



Report - Hands on Training in Digital Image Processing & its Applications

NAME OF ACTIVITY: Workshop on Hands on Training in Digital Image Processing & its Applications

DATE & DURATION: May 14-16, 2024

ORGANIZED BY: Department of Civil Engineering

RESOURCE PERSON: Dr. Pran Nath Dadhich

DATE: 14/05/2024 to 16/05/2024

OUTCOMES:

CO1: Gain hands-on experience in using modern tools and techniques essential for civil engineering applications.

CO2: Understand the importance of sustainability in civil engineering practices and its impact on the environment.

CO3: Develop the ability to work collaboratively in a team to execute engineering tasks and communicate findings effectively.

MAPPING OF COS WITH POS AND PSOS:

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Dr. Mahesh Bundele
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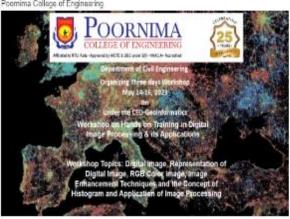
Director
Poornima College of Engineering
ISI-6, FILCO Institutional Area
Strapura, JAIPUR

OBJECTIVE:

- Train the participants with the theoretical concepts of the digital image processing techniques with main emphasize to remote sensing applications.
- Understanding of various state-of-art techniques in image processing.
- Training on the development of pattern recognition and digital image analysis algorithms.
- Knowledge and hands-on training of software for image analysis.
- Training of the students with recent developments in digital image processing in industries.

CIRCULAR





Dr. Mahesh Bundele
B.E., M.E., Ph.D.

Director

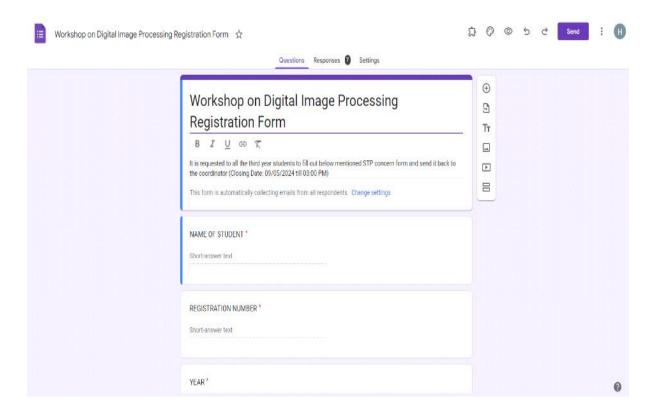
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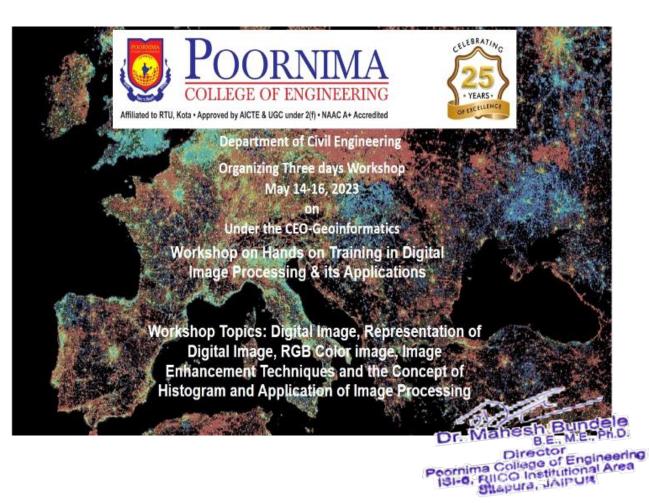
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Google Form for Registration:



BROCHURE:



INTRODUCTION:

In this workshop, we'll delve into the intricate world of digital image processing, a pivotal component of remote sensing technology. From satellite imagery capturing the Earth's surface to drones surveying inaccessible terrains, remote sensing platforms provide us with a wealth of data that holds immense potential for scientific research, environmental monitoring, urban planning, agriculture, disaster management, and much more.

