at a particular point. Stream order, stream number, stream length, mean stream length, stream length ratio, bifurcation ratio, mean bifurcation ratio, drainage density, drainage texture, stream frequency, relief ratio, form factor, elongation ratio, circularity ratio, length of overland flow are the most common morphometric parameters. Our main focus during this analysis was to obtain the stream order and bifurcation ratio of Hirakud Reservoir. Unfortunately, there is no complete classification for all parameters used. Some classifications are presented but not all.

Keywords: GIS; Geomorphology; Bifurcation Ratio; Hirakud Reservoir; Stream Order.



Credit Card Fraud Detection using Machine Learning

Praveen Kumar Sah

Centurion University of Technology and Management, Odisha

Corresponding email: 190301120043@cutm.ac.in

Abstract

It is vital that credit card companies are able to identify fraudulent credit card transactions so that customers are not charged for items that they did not purchase. Such problems can be tackled with Data Science and its importance, along with Machine Learning, cannot be overstated. This project intends to illustrate the modelling of a data set using machine learning with Credit Card Fraud Detection. The Credit Card Fraud Detection Problem includes modelling past credit card transactions with the data of the ones that turned out to be fraud. This model is then used to recognize whether a new transaction is fraudulent or not. Our objective here is to detect 100% of the fraudulent transactions while minimizing the incorrect fraud classifications. Credit Card Fraud Detection is a typical sample of classification. In this process, we have focused on analysing and pre-processing data sets as well as the deployment of multiple anomaly detection algorithms such as Local Outlier Factor and Isolation Forest algorithm on the PCA transformed Credit Card Transaction data.

Keywords: Credit card; Fraud Detection; Machine Learning; Local Outlier Factor.



Breast Cancer Detection using Different Algorithm

Sharad Kumar Urma

Centurion University of Technology and Management, Odisha

Corresponding email: 190301161035@cutm.ac.in

Abstract

Now a days, breast cancer has become a common cause but the general hospitals have no facilities to diagnose breast cancer through mammograms. Breast cancer has become the second most severe cancer among all the cancers. The most frequently occurring cancer among Indian women is breast cancer. There is a chance of fifty percent for fatality in a case as one of two women diagnosed with breast cancer die in the cases of Indian women. This paper aims to present comparison of the largely popular machine learning algorithms and techniques commonly used for breast cancer prediction, namely Random Forest, logistic regression and linear Regression. The Wisconsin Diagnosis Breast Cancer data set was used as a training set to compare the performance of the various machine learning techniques in terms of key parameters such as accuracy, and precision. The results obtained are very competitive and can be used for detection and treatment.

Keywords: Breast cancer; Random Forest; Logistic regression.



Car Price Predication

Abhijit Routray

Centurion University of Technology and Management, Odisha

Corresponding email: 190301120080@cutm.ac.in

Abstract

India has one of the biggest automobile markets all over the globe every day many buyers usually sell their cars after using for the time to another buyer, we call them as 2nd /3rd owner etc. Many platforms such as cars24.com, cardekho.com and OLX.com provides these buyers with a platform where they can sell their used cars, but what should be the price of the car, this is the toughest question ever. Machine Learning algorithms can bring a solution to this problem. Using a history of previously used cars selling data and using machine learning techniques such as Supervised Learning can predict a fair price of the car, here I also used machine learning algorithms such as Random Forest and Extra Tree Regression along with powerful python library Scikit-Learn to predict the selling price of the used car. The result has shown that these both algorithms are highly accurate in prediction even the dataset is large or small, irrespective of the size of the dataset they give a precise result.

Keywords: Automobile market; cars24.com; cardekho.com; OLX.com; Random Forest; Extra Tree Regression.



Real Time Face Mask Detection

Pratik Bose

Centurion University of Technology and Management, Odisha

Corresponding email: 190301120009@cutm.ac.in

Abstract

During this Covid-19 Pandemic situation, WHO has made wearing masks compulsory to protect humans against this deadly virus. So, we'll develop machine learning project which is Real-Time Face Mask Detector with python. Indoor places such as restaurants and grocery stores, are legally required to have rules in place for the mandatory use of face masks. Having a worker manually examining each person to make sure their mask is on simply defeats the goal of limiting contact with people as much as possible. So, a real-time face mask detection system can be used to address this issue that will not only maximize efficiency but will also ensure to potentially save lives. The goal of face detection is to determine if there are any faces in the image or video. If multiple faces are present, each face is enclosed by a bounding box and thus we know the location of the faces. It will work by recognizing the boundaries of the face and predicting whether or not you are wearing a face mask in real-time. Human faces are difficult to model as there are many variables that can change for example facial expression, orientation, lighting conditions and partial occlusions such as sunglasses, scarf, mask etc. The result of the detection gives the face location parameters and it could be required in various forms, for instance, a rectangle covering the central part of the face, eye centers or landmarks including eyes, nose and mouth corners, eyebrows, nostrils, etc. The technology behind the real-time face mask detection system is not new. In Machine Learning, face mask detection is the problem of computer vision. Too often we see computer vision applications of this technology in our daily lives.

Keywords: Face mask; Real-time face mask detection system; Machine Learning.



