Alva's Institute of Engineering and Technology

Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

Internal Quality Assurance Cell (IQAC),

Geoinformatics Research Lab,

In Association with

Energy and Wetlands Research Group

Centre for Ecological Sciences,
Indian Institute of Science, Bengaluru

Organises

Four Week Internship on

Geographical Information Systems GIS

Internship Report

26th October 2023 to 25th November 2023

Venue: Geoinformatics Research Lab
AIET, Mijar, Moodbidri

TABLE OF CONTENTS

Geoinformatics Research Lab,
Internal Quality Assurance Cell (IQAC)
Alva's Institute of Engineering and Technology (AIET),
Mijar, Moodbidri, Dakshina Kannada
In association with
Energy and Wetlands Research Group, Centre for Ecological Sciences, Indian Institute of Science, Bengaluru

Jointly Organizes Internship Programme on GIS

The aim of the internship is to give an idea about GIS and its applications to the students across different domains of science and engineering enable the students to use GIS for solving real world problems by integrating state of the art technologies and interactions with research scientists from IISc, IIT Kgp, NIAS, ICHEC.

About Geoinformatics Research Lab

Geoinformatics Research Lab aims to leverage geospatial technology and data to solve complex spatial problems, contribute to scientific research, inform policy decisions, and enhance the knowledge of interconnectedness of natural and human systems on a geographic scale.

With an immediate vision of Monitoring the Fragile Western Ghats Ecosystems using geospatial technologies involving multidisciplinary approaches to promote sustainability, conservation and management.

This involves mapping visualizing and simulating the land use and land cover changes, its associated processes in the Western Ghats and Coastline using geospatial tools and disseminating the information to public, researchers, decision makers though web portals (WebGIS) and mobile applications (Mobile GIS), etc.

GIS lab is responsible for training budding researchers, teachers across domain for integrating the geospatial data.

Alva's Institute of Engineering and Technology

Alva's Institute of Engineering and Technology in Moodbidri stands as a testament to the pursuit of academic excellence and holistic development.

Established with the aim of fostering academic excellence and holistic development in 2008, the institute is affiliated to Visvesvaraya Technological University, Belagavi. Through its comprehensive programs, dedicated faculty, infrastructure and commitments towards innovation, the institute plays a

significant role in shaping the future decisionmakers, technologists and engineers of India.

Located in Moodbidri, the Institute has continually focused on providing quality engineering and technical education to its students and to support them both in academic and extracurricular activities.

AIET is associates with numerous Government, Non-Government and Private Organisations with a focus on research and consultancy projects. AIET currently has MoU's with reputed national level organizations viz., ISRO, NRSC, NIAS, NAL, RRSC, IIT, NIT, IISc and many more.

Day 1

Inauguration:

Mr. Vivek Alva, Managing Trustee inaugurated the internship by lighting the lamps and expressed his thoughts on the need of Geospatial.

Morning Session: The Power of Geographic Information Systems (GIS)- Insights

Introduction:

Dr. Vinay, discussed the transformative technology of GIS, which combines hardware, software, data, and user expertise to understand spatial information.

Highlights of the lecture:

- Understanding Data and Information:
  Data becomes significant through processing and contextualization, evolving into information. GIS refines data into actionable insights.
- Interweaving Information and Knowledge:
  Information serves as the foundation for knowledge. GIS facilitates the extraction of profound insights and informed decision-making through the synthesis of information.
- Applications and Significance of GIS:

GIS has diverse applications across various sectors, such as environmental management, urban planning, disaster management, business and marketing strategies, and healthcare systems.

- Critical Aspects of GIS:
  The report emphasizes the pivotal roles of data management, manipulation, capturing, and presentation in GIS operations.

Afternoon Session: Exploring Google Earth: A Practical Session at AIET Campus

Introduction:

The hands-on session on Google Earth at AIET Campus aimed to familiarize participants with the functionalities of this powerful mapping tool, including marking lines and polygons within the campus and measuring distances from the campus to individual locations.

Highlights of the lecture:

- Understanding Google Earth:
  Google Earth allows users to explore detailed satellite imagery, maps, terrain, 3D buildings, and more. Its intuitive interface enables users to navigate the world virtually, making it an ideal platform for diverse applications, from exploration to education.
- Hands-On Session:
  During the session, participants were guided through the step-by-step process of using Google Earth to explore AIET Campus, mark lines and polygons, and measure distances.
- Application at AIET Campus:
  Participants marked significant areas within the campus using lines and polygons, showcasing the potential use cases for boundary marking, mapping pathways and infrastructure, and environmental mapping.
- Measuring Distances:

Individuals employed the distance measurement tool to gauge the distance from AIET Campus to their homes, demonstrating the tool's practicality for personal or professional purposes.

Day 2

Morning Session: Exploring Data Realms: Understanding Types, Distributions, Spatial Representations, and Classifications

Introduction:

Dr. Vinay orchestrated an engaging and enlightening session, guiding participants through the intricate realms of data. This comprehensive exploration spanned the fundamental pillars of data analysis: types, distributions, spatial representations, and classifications. Attendees embarked on a journey uncovering the diverse dimensions of data, from its foundational types to the nuanced classifications essential in understanding and interpreting information. Dr. Vinay's adept explanations provided a robust foundation for comprehending the multifaceted nature of data and its significance in various analytical methodologies.

Highlights of the lecture:

- Overview of data types such as integers, floats, strings, arrays, dictionaries, and objects and their role in structuring information and enabling nuanced data manipulation within programming languages.
- Insights into the significance of probability distributions, specifically alpha and beta distributions, and their applications in modeling complex phenomena and variables like probabilities and proportions.
- Showcased the indispensability of vectors in fields like physics and computer graphics and the extensive utilization of grids, exemplifying tessellation, in diverse domains such as mapping, image processing, and mathematical applications.

- Explored the advantages and disadvantages inherent in vectors and rasters in representing directional data and handling intricate geometric representations.
- Classification of data into nominal, ordinal, interval, and ratio values, providing attendees with a robust understanding of the diverse classifications of data.

Afternoon Session: Navigating Geospatial Insights: Unveiling Mapping Techniques and Cartographic Fundamentals

Introduction: Dr. Vinay orchestrated an insightful and hands-on session delving into the art and science of mapping, employing Google Earth as a powerful tool to explore diverse features in Moodbidri. The session embarked on an illuminating journey, introducing attendees to the essence of maps and their pivotal role in comprehending geographical landscapes. Furthermore, Dr. Vinay intricately unfolded the various types of maps, from cadastral representations to scale-based depictions, unveiling their distinct purposes and functionalities. Participants were immersed in a comprehensive exploration, dissecting the fundamental components integral to constructing informative and visually rich cartographic representations. This session laid the groundwork for a profound understanding of mapping methodologies and the intricate components shaping geographic visualizations.

Highlights of the lecture:

- Google Earth session showed insights into cadastral and scale-based mapping techniques.
- Components integral to map construction were discussed (legends, compass roses, scales, and titles).
- The importance of cadastral maps in delineating property boundaries was highlighted.
- The use of scale-based maps to portray accurate spatial relationships and distances was explained.

- Practical demonstration using Google Earth facilitated a profound understanding of maps.
- Attendees learned about diverse types of cartographic representations.

DAY 3

Morning Session: Accessing and Utilizing Geospatial Data Platforms

- Platform Registration
    1. USGS Earth Explorer

       Overview of registration process: Creating an account for accessing satellite imagery and geospatial data.

       Understanding search parameters and filters for efficient data discovery.
    2. Copernicus Data Space

       Insight into registration procedures: Accessing a vast repository of Copernicus Sentinel data.

       Tools available for data visualization and analysis within the Copernicus Data Space platform.
    3. Alaska Satellite Facility

       Registration process and access to specialized SAR data: Exploration of SAR imagery and data products available.
    4. Bhuvan NRSC

       Creating an account and navigating the Bhuvan NRSC interface for Indian Earth observation data.

       Utilizing tools for data analysis and thematic mapping on the platform.
- Learning and Data Retrieval
    1. USGS Earth Explorer Basics

Understanding how to search for and refine satellite imagery based on specific criteria. Downloading data from the USGS Earth Explorer platform.

2. Copernicus Data Space Basics

   Learning about Copernicus Sentinel satellites and the diverse datasets they provide.

   Successful retrieval of Copernicus Sentinel data for a designated region of interest.

- Practical Application

  Demonstrating the application of learned skills in GIS and remote sensing by downloading data from platforms like USGS Earth Explorer and Copernicus Data Space.

  The importance of accessing multiple data sources to gain comprehensive insights into Earth's dynamics.

DAY 4

Morning Session: Essentials of Remote Sensing: Principles, Platforms, and Analysis Techniques

Introduction

Remote sensing is a powerful tool that helps explore the Earth's surface without physical interaction. It involves various platforms such as satellites and drones for data collection and analysis techniques like enhancement, classification, and change detection for environmental understanding and resource management.

Highlights of the lecture:

- Remote sensing involves acquiring information about the Earth's surface without direct physical contact.
- Energy interactions in the atmosphere affect the quality of remote sensing data.

- Specular reflection occurs when light reflects off a smooth surface, while diffused reflection occurs when light scatters in different directions due to rough surfaces.
- Remote sensing platforms include satellites, aircraft, drones, and ground-based systems.
- Remote sensing can be active or passive.
- The spectral reflectance curve illustrates how a surface reflects electromagnetic radiation across different wavelengths.
- Remote sensing data is characterized by spatial, spectral, temporal, and radiometric resolutions.
- Analyzing remote sensing images involves techniques such as image enhancement, classification, and change detection.

Afternoon Session: Exploring Image Processing: Python Tools, Techniques, and PyCharm Integration

Introduction

Image processing with Python is a dynamic field with versatile tools such as OpenCV and Pillow libraries. It has substantial practical implications across various domains, from medical imaging to computer vision. Key techniques include image compression, restoration, and denoising. PyCharm is a useful integrated development environment for Python-based image processing projects. Together, they form a comprehensive introduction to crafting visually compelling stories.

Highlights of the lecture:

- Image processing manipulates and analyzes images for improved visibility, interpretation, or extraction of relevant information.
- An image is a visual representation or a two-dimensional signal that can be affected by resolution and aspect ratio.

- Resolution refers to the number of pixels in an image, while aspect ratio is the proportional relationship between the width and height of an image.
- Python offers robust libraries and tools for image processing, such as OpenCV, Pillow, and scikit-image.
- Image processing plays a crucial role in various fields, including medical imaging, computer vision, and satellite image analysis.
- Image compression, restoration, and denoising are essential techniques in image processing.
- PyCharm is an integrated development environment (IDE) for Python that provides a user-friendly interface and features for efficient Python development.
- To install PyCharm, download the software from the official website and follow the installation instructions. PyCharm facilitates a streamlined development environment for Python-based image processing projects.

DAY 5

Morning Session: AI Unveiled: Transformative Trends, Applications, and Challenges in 2023

Introduction:

AI is a field creating computer systems that emulate human intelligence for tasks like learning, reasoning, and decision-making. AI applications range from automation to natural language processing. Machine Learning (ML) involves algorithms enabling computers to learn from data. In 2023, AI trends include Explainable AI and Edge AI, with applications expanding into healthcare, finance, etc. Challenges in machine learning, like data bias, prompt discussions on responsible AI. Artificial Intelligence (AI) is the development of computer systems that can perform tasks requiring human intelligence.

Highlights of the lecture:

- AI Levels: Narrow AI (Weak AI) and General AI (Strong AI).
- Uses of AI: Automation, data analysis, natural language processing, computer vision, and robotics.
- Top 10 AI Trends in 2023: Explainable AI (XAI), Edge AI, AI Ethics, Quantum Computing and AI, AI in Healthcare, AI-driven Cybersecurity, AI in Finance, AI and IoT Integration, AI in Education, and AI-powered Creativity.
- Aspects with GIS: AI enhances Geographic Information Systems (GIS) by improving spatial data analysis, image recognition for mapping, and optimizing route planning.
- Machine Learning (ML) is a subset of AI that involves developing algorithms allowing computers to learn from data.
- Machine Learning Algorithms: Supervised Learning, Unsupervised Learning, and Reinforcement Learning.
- Challenges and Limitations of ML: Data quality, bias, interpretability, and ethical concerns.
- Deep Learning Process: Deep learning involves training neural networks on large datasets, allowing them to automatically learn hierarchical representations of data.
- Types of Deep Learning Models: Feedforward Neural Networks, Recurrent Neural Networks (RNNs), and Convolutional Neural Networks (CNNs).