Throughout our session, we'll unravel the complexities of digital image processing techniques tailored for remote sensing applications. We'll explore how algorithms and software tools transform raw sensor data into meaningful insights, enhancing our understanding of natural phenomena and human activities on a global scale.

Through hands-on demonstrations, case studies, and interactive discussions, we aim to equip you with the knowledge and tools needed to navigate the dynamic landscape of digital image processing in remote sensing.

Session Overview:

Date	Day	Topics Covered				
		Basic of Satellite Images				
14/05/2024	TUESDAY	Digital Image Concepts				
		Representation of Digital Image				
		Acquiring Satellite Images using Bhoonidhi portal of				
		ISRO				
		Letter dustion to Endos imposing auftman				
		Introduction to Erdas imagine software				
15/05/2024	WEDNESDAY	RGB Color images				
		Image Enhancement Techniques and the Concept of				
		Histogram technique.				
		Image enhancement through the PAN merge.				
		Basic concepts of Image classification				
16/05/2024	THURSDAY	Image Interpretation Keys/ Elements				
		Image Classification Methods- Supervised and				
		Unsupervised				
		Analysis and Discussion of classified satellite is age				

Day: 1

DATE: 14/05/2024, (Tuesday)

Basics of Satellite Images:

- Satellite images are captured by satellites orbiting the Earth.
- They provide valuable information about the Earth's surface.
- Used in various fields like cartography, environmental monitoring, and urban planning.

Digital Image Concepts:

- Digital images are composed of pixels, each representing a small portion of the image.
- Image resolution determines the level of detail in an image.
- Color depth refers to the number of colors that can be represented in an image.

Representation of Digital Images:

- Digital images are represented using matrices of numerical values.
- Grayscale images have one matrix representing brightness values.
- Color images have multiple matrices representing color channels (e.g., red, green, blue).

4. Acquiring satellite images using Bhunidhi portal of ISRO

The Bhunidhi portal, developed by the Indian Space Research Organisation (ISRO), provides access to satellite imagery for various applications. This step-by-step guide explains how to download satellite images using the Bhunidhi portal.

Step 1: Accessing the Bhunidhi Portal

Open your web browser and navigate to the Bhunidhi portal website (URL: [insert URL]).

Log in to the portal using your credentials. If you don't have an account, sign up for one to access the features.

Step 2: Searching for Satellite Images

Once logged in, navigate to the search interface or dashboard.

Dr. Mahesh Bundele
B.E., M.E., Ph.D.

Director
Poornima College of Engineering
131-6, Filico Institutional Area
Stiapura, JAIPUR

Specify your search criteria, such as location, date range, satellite sensor, and image resolution.

Step 3: Viewing Image Results

After entering your search parameters, click on the "Search" or "Submit" button.

The portal will display a list of satellite images matching your search criteria.

Preview the images to ensure they meet your requirements.

Step 4: Selecting Images for Download

Select the satellite images you wish to download by clicking on them or checking the respective checkboxes.

You can choose multiple images for download if needed.

Step 5: Downloading Images

After selecting the desired images, locate the download option (usually represented by a download icon or button).

Click on the download option to initiate the download process.

Depending on the file size and your internet connection speed, the download may take some time.

Step 6: Post-Download Processing (Optional)

Once the images are downloaded, you can use image processing software to analyze and manipulate them as needed.

Perform tasks such as image enhancement, classification, and georeferencing to extract valuable information from the images.



Day: 2

DATE: 15/05/2024, (Wednesday)

• Introduction to Erdas Imagine Software

Erdas Imagine is a powerful remote sensing and image processing software widely used for analyzing and interpreting satellite and aerial imagery. This brief overview introduces the basic functionalities of Erdas Imagine software and explores the concept of RGB color images commonly used in remote sensing applications.

Erdas Imagine Software:

Erdas Imagine is a comprehensive software suite developed by Hexagon Geospatial for remote sensing, spatial analysis, and image processing.