Application of Remote Sensing Data Products in Regional Evapotranspiration Mapping

Bhakti Bisoi, Soumya Ranjan Sahoo, N. Gourav Patro

Centurion University of Technology and Management, Odisha

Corresponding email: bhaktip638@gmail.com

Abstract

Irrigation water is limited and scarce in many districts of Odisha, including Gajapati district. Evapotranspiration is the loss of water to the atmosphere through evaporation and transpiration by plants. The General objective was to estimate crop water demands or crop evapotranspiration (ET_c) at different scale using satellite product. For estimating evapotranspiration (ET_c) other than remote sensing there are methods like using Lysimeter or by Penman Monteith equation, but in remote sensing there is no need of field survey, no labor requirement and more aerial coverage. The study area was carried out for different block of Gajapati district of Odisha. ET data was taken for kharif season for the year 2020. By using MODIS MOD16A2 product. The MODIS data was processed by the help of ArcGIS. The result showed that in Gajapati district the Rayagada block has peak ET_c and lowest was in Kasinagar block during these four months from July to October. ET_c map helped to explain variability of crop water use during this season. Based on the result we can conclude that ET_c map developed from remote sensing are useful tool for quantifying crop water consumption at regional and field scale. Using this ET_c maps, farmers can supply appropriate amount of irrigation water during each growth stage, leading to water conservation.

Keywords: Evapotranspiration; MODIS; ArcGIS; Irrigation.



Effect of DEM Resolution on Watershed Mapping

Subham Panda

Centurion University of Technology and Management

Corresponding email: 18010117035@cutm.ac.in

Abstract

There are two types DEM (Digital Elevation Model) resolution generally found i.e., 1-arc-second global data and 3-arc-second global data. The DEM data gives an idea of elevation difference. From the elevation difference one can compute slope, aspect, contour values which can be useful for watershed mapping. With the help of slope, contour values, after delineating the system one can see the stream-ordering, compute the drainage density and can differentiate how the resolution has an impact on morphometrical analysis of watershed. The DEMs of 30m and 90m resolution showed the percentage of slope variation and the percentage of accuracy of slope values.

Keywords: DEM; Slope; Watershed mapping; Resolution.



Estimation of Average Annual Rainfall of Odisha using Thissen Polygon Method

Arindam Chattaraj, Sonu Saw

Centurion University of Technology & Management, Odisha

Corresponding Email: 193001170001@cutm.ac.in

Abstract

Rainfall estimates have relevance in meteorology, hydrology, agriculture and climate change studies. Near real-time accurate rainfall information at fine spatial and temporal scale is important in the context of occurrence of recent flood events over the Indian region. It is important to accurately estimate rainfall for effective use of water resources and optimal planning of water structures. Also, the occurrence of extreme rainfall in a short time causes significant events that affect human life, such as flood as mentioned before. Thus, rainfall estimation is important in terms of effects on human life, water resources and water usage areas. In this study we have chosen, the Indian state, Odisha and calculated its average annual rainfall using thissen polygon method. Here we have computed the Thissen polygon method in Arc GIS. Here we have imported the rainfall data, meteorological stations and shape file of Odisha. We have used Thissen Polygon as it is one of the most accurate method over the arithmetic mean method as it's very accurate and is used for basins having areas between 500 – 5000 km^2 . Here once the polygon is created it is a simple process to compute the mean rainfall from other events also here the polygons need to be created ones for the calculation of our desired values.

Keywords: Arc GIS; Thissen Polygon; Average annual rainfall.



Spatial Identification of Bangalore City Applying Various Remote Sensing Sensors

Preeti Patnaik, Kanhaiya Kumar, Nitesh Kumar Patel

Centurion University of Technology & Management, Odisha

Corresponding Email: 180101111009@cutm.ac.in

Abstract

A prospering Remote Sensing programme has seen the development of space-based and airborne remote sensing sensor systems for various science and application studies over the last four decades. The Space Programme is focused on applications with a key goal of national development. A series of earth observation systems have been launched in both polar and geo synchronous orbits to get the valuable information from the Earth's surface. The Remote sensing satellite sensors include: 1) Electro Optical Remote Sensing sensors provide data from space-based remote sensing in a variety of spatial, spectral, and temporal resolutions to fulfil the needs of a wide range of applications for the development of the country. These sensors involve in a) Resource Monitoring -AWiFS-A&B, (56 m), LISS-3* (23 m) & LISS-4 (5.8 m) for its broad range of applications, which include agriculture, urban mapping, and forest management., b) Oceanography - intended to collect data for applications in oceanography, land (vegetation dynamics), and atmospheric science. C) High Resolution Observation - High-resolution imagery for the application of urban mapping, cartography, and surveillance applications. From a spatial resolution of 5.8 m in IRS-1C to 2.5 m in Cartosat-1 to 1 m in Cartosat-2, the capacity has steadily improved. d) Small Satellite Platforms: These missions are carried out on small satellite platforms to save money, time, and risk. The IMS-1 satellite (100 kg class) was launched in this category in 2008. 2) Microwave Remote Sensing Sensors: Active sensors (SAR, Scatterometer, Altimeter) are dedicated to terrestrial and oceanic applications, while passive sensors (Radiometers) are focused at supplying atmospheric and oceanographic remote sensing data from space-based platforms. Payloads like MSMR and Scatterometers have evolved from the humble beginnings of developing SAMIR payloads for the Bhaskara series of satellites for scientific study to payloads like MSMR and Scatterometers meant to provide operational services. At the same time, ISRO began collaborating on payload development with established space agencies, such as Megha-Tropiques, in order to pool expertise in the development of difficult technology.

Keywords: Earth Observation; Remote sensing; Satellite Sensors; Satellite Resolution; Remote sensing application.



Used Car Price Prediction Based on ANN

Sujeet Kar

Centurion University of Technology & Management, Odisha

Corresponding Email: 190301120070@cutm.ac.in

Abstract

The world is growing day by day and also expectations of every people are also growing up. Out of all the expectation one of them is to buy a car. But all are not able to buy always a new car, so they will buy used one. In the current era online market has facilitated both the buyers and the sellers to be better informed about the trends. This is why we need a platform which help people to find the best price of the car with less effort and in less time. It can be done using machine learning algorithms. We have trained various models like decision tree, Linear regression, Random Forest, and ANN, but the main purpose here is to compare the other three algorithm result with ANN. The models are trained using data collected from the Kaggle website. It contains features like Name, Location, Year, Kilometers_Driven, Fuel_Type, Transmission, Owner_Type, Milage, Engine, Power, Seates, New_Price, and Price. Where New_Price is the dependent column and others are independent columns. It is intended to use more sophisticated algorithm in the future for batter prediction.