Afternoon Session: Essentials of Machine Learning: From Regression to Neural Networks

Introduction

Delving into artificial intelligence and machine learning opens a realm of predictive power and pattern recognition. From Regression to Artificial Neural Networks, these concepts shape the backbone of advanced data analysis. In this

landscape, the nuances of overfitting and underfitting, classification through K-Nearest Neighbors, and the insight gleaned from unsupervised learning algorithms collectively illustrate the transformative potential of these technologies in our data-driven era.

Highlights of the lecture:

- Regression: Predicting numerical outcomes in machine learning.
- Decision Tree: Tree-like model making decisions based on a series of questions, with nodes representing decisions, branches indicating outcomes, and leaves presenting final predictions.
- Random Forest: Ensemble learning method using multiple decision trees, providing robust predictions.
- Overfitting and Underfitting: Overfitting captures noise, while underfitting creates overly simple models; finding a balance is crucial.
- Classification of KNN: K-Nearest Neighbors classifies data points based on the majority class of their k-nearest neighbors.
- Artificial Neural Networks (ANNs): Computational models inspired by the human brain, consisting of interconnected nodes for tasks like pattern recognition.
- Unsupervised Learning and Algorithms: Trains models on unlabeled data using techniques like K-Means for clustering and PCA for dimensionality reduction.
- Single Value Decomposition (SVD): Matrix factorization method capturing latent features in data for unsupervised learning and dimensionality reduction.
- Back Propagation: Training algorithm in artificial neural networks adjusting weights to minimize the difference between predicted and actual outputs.

DAY 6

Morning Session: Empowering Geospatial Insights: Open Source Software and Deep Learning in GIS

Introduction: In the dynamic realm of Geographic Information Systems (GIS), the fusion of Open Source Software (OSS) philosophy and cutting-edge deep learning techniques is revolutionizing the landscape. Mr. Neerav's insightful discussion on OSS illuminated the ethos of collaboration and transparency inherent in this paradigm, while Mr. Satyam's elucidation on the U-Net architecture unveiled the prowess of deep learning in GIS applications.

Highlights of the lecture:

- Open Source Software (OSS) is freely available software that allows users to modify, distribute, and enhance it.
- FOSS is a classification of software that grants users the freedoms of using, studying, modifying, and distributing the code.
- FOSS tools such as QGIS, GRASS GIS, GeoServer, and Mapbox, along with organizations like OSGeo, promote the development and use of open-source geospatial software.
- Protocols like WMS, WFS, and WCS enable data sharing and interoperability in GIS.
- U-Net is a widely used convolutional neural network in image segmentation tasks used for object detection and classification in satellite or aerial imagery.
- U-Net architecture enables accurate spatial classification within geographical data, making it easier to make informed decisions and analyze GIS.

Afternoon Session: Unveiling GRASS GIS: Navigating Spatial Frontiers

Introduction: In the realm of Geographic Information Systems (GIS), the afternoon session led by Dr. Vinay S served as a gateway to unlock the potential of GRASS GIS. Participants embarked on an immersive journey, navigating the intricate landscapes of spatial datasets and workflows within this powerful tool. This foundational experience laid the groundwork for participants to harness GRASS GIS's capabilities in geographic analysis and spatial data management.

Highlights of the lecture:

- Participants successfully installed GRASS GIS and imported geographical data into the software.
- They gained a fundamental understanding of navigating the GRASS interface, handling spatial datasets, and initiating GIS workflows.
- This hands-on experience empowered them to begin their journey in utilizing this powerful tool for geographic analysis and geospatial modeling.
- The session proved to be a valuable introduction to the installation of GRASS GIS and the initial steps of data importation.

DAY 7

Morning Session: Bridging Nature and Data: A Comprehensive GIS Field Visit

Introduction: Guided by the expertise of Dr. Vinay S., a transformative GIS field visit unfolded, aimed at capturing the intricate tapestry of the ecosystem's elements. This comprehensive endeavor employed cutting-edge technology and collaborative efforts to meticulously document medicinal plants, butterflies, birds, and land use patterns.

Highlights of the lecture:

- The GIS field visit involved four teams, each with 10 members, collecting spatial data on medicinal plants, butterflies, birds, and land use using the Epicollect5 app and GitHub.
- Each team collected GPS coordinates, took photographs, and provided detailed descriptions of the observed flora, fauna, and land use characteristics.
- All team members were trained to use the app for data collection, which ensured a standardized data format and GPS accuracy.
- The data collected can be used for ecological research, conservation planning, and future GIS analysis to aid in developing strategies for ecosystem management.

Afternoon Session: Navigating Earth's Tapestry: Remote Sensing and Geospatial Technologies Unveiled

Introduction: Amidst the afternoon session's intellectual canvas, Dr. Prakash, illuminated the multifaceted domain of remote sensing and geospatial technologies. His compelling presentation transcended disciplinary boundaries, unraveling the intricate web of sensors, images, and applications that define this dynamic field.

Highlights of the lecture:

- Presentation on remote sensing and geospatial technologies during afternoon session
- Explanation of remote sensing process and role of sensors in capturing images
- Showcased remote sensing images obtained through ISRO
- Detailed range of remote sensing applications like environmental monitoring and natural resource exploration
- Discussion of related technologies like photogrammetry, drones, GPS, and GIS.

- Emphasized interplay of geospatial technologies in terrain modeling, high-resolution mapping, accurate positioning, and data integration and analysis.
- Audience gained better understanding of importance of these technologies in various fields and contribution to better understanding of our planet.

DAY 8

Morning Session: Unveiling Geospatial Insights: Satellite Data Analysis with GRASS GIS

Introduction: Under the adept guidance of Dr. Vinay S., a transformative hands-on session unfolded, immersing participants in the world of GRASS GIS (Geographic Resources Analysis Support System). This interactive session was a voyage into the intricacies of importing, processing, and analyzing satellite data, arming participants with practical skills to extract meaningful insights from spatial information.

Highlights of the lecture:

- Learned to import, process, and analyze satellite data using GRASS GIS (Geographic Resources Analysis Support System)
- Converted vector boundaries to raster format for further analysis
- Imported datasets from local directories into GRASS and visualized satellite images within the platform
- Developed signatures and extracted significant features from the satellite imagery
- Learned supervised classification techniques to classify different land cover types within the satellite imagery
- Gained practical exposure to various functionalities of GRASS GIS and the ability to conduct geospatial analyses and land cover classifications within the platform.

DAY 9

Morning Session: Exploring the Frontier: Advanced Algorithms and QGIS Applications in Forest Remote Sensing

Introduction

The morning session of the workshop aimed to provide a well-rounded understanding of both theoretical concepts and practical applications, ensuring participants gained valuable insights into the dynamic field of forest remote sensing.

Highlights of the lecture:

- Significance of remote sensing in monitoring and managing forests.
- Introduction to Quantum Geographic Information System (QGIS) and its role in geospatial data handling.
- Practical insights into using QGIS for remote sensing applications.
- Overview and practical applications of Minimum Distance to Mean (MDM) algorithm in forest remote sensing.
- In-depth explanation of Parallel Piped Algorithm and its relevance in image classification, overview and practical insights into MLC Algorithm (Maximum Likelihood Classification).
- Step-by-step guidance on importing and manipulating data into QGIS.
- Hands-on experience for participants in dealing with spatial data.
- Introduction to fuzzy logic in the context of machine learning, practical exercises to reinforce understanding, especially in importing delimited text layers into QGIS.
- Enhancing practical skills in geospatial data handling through QGIS.

Afternoon Session: Precision Unleashed: Fuzzy Machine Learning in Forest Remote Sensing

Introduction

The workshop equipped participants with theoretical insights into fuzzy machine learning models and the advantages of ISM and also provided practical skills through the application of these concepts in QGIS.

Highlights of the lecture:

- Dr. Vinay S introduced the realm of fuzzy machine learning models in forest remote sensing.
- Fuzzy logic was explored as a key component of these models, providing a nuanced approach to decision-making in the context of complex and imprecise data.
- Advantages of employing Individual Sample Mean (ISM) over traditional statistical mean-based approaches were discussed, highlighting how ISM enhances robustness and adaptability.
- Participants were guided through the step-by-step process of importing delimited text layers into Quantum GIS (QGIS), a pivotal tool in geospatial data handling.

DAY 10

Morning Session: Harnessing Advanced Remote Sensing and GIS Tools

Introduction:

Dr. Vinay's insightful session navigated the applications of Convolutional Neural Networks (CNNs) in remote sensing, explored pivotal deep learning frameworks—Keras, TensorFlow, and PyTorch—and introduced fundamental

computer vision principles. Additionally, the session covered image segmentation, classification, interpolation, and thematic mapping within QGIS, enriching comprehension in geospatial data analysis.

Highlights of the lecture:

- Convolutional Networks in Remote Sensing:
  Leveraging CNNs in remote sensing: Identifying objects, land cover, and landscape changes. Facilitating environmental monitoring, urban planning, and agricultural analyses.
- Deep Learning Frameworks: Keras, TensorFlow, and PyTorch:
  Overview of Keras, TensorFlow, and PyTorch functionalities.
  Practical applications for developing neural network models in remote sensing tasks.
- Introduction to Computer Vision:
  Grasping computer vision fundamentals: Algorithms for analyzing and interpreting visual data. Key role in interpreting satellite and drone imagery for remote sensing.
- Segmentation and Classification:
  1. Image segmentation: Partitioning images into meaningful regions.
  2. Image classification: Categorizing segments for land cover mapping and change detection.
- Interpolation and Thematic Maps in QGIS:
  Interpolation techniques: Predicting values at unsampled locations for continuous surfaces.
  Thematic maps using QGIS: Visualizing spatial patterns to communicate geospatial data effectively.

Afternoon Session: Georeferencing, Feature Mapping in QGIS, and CNN Model Analysis

Introduction:

Dr. Vinay S. Sir's session encompassed georeferencing techniques for topographical maps, feature mapping within QGIS, and an exploration of Convolutional Neural Network (CNN) model aspects such as stride calculation and kernels. These topics represent critical components in geospatial data processing, analysis, and advanced neural network model development.

Highlights of the lecture:

- Georeferencing Topographical Maps:
- Understanding georeferencing:
  Associating non-spatial images like topographical maps with real-world coordinates.
  Importance in GIS: Integrating legacy maps or scanned images into a spatial framework for accurate analysis.
- Feature Mapping in QGIS:
  Mapping different features: Utilizing QGIS to identify and visualize diverse geographic elements like land cover, water bodies, roads, and infrastructure.
- Practical applications:
  Facilitating land use planning, environmental assessment, and resource management.
- Stride Calculation and Kernels in CNN Model:
  1. Stride in CNN: Understanding stride as the step size for traversing input data during convolution.
  2. Kernels: Exploring the role of kernels as filters for feature extraction within CNN layers.
  3. CNN optimization: Leveraging stride settings and kernel configurations for enhanced model performance.

- Integration and Application:
- Combining georeferenced topographical maps with feature data: Illustrating the linkage between georeferencing techniques and feature mapping in a GIS environment.
- Applying CNN concepts to geospatial data: Analyzing how CNN strides and kernels can be adapted for spatial data analysis, like object recognition in satellite imagery or terrain classification.