It offers a wide range of tools and capabilities for handling various types of satellite, aerial, and drone imagery.

Users can perform tasks such as image interpretation, classification, mosaicking, and change detection.

Introduction to RGB Color Images:

RGB (Red, Green, Blue) color images are a common type of digital image representation where each pixel is defined by three color channels: red, green, and blue.

These color channels are combined to create a full-color image where each pixel's color is a mixture of red, green, and blue intensities.

RGB color images closely resemble how the human eye perceives color, making them intuitive and widely used in various applications.

Key Features of Erdas Imagine for RGB Color Images:

Importing and Displaying Images:

Erdas Imagine allows users to import satellite, aerial, and other imagery in various formats such as GeoTIFF, JPEG, and ERDAS IMAGINE (.img) format.

Once imported, users can visualize the images in the software's display window, enabling easy exploration and interpretation.

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Color Enhancement and Adjustment:

Users can perform color enhancement and adjustment techniques to improve the visual quality of RGB images.

This includes adjusting brightness, contrast, and color balance to enhance image clarity and highlight specific features.

Image Analysis and Classification:

Erdas Imagine offers tools for image analysis and classification, allowing users to identify and classify objects within RGB images.

Classification techniques can be applied to separate land cover types, vegetation, water bodies, and built-up areas based on their spectral signatures.

Image Fusion and Integration:

Users can fuse or integrate multiple RGB images with other spectral bands or datasets to create composite images with enhanced information content.

Image fusion techniques combine the strengths of different sensors or image sources to generate high-quality, multispectral imagery.

Day: 3

DATE: 16/05/2024, (Thursday)

Basic Concepts of Image Classification:

Image classification is the process of categorizing pixels within an image into thematic classes or categories based on their spectral characteristics.

Key concepts include spectral resolution (the number of bands), spatial resolution (the size of pixel), and thematic resolution (the number of classes).

Image Interpretation Keys/Elements:

Image interpretation involves analysing the visual characteristics of satellite imagery to identify features and land cover types.

Poornima College of Engineering 131-6, RIICO Institutional Area Stapura, JAIPUR Elements of image interpretation include tone/colour, texture, pattern, shape, size, shadow, and association.

Image Classification Methods - Supervised and Unsupervised:

Supervised classification involves training a classifier using a set of known, labelled samples to classify pixels into predefined classes.

Unsupervised classification groups pixels based on their spectral similarity without prior knowledge of class labels, often resulting in clusters of similar spectral signatures.

Analysis and Discussion of Classified Satellite Image:

Once a satellite image is classified, the results are typically analysed and interpreted to extract meaningful information.

Analysis involves assessing the accuracy of the classification, identifying areas of interest, and evaluating changes over time.

Discussion may include insights gained from the classification results, implications for land use planning or environmental monitoring, and recommendations for further analysis or actions.

PHOTOGRAPHS:



CONCLUSION:

The three-day workshop on digital image processing and its applications has been a transformative journey, providing participants with a comprehensive understanding of the fundamental concepts and practical techniques in this dynamic field. Throughout the workshop, attendees delved into a diverse range of topics, including image acquisition, enhancement, classification, and analysis, gaining valuable insights into the potential applications across various domains.

Participants have not only acquired theoretical knowledge but also honed their practical skills through hands-on sessions and real-world case studies. By exploring cutting-edge tools and software platforms, such as Erdas Imagine and ENVI, attendees have developed proficiency in processing and interpreting digital imagery, paving the way for innovative solutions in research, industry, and academia.

Moreover, the workshop fostered a collaborative environment where participants engaged in fruitful discussions, shared experiences, and exchanged ideas. This collective learning experience has enriched their perspectives and inspired creativity in leveraging digital image processing techniques to address complex challenges and drive meaningful impact.