Keywords: ANN; Car price; Linear regression; Random Forest.



GIS Applications in Water Resources Management

K. Rupesh

Centurion University of Technology & Management, Odisha

Corresponding Email: 191801120010@cutmap.ac.in

Abstract

Increasing public awareness, stricter measures and promulgation of new laws in the area of water resources have made the use of advanced technologies indispensable. Geographic Information Systems (GIS) are an effective tool for storing, managing, and displaying spatial data often encountered in water resources management. The application of GIS in water resources is constantly on the rise. In order to stress the importance of GIS in water resources management, applications related to this area are addressed and evaluated for efficient future research and development. Fundamentals of GIS are summarized and the history of the GIS evolution in water resources is discussed. Current GIS applications are presented including surface hydrologic and groundwater modelling, water supply and sewer system modelling, stormwater and nonpoint source pollution modelling for urban and agricultural areas, and other related applications. Prior to performing actual simulation, water resources modelling requires a number of time-consuming steps, including collection, compilation, storage, retrieval and manipulation of spatial data. The spatial nature of data associated with water resources is the single most significant factor contributing to the complexity of data management. With their ability to combine a variety of data into an easily understood format, GIS software can drastically change the way engineers handle water resources modelling (Denning, 1993; Jeton and Smith, 1993). Field data gathering, the critical first step in applying GIS to water resources problems (Kovas, 1991), can generally be divided into two tasks. The first is primarily obtaining ground control to establish scaling and positional relationships throughout the project area. The second is acquiring locations and attributes of certain features in the field (e.g., manholes, water valves, and retaining walls, among others), and can be supplemented by photogrammetric location techniques on projects with features that are not visible from aerial photographs, such as inlet casting, culvert size, and manholes.

Keywords: GIS; Surface hydrologic; Groundwater modelling; Aerial photographs.

Drainage Density and Stream Flow

Sudhir Kumar Tudu

Centurion University of Technology & Management, Odisha

Corresponding Email: 190301110012@cutm.ac.in

Abstract

Drainage density, surface-water discharge, and ground-water movement are shown to be parts of a single physical system. A mathematical model for this system, which was developed by C. E. Jacob, can be expressed in the equation $T = WD^{-2}/8h_0t$ in which T is transmissibility, W is recharge, D is drainage density, and h_0 is the height of the water table at the water table divide. The rate of ground-water discharge into streams, or base flow (Q_b), is dependent on and varies directly with transmissibility of the terrane. If W and h_0 are constant, $Q_b \propto D^{-2}$. Thirteen small, almost monolithologic basins, located in a climatic area in the eastern U.S. where recharge is nearly a constant, were found to have a relation of base-flow discharge to drainage density in the form of $Q_b \text{ per mi}^2 = 14Z^{-2}$. The field relations, therefore, agree with that predicted by the Jacob model. If transmissibility controls the relative amount of precipitation which enters the ground as contrasted with that which flows off the surface, surface-water or overland discharge should vary inversely with transmissibility. It was found that flood runoff as measured by the mean annual flood ($Q_{2.55}$) varies with drainage density in the form of $Q_{2.55} \text{ per mi}^2 = 1.3D^2$. The close relation of mean annual flood to drainage density in 15 basins was not affected by large differences among the basins in relief, valley-side slope, stream slope, or amount and intensity of precipitation. It is concluded that drainage density is adjusted to the most efficient removal of flood runoff and that the mean annual flood intensity is due predominantly to terrane transmissibility.

Keywords: Base flow; Drainage density; Jacob model; Mean annual flood; Precipitation; Valley-side slope; Terrane transmissibility.

Estimation of Soil Erosion Extent using RUSLE Model Integrated with GIS and RS: The case of Megech – Dirma Watershed of the Blue Nile Basin, Northwest Ethiopia

Worku Habtu^{1, *} and Jayappa K. S²

^{1,2} *Geoinformatics Programme, Department of Marine Geology, Mangalore University, Mangalagangothri, Mangalore, 574 199, India*

**Department of Geography and Environmental Studies, Debre Tabor University of Ethiopia*

Corresponding email: habtuworku3@gmail.com

Abstract

Background: Soil erosion causes topsoil loss, which decreases fertility in agricultural land. Spatial estimation of soil erosion is essential for an agriculture-dependent country like Ethiopia for developing of its natural resources control plans.

Study area and objective: The study area is Megech – Dirma watershed which is 1310 km² area coverage in Northwest Ethiopia. The watershed is subbasin of the Blue Nile Basin of Ethiopia. The objective of the study was to estimate rate of soil loss using the Revised Universal Soil Loss Equation (RUSLE) model integrated with GIS and RS.

Method: Rainfall data for R factor, soil data for K factor, Land cover data for C and P factors and topographic data of DEM was used for LS factor calculation in ArcGIS 10.4 spatial analysis tool.

Results: The soil erosion rate categorized into six classes. The 46.38 % as low (0-11 t ha⁻¹ yr⁻¹), 13.63 % moderate (11-18 ha⁻¹ yr⁻¹), 9.22% high (18-30 ha⁻¹ yr⁻¹), 12.30% very high 30-50% (30-50 ha⁻¹ yr⁻¹), 7.20% sever (50-100 ha⁻¹ yr⁻¹) and very sever erosion 11.27% (>100 ha⁻¹ yr⁻¹). Based on the erosion severity class 46.38% of the watershed is under low erosion status whereas 11.27% of the areas found under very severe erosion risk. Result suggests the area of the north-eastern part suffers from a high to very sever soil erosion risk due to steep slope and high rainfall access.

