



POORNIMA
COLLEGE OF ENGINEERING

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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:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	3	-	-	-	-	-	-	-	3	-	-
CO2	-	-	-	-	-	2	-	-	-	-	-	-	-	-	3
CO3	-	-	-	-	-	-	-	-	3	-	-	-	-	2	-


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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

Workshop on Hands on Training in Digital Image Processing & its Applications

HOD CIVIL PCE <hodcivil.pce@poornima.org>
to PCE- ▾

Wed, 8 May, 13:59 (8 days ago) ☆ ↶ ⋮

Dear Students,

The Department of Civil Engineering is organizing a Workshop on Hands on Training in Digital Image Processing & its Applications from May 14-16, 2024.

The focus of the workshop will be: Digital Image, Representation of Digital Image, RGB Color Image, Image Enhancement Techniques and the Concept of Histogram and Application of Image Processing.

It is informed to register for this workshop through the below google form link.

<https://forms.gle/wuUjLNDm87FVhw2X38>

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Thanks and Regards

Pran N. Dadhich (D. Eng)
Department of Civil Engineering
Poornima College of Engineering




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Google Form for Registration:

The screenshot shows a Google Form titled "Workshop on Digital Image Processing Registration Form". The form is set against a light purple background. At the top, there is a header bar with the title, a star icon, and navigation links for "Questions", "Responses" (with a count of 7), and "Settings". Below the header, the form content is displayed in a white box. The title "Workshop on Digital Image Processing Registration Form" is followed by a text area containing instructions: "It is requested to all the third year students to fill out below mentioned STP concern form and send it back to the coordinator (Closing Date: 09/05/2024 till 03:00 PM)". Below this, there is a note: "This form is automatically collecting emails from all respondents. [Change settings](#)". The form then contains three required text input fields: "NAME OF STUDENT *", "REGISTRATION NUMBER *", and "YEAR *". Each field has a "Short-answer text" label and a dashed line indicating the input area. To the right of the form, there is a vertical toolbar with icons for adding, deleting, duplicating, and other form editing functions.

BROCHURE:

The brochure is for a workshop organized by the Department of Civil Engineering at Poornima College of Engineering. The background is a dark, abstract, colorful pattern. At the top left is the Poornima College of Engineering logo, which includes a shield with a book and a lamp, and the text "POORNIMA COLLEGE OF ENGINEERING". To the right of the logo is a gold shield with the text "CELEBRATING 25 YEARS OF EXCELLENCE". Below the logo, it says "Affiliated to RTU, Kota • Approved by AICTE & UGC under 2(f) • NAAC A+ Accredited". The main text in the center reads: "Department of Civil Engineering", "Organizing Three days Workshop", "May 14-16, 2023", "on", "Under the CEO-Geoinformatics", "Workshop on Hands on Training in Digital Image Processing & its Applications". Below this, the workshop topics are listed: "Workshop Topics: Digital Image, Representation of Digital Image, RGB Color image, Image Enhancement Techniques and the Concept of Histogram and Application of Image Processing". At the bottom right, there is a signature of "Dr. Mahesh Bunde" with the text "B.E., M.E., Ph.D.", "Director", "Poornima College of Engineering", "131-0, RICO Institutional Area", "Sitapura, JAIPUR".

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
14/05/2024	TUESDAY	<ul style="list-style-type: none">• Basic of Satellite Images• Digital Image Concepts• Representation of Digital Image• Acquiring Satellite Images using Bhoonidhi portal of ISRO
15/05/2024	WEDNESDAY	<ul style="list-style-type: none">• Introduction to Erdas imagine software• RGB Color images• Image Enhancement Techniques and the Concept of Histogram technique.• Image enhancement through the PAN merge.
16/05/2024	THURSDAY	<ul style="list-style-type: none">• Basic concepts of Image classification• Image Interpretation Keys/ Elements• Image Classification Methods- Supervised and Unsupervised• Analysis and Discussion of classified satellite image


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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.


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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.


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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 IMAGE (.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.