DAY 11

Morning Session: Geospatial Fusion: Integrating FCC, Sentinel 2A Data, and False Color Composites

Introduction: Dr. Vinay orchestrated an illuminating session that seamlessly merged Geographic Information System (GIS) techniques, encompassing the exportation of Feature Cover Classification (FCC) data from GRASS to QGIS. Moreover, the session ventured into the acquisition, analysis, and utilization of Sentinel 2A data, harnessing its potential to generate diverse false color composites within a 10-meter radius. Attendees embarked on a dynamic journey, exploring the synergies between different GIS platforms and the versatility of Sentinel 2A imagery in producing nuanced visual representations. This session served as a gateway to understanding the fusion of geospatial data sources, empowering participants to leverage advanced GIS methodologies for comprehensive analyses and visualizations.

Highlights of the lecture:

- The session covered Geographic Information System (GIS) methodologies and practical insights on working with Sentinel 2A data.
- Attendees learned to derive false color composites and export Feature Cover Classification (FCC) data from GRASS to QGIS.

- Sentinel 2A data was emphasized for its high spatial resolution and multispectral capabilities in remote sensing.
- The session also included a hands-on demonstration on creating false color composites and manipulating spectral bands to highlight landscape elements within a 10-meter radius.

Afternoon Session: Geospatial Feature Profiling: Classifying Land Use in QGIS from Imported FCC Data

Introduction:

Dr. Vinay spearheaded an engaging and insightful session focused on delineating and classifying various land use features within QGIS, leveraging imported Feature Cover Classification (FCC) data. Attendees were immersed in an interactive exploration, tasked with drawing distinct features such as built-up areas, agricultural and horticultural zones, forests, water bodies, and other elements. Furthermore, participants were guided through the intricate process of feature classification, unraveling the multifaceted nature of land use analysis within a Geographic Information System (GIS) environment. This session served as a pivotal step in understanding the nuanced classification methodologies essential for interpreting and analyzing geospatial data, empowering attendees with practical insights into land use profiling using GIS tools.

Highlights of the lecture:

- QGIS practical exercise with drawing and delineating features
- Expert demonstration and guidance by Dr. Vinay
- Comprehensive understanding of GIS techniques, remote sensing applications, and feature classification methodologies

DAY 12

Morning Session: Cartographic Chronicles: Navigating the Terrain of Maps, Projections, and Earth's Geometry in the Vedic Light

Introduction

Participants gained a multifaceted understanding of maps, projections, and cartography in Vedic literature. They learned practical skills to navigate projections and convert coordinates, laying a foundation for GIS and mapping technologies.

Highlights of the lecture:

- Maps in Vedic Literature: Evidence supporting the existence of maps in Vedic literatures was explored, showcasing the rich historical roots of cartography.
- Types of Projections: Participants studied various map projections, including Mercator, Robinson, and azimuthal equidistant projections, each serving specific purposes and introducing distortions.
- Measurements and Shape of Earth: Dr. Vinay S explained the fundamental principles of measuring the Earth and understanding its shape, including geodetic concepts and the fact that Earth is not a perfect sphere but an oblate spheroid.
- Degree to Degree Decimal Conversions: Attendees gained practical skills in converting geographical coordinates from the traditional degree-minute-second format to the more modern and computationally friendly degree decimal format, a crucial skill for working with geographic information systems (GIS) and other mapping tools.

Afternoon Session: Exploration Unleashed: FieldWork at Konajekallu for Landuse Data Collection and Group Project Briefing by Dr. Vinay S

Introduction

The trek and data collection exercise provided participants with a unique hands-on experience, bridging the gap between theoretical knowledge and practical application. It allowed them to apply the concepts learned in the workshop to a real-world scenario, enhancing their skills in field data collection and analysis.

Highlights of the lecture:

- Group Formation: Participants were divided into four groups to foster collaboration and a hands-on learning environment.
- Project Overview: Each group was assigned a project with clear objectives and tasks.
- Trekking Expedition to Konajekallu: Participants embarked on a trekking expedition to Konajekallu to gain practical field experience.
- Data Collection Using Epicollect App: The Epicollect app was used to collect land-use data such as land cover, vegetation, and other geographical features.

Hands-On Experience: Participants gained a unique hands-on experience, bridging the gap between theoretical knowledge and practical application.

DAY 13

Morning Session: Project-Based Division and Data Acquisition for Dakshina Kannada Region

Introduction:

Dr. Vinay S. Sir organized a project-based division where groups were assigned specific projects and guided through the acquisition of diverse data from the USGS

and Copernicus databases, focusing on the Dakshina Kannada region. This initiative aimed to provide hands-on experience in utilizing various datasets for geospatial analysis and project implementation.

Highlights of the lecture:

- Group Division and Project Guidance:
  Groups were structured around distinct projects tailored for the Dakshina Kannada region, allowing participants to concentrate on specific geographic or thematic objectives.
  Each group was mentored to ensure a comprehensive understanding and effective execution of their designated project.
- Data Acquisition from USGS and Copernicus:
  1. Utilizing USGS: Accessing a range of geospatial data sources, including satellite imagery, elevation data, land cover information, and more relevant to the Dakshina Kannada region.
  2. Leveraging Copernicus for Landsat and Satellite Data: Download high-quality data from Copernicus, particularly Landsat imagery and other satellite data for comprehensive analysis.
- Project Implementation and Analysis:
  Participants engaged in project implementation by integrating the acquired datasets into their projects, emphasizing the practical application of diverse data sources. Analyzing and interpreting datasets to derive meaningful insights and conclusions for the assigned projects, ranging from land cover analysis to environmental assessments or infrastructure planning.
- Learning Outcomes and Benefits:
  1. Hands-on Experience: Participants gained practical experience in data acquisition, processing, and analysis, fostering a deeper understanding of real-world geospatial challenges.
  2. Collaboration and Project Management: Collaborative efforts within groups honed teamwork and project management skills, vital for successful completion of geospatial projects.

Afternoon Session: Composite Rasters: NDVI, NDWI, and Indices in Dakshina Kannada

Introduction:

This study focuses on leveraging remote sensing techniques to generate composite rasters for the Dakshina Kannada district. By employing indices like NDVI, NDWI, and other relevant metrics derived from satellite imagery, this analysis aims to provide a comprehensive overview of vegetation, water content, and additional landscape features within the region. The creation of these composite rasters enables a nuanced understanding of the district's environmental dynamics, facilitating informed decision-making for various sectors including agriculture, water resource management, and urban planning.

Highlights of the lecture:

- Acquiring and Preprocessing Data:
  Obtain satellite imagery (e.g., Landsat, Sentinel) covering the Dakshina Kannada district. Preprocess the imagery to correct for atmospheric disturbances, apply radiometric corrections, and ensure uniform spatial resolution across different datasets.
- Calculation of NDVI, NDWI, and Other Indices:
  Compute NDVI using the formula: (NIR - Red) / (NIR + Red), where NIR is the near-infrared band and Red is the red band.
  Calculate NDWI using the formula: (Green - NIR) / (Green + NIR), where Green is the green band. Explore other indices relevant to your study objectives, such as EVI (Enhanced Vegetation Index) or SAVI (Soil Adjusted Vegetation Index), and compute them accordingly.
- Creation of Raster Layers for Each Index:
  Generate separate raster layers for NDVI, NDWI, and other calculated indices, each representing the spatial distribution of the respective index across the Dakshina Kannada district.
- Swath Conversion and Merging of Indices:

Merge or combine the individual raster layers (NDVI, NDWI, and other indices) into a single composite raster, integrating the information from each index into a comprehensive dataset. Utilize GIS software to perform the merging process, ensuring alignment and compatibility between the different layers.

- Interpretation and Analysis:
  Utilize the merged raster containing integrated indices for comprehensive analysis, such as identifying vegetation health, water bodies, land-use patterns, or environmental changes within the Dakshina Kannada district.

DAY 14

Morning Session: Elevating Forest Evaluation: Reclassification, Georeferencing, and Analysis of Dakshina Kannada's Diverse Forests

Introduction: Dr. Vinay's groundbreaking work in Dakshina Kannada is reshaping our understanding of the region's forests. His innovative approach involves reclassifying and upscaling various indices, employing georeferencing techniques to map different forest types accurately, and conducting in-depth analyses to unveil the nuances within these ecosystems. This report delves into Dr. Vinay's methodologies, insights, and the implications of his work on comprehending and conserving the diverse forests of Dakshina Kannada.

Highlights of the lecture:

- Reclassifying and upscaling indices to create a more nuanced understanding of the diverse forest types present in Dakshina Kannada
- Georeferencing through satellite imagery, GPS data, and advanced mapping techniques to create detailed maps that accurately depict the distribution and boundaries of different forest types across the region
- Conducting detailed analyses of factors like biodiversity, ecological interactions, carbon sequestration capabilities, and vulnerability to environmental changes to unravel the intricacies within each forest type

- Providing a comprehensive framework for forest evaluation that serves as a crucial tool for policymakers, environmentalists, and conservationists striving to protect and sustain these invaluable ecosystems for future generations.

DAY 15

Morning Session: Geoinformatics Unveiling Environmental Dynamics: Dr. T.V. Ramchandra's Insights into Forest Cover, Rainfall Correlation, and Urban Planning

Introduction: Dr. T.V. Ramchandra's geoinformatics expertise sheds light on the correlation between forest cover and rainfall, and its implications for urban and environmental planning. His research explores the interconnectedness between ecosystems, climate, and human settlements, showcasing the potential of geoinformatics.

Highlights of the lecture:

- The research revolves around unraveling the intricate relationships between forest cover distribution, rainfall patterns, and their pivotal roles in shaping the landscape for sustainable urban and environmental planning.
- The correlation between forest cover distribution and rainfall patterns is at the core of the research. - Geoinformatics tools and methodologies are used to unveil the interconnectedness between these environmental components.
- His insights into this correlation serve as a cornerstone for understanding ecosystem services, biodiversity conservation, and climate resilience.
- The research offers invaluable insights into leveraging geospatial technologies for informed decision-making in urban planning processes.
- The work fosters a holistic approach to urban development that embraces environmental sustainability.

Afternoon Session: Exploring Geospatial Frontiers: Dr. T.V. Ramchandra's Insights into GIS, Remote Sensing, and Spatial Data Dynamics

Introduction: Dr. T.V. Ramchandra is an expert in GIS and remote sensing with profound insights into spatial data, vectors, raster's, and workflows. This report highlights his

expertise in GIS, remote sensing, spatial data dynamics, and sensor resolution in geospatial technologies.

Highlights of the lecture:

- GIS is the combination of data, technology, and expertise aimed at capturing, analyzing, and presenting geographical information.
- Vectors and raster's are fundamental data models in spatial analysis, with different strengths and applications.
- Simulating real-world scenarios within the realm of GIS involves synthesizing diverse data streams to create comprehensive models that enable informed decision-making and predictive analyses.
- GIS chains are a sequence of processes and tools within a GIS workflow that can be streamlined and optimized for diverse applications.
- Remote sensing involves understanding sensor resolution types, such as spatial, spectral, radiometric, and temporal resolution, to effectively leverage remote sensing data in different applications.

DAY 16

Morning Session: Revolutionizing Forest Assessment: Advanced GIS Concepts, Image Processing, and Machine Learning Applications

Introduction: Dr. Vinay has revolutionized forest assessment by integrating advanced GIS concepts, image processing, and Machine Learning algorithms. This report highlights his pioneering contributions, including the revision of GIS concepts, innovative algorithms like MCC, and the use of sophisticated techniques such as image enhancement and classification methodologies.

Highlights of the lecture:

- Advanced GIS techniques, sophisticated image processing, and robust data analysis are reshaping forest assessment.

- Spatial analysis tools capture the complexities of forest ecosystems, enabling a comprehensive understanding of their composition, distribution, and dynamics.
- Image enhancement techniques extract valuable information from satellite imagery and remote sensing data.
- Machine learning algorithms enhance the accuracy of classifying forests based on multiple parameters.
- Novel algorithms like Matthews Correlation Coefficient, minimum distance to mean, and parallelepiped offer enhanced accuracy and robustness in delineating different forest types and their characteristics.
- This innovative approach holds immense potential for informing conservation strategies and sustainable forest management practices.