Conclusions: The result produces a spatial distribution of soil erosion over Megech – Dirma watershed, which applied for conservation and management planning processes, at the policy level, by land-use planners of lower administrative bodies and decision-makers.

Keywords: Soil erosion; RUSLE; GIS and RS; Megech – Dirma watershed; Northwest Ethiopia.



Using GIS Techniques and RUSLE Model to Examine Soil Erosion. A Case Study in Portions of Four Districts in Central Region of Ghana

Augustine Mensah Ohene

Council for Scientific and Industrial Research – Institute for Scientific and Technological Information

Corresponding email: adomaugmens14@gmail.com

Abstract

Soil erosion is one of the most critical problems facing the global environment, both in developed and developing countries. Soil erosion is a growing problem in especially agricultural areas where it negatively impacts agricultural productivity and also degrades the land. The Revised Universal Soil Loss Equation (RUSLE) is the most popular empirically based model which is used globally for checking and controlling soil erosion. Using Geographic Information System (GIS) is an essential tool for determining the soil loss of an area. In this study, the application of RUSLE and GIS techniques are used in estimating the average annual soil loss of portions of four districts in the Central region of Ghana. The estimation of the annual average annual soil loss is based on the Revised Universal Soil Loss Equation, $E = R * K * L * S * C * P$, where E represents the average annual soil loss (tones/yr), R represents the rainfall erosivity factor, K represents the soil erodibility factor, L represents the slope length factor, S represents the slope steepness factor, C represents the land cover management factor, and P represents the support practice factor. Map outputs will provide recommendations on how the land can be controlled and managed to solve the soil erosion in the area. The study outcome will therefore aid land management by helping explain areas vulnerable to soil erosion due to certain factors such as vegetation, rainfall, soil type and other human activities.

Keywords: Soil erosion; Quantum Geographic Information System (QGIS); Revised Universal Soil Loss Equation (RUSLE); Geographic Information System (GIS).



How GIS can inform Disaster Risk Reduction and Climate Change Adaptation Planning Process

Kamil Peter Korisa

National Disaster Management Office

Corresponding email: peterkorisa911@gmail.com

Abstract

The geographic information system (GIS) applications are very useful tools for analyzing the potential risk associate with hydro-logical, meteorological and geological induce hazards. Spatial planning helps the planners, policy makers and community leaders to well inform on the potential risk surrounding their environment. By depicting the vulnerability and level of exposure of the particular risk within their surrounding through risk mapping. The community members, planners and policy makers utilize the risk map to make an inform decision on how to mitigate and prevent the potential risk. Risk mapping shows the interactions of different hazards within the community and their potential probability and intensity to impact the community. The vulnerability layer of the risk map is associate with the level of exposure and its susceptibility towards the community. Vulnerability layers is usually consisted of other important spatial data, such as building footprint, farming, utilities, demography and infrastructure. Such spatial information is very essential for planning to enhance socioeconomic development for the community.

Keywords: Geographic information system (GIS); Spatial planning; Risk mapping; Socioeconomic development.



Rate of Land Use Land Cover Changes of Setema District Jimma Zone South West, Ethiopia

Tadesse Leta

Ethiopian Biodiversity Institution

Corresponding email: tadeleta61@gmail.com

Abstract

LULCC is the result of the long-time process of natural and anthropogenic activities that have been practiced on the land. The study intended to carry out the rate of land use /land cover changes, trends, and their magnitude over the last 30 years (1988-2018). The study has initiated loss of biodiversity (used for food, fuelwood, construction medicine, etc.) and wetland expansion to agricultural land. The study has used QGIS software 2.18.3. SCP plug-in extension 5.4.2 and MOULUSCE plug-in extended version.3 for image detection, classification, and Simulation. The LULCC classification result revealed that at the base period of 1988 Land sat imagery, forest land (56.22%), grassland (15.7%), Agricultural land (23.13%), Bare land (0.03%), wetland (2.18), and Settlement land (1.58%) were identified with their respective percentage. On the contrary in the recent period of 2018 land sat imagery forest land, grassland, wetland was decreased to (39.71%), (6.53%), (0.87%) (23.13%) respectively. The maps of 1998 and 2008 were used to simulate the LULC for 2018 using MOLUSCE available in QGIS software. The predicted result was compared with the classified LULC map of 2018 to validate the model. Finally, based on this, the prediction of future LULC for the years 2028 was performed. The outcomes of this study show that there would be decreasing in forestland; grassland and increasing in agricultural land and settlement area.

Keywords: LULCC; QGIS software; MOULUSCE plug-in.



Covid-19: Positive Impacts on Environment and Biodiversity

Md. Monjurul Hasan

Bangladesh Fisheries Research Institute

Corresponding email: mhshihab.hasan@gmail.com

Abstract

Coronavirus disease 2019 (COVID-19) being a global pandemic has affected almost the entire globe. Despite huge death toll and global economic recession, it has some positive impacts on global environment as well as biodiversity. Air pollution and greenhouse gas emissions have decreased to a greater extent in many countries specially China, America and Europe which has been evident from different environmental agencies and daily newspaper. The wild animals and different sea creatures are surprisingly returning to and also reclaiming their previous habitats occupied by humans, and some of them started to breed in a peaceful environment which will save them from the brink of extinctions to some extent. The COVID-19 has created the opportunities to adopt and rebuild a sustainable, greener, low-carbon and resilient world at least during the crisis period.

Keywords: Coronavirus disease 2019 (COVID-19); Air pollution; Greenhouse gas emissions.