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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.


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Sample Certificate




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ATTENDANCE SHEET


[Signature]
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Poornima College of Engineering Department of Civil Engineering Workshop on Digital Image Processing and Its Applications				
Registration No.	Participant Name	Sign 14/05/2024	Sign 15/05/2024	Sign 16/05/2024
PCE21CE045	Pethia Sudhakar	Pethia	Pethia	Pethia
PCE21CE041	Budhar	Budhar	Budhar	Budhar
PCE21CE042	Sujata	Sujata	Sujata	Sujata
PCE21CE039	Shaguni Verma	Shaguni	Shaguni	Shaguni
PCE21CE043	Tamara Singh	Tamara	Tamara	Tamara
PCE21CE040	Hareesh	Hareesh	Hareesh	Hareesh
PCE21CE045	Tilak Raj	Tilak Raj	Tilak Raj	Tilak Raj
PCE21CE034	Ravi Kumar Sharma	Ravi	Ravi	Ravi
PCE21CE046	Vijay Kumar	Vijay	Vijay	Vijay
PCE21CE044	Rahul Singh	Rahul	Rahul	Rahul
PCE21CE006	Akash Dhole	Akash	Akash	Akash
PCE21CE010	Devanshi Meena	Devanshi	Devanshi	Devanshi
PCE21CE048	Anurag Singh	Anurag	Anurag	Anurag
PCE21CE042	Aashish Chandra	Aashish	Aashish	Aashish
PCE21CE003	Kashif Nani	Kashif	Kashif	Kashif
PCE21CE045	Waseem Ali	Waseem	Waseem	Waseem
PCE21CE035	Ravi Arora	Ravi	Ravi	Ravi
PCE21CE044	Tara Bhatnagar	Tara	Tara	Tara
PCE21CE008	Rajesh Kumar Sharma	Rajesh	Rajesh	Rajesh
PCE21CE003	Aditya Kumar	Aditya	Aditya	Aditya
PCE21CE038	Sushma Barua	Sushma	Sushma	Sushma
PCE21CE034	Nitin Kumar	Nitin	Nitin	Nitin
PCE21CE025	Prithvi Chandra	Prithvi	Prithvi	Prithvi
PCE21CE044	Gaurav Chandra	Gaurav	Gaurav	Gaurav
PCE21CE005	Aditya Meena	Aditya	Aditya	Aditya
PCE21CE040	Shreya Sharma	Shreya	Shreya	Shreya
PCE21CE033	Vandana Singh	Vandana	Vandana	Vandana
PCE21CE001	Ashish Chandra	Ashish	Ashish	Ashish
PCE21CE003	Ashish	Ashish	Ashish	Ashish
PCE21CE011	Devanshi	Devanshi	Devanshi	Devanshi
PCE21CE015	Himanshu	Himanshu	Himanshu	Himanshu
PCE21CE019	Manish	Manish	Manish	Manish
PCE21CE005	Waseem Ali	Waseem	Waseem	Waseem
PCE21CE012	Fareez Khan	Fareez	Fareez	Fareez
PCE21CE032	Ranjit Chandra	Ranjit	Ranjit	Ranjit
PCE21CE035	Ravi Meena	Ravi	Ravi	Ravi
PCE21CE042	Waseem Ali	Waseem	Waseem	Waseem

FEEDBACK

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FEEDBACK ANALYSIS (2023-24)							
S.No.	Attributes	Total Feed Back					100
1	Did the session meet its objectives?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		77.21	10.91	8.29	1.20	0.00	
2	Did you find the contents useful?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		75.88	14.19	7.92	1.11	0.00	
3	Did it help students to enhance their skills or learnings?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		73.29	16.11	6.49	1.20	0.00	
4	Did you receive uninterrupted Connectivity in case of online sessions?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		71.20	18.59	5.19	1.32	0.00	
5	How do you rate this session overall?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		72.29	18.52	6.99	1.00	0.00	
Overall Remark:- These kind of sessions should be conducted in the future for more awareness.							


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