As the workshop draws to a close, participants depart with newfound knowledge, skills, and enthusiasm to apply digital image processing in their respective fields. Armed with practical insights and a deeper understanding of the potential applications, they are well-equipped to harness the power of imagery for environmental monitoring, agriculture, urban planning, disaster management, and beyond.

In essence, the three-day workshop has been a catalyst for professional growth, collaboration, and innovation, empowering participants to unlock the full potential of digital image processing and make meaningful contributions to society. As they return to their endeavors, they carry with them the tools and inspiration to embark on a transformative journey in the realm of digital imagery and its applications.

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Peornima College of Engineering
181-6, RIICO Institutional Area
Stlapura, JAIPUR

Sample Certificate



DEEPARTMENT OF CIVIL ENGINEERING

C. No. - 2023-24/CE/WVI-008

CERTIFICATE OF PARTICIPATION

This is to certify that

Mr. NITIN KUMAR

REG. No. - PCE21CE024

Poornima College of Engineering, Jaipur has participated in the workshop on Hands on Training in Digital Image Processing & its Applications held from 14-16 May 2024.

Dr. Mahesh Bundele Principal and Director, Poornima College of

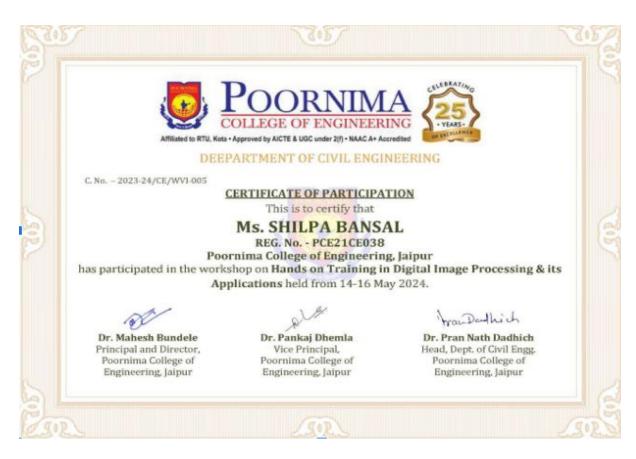
Engineering, Jaipur

Dr. Pankaj DhemlaVice Principal,
Poornima College of
Engineering, Jaipur

Dr. Pran Nath Dadhich Head, Dept. of Civil Engg.

Head, Dept. of Civil Engg. Poornima College of Engineering, Jaipur

> Dr. Mahesh Bundele B.E., M.E., Ph.D. Director Poornima College of Engineering 191-6, FIIICO Institutional Area Stlapura, JAIPUR



ATTENDANCE SHEET

Dr. Mahesh Bundele
B.E., M.E., Ph.D.
Director
Poornima College of Engineering
131-6, Fulco Institutional Area
Stlapura, JAIPUR

	Poornima	College of Eng	ineering	
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FEEDBACK

Dr. Mahesh Bundele
B.E., M.E., Ph.D.

Director
Peornima College of Engineering
151-6, Fill Co Institutional Area
Strapura, JAIPUR

FEEDBACK ANALYSIS (2023-24)								
S.No.	Attributes		100					
1	Did the session meet its objectives?	Outstanding 77.21	Excellent 10.91	Good 8.29	Average 1.20	Satisfactory 0.00	Remark	
2	Did you find the contents useful?	Outstanding 75.88	Excellent 14.19	7.92	Average	Satisfactory 0.00	Remark	
3	Did it help students to enhance their skills or learnings?	Outstanding 73.29	Excellent 16.11	Good 6.49	Average	Satisfactory 0.00	Remark	
4	Did you receive uninterrupted Connectivity in case of online sessions?	Outstanding 71.20	Excellent 18.59	Good 5.19	Average	Satisfactory 0.00	Remark	
5	How do you rate this session overall?	Outstanding 72.29	Excellent 18.52	Good 6.99	Average	Satisfactory 0.00	Remark	

Overall Remark:- These kind of sessions should be conducted in the future for more awareness.