Investigating Land Use-Cover Changes and Relationship Between Land Surface Temperature and Vegetation Indices in Dadu District, Pakistan

Shoukat Ali Shah¹, Madeeha Kiran²

¹*Institute of Water Resources Engineering and Management, Mehran University of Engineering and Technology, Jamshoro, Pakistan*

²*Institute of Natural Disaster Research, School of Environment, Northeast Normal University, Changchun 130024, China*

Corresponding email: sarkar.sain151@gmail.com, madeehajanwery@yahoo.com

Abstract

Urban growth areas have a potential impact on land use-cover due to replacing agricultural land with built-up and commercial areas. This intensifies the earth's surface temperature. The objectives of the present study are to investigate Land use-cover changes and explore the relationship between land surface temperature (LST) and vegetation indices (NDVI) in Dadu. This study depends on two images of Landsat 8 (2013-2020), downloaded from the USGS web portal. Supervised classification with Maximum Likelihood Classification (MLC) process was applied for land use-cover dynamics. To retrieve the LST and to examine the NDVI, the red, NIR, and thermal bands were used in the ArcGIS 10.3 environment. A Linear regression analysis was applied to make a correlation graph of LST-NDVI in Origin software. The results revealed that land use-cover changes seemed among the classes. There was a -0.0254% decrease in vegetation area, 1.07% increase in water body, 7.7% increase in barren land, 8.6% increase in settlements and -17.7% decrease in the mountains area. The overall classification accuracy and kappa coefficient results of both images were 88.8% & 0.8607% for 2013 and 88.8% & 0.8848% for 2020. The impacts of land use-cover dynamics on the environment have also been evaluated. Maximum and minimum LST of 2013-2020 were computed as 6°C to 46°C and 17°C to 43°C respectively. There was a linear and negative correlation was detected in 2013 ($R^2=0.337$) and 2020 ($R^2=0.2361$) between LST-NDVI. Increasing population with unplanned settlements/built-up is carrying the district towards serious ecological problems and climate changes. It is a dire need to manage the land use properly and create a policy for controlling urban development in the district, as current and future generations have a sustainable and workable residence to breathe in.

Keywords: ArcGIS; LST-NDVI; Landsat 8; Land use-cover; NIR.



Hydrological Water Simulation Modelling Using Hec-Ras and Geo-Hecras for Watershed Management

Henry Ebiakpo Egbejule¹, Dr. Rliwanu Rab iu Tasiu²

¹*Department of Geography,* ²*Faculty of Earth and Environmental Science, Bayero University, Kano*

Corresponding email: Henryhegxy32@gmail.com, tryalwa.geog@buk.edu.org

Abstract

In many developing countries water has become one of the topmost priorities for resource management, and this may affect the environment and the outcome of the production and which it impacts differs due to its geological and hydrological settings. In an attempt to adopted hydrologic engineering center river analysis system (HEC-RAS) and Geographical hydrologic engineering center river analysis system (Geo-HECRAS) simulation model along river Kogi at Magasawa village Kumbosto local government area Kano State North-Eastern Nigeria, to examine the rainfall and surface runoff and the peak discharge of the river. In the study area Hec-Ras model is used to describe the hydraulic behavior of this system, the river reach selected along the river threshold, from an image LANDSTAT the area, has been divided into 20 cross sections perpendicular to the flow directions numbered 1 to 20. ArcGis was used to extract the bathymetry for each cross section, this allows to creating the river geometry with Hec-Ras. The stream flow has successively fixed as upstream boundaries. For each stream flow, Hec-ras calculate the flow characteristics. The high and low characteristics areas have been located. The most of these stream parameter decreases for upstream to downstream. In general, the result shows that in the study area. Based on the findings of the study it is recommended that investor friendly environment should be created for those willing to invest to avoid environmental mismanagement.

Keywords: Water flow parameter; Garmin 76 GPS; ARCGIS; HEC-RAS; GEO-HECRAS software.



Agriculture Land Suitability Analysis using GIS Techniques: A case study of Chamarajanagar District, Karnataka

Bhuvanesh G

JSS Academy of Higher Education & Research

Corresponding email: bhuvaneshgbhuvi@gmail.com

Abstract

The goal of the study is to identify the suitability of land for agriculture in Chamarajanagar District. The geographical information system (GIS) techniques, multi-criteria analysis (MCA) and weightage overlay analysis (WOA) assigned to identify and suitability of this study Chamarajanagar district, Slope, relief, land use and land cover, drainage density, soil texture, geology, geomorphology, and rainfall these all parameters are considered in this study. The agriculture land suitability map was generated, it is classified into three classes such as 1. Highly suitable 2. Moderately suitable and 3. Not suitable for agriculture production. According to the prepared land suitability map for agriculture, it was measured that 17.78% of the study area be highly suitable for agriculture, 58.59% is moderately suitable and 23.62% is not suitable for agriculture. This area has 58.59 (3296.08 sq/kms) moderately suitable land for agriculture.

Keywords: Geographical information system (GIS) techniques; Multi-criteria analysis (MCA); Weightage overlay analysis (WOA).



Earthquake Vulnerability in the Himalaya by Integrated Multi-Criteria Decision Models

Sukanta Malakar, Abhishek K. Rai

Centre for Oceans, Rivers, Atmosphere and Land Sciences (CORAL), Indian Institute of Technology Kharagpur, West Bengal, India

Corresponding email: malakarsukanta031@iitkgp.ac.in

Abstract

Himalayan mountains are one of the most seismo-tectonically active zones on the surface of the earth. Recurring moderate and high magnitude earthquakes are not uncommon in this region. This paper maps the earthquake vulnerability in the region using integrated multi-criteria decision models. Factors which may influence vulnerability in a region can be categorized in social, geotechnical, structural, and physical parameters. We have used the analytical hierarchy process (AHP) approach to determine the weights of various parameters, which were further used to develop earthquake vulnerability maps for the study area using the ViseKriterijumska Optimizacija I Kompromisno Resenje (VIKOR), and Grey Relational Analysis (GRA) methods. There is good correlation between the vulnerability estimated through AHP-VIKOR and AHP-GRA methods. Our analysis indicates that more than 12% area may be under high to very-high vulnerability, whereas more than 44% population and about 43% buildings are highly vulnerable to hazards due to earthquakes. The results would be useful for various hazard mitigation and infrastructure planning agencies working in the region.