Afternoon Session: Integrated Geospatial Solutions: Harnessing Google Earth Engine and Software Suite Instruction

Introduction: Dr. Vinay is an expert in geospatial analysis and utilizes advanced platforms like Google Earth Engine and software suites such as XAMPP, Geo Server, and PostgreSQL to create robust geospatial databases. This report focuses on his invaluable insights and step-by-step instructions for establishing and managing geospatial databases for advanced research purposes.

Highlights of the lecture:

- Google Earth Engine is a key component for geospatial analysis.
- Utilizes software tools like XAMPP, Geo Server and PostgreSQL for comprehensive analysis and geospatial database management.
- XAMPP provides a pre-configured environment for web development.
- Geo Server allows for the sharing and utilization of geospatial data across different platforms.
- PostgreSQL facilitates the creation and management of geospatial databases.
- Expertise in leveraging these platforms and software suites fosters innovative discoveries and solutions in environmental science and beyond.

DAY 17

Morning Session: Exploring Remote Sensing and Geospatial Analysis: Applications and Techniques

Introduction: Dr. T.V. Ramachandra, a distinguished scientist and expert in environmental studies, delves into the realm of remote sensing, data cataloging, and geospatial analysis. This report aims to elucidate the significance of data catalogs, satellite imagery, visualization techniques, land cover and land use classifications, and coding for data extraction and visualization.

Highlights of the lecture:

- Utility of Landsat satellites in capturing high-resolution multispectral imagery
- Different visualization methods to interpret satellite imagery effectively
- Examples of code snippets for visualizing geospatial data using tools like Python's Matplotlib or JavaScript libraries such as Leaflet.js or D3.js
- Methodologies for classifying land cover using remote sensing data, including supervised and unsupervised classification algorithms
- Differentiating between land cover and land use classifications, highlighting how satellite imagery assists in identifying not just surface features but also human activities and their impact on the landscape
- Capabilities of Google Earth Engine for accessing, analyzing, and processing satellite imagery and geospatial datasets
- Examples of JavaScript code snippets demonstrating how to select and retrieve specific datasets or image collections from Google Earth Engine.

Afternoon Session: Geospatial Analysis: From Training to Classification and Accuracy Assessment

Introduction: An exploration of geospatial analysis, focusing on the crucial steps involved in land cover classification using remote sensing data. The process encompasses the creation of training polygons, classification inputs, division into

training and testing sets, actual training and classification, visualization of outcomes, and accuracy assessment. These steps are fundamental in harnessing satellite imagery to derive valuable insights for land use planning, environmental monitoring, and resource management.

Highlights of the lecture:

- Manually delineating training polygons on satellite imagery
- Extracting spectral, textural, and contextual features for classification algorithms
- Data partitioning into training and testing subsets
- Random sampling to ensure representative training and testing sets
- Various classification algorithms such as Random Forest, SVM, and Neural Networks
- Training classification algorithm using satellite imagery features
- Classifying the entire satellite image
- Visual representation techniques using color schemes or thematic legends
- Overlaying classified results on satellite imagery
- Validation techniques like confusion matrices, kappa statistics, and accuracy metrics
- Interpreting accuracy metrics and their implications for reliability

DAY 18

Morning Session: Harnessing Geo Server and PostgreSQL: Database Creation and Management in Geospatial Applications

Introduction: The essence of a comprehensive quiz conducted by a resource person, focusing on the utilization of Geo Server in tandem with PostgreSQL for creating and managing databases in geospatial applications. The quiz delves into the fundamental concepts and practical applications of database creation, storage,

and integration using Geo Server, XAMPP, and PostgreSQL, elucidating their significance in the realm of geospatial technology.

Highlights of the lecture:

- Quiz Overview and Database Fundamentals:
- Introduction to the purpose and objectives of the quiz
- Foundational aspects of databases, including relational database management systems (RDBMS), spatial databases, and their role in storing and retrieving geospatial data.
- Creating a Database in Geo Server:
- Exploring the functionalities of Geo Server as an open-source server for sharing geospatial data.
- Detailed step-by-step process of configuring Geo Server to connect and create databases using PostgreSQL, including setting up data stores and layers.
- Utilizing XAMPP and PostgreSQL for Database Management:
- Discussing the role of XAMPP as a development environment, particularly focusing on its integration with PostgreSQL for database management.
- Providing insights into installing, configuring, and managing PostgreSQL databases within the XAMPP environment, emphasizing spatial data storage and retrieval capabilities.
- Storing and Retrieving Geospatial Data:
- Exploring the process of storing various geospatial datasets within PostgreSQL databases, emphasizing best practices for efficient data organization and management.
- Detailing the retrieval mechanisms within Geo Server, showcasing how geospatial data stored in PostgreSQL can be seamlessly accessed and served through Geo Server's web services.

DAY 19

The internship program has been divided into four distinct teams, each assigned to specific projects aimed at various GIS-related tasks. The teams and their assigned projects are as follows:

Alva's GIS Team - Project Name: Alva's GIS

Task 1: Digitizing land use and land cover classification in QGIS.

Task 2: Digitizing locations where bird and plant species are observed within AIET campus in QGIS.

Dakshina Kannada Team - Project Name: Dakshina Kannada

Task 1: Digitizing land surface temperature using GRASS GIS software.

Task 2: Land use and land cover mapping in Google Earth Engine.

Task 3: Classification of flora and fauna.

Task 4: Analysis of climate and soil temperature in QGIS.

Shanti Sagar 1 Team - Project Name: Shantisagar 1

Task 1: Rainfall and temperature analysis, and drainage mapping in QGIS software.

Task 2: Land use assessment using Google Earth Engine.

Task 3: Land cover classification using GRASS GIS software for the year 2023.

Shanti Sagar 2 Team - Project Name: Shantisagar 2

Task 1: Rainfall and temperature analysis, and drainage mapping in QGIS software.

Task 2: Land use assessment using Google Earth Engine.

Task 3: Land cover classification using GRASS GIS software for the year 2011.

DAY 20

Alva's GIS Team:

i. Ongoing digitization and verification of bird and plant species locations in AIET campus in QGIS.
ii. Continuous refinement of species classification processes based on ongoing data collection.

Dakshina Kannada Team:

i. Progressing steadily with land use and land cover mapping in Google Earth Engine.
ii. Continuing the enhancement of flora and fauna classification algorithms for improved accuracy.
iii. Systematic analysis of climate and soil temperature data in QGIS, ensuring data integrity.

Shanti Sagar 1 Team:

i. Advancing the land use assessment using Google Earth Engine, incorporating additional data for completeness.
ii. Iterative improvements in land cover classification using GRASS GIS software for the year 2023.
iii. Finalizing reports for rainfall, temperature, and drainage analysis in QGIS, incorporating feedback.

Shanti Sagar 2 Team:

i. Making significant strides in land use assessment using Google Earth Engine, focusing on data completeness.

ii. Continuing the process of land cover classification using GRASS GIS software for the year 2011.
iii. Completed and reviewing final reports for rainfall, temperature, and drainage analysis in QGIS.

DAY 21

Alva's GIS Team:

- Continuously verifying plant species locations in AIET campus in QGIS.
- Refining and enhancing the classification processes based on ongoing data collection and analysis.

Dakshina Kannada Team:

- Progressing steadily with the completion of land use and land cover mapping in Google Earth Engine.
- Actively refining and improving algorithms for flora and fauna classification to increase accuracy.
- Continuing comprehensive analysis of climate and soil temperature data in QGIS.

Shanti Sagar 1 Team:

- Making significant advancements in land use assessment using Google Earth Engine, incorporating new data for completeness.
- Iteratively improving land cover classification using GRASS GIS software for the year 2023.
- Preparing reports for rainfall, temperature, and drainage analysis in QGIS, refining data for accuracy.

Shanti Sagar 2 Team:

- Progressing steadily with land use assessment using Google Earth Engine, ensuring data completeness and accuracy.

- Continuing the process of land cover classification using GRASS GIS software for the year 2011.
- Reviewing and refining reports for rainfall, temperature, and drainage analysis in QGIS.

DAY22

Alva's GIS Team:

- Successfully completed verification and validation of bird and plant species locations in AIET campus in QGIS.
- Commenced the documentation phase for the species classification report.

Dakshina Kannada Team:

- Completed land use and land cover mapping in Google Earth Engine.
- Started compiling detailed documentation for the completed tasks and analysis.

Shanti Sagar 1 Team:

- Successfully finished land use assessment using Google Earth Engine and land cover classification using GRASS GIS software for the year 2023.
- Initiated the report writing process based on the completed analysis and findings.

Shanti Sagar 2 Team:

- Completed land use assessment using Google Earth Engine and made significant progress in land cover classification using GRASS GIS software for the year 2011.
- Started drafting comprehensive reports detailing the analysis conducted.

DAY 23

Interaction with Dr. P G Diwakar and Dr. Ajith H Hebbar

Alva's GIS Team:

Presented a comprehensive report on the verification and validation of bird and plant species locations in AIET campus in QGIS.

Discussed the methodologies employed, challenges faced, and the accuracy achieved in species classification.

Received positive feedback on the thoroughness of the analysis and the clarity of the presentation.

Dakshina Kannada Team:

Conducted a detailed presentation on the completed land use and land cover mapping in Google Earth Engine.

Shared insights into the refined algorithms for flora and fauna classification, highlighting the accuracy attained.

Received commendation for the structured approach and depth of analysis.

Shanti Sagar 1 Team:

Presented findings from the successful land use assessment using Google Earth Engine and land cover classification using GRASS GIS software for the year 2023.

Highlighted the completeness of the assessment and accuracy in the classification process.

Received positive remarks on the clarity and organization of the presentation.

Shanti Sagar 2 Team:

Delivered a comprehensive presentation on the completed land use assessment using Google Earth Engine and progress in land cover classification using GRASS GIS software for the year 2011.

Showcased the accuracy achieved in assessments and discussed the ongoing refinements in land cover classification.

Received praise for the thoroughness of the analysis and dedication to accuracy.

Feedback Received by Dr. P G Diwakar

- The applicability algorithms used needs more clarity, understand the working principle, algorithms and then apply.
- It is necessary to go to field, identify the land use features and check the classification accuracy post analysis.
- Rainfall is better for be shown as point information as against interpolation
- Program can be written to understand the transition at pixel level so as to define the change in class.
- Students should be able to predict the change in population dynamics over time
- Check LCMRWM for authentic weather data

Feedback Received by Dr. Ajith H Hebbar

- All teams received positive feedback on their detailed analysis, thoroughness, and dedication to accuracy.
- The presentations were commended for their clarity, organization, and the depth of insights shared.
- Teams were appreciated for addressing challenges effectively and showcasing strong analytical skills.

VALEDICTORY CEREMONY

The valedictory ceremony served as a culmination of the GIS Internship Program, celebrating the accomplishments of the participating interns. Dr. Ajith H Hebbar, the esteemed HOD of the Civil Eng Department, and Dr. Vinay S, the Internship Coordinator, presided over the event, adding prestige and recognition to the interns' hard work.

Key Aspects of the Ceremony:

Dignitaries' Presence: Dr. Ajith H Hebbar and Dr. Vinay's presence added a sense of honor and validation to the interns' efforts, underscoring the significance of the GIS projects.

Certificate Distribution: The presentation of certificates by Dr. Ajith H Hebbar and Dr. Vinay symbolized the successful completion of the internship, recognizing the interns' dedication and contributions.

Special Recognition: Dr. Vinay's gesture of awarding a one-year subscription to ArcGIS stood as a remarkable acknowledgment of the interns' exceptional work. This subscription offered an invaluable opportunity for further exploration and skill development in GIS.

Words of Encouragement: The motivational speeches delivered by the dignitaries inspired and motivated the interns, acknowledging their achievements and encouraging them to continue their pursuit of excellence in GIS.

Networking and Interaction: The ceremony provided a platform for interns to connect with each other and experts from IIT, IISc, NIAS, NITK. It fostered an environment for sharing experiences, insights, and future aspirations in the field of GIS.