Keywords: Himalaya; Earthquake vulnerability; multi-criteria decision making; AHPGRA; AHP-VIKOR.



Environmental Impact Assessment of Granite Quarry in Wayanad District, Kerala

Vimod K. K.¹, Praveen P. Raj² and Dr T V Sajeev T. V.³

Kerala Forest Research Institute

Corresponding email: vimodkk@gmail.com

Abstract

Mining is one of the widespread activities occurring in many parts of the world. This study investigates the Environmental Impact of Quarry Operations in Wayanad District, Kerala. Kerala facing a lot of environmental issues during the period of 2018 and 2019. This is one of the reasons why we go through this work. The Wayanad district is known as the land of paradise in Kerala because the presence of forest, mountains, and waterfalls make this land in immense beauty. Now, this land is changing from its beauty about a decade ago. During our fieldwork, we noted that major of the mountains and hills are eroded by the process of rock mining. And also, we observed that the existing mountains are waning due to landslides. Due to extreme heat and dust particles in the air makes uncontrolled air pollution rate and changing climate all over the world. The first step of this study is to observe the number of quarry mining areas and their age. The study was conducted using Geo-Informatics open-source software tools. The two major reports related to environmental studies are Gadgil and Kasturirangan reports. In that report, they mentioned the quarry mining figures in the zones. The major river sources of Wayanad are facing dire of water. Because all the drainage source is covered with rock dust, and the vegetation is degraded day by day. And these hilly areas become under the control of the quarry mining process. Previous studies suggested that rock quarrying is one of the leading causes of landslides. However, this study showed how many landslides are occurred in 2018 and 2019 along with quarry mining. Later, the study also talked about the quarry mining in the KSDMA landslide zones. Wayanad district has more than 20 tourist destinations, including forest and non-forest tourist attractions. And also, we come across the rock mining area adjacent to forests and the distance of rock mining.

Keywords: Mining; Environmental Impact; Geo-Informatics; KSDMA landslide zones.



Incorporating A Geographical Information System on Abia Road Infrastructure

Moses Chinedum. C

Ministry of works, Abia state. Nigeria

Corresponding email: chinedummosesfirms@gmail.com

Abstract

This article highlights the use of a geo-referenced computer base blueprint data and the implementation of geographical information system (GIS) as a decision support system in road maintenance and development in the state. It also presents a methodology and system development of a Customized Geographical Information System (GIS) database decision support system for our road infrastructure.

Keywords: Geographical information system (GIS) techniques; Geo-referenced computer; Road infrastructure.



Neotectonics Study of Upper Teesta River Basin, Sikkim Himalaya Using Geospatial Techniques

Irjesh Sonker, Jayant N. Tripathi, Swarnim

Department of Earth and Planetary Sciences, University of Allahabad, Prayagraj-211002

Corresponding email: irjeshsonker12@gmail.com

Abstract

The increasing frequency of earthquakes and the resulting damages across the Indian subcontinent in recent years has necessitated a study of tectonic significance, with a focus on morphotectonics research. Subsurface faults and active tectonic processes disrupt the natural drainage basin system. The drainage pattern of the basin and basic morphological properties lead to significant geomorphometric of drainage basins, which are tectonic activity indicators. The study is focused on the Upper Teesta basin of Sikkim state of the Himalayan Mountain. Alos Palsar DEM data used to identify the geomorphic Indices (tectonic parameters) at the level of basin. In this research area, using Remote Sensing and GIS are analysing geomorphic changes and study the tectonic behaviour and the results are correlated with recent earthquake data.

Keywords: Morphotectonics; Neotectonics; Geospatial technique; Sikkim Himalaya.



Flood Impact Analysis of Kuzhur Panchayat, Thrissur District Kerala

Praveen P. Raj

Kerala Forest Research Institute Peechi Thrissur Kerala

Corresponding email: praveenprajinfo@gmail.com

Abstract

Floods are the most common and one of the destructive natural hazards causing extensive damage to infrastructure, public and private services, the environment, the economy and devastation to human settlements. River floods are the most frequent and often devastating. It is mainly due to excessive rain, ruptured dam or levee, tides or cyclonic surges, rapid melting of snow, temporary backwater effects in sewers and local drainage channels, creation of unsanitary conditions, deposition of materials in stream channels during flood recession, rise of ground water coincident with increased stream flow and other geo-environmental influences. India is a developing country and floods have been regular phenomena in the country from the time immemorial. Kerala is a southwestern state of India with a total area of 38,863 km². The state is divided into 14 districts within 941 panchayats. Usually, Kerala receives rainfall of about 3000mm annually. In 2018, the intensity of the south west monsoon was very high which resulted in severe flooding. This flood was recorded as the highest flood that the Kerala state has ever experienced. Earlier the “Great flood of 99” was reported as the highest flood in Kerala in the year 1924 where the rain continued for about 3 weeks and many districts of the present Kerala were submerged in the water. The 2018 flood inundated 13 out of 14 districts in the state. The study was conducted in the Kuzhur panchayat which is one of the best panchayats in Thrissur district. Kuzhurpanchayat is a panchayat that was completely submerged in the 2018 floods. It is located in Mala block of Mukunthapuram taluk and the panchayat is bordered by Mala, Annamada Panchayats in the north, Poyya and Puthanvelikara panchayats in the west, Chalakudy river in the south, Annamada and Parakadavu panchayats in the east. Kuzhur is 37.6 km far from its District Main City, Thrissur. This panchayat has a geographical area of 19.11 sq.km. The panchayat has 14 wards namely Thanissery, Kakkulissery, Thumbarassery, Kuzhur, Thekkumcherry, Eravathur, Kochukadavu, Kundoor, Vayalar, Alamattom, Thirutha, Thirumukkulam, Parappuram and Iranikulam. It has a total population of 19956 in which 9737 are males and 10219 females. The panchayat has 5603 households. (Kerala state land use board, 2007).

Keywords: Flood; Backwater Kerala; Great flood of 99.



Dynamics of Land Use and Land Cover Change (LULC) Using Geospatial Techniques in Mahanadi River Basin, Odisha

Biswajit Pradhan

National Institute of Technology Rourkela

Corresponding email: biswajitpradhan030@gmail.com

Abstract

Change in land use land cover patterns has a significant contribution to hydrological cycle. Understanding the pattern of LULC is a great aspect of watershed management, so this study discusses the dynamics of LULC changes on Mahanadi River basin from 2002 to 2020. In the present study, assessment of LULC and their change detection were carried out using digital image processing techniques. In order to study LULC changes in Mahanadi River basin, multispectral satellite images were used for three Epochs; 2002, 2010 and 2020. For the year 2002, 2010 and 2020 satellite images were obtained for the month of January from United States Geological Survey (USGS). Spatial data such as MODIS LP DAAC satellite data and maps are downloaded from USGS website. Present research elaborates on 17 land use classes as per the Land use land cover data from MODIS LP DAAC Data Pool of USGS Earth explorer. A significant change in the pattern of LULC is noticed for the Mahanadi River basin. The main cause behind this change was economic development, significant change in climate and rapid population growth. Urbanization and deforestation resulted in a wide range of environmental impacts, including degraded habitat quality. The developed LU/LC maps are providing insights to possible changes and helps managing in agriculture, forest, urban, and water resource planners and managers in improved policy-making processes.

Keywords: GIS; Mahanadi River basin; Land use land cover.

Ranking of CMIP6 Based Global Climate Models for the Prediction of Climate Variables in Godavari River Basin

M Uma Maheswar Rao, K. C. Patra

National Institute of Technology, Rourkela

Corresponding email: Mahesh93.happy@gmail.com

Abstract

Climate change is emerging as a very crucial problem to our environment as they would lead to negative effects on natural as well as human systems. To examine the climate change impact on a river basin, prediction of future climate is essential. General Circulation Models (GCMs), also known as the Global Climate Models are the most credible tool for modelling the climate change. In the present study, selection of suitable GCM to assess the performance of maximum temperature (Tmax), precipitation (Pr) simulation for Godavari River basin covering 28 points (with a grid resolution of 1° X 1°) is assessed. The observed and model historical temperature datasets cover the period from 2000-2019. Twelve Coupled Model Intercomparison Project – Phase 6 (CMIP6) GCMs are used for the climate variable (Tmax) and (ACCESS- CM2, CESM2, CIESM, FGOALS- g3, HadGEM3, GFDL-ESM4, INM- CM5-0, MIROC- ES2L, NESM3, UKESM1, MPI- ESM1, NorESM2) are used for the climate variable (Pr) using five indicators of performance. Indicators used are Average Absolute Relative Deviation (AARD), Skill Score (SS), Absolute Normalized Mean Bias Deviation (ANMBD), Correlation Coefficient (CC), Normalized Root Mean Square Deviation (NRMSD). Statistical downscaling technique is applied to eliminate the systematic biases in GCM simulations. Weights are determined using Entropy technique for each performance metric. Cooperative Game Theory (CGT), Compromise programming (CP), Weighted Average Technique, Technique for Order Preference by Similarity to an Ideal Solution (TOPSIS) and Preference Ranking Organization Method of Enrichment Evaluation (PROMETHEE-2) methods are utilized to rank the GCMs for the study area. The results obtained for maximum temperature suggest that MIROC-ES2L, HadGEM3, GFDL-ESM4, IPSL-CM6A and FGOALS-g3 are the top five models that are suitable for prediction of maximum temperature for the Godavari River basin. The results obtained for precipitation suggest that MIROC-ES2L, HadGEM3, GFDL-ESM4, UKESM1, FGOALS-g3 are the top five models that are preferred for prediction of precipitation in the Godavari River basin.

Keywords: GCM; CMIP6; Entropy method; PROMETHEE-2; TOPSIS; CP; CGT.



Assessing Spatiotemporal Dynamics of Urban Green Spaces (UGS) in Chennai in Response to Rapid Urbanization and Pre-Existing Geological and Hydrological Conditions

Christina Rexlin. C. J.

SRM Institute of Science and Technology

Corresponding email: Chris.rex73@gmail.com

Abstract

Urban green spaces are the primary source of contact with nature for the people in cities, access to ecosystem services provided by urban green spaces is perceived to be an important factor where sustainable urban design and planning components should be increasingly considered in urban policies, these rely on indicators and data's that can capture variations in the distribution of urban green spaces within the neighbourhoods of the city. In this context, this research will deal with the analysis and assessment of the changing scale and spatial layout of the urban green spaces in the City of Chennai, India, for a period of four decades and the study of the paradigmatic indicators like NDVI, NDBI, LST and pre-existing geological and hydrological conditions such as soil type, slope, basin flow and water flow through multiple correlation matrix and general differentiation analysis of which three zones will be selected based on high, intermediate and low base of vegetation distribution taking population into account for which ward wise vegetation data will be calculated. The results would help Chennai's planners in formulating local cost-effective greening strategies. Further, this study will have wider implications in planning greens, in the under studied, fast-urbanizing neighbourhoods of Chennai.