OUTCOME

There were about 19 participants in the entire internship, rhe duration of the internship was 4 weeks with over 160 hours of training on GIS (both hands on and practicals).

During the intership the interns were able understand the basic concepts of GIS, Remote Sensing, WebGIS, AIML that can be well implemented in converting data into geospatial data products that would enable one to evaluate the dynamics in region and likely cause.

The students were able to learn and present their work in front of expertise from IISc, (Dr. T.V. Ramachandra), NIAS (Dr Diwakar).

About 30% of the interns are showcasing interest in development and deployment of projects in GIS and continue to work in the lab for the next 2 years.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Moodbidri

Dr. Dattathreya
IQAC Main Coordinator
AIET, Moodbidri

Dr. Peter Fernanades
Principal
AIET, Moodbidri

Acknowledgements

We wholeheartedly express our gratitude to the Management for their unwavering support throughout the internship programme. Special thanks to Dr. T V Ramachandra and the entire IISc team for actively engaging students and providing insights into advanced GIS concepts. Our sincere appreciation goes to Dr. P G Diwakar for consistently supporting the GIS lab through valuable suggestions and interactions. We extend our thanks to Dr. Bharath H Aithal and Dr. Prakash for sharing their knowledge virtually. Our gratitude also extends to all the resource persons who patiently guided the interns during and after college hours.

A heartfelt acknowledgment to the IEEE student chapter for actively organizing World GIS Day and a five-day workshop. Lastly, we express our thanks to all the interns for their patient support and to the IEEE students for their contribution to drafting the report.

Inaugural session – Lighting of Lamps

Inaugural session – Deliberations by Mr. Vivek Alva

Student Interactions

Digital Image Processing – Mr. Vedanth V

Open Source GIS – Mr. Neerav Patel

Introducing AI and ML to the participants – Mr. Satyam P

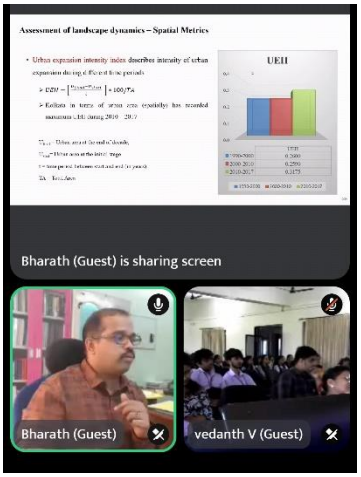
Guest Lecture by Dr. Prakash (AIML to GIS)

Dr. Ramachandra T V interacting with Interns at AIET

Google Earth Engine – Tulika Mondal, IISc

WebGIS – Tulika Mondal, IISc

World GIS Day Celebrations – 15 Nov 2023



Guest Lecture by Dr. Bharath H Aithal

Participants

Vote of Thanks GIS Day - Dr. Dattahreya

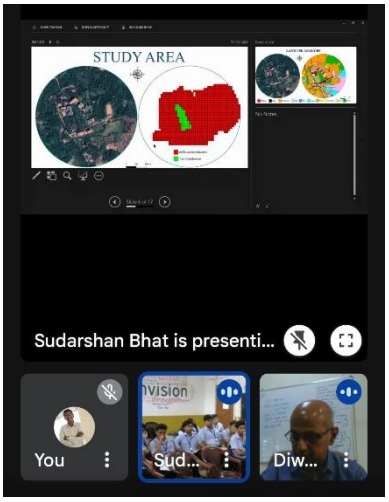
Marking First GIS Day at AIET with planting of saplings

Grasslands

Acacia and Scrub

Field Investigations with Chirpp Club experts

Field investigations during travel by interns



Interaction with Dr. P G Diwakar

Shantisagara

Dakshina Kannada

Alvas GIS

Handing over the Licences and Certificate to Interns

Interns – Oct-Nov 2023

ANNEXURES

About Geoinformatics Research Lab

Geoinformatics Research Lab aims to leverage geospatial technology and data to solve complex spatial problems, contribute to scientific research, inform policy decisions, and enhance the knowledge of interconnectedness of natural and human systems on a geographic scale.

With an immediate vision of Monitoring the Fragile Western Ghats Ecosystems using geospatial technologies involving multidisciplinary approaches to promote sustainability, conservation and management.

This involves mapping visualizing and simulating the land use and land cover changes, its associated processes in the Western Ghats and Coastline using geospatial tools and disseminating the information to public, researchers, decision makers though web portals (WebGIS) and mobile applications (Mobile GIS), etc.

GIS lab is responsible for training budding researchers, teachers across domain for integrating the geospatial data.

Internship Programme at Geoinformatics Research Lab

In the Internship programme for 30 days, the students will be exposed to geospatial technology and trained to work on Geospatial tools using Free and Open-Source Software's.
The following are the lines in which the Internship program will follow

Date	Week	Description
25th to 28th October 2023	Week 1	Introduction to Geographic Information System Introduction to Data types and formats (Spatial and Non-Spatial). Software's used: Google Earth, QGIS WebGIS portals exploration Objectives: Creating Spatial layers, Databases, Data inject, Querying, Interpolation, Data extraction, csv to geodatabase, preparation of Maps etc.

Date	Week	Description
30th Oct to 4th Nov 2023	Week 2	Tools and methods for Satellite image processing (IEEE workshop) Remote Sensing, Satellites and data sources, FOSS, Digital image processing, Tools: Python, Grass GIS, QGIS, Google Earth
6th to 18th November 2023	Week 3 and Week 4	Mini Project – Dakshina Kannada District Multi-disciplinary teams consisting of students across domains will be formed for - Development of database, - Analysis of land use land cover (Machine Learning, Segmentation, Indices) etc. - Visualizing Land use changes in the select taluk - Collating information from published literatures (Journals, Conferences) on flora, fauna, - Collating and integrating population data at village level **Geocache Activity – World GIS Day 18 Nov 2023**
20th to 25th November 2023	Week 5	Report Writing, Presentation of the Work carried out with maps and outcomes in the presence.
Students can further continue to be the part of Geoinformatics Lab for working on *Western Ghats and Coastal Ecosystems* The same can be further utilized for the final year projects at department level with suitable advancements		

Registration can be made at https://forms.gle/wJPiYGdysZ8eVTif8

Dr. Vinay S
Geoinformatics Research Lab,
Associate Prof. Dept of Civil Eng.
AIET, MIJAR, Moodbidri

Dr. Peter Fernandes
Principal & IQAC Chairman
AIET Mijar, Moodbidri

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

(A Unit of Alva's Education Foundation (R) Moodbidri)
Affiliated to Visvesvaraya Technological University, Belagavi.
Approved by AICTE, New Delhi & Recognized by Government of Karnataka
Accredited by NAAC with A+ & NBA (CSE & ECE)

ATTENDANCE IEEE-AIET IEEE-NITK

SL.NO	NAME	DEPT	26/10	27/10	28/10	30/10	31/10	2/11	3/11	4/11	6/11	7/11	8/11	9/11	10/11	11/11
1.	Shrishanth S Shetty	AI & ML	P P	P P	E	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
2.	saneesha Prashant Kadam	AI & ML	P P	P P	E	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
3.	Yashwanth R	AI & ML	P P	P P	E	P P	P P	P P	P P	P	P P	P P	P P	P P	• •	P
4.	Gururagavendra Paluri	AI & ML	P P	P P	P	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
5.	D Chandan Lagubigi	AI & ML	P P	P P	. .	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
6.	Bhavish	AI & ML	P P	P P	P	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
7.	Jahnavi V	CSD	P P	P P	P	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
8.	Darshan RAI	CSD	• •	• •	• .	• -	• -	,								
9.	Harshith D M	CSE	P P	• •	• •	• •	• •	,								
10.	Akshatha	CSE	P P	P P	P .	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
11.	Tejaswini Venkatesh gudigar	CSE	P P	P P	P	P P	P P	P P	P D	P	P P	P P	P P	P P	P P	P
12.	Shetty Yash Chandrashekhar	CSE	P P	P P	E •	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
13.	Kagwade Abhishek Shashank	CSE	P P	P P	E	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
14.	Abhay Gowda M K	CSE	• •	• •	.	• •		.								
15.	Bhagyashree Shyam Naik	CSE	P P	P P	P	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
16.	Venkatesh Hanamanta Hulasad	CSE	- •	• •	•	, •	,	.								
17.	Ganesh	CSE	P P	• •	•	• •	,	,								
18.	Sudarshan T Bhat	CSE	P P	P P	P	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
19.	Lakshan	ECE	• •	• •	•	• ,										
20.	Rakshith	ECE	• •	• •	•	) •					•					
21.	Mohammed Rihan	ISE	P P	P P	.	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
22.	Arvinkanth Suvarna	ISE	P P	P P	•	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
23.	Mohammed Adil	ISE	P P	P P	P	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
24.	Anirudh Kamath K	ISE	P P	P P	E E	E E	E E	P P	P P	P	P P	P P	P P	P P	P P	P
25.	Muhammed Yamin Sharfuddin	ISE	P P	P P	P	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P
26.	~~Pavan Kumar H.R~~ Syed Sadeha	~~Mechanical~~ ISE	• •	P P	P .	P P	P P	P P	P P	P	P P	P P	P P	P P	P P	P

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

(A Unit of Alva's Education Foundation (R) Moodbidri)
Affiliated to Visvesvaraya Technological University, Belagavi.
Approved by AICTE, New Delhi & Recognized by Government of Karnataka
Accredited by NAAC with A+ & NBA (CSE & ECE)

ATTENDANCE

SL.NO	NAME	DEPT	15/11		16/11		17/11		18/11		20/11		21/11		22/11		23/11		24/11		25/11	
1.	Shrishanth S Shetty	AI & ML	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
2.	saneesha Prashant Kadam	AI & ML	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P				
3.	Yashwanth R	AI & ML	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
4.	Gururagavendra Paluri	AI & ML	A	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
5.	D Chandan Lagubigi	AI & ML	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
6.	Bhavish	AI & ML	A	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
7.	Jahnavi V	CSD	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
8.	Darshan RAI	CSD																				
9.	Harshith D M	CSE																				
10.	Akshatha	CSE	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
11.	Tejaswini Venkatesh gudigar	CSE	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
12.	Shetty Yash Chandrashekhar	CSE	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
13.	Kagwade Abhishek Shashank	CSE	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
14.	Abhay Gowda M K	CSE																				
15.	Bhagyashree Shyam Naik	CSE	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
16.	Venkatesh Hanamanta Hulasad	CSE																				
17.	Ganesh	CSE																				
18.	Sudarshan T Bhat	CSE	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
19.	Lakshan	ECE																				
20.	Rakshith	ECE																				
21.	Mohammed Rihan	ISE	P	P	A	A	P	P	P		P	P	P	P	P	P	P	P	P			
22.	Arvinkanth Suvarna	ISE	P	P	A	A	P	P	P		P	P	P	P	P	P	P	P	P			
23.	Mohammed Adil	ISE	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
24.	Anirudh Kamath K	ISE	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			
25.	Muhammed Yamin Sharfuddin	ISE	P	P	A	A	P	P	A		P	P	P	P	P	P	P	P	P			
26.	~~Pavan Kumar H.R~~ Syed Saleha	~~Mechanical~~ ISE	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P			

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Shrishanth S Shetty

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

T V Ramachandra
Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Saneesha Prashant Kadam

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

T V Ramachandra
Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Yashwanth R

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

T V Ramachandra
Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Gururagavendra Paluri

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

T V Ramachandra
Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru


Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka
in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru
Certificate of Internship
This is to Certify that
D Chandan Lagubigi
has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.
Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar
Dr. Peter Fernandes
Principal, AIET
AIET, Mijar
T V Ramachandra
Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru


Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka
in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru
Certificate of Internship
This is to Certify that
Bhavish
has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.
Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar
Dr. Peter Fernandes
Principal, AIET
AIET, Mijar
T V Ramachandra
Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Jahnavi V

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Akshatha

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru


Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka
in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru
Certificate of Internship
This is to Certify that
Tejaswini Venkatesh Gudigar
has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.
Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar
Dr. Peter Fernandes
Principal, AIET
AIET, Mijar
T V Ramachandra
Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru


Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka
in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru
Certificate of Internship
This is to Certify that
Shetty Yash Chandrashekar
has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.
Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar
Dr. Peter Fernandes
Principal, AIET
AIET, Mijar
T V Ramachandra
Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Kagwade Abhishek Shashank

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Bhagyashree Shyam Naik

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Sudarshan T Bhat

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Mohammed Rihan

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Arvinkanth Suvarna

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Mohammed Adil

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Anirudh Kamath K

has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru

Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka

in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru

Certificate of Internship

This is to Certify that

Muhammed Yamin Sharfuddin

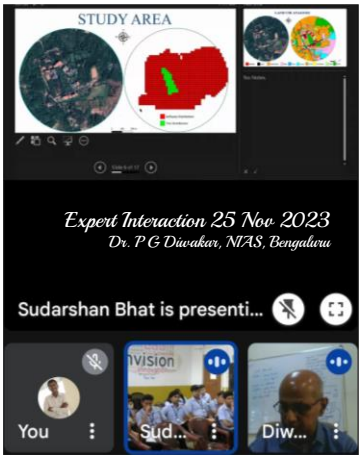
has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.

Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar

Dr. Peter Fernandes
Principal, AIET
AIET, Mijar

Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru


Alva's Institute of Engineering and Technology
Shohavana Campus, Mijar, Moodbidri
Dakshina Kannada, Karnataka
in association with
Energy and Wetlands Research Group,
Centre for Ecological Sciences, IISc, Bengaluru
Certificate of Internship
This is to Certify that
Syed Saleha
has successfully completed the internship programme on Geospatial Technologies at the Geoinformatics Research Lab, Alva's Institute of Engineering and Technology in association with EWRG, CES, IISc from 26 October to 25 November 2023.
Dr. Vinay S
Geoinformatics Research Lab
AIET, Mijar
Dr. Peter Fernandes
Principal, AIET
AIET, Mijar
Dr. Ramachandra T V
EWRG, CES, IISc
Bengaluru



GIS day

Alva's Institute of Engineering and Technology,

Shobhavana Campus, Mijar, Moodbidiri
Dakshina Kannada, Karntaka – 574 225

ALVA'S
Education Foundation®

Alva's Institute of Engineering and Technology

Internal Quality Assurance Cell (IQAC),

Geoinformatics Research Lab,

AIET IEEE Student Branch Chapter

(STB60215368)

&

Institute Innovation Council – AIET

Jointly Organises

Five-Days workshop on

Innovative Tools and Methods for Satellite Image Processing

30th October 2023 to 4th November 2023

Venue: DS Lab, Dept of AI & ML
AIET, Mijar, Moodbidri

Table of Contents

Internal Quality Assurance Cell (IQAC)
Geoinformatics Research Lab
IEEE- Student Branch Chapter – AIET (STB60215368)
Institute Innovation Council – AIET

Alva's Institute of Engineering and Technology (AIET),
Mijar, Moodbidri, Dakshina Kannada

Organises a five-day hands-on workshop on "Innovative Tools and Methods for Satellite Image Processing"

The workshop aimed to enhance the skills with knowledge in the domain of Remote Sensing amongst the young minds using state of the art tools focused on AI, ML, Image Processing.

About Geoinformatics Research Lab

Geoinformatics Research Lab aims to leverage geospatial technology and data to solve complex spatial problems, contribute to scientific research, inform policy decisions, and enhance the knowledge of interconnectedness of natural and human systems on a geographic scale.

With an immediate vision of Monitoring the Fragile Western Ghats Ecosystems using geospatial technologies involving multidisciplinary approaches to promote sustainability, conservation and management.

This involves mapping visualizing and simulating the land use and land cover changes, its associated processes in the Western Ghats and Coastline using geospatial tools and disseminating the information to public, researchers, decision makers though web portals (WebGIS) and mobile applications (Mobile GIS), etc.

GIS lab is responsible for training budding researchers, teachers across domain for integrating the geospatial data.

Alva's Institute of Engineering and Technology

Alva's Institute of Engineering and Technology in Moodbidri stands as a testament to the pursuit of academic excellence and holistic development.

Established with the aim of fostering academic excellence and holistic development in 2008, the institute is affiliated to Visvesvaraya Technological

University, Belagavi. Through its comprehensive programs, dedicated faculty, infrastructure and commitments towards innovation, the institute plays a significant role in shaping the future decisionmakers, technologists and engineers of India.

Located in Moodbidri, the Institute has continually focused on providing quality engineering and technical education to its students and to support them both in academic and extracurricular activities.

AIET is associates with numerous Government, Non-Government and Private Organisations with a focus on research and consultancy projects. AIET currently has MoU's with reputed national level organizations viz., ISRO, NRSC, NIAS, NAL, RRSC, IIT, NIT and many more.

Day 1. **Inauguration**

The five-day workshop on "Innovative Tools and Methods for Satellite Image Processing" was held between 30th October and 4th November 2023 at DS lab, Dept of AI and ML. The workshop began at 9:30 AM with lighting of lamps. Dr. Majunath Kotari, HoD CSE and IEEE-faculty coordinator- AIET welcomed the gathering and addressed the need for Geospatial tools in the digital world. Dr. Vinay S, highlighted the applications of GIS, Remote Sensing and need of interdisciplinary research and studies for addressing real world problems. He also highlighted about the contents deliverable in the workshop. The speech underscored the importance of GIS in promoting innovation, sustainability, and informed decision-making across various industries. The audience gained valuable insights into the practical applications of GIS and its significant impact on addressing real-world challenges.

Dr. Dattathreya, Dean Planning and IQAC main Coordinator, expressed his thoughts and need geospatial tools. He elaborated on how ISRO, NRSC and AIET have collaborated worked in the past as a result, AIET is a testament for developing skills of student.

Dr. Peter Fernandes, Principal AIET, in his presidential address indicated the role of Remote Sensing in the growing world and its importance in decision making. He emphasized on how GIS has been extensively used across multiple domains. He emphasized the importance of conducting multidisciplinary research and urged the students to think beyond the box to comprehend and resolve real-world issues. He appreciated the move of inducing the students as resource persons for the event.

The vote of thanks was given by Mr. Neerav Patel, Chairman of IEEE-Student Branch Chapter. He expressed our gratitude to the organisation, principal, deans and faculty, students, and IEEE for their support.

Fig: Welcoming the Gathering – Dr. Majunath Kotari

Fig: Lighting of Lamps

Fig: About the Workshop – Dr Vinay S

Fig: Presidential Address – Dr. Peter Fernandes

Introduction to Remote Sensing

Dr. Vinay S introduces the very basics of remote sensing, providing a comprehensive understanding on the domain. He introduced the key components of remote sensing, principal, the physics behind it and explained their significance and future prospects. The session covered topics viz., energy interactions in the atmosphere, (including the different types of reflection,

such as specular and diffuse reflection); remote sensing platforms; Spectral reflection curves; Resolutions (Spatial, spectral, temporal, radiometric). The session also included an in-depth analysis of remote sensing satellite images, deliberated on how to interpret and analyze the satellite images.

Fig: Participants

Digital Image Processing

Mr. Vedanth conducted a highly effective and detailed session on image processing. He explained the basics of image processing, starting with introduction to images, resolution, and aspect ratio. He also provided insights on using various libraries and tools in Python for image processing. The importance of image processing, including image compression, restoration, and denoising, was also discussed in detail. We also installed PyCharm, which is a crucial tool for image processing. The session concluded with a group quiz based on the topic of image processing, which was fun and effective way to reinforce our learning.

Fig: Digital Image Processing – Mr. Vedanth

Day 2: Artificial Intelligence and Machine Learning

Mr. Satyam systematically elucidated the concepts and components of AI and ML, commencing with an overview of what AI is and the genesis of its formation. He highlighted AI's role in automating routine tasks, such as image classification and pattern recognition, while intermediate AI delves into more complex functions like predictive analysis and route optimization. The advanced applications of AI in GIS incorporate machine learning, deep learning, and neural networks, enabling sophisticated spatial analysis and decision-making.

Spatial data analysis in GIS involves scrutinizing geographic data to derive meaningful insights. Automated feature recognition utilizes AI to identify and classify objects in maps or imagery. Predictive analysis in GIS anticipates future trends or events based on historical spatial data. Routing and navigation tools optimize travel routes and offer real-time directions. Spatial clustering and pattern recognition assist in detecting spatial relationships and groupings in geographic data, facilitating decision-making and problem-solving.

During the afternoon session, the speaker delved into Convolutional Neural Networks (CNN), a deep learning model primarily used for image analysis. Three types of machine learning were discussed: supervised, unsupervised, and reinforcement learning. Supervised learning entails training a model on labeled data to predict outcomes, with regression predicting continuous outcomes and various algorithms like decision trees, random forests, and K-Nearest Neighbors (KNN). Challenges such as overfitting and underfitting were highlighted in supervised learning.

Unsupervised learning involves algorithms extracting patterns from unlabeled data, including K-means clustering and Principal Component Analysis (PCA). In GIS, backpropagation in neural networks optimizes spatial analysis and decision-making processes by refining models through iterative learning and adjustments based on error minimization.

Fig: Introducing AI and ML to the participants – Mr. Satyam

Fig: Introducing AI and ML to the participants – Mr. Satyam

Day 3:

Open-Source Software's

During the session with Mr. Neerav, he expounded on the concept of Open Source Software (OSS). This term encompasses software that is freely accessible to the public, allowing users the freedom to modify, distribute, and enhance the software. In contrast to closed-source proprietary software, open source promotes collaboration and transparency, providing users with freedoms such as the ability to study, modify, and distribute the software. The operational framework of open source follows a community-driven model, where users actively contribute to the development and improvement of the software.

Free and Open-Source Software (FOSS) is a categorization of software that endows users with the freedoms of using, studying, modifying, and distributing the source code. FOSS is further subdivided into various categories, including copyleft licenses (e.g., GPL), permissive licenses (e.g., MIT), and public domain licenses (e.g., CC0), each governing usage and distribution terms.

In the realm of GIS, FOSS tools like QGIS, GRASS GIS, and GeoServer, in conjunction with organizations such as OSGeo, advocate for the development and utilization of open-source geospatial software. Platforms like Mapbox offer mapping services, while protocols like Web Map Service (WMS), Web Feature Service (WFS), and Web Coverage Service (WCS) facilitate data sharing and interoperability within GIS. FOSS in GIS finds applications across diverse fields, including environmental monitoring, urban planning, disaster management, and public health, providing cost-effective and customizable solutions for spatial data analysis and visualization.

UNET Demonstration

Mr. Satyam elucidated that the U-Net architecture, one of the widely employed convolutional neural network for image segmentation/classification tasks. Within the domain of GIS, this architecture is harnessed for object detection and classification in satellite or aerial imagery. The code typically encompasses data preprocessing, model training, and evaluation, utilizing annotated datasets to identify and categorize objects in geographical imagery.

The application of U-Net in GIS facilitates detailed and precise identification of various objects, including buildings, roads, or vegetation. This capability proves invaluable for tasks such as land use mapping, disaster response, and urban planning. Leveraging the network's capacity to discern unique features and patterns, the implementation of the code enables accurate spatial classification within geographical data. This, in turn, simplifies the process of making well-informed decisions and analyzing geographic information systems.

GRASS GIS – Hands on

During the afternoon session under the guidance of Dr. Vinay S., participants successfully installed GRASS GIS and imported geographical data into the software. They acquired a fundamental understanding of navigating the GRASS interface, managing spatial datasets, and initiating GIS workflows. This hands-on experience provided them with the necessary foundation to leverage GRASS for geographic analysis and laid the groundwork for further exploration of the tool's capabilities in spatial data management and analysis. Processes such as land cover analysis, land use analysis were focused during the session. Overall, the session proved to be a valuable introduction to the installation of GRASS GIS and the initial steps of data importation. It empowered the participants to embark on their journey in utilizing this powerful tool for geographic analysis and geospatial modeling.