Keywords: Urban Green spaces; Urbanization; Spatiotemporal dynamics; Landscape planning; Urban policy.



Spatial Temporal Analysis of Islands- Gulf of Mannar

Surya P.

Bharathidasan University

Corresponding email: suryaponnusamy05@gmail.com

Abstract

Islands are in the Dynamic relationship with the sea, where the material constantly being deposited on or carried away from the shoreline. The Coral Islands are unique and most diverse marine ecosystems on the earth. As many as 10 percent of the coral reef across the globe have degraded, another 30 percent may disappear within next 20 years. If sea level rise predicted to accompany global warming does occur, this will become a widespread problem for all islands. A basic methodology of island study is to calculate the area of an island throughout the years from 1995 to 2020, over the period the coral reef has been decreased. The results unequivocally show that the physical island response to increased sea-level rise over the past century, and particularly over the past 20 years, has not been one of the reasons that is widespread erosion. Rather, the evidence demonstrates that the majority of islands increased in area during this time despite accelerated sea-level rise, and island change is sensitive to other local and shorter temporal-scale processes such as changes in sediment supply, storm events, and human modification that may mask the influence of sea-level rise. Low lying coral reef islands are coherent accumulations of sand deposited on coral reef surface and they are very sensitive to change in physical boundary conditions due to sea level changes and climate changing impact.

Keywords: Coral Islands; Global warming; Sea-level rise.



Assessing the Spatial Variability of Soil Nutrients Distribution Through GIS-Based Interpolation Techniques

Chiranjit Singha and Kishore C. Swain

*Department of Agricultural Engineering, Institute of Agriculture, Visva-Bharati,
Sriniketan, West Bengal-731236*

Corresponding email: singha.chiranjit@gmail.com

Abstract

Recently, GIS-based spatial interpolation approaches have been utilized in various disciplines including soil sciences for analyzing, predicting, and digital mapping distribution and surface modeling of environmental factors such as soil properties. Seventy soil samples were collected at depths of 0–40 cm from randomly selected farm plots surrounded in an area of 300ha from the *Tarakeswar* block in Hooghly region, West Bengal, India during the post-harvest period 2018-2019. This study aimed at comparing the performance of four widely used interpolation methods in estimating spatial variability soil nutrients distribution using a GPS-aided Geographical Information System. The performance of three deterministic interpolation techniques, such as inverse distance weighting (IDW), radial basis function (RBF), Local Polynomial Interpolation (LPI) and stochastic, ordinary kriging (OK), Empirical Bayesian kriging (EBK) interpolation techniques were employed to estimate and compared to predict spatial variability of soil nutrients distribution including soil pH, electrical conductivity, organic carbon, available nitrogen, available phosphorous, available potassium, zinc, sand silt, and clay. The accuracy of different interpolation techniques examines by the coefficient of determination (R^2) and root mean square error (RMSE) through the cross-validation method. The outcomes demonstrate that LPI and EBK is the most preferred method with the highest R^2 and smallest RMSE value for interpolation of spatial variability of soil nutrients parameters distribution. However, the GIS-based interpolation technique techniques offer an alternative approach for predicting the spatial variability of different soil nutrients parameters in sustainable agriculture land suitability evaluation in the study area.

Keywords: GIS; Spatial interpolation; Soil nutrients; LPI; Sustainable agriculture.



Evaluating the Impact of Land-Use and Land-Cover Change on the Land Surface Flow in Budhabalanga River

Asit Kumar Dandapat

Research Scholar, NIT Rourkela

Corresponding email: asit80t@gmail.com

Abstract

The main focus of study is to compute the surface runoff and to assess the impact of land use/land cover changes (LULC) with the help of hydrological model (SWAT) in Budhabalanga River Basin (BRB) over a period of 1999–2014. For runoff simulation, two different loss models were employed like SCS-CN (Soil Conservation Services – Curve Number) model and Green-Ampt model (GA). Drainage map, elevation map, land use/land cover map, slope map, and soil map of the watershed are prepared using remote sensing and GIS approaches as input data to the model. During this period, runoff is found to increase by 6.06% due to decrease in infiltration rate. The comparison between the observed and estimated data shows the Nash– Sutcliffe efficiency (NSE) values are 0.91 and 0.90, and coefficient of determination (R^2) values are 0.89 and 0.88 for SCS-CN and GA methods, respectively. Thus, SCS model is found to do well than GA model in this River Basin. This type of study would be beneficial for the watershed development at that particular watershed.

Keywords: Runoff simulation; LULC; SWAT; SCS-CN; Green-Ampt model; Infiltration rate.



Expansion of Coal Mines in Western Part of the Paschim Bardhaman District from 1998 To 2021

Uday Das

Government Teacher at West Bengal

Corresponding email: uday.geography@gmail.com

Abstract

Along with the global demand for coal, the demand for coal is also increasing across India. Coal is mostly used in power generation. Expansion of coal mines is essential for the continuation of coal supply in the future. In my study, I have discussed how ECL (Eastern Coalfield Limited)/BCCL (Bharat Coking Coal Limited.) has expanded its coal mines in the western part of the Paschim Bardhaman district. I have also collected information on the expansion of coal mines by direct observation of the area and online sources such as; BCCL, ECL, CMPDIL. I have used geo-spatial techniques of Landsat 4-5 TM C1, Landsat 7 ETM+, Landsat OLI of the Landsat series Satellite data sensor for the image of coal mines expansion. I Used Google earth for the photo of coal mines. Using these techniques, mines area has increased from 58,46,156 sq.mtr. in 1998 to 1,52,29,270 sq. mtr. by 2021. The role of coal mines expansion is very important for the socio-economic development of the people in this region.

Keywords: CIL; BCCL; ECL; CMPDIL; Expansion; Landsat; Geo-spatial techniques.



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.

About Esri

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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).