Day 4:

Mobile GIS for Field Data Collection

Under the guidance of Dr. Vinay S., the GIS field visit constituted a comprehensive effort to collect detailed spatial data on various elements of the ecosystem, including medicinal plants, butterflies, birds, and land use. To achieve this objective, four teams, each consisting of 10 members, utilized the Epicollect5 app and GitHub to ensure efficient and organized data collection, storage, and sharing. Each team was assigned a specific task, encompassing gathering information on medicinal plant species, documenting butterfly sightings, assessing bird diversity, and analyzing land use patterns. The teams collected GPS coordinates, captured photographs, and provided detailed descriptions of observed flora, fauna, and land use characteristics using the Epicollect5 app.

All team members received training in using the app for data collection, ensuring standardized data formats and GPS accuracy. Following data

collection, they uploaded the information to a GitHub repository for organized and collaborative data management. Despite challenges such as GPS accuracy, data synchronization, and varying field conditions, the teams effectively mitigated these issues.

The GIS field visit successfully gathered significant data, now serving as a valuable resource for ecological research, conservation planning, and future GIS analysis. The collected data will contribute to understanding the dynamics of the ecosystem, its components, and their interactions. This information can be instrumental in developing strategies for the conservation and management of the ecosystem.

Fig: Data collection using MobileGIS at Bird Park

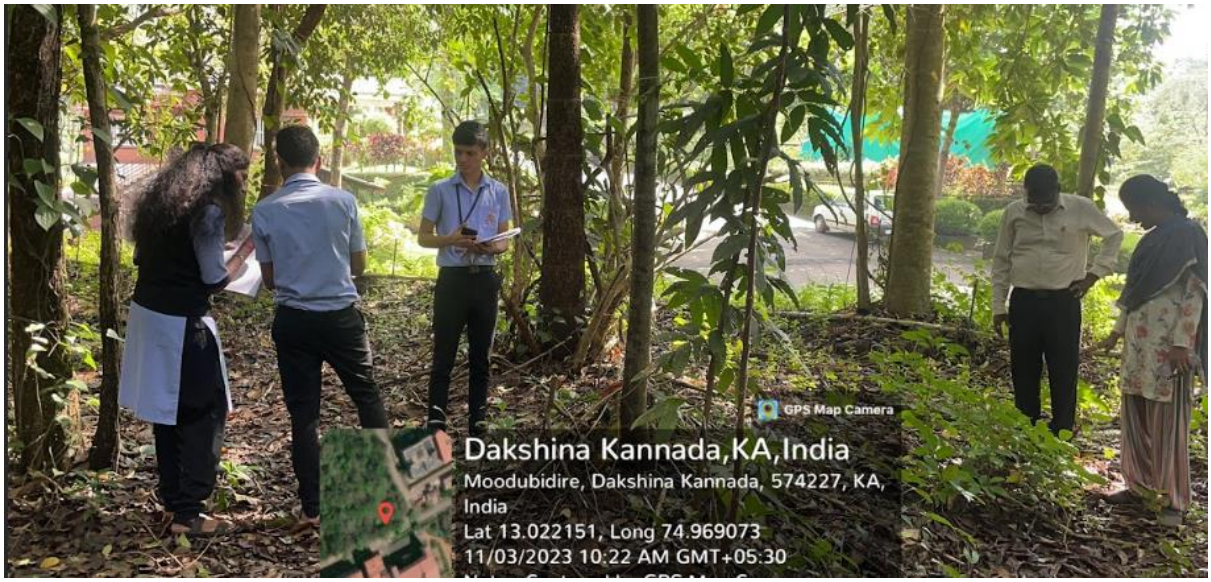


Fig: Data collection using MobileGIS at Shobhavana

Expert Lecture – Dr. Prakash P S

During the afternoon session, Dr. Prakash, a distinguished speaker from Irish Centre for High-End Computing ICHEC, delivered an informative presentation on the multidisciplinary field of remote sensing and geospatial technologies. He explained the process of remote sensing and highlighted the crucial role of sensors in capturing remote sensing images. The presentation showcased remote sensing images obtained through ISRO and detailed a wide range of remote sensing applications, from environmental monitoring to natural resource exploration.

Dr. Prakash also discussed related technologies such as photogrammetry, drones, GPS, and GIS. He emphasized the interplay of geospatial technologies in relation with new age tools viz., AI and ML, depicting how they contribute to terrain modeling, high-resolution mapping, accurate positioning, and data integration and analysis.

Fig: Guest Lecture by Dr. Prakash

Day 5

GRASS GIS - Hands on

During the hands-on session hosted by Dr. Vinay S., participants learned how to utilize GRASS GIS (Geographic Resources Analysis Support System) for the importation, processing, and analysis of satellite data. The session encompassed various tasks, including importing vector boundaries, converting vectors to rasters, integrating folders into the GIS system, importing satellite imagery, developing signatures, and performing supervised classification.

The session commenced with the importation of vector boundaries into GRASS, followed by their conversion into a raster format suitable for subsequent analysis. Participants acquired skills in organizing and importing

diverse datasets from local directories into GRASS, as well as incorporating and visualizing satellite images within the GIS platform. The latter part of the session focused on developing signatures from the imported satellite data. Participants were instructed in the process of identifying and extracting significant features or classes from the imagery. Additionally, they were introduced to supervised classification techniques, demonstrating how to classify or categorize different land cover types within the satellite imagery.

Overall, this hands-on session provided participants with practical exposure to various functionalities of GRASS GIS. It equipped them with the skills required to manipulate and extract meaningful information from satellite data, enhancing their ability to conduct geospatial analyses and land cover classifications within the GRASS GIS platform.

Fig: Participants working with GRASS GIS

Valedictory Session

The IEEE-organized workshop marked a significant milestone in the field of Geographic Information Systems (GIS) at AIET. The event featured certificate distribution to participants, along with speeches from Dr. Dattathreya, the chief guest, and Dr. Vinay S, the resource person. Both speakers emphasized the importance of GIS in the modern technological landscape and its pivotal role in decision-making processes.

In his speech, Dr. Dattathreya spoke about the advancements and potential applications of GIS in various industries, highlighting its significance in

diverse domains, from urban planning to environmental monitoring. Dr. Vinay S, the distinguished resource person, demonstrated the practical aspects of GIS, showcasing its implementation in real-world scenarios. His presentation illustrated how GIS technologies aid in spatial analysis, cartography, and data visualization, unveiling the power of geographic information in solving complex problems.

The ceremony also recognized the efforts of participants who completed workshops in GIS by distributing certificates. It served as a platform for knowledge sharing and recognition of the dedication and commitment of the participants in advancing their GIS proficiency.

Fig: Valedictory Session

Workshop Outcomes

The workshop focused on introducing the students to concepts of Remote Sensing, Digital Image Processing, AI and ML with both theory and hands on session. The participants were able to Develop Indices for extracting natural features. The use of Google Colab opened a new dimension in the thought processes for the participants. The participants were able to work on the basic steps for evaluating Land use of Moodbidri using Landsat 9 data. The participants had a flavor of Remote Sensing using classical and advanced methods using FOSS.

Acknowledgement

We would like to thank the efforts made by the young IEEE brains for organizing and conducting the workshop. We would like to express out sincere gratitude to the resource persons Mr. Vedant, Mr. Satyam, Mr. Neerav, Dr. Prakash for introducing them to diverse topic beyond the syllabi. We are extremely thankful to the Management, Principal, Deans, Heads and faculties for their kind support.

Dr. Vinay S
IEEE Member
Geoinformatics Research Lab
Associate Professor,
Dept of Civil
AIET, Mijar

Dr. Manjunath Kotari
IEEE Member
Professor, Dept of CSE
AIET, Mijar

Dr. Dattathreya
Dean Planning
IQAC Main Coordinator
Professor, Dept of ECE
AIET, Mijar

Dr. Peter Fernandes
Principal &
IQAC Chairman
AIET, Mijar

Dr. DATTATHREYA BE, M. Tech, Ph.D
Sr. Professor, Dept. of ECE
Alva's Institute of Engineering & Technology
Shobhavana Campus, Mijar
Moodbidri, D.K - 574225, Karnataka

.

ANNEXURE

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

(A Unit of Alva's Education Foundation (R) Moodbidri)
Affiliated to Visvesvaraya Technological University, Belagavi.
Approved by AICTE, New Delhi & Recognized by Government of Karnataka
Accredited by NAAC with A+ & NBA (CSE & ECE)

Ref.No.: AIET/IQAC/2022-23/ 13/10/2023

Internal Quality Assurance Cell (IQAC)
Geoinformatics Research Lab
IEEE Student Branch Chapter, AIET (STB60215368)
Institution's Innovation Council

To,

Dr. Peter Fernandes
IQAC Chairman
AIET, MIJAR

Subject: Request permission to conduct Hands on Workshop on Satellite Image Processing

Respected Sir,

We are pleased to inform you that AIET-IQAC, Geoinformatics Research Lab, IEEE student branch chapter (STB60215368) & IIC, AIET are planning to organize a hands-on workshop between 30th October to 4th November 2023. The meeting will be conducted focusing on innovative tools and methods for analysis of Satellite images using Digital Image Processing techniques (AI/ML) with focus on Western Ghats and Coastal Ecosystems. Target audience would be interested students and teaching fraternity across all Engineering branches from AIET (2nd, 3rd and 4th year) and Degree College with an upper limit of 50 participants. The workshop will be conducted at Machine Learning Lab.

We would request you to kindly permit us to proceed with the activities planned. Your valuable suggestions and support in this endeavor would be greatly appreciated.

Thank you for your consideration.

Dr. Dattathreya
IQAC Main Coordinator
AIET, MIJAR, Moodbidri

13/10/2023
Dr. Vinay S
Geoinformatics Research Lab,
AIET, MIJAR, Moodbidri

13/10/23
Dr. Manjunath Kotari
IEEE Faculty Counselor
AIET, MIJAR, Moodbidri

PRINCIPAL
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225, D.K

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

(A Unit of Alva's Education Foundation (R) Moodbidri)
Affiliated to Visvesvaraya Technological University, Belagavi.
Approved by AICTE, New Delhi & Recognized by Government of Karnataka
Accredited by NAAC with A+ & NBA (CSE & ECE)

Ref.No.: AIET/IQAC/2022-23/ 13/10/2023

CIRCULAR

It is hereby informed that hands on training workshop on Innovative tools and methods for Satellite image processing for monitoring Western Ghats and Coastal Ecosystems is organized by IQAC, Geoinformatics Research Lab & IEEE student branch chapter between 30 October and 4th November 2023, venue being Machine Learning Lab between 9:30 AM and 5:00 PM. In this regards all HOD's (Agri, AIML, Civil, CSE, CSD, ECE, ISE) are requested to kindly be present for the inaugural and depute select faculty and interested students from the department.

Please note: Faculty are required to be present full time once registered

Dr. Peter Fernandes
Principal & IQAC Chairman
AIET Mijar, Moodbidri

To

Principal Alva's Degree College, All Deans and Heads, AIET

M – N.R. Shetty
ISE – N.R.S.
CSE – T. HP
CSD S
AIML S
MBA Sruj L

ECE GLa
ME – T. HP
CIVL
AG – Sa
PHY
CHY
Dean (SA) – 13/10/23

ALVA'S
Education Foundation®

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

(A Unit of Alva's Education Foundation (R) Moodbidri)
Affiliated to Visvesvaraya Technological University, Belagavi.
Approved by AICTE, New Delhi & Recognized by Government of Karnataka
Accredited by NAAC with A+ & NBA (CSE & ECE)

IEEE AIET

Date	9:30 to 11:00	11:00 to 12:30	12:30 to 1:30	1:30 to 3:00	3:30 to 5:00
30 October 2023	Inauguration	Introduction to Remote Sensing (Dr. Vinay)	LUNCH	Digital Image Processing (Mr. Vedant)	Satellite and Data Sources (Dr. Vinay)
31 October 2023	AI and ML for Beginners (Mr. Satyam)			Hands on session – Python for image processing (Mr. Vedant/ Mr. Satyam)	
2 November 2023	Open-Source Tools (Mr. Neerav)	GRASS GIS Hands on (Dr. Vinay)		GRASS GIS Hands on (Dr. Vinay)	
3 November 2023	GRASS GIS Hands on (Dr. Vinay)			Mini Project	
4 November 2023	Mini Project + Presentation	Valedictory and Certificate Distribution			

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY
Affiliated to Visvesvaraya Technological University, Belagavi.
Approved by AICTE, New Delhi & Recognized by Government of Karnataka
Accredited by NAAC with A+ & NBA (CSE&ECE)

Registration List of Week Workshop on Innovative Tools &Techniques in Satellite Image Processing (30th Oct-4th Nov,2023)

Sl No	Name	Member Id	Signature
1.	Akshatha Hebbar	99490549	
2.	Abhishek B K	99496050	
3.	Archana Hublikar	99473663	
4.	Gayatri C Bhagavantnavar	99408977	
5.	Naveesh Kumar	99496077	
6.	Nikisha Krishna Nagesh Poojari	99473931	
7.	Priyanka D	99494027	
8.	Tejaswini Venkatesh Gudigar	99483672	
9.	Kamma Puspuri Madhavi	99494382	
10.	Reshna Nandipi	99474505	
11.	Shetty Balija Deepthi	99494335	
12.	Sansitha Rajesh	99495546	
13.	Toshif Husen Patil	99495745	
14.	Shrishanth S Shetty	-	
15.	Saneesha Prashanth Kadam	-	
16.	Yashwanth R	-	
17.	Gururagavendra Paluri	-	
18.	D Chandan Lagubigi	-	
19.	Bhavish	-	
20.	Jhanavi V	-	
21.	Darshan Rai	-	
22.	Harshith D M	-	
23.	Shetty Yash Chandrashekar	-	
24.	Kagwade Abhishek Shashank	-	
25.	Abhay Gowda M K	-	
26.	Bhagyashree Shyam Naik	-	
27.	Venkatesh Hanamanta Hulasad	-	
28.	Ganesh	-	
29.	Sudarshan T Bhat	-	
30.	Lakshan	-	
31.	Rakshith	-	
32.	Mohammed Rihan	-	
33.	Arvinkanth Suuvarna	-	
34.	Moammed Adil	-	
35.	Anirudh Kamath K	-	
36.	Muhammed Yamin Sharfuddin	-	
37.	Syed Saleha	-	
38.	Krupashree R.	-	
39.	Chaitra S Koddaddi	-	
40.	Vedanth V	-	

41.	Laya R	-	
42.	Abhiram H. A.	-	
43.	Abhishek Pandit	-	
44.	Jyothi B.	-	
45.	Abhishek P.	-	
46.	Varshini K. L.	-	
47.	Mohammed Sharfuddin	-	
48.	Satyam Pawale	-	
49.	Manjunath M. Sajjan	-	
50.	A. Bhoomika Reddy	-	
51.	Chaitra	-	
52.	Dr Bramha Prakash H P	99627377	
53.	Neerav V Patel	99494129	

IEEE Student Branch Chair

IEEE Faculty Councellor

CERTIFICATE

Of Appreciation

THIS IS TO CERTIFY THAT

Vedanth V

In recognition of his/her amazing performance and great efforts during the Workshop on Innovative tools and Methods for Satellite Image Processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

CERTIFICATE

Of Appreciation

THIS IS TO CERTIFY THAT

Neeraw V Patel

In recognition of his/her amazing performance and great efforts during the Workshop on Innovative tools and Methods for Satellite Image Processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Abhiram HA

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

CERTIFICATE

Of Appreciation

THIS IS TO CERTIFY THAT

Satyam Pawale

In recognition of his/her amazing performance and great efforts during the Workshop on Innovative tools and Methods for Satellite Image Processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Akshatha

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Abhishek P

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Anirudh Kamath K

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Abhishek Pandit

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Bhagyashree Shyam Naik

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Archana Hublikar

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Bhavish

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Arvinkanth Suvarna

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation

IEEE AIET

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Jahnavi V

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S	Dr Manjunath Kotari	Dr Peter Fernandis
Faculty Member IEEE	*Faculty councilor IEEE*	*Principal AIET*

ALVA'S Education Foundation

IEEE AIET

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

D Chandan Lagubigi

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S	Dr Manjunath Kotari	Dr Peter Fernandis
Faculty Member IEEE	*Faculty councilor IEEE*	*Principal AIET*

ALVA'S Education Foundation

IEEE AIET

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Kagwade Abhishek

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S	Dr Manjunath Kotari	Dr Peter Fernandis
Faculty Member IEEE	*Faculty councilor IEEE*	*Principal AIET*

ALVA'S Education Foundation

IEEE AIET

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

GURURAGAVENDRA PALURI

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S	Dr Manjunath Kotari	Dr Peter Fernandis
Faculty Member IEEE	*Faculty councilor IEEE*	*Principal AIET*

ALVA'S Education Foundation® | IEEE AIET | ISAC | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Mohammed Rihan

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ISAC | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Kamma purapuri madhavi

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ISAC | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Muhammed Yamin Sharfuddin

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ISAC | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Mohammed Adil

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation

IEEE AIET

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Saneesha prashant kadam

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation

IEEE AIET

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Priyanka D

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation

IEEE AIET

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Sansitha Rajesh

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation

IEEE AIET

INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Reshna Nandipi

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ISAC | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Shrishanth S Shetty

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S	Dr Manjunath Kotari	Dr Peter Fernandis
Faculty Member IEEE	*Faculty councilor IEEE*	*Principal AIET*

ALVA'S Education Foundation® | IEEE AIET | ISAC | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Satyam Pawale

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S	Dr Manjunath Kotari	Dr Peter Fernandis
Faculty Member IEEE	*Faculty councilor IEEE*	*Principal AIET*

ALVA'S Education Foundation® | IEEE AIET | ISAC | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Sudarshan T Bhat

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S	Dr Manjunath Kotari	Dr Peter Fernandis
Faculty Member IEEE	*Faculty councilor IEEE*	*Principal AIET*

ALVA'S Education Foundation® | IEEE AIET | ISAC | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Shetty Balija Deepthi

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S	Dr Manjunath Kotari	Dr Peter Fernandis
Faculty Member IEEE	*Faculty councilor IEEE*	*Principal AIET*

ALVA'S Education Foundation® | IEEE AIET | ATLA'S INSTITUTE OF ENGINEERING & TECHNOLOGY | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

VEDANTH V

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ATLA'S INSTITUTE OF ENGINEERING & TECHNOLOGY | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Syed Saleha

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ATLA'S INSTITUTE OF ENGINEERING & TECHNOLOGY | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

Yash Shetty

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

Dr Peter Fernandis
Principal
AIET

ALVA'S Education Foundation® | IEEE AIET | ATLA'S INSTITUTE OF ENGINEERING & TECHNOLOGY | INSTITUTION'S INNOVATION COUNCIL (Ministry of Education Initiative)

CERTIFICATE

OF PARTICIPATION

THIS IS TO CERTIFY THAT

TEJASWINI VENKATESH GUDIGAR

In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing

Dr Vinay S
Faculty Member
IEEE

Dr Manjunath Kotari
Faculty councilor
IEEE

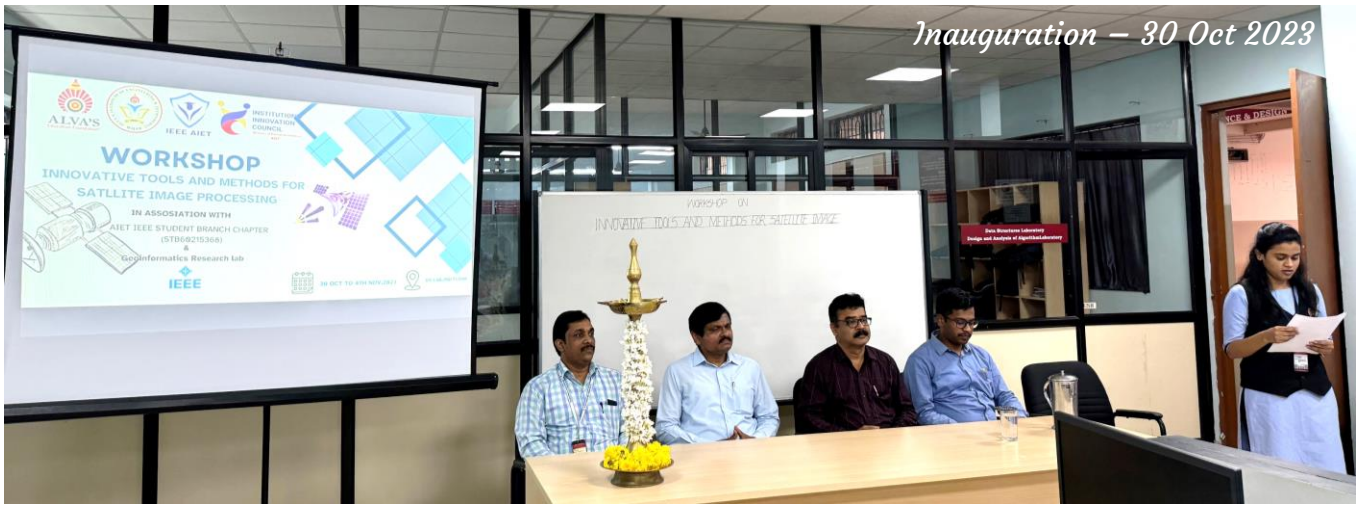
Dr Peter Fernandis
Principal
AIET


ALVA'S
Education Foundation
IEEE AIET
INSTITUTION'S
INNOVATION
COUNCIL
CERTIFICATE
OF PARTICIPATION
THIS IS TO CERTIFY THAT
Yashwanth R
In recognition for his/her active participation and great efforts during the workshop on innovative tools and methods for satellite image processing
Dr Vinay S
Faculty Member
IEEE
Dr Manjunath Kotari
Faculty councilor
IEEE
Dr Peter Fernandis
Principal
AIET

Advancing Technology for Humanity

IEEE BANGALORE SECTION

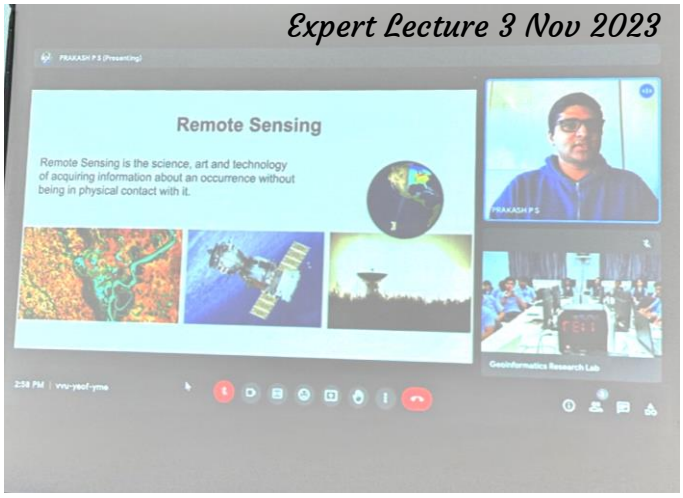
IEEE Mangalore Subsection



Inauguration – 30 Oct 2023

Expert Lecture 30 Oct 2023

Expert Lecture 31 Oct 2023



Expert Lecture 3 Nov 2023

Valedictory 4 Nov 2023

Alva's Institute of Engineering and Technology,

Shobhavana Campus, Mijar, Moodbidiri
Dakshina Kannada, Karntaka – 574 225

ALVA'S Education Foundation®