



NALLA NARASIMHA REDDY
Education Society's Group of Institutions - Integrated Campus
(UGC AUTONOMOUS INSTITUTION)



School of Engineering

Department of Electronics and Communication Engineering

Date: 11-05-2023

Report

on

Guest Lecture: "IMAGE RESTORATION TECHNIQUES IN IMAGE PROCESSING"

Overview of Program

The Department conducted a Technical Seminar on "Image Restoration Techniques in Image Processing" by Mr. Seetha Mounish Patel, CEO, Optimum Private Limited, Hyderabad. The seminar introduced students to image restoration methods used to improve degraded digital images in various engineering applications.

Date Organized	Title of Program	Name of Resource Person	Participants
09-05-2023	"Image Restoration Techniques in Image Processing"	Mr. Seetha Mounish Patel, CEO, Optimum Private Limited, Hyderabad	B. Tech. ECE III-I (82 Students) and ECE faculty members



Department of Electronics and Communication Engineering

Organizes

Guest Lecture

on

IMAGE RESTORATION TECHNIQUES IN IMAGE PROCESSING



Mr. Seetha
Mounish Patel

Date: 09-05-2023

Time: 2:00 PM

Venue: ECE Seminar Hall

Purpose of Program

The seminar was organized to enhance students' understanding of digital image processing, image degradation models, and restoration algorithms. It also aimed to create awareness of research opportunities in computer vision, artificial intelligence, and image analysis.

Program Highlights

The resource person discussed image degradation models, noise removal techniques, spatial and frequency domain filtering, Wiener filtering, inverse filtering, and AI-based image restoration methods. Practical demonstrations and application examples in medical imaging, satellite imaging, and surveillance systems made the session highly informative.

1. Image Degradation and Noise Models

The session commenced with an introduction to image degradation and various types of noise that affect the quality of digital images. Students learned about the causes of image degradation, including motion blur, sensor imperfections, atmospheric disturbances, and transmission errors. The resource person explained different noise models such as Gaussian noise, Salt-and-Pepper noise, and Speckle noise, enabling students to understand how image quality is affected during acquisition and transmission. The discussion helped students appreciate the importance of identifying degradation models before applying appropriate restoration techniques.

2. Spatial and Frequency Domain Filtering

Students gained valuable insights into spatial and frequency domain filtering techniques used to enhance and restore digital images. The speaker explained how spatial domain filtering directly processes image pixels using smoothing and sharpening filters, while frequency domain filtering manipulates image frequency components using mathematical transformations. Through practical examples, students understood the advantages and limitations of both approaches and learned how these techniques improve image quality in various engineering applications.



3. Wiener and Inverse Filtering

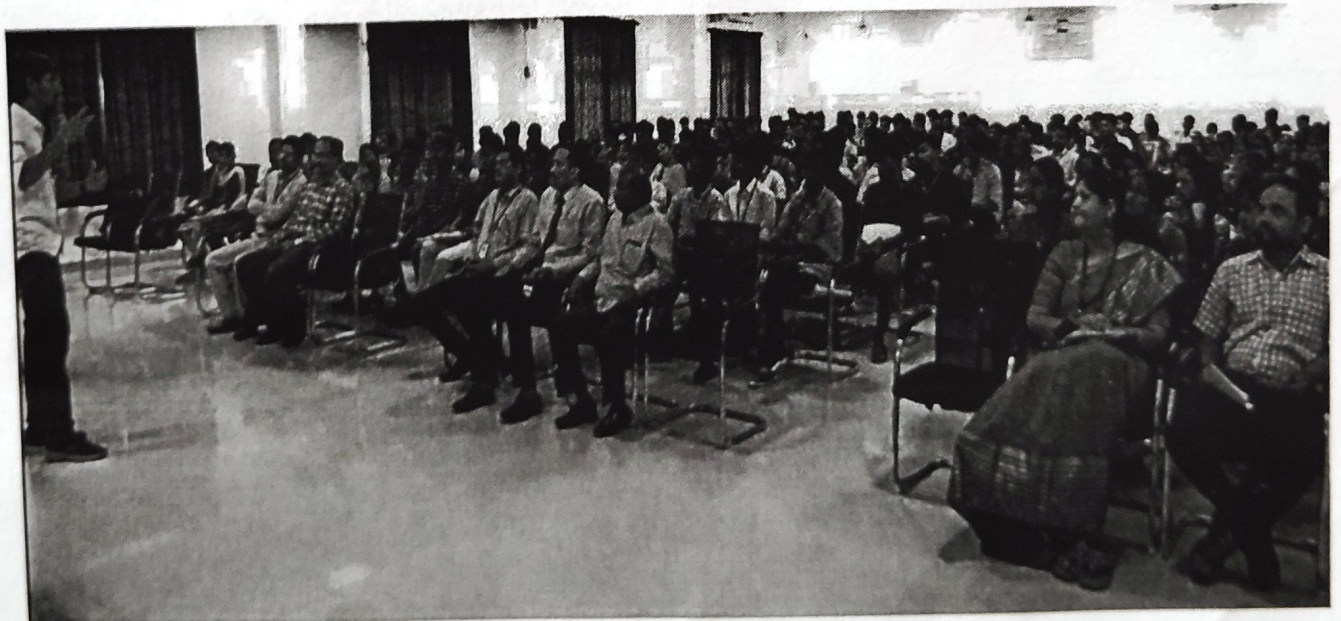
The resource person introduced advanced image restoration techniques, including Wiener filtering and inverse filtering, which are widely used for recovering degraded images. Students learned how inverse filtering attempts to reconstruct the original image by reversing the degradation process, while Wiener filtering minimizes noise and restoration errors by considering statistical information. The practical illustrations enabled students to understand the effectiveness of these techniques in improving image clarity and reducing distortions in real-world applications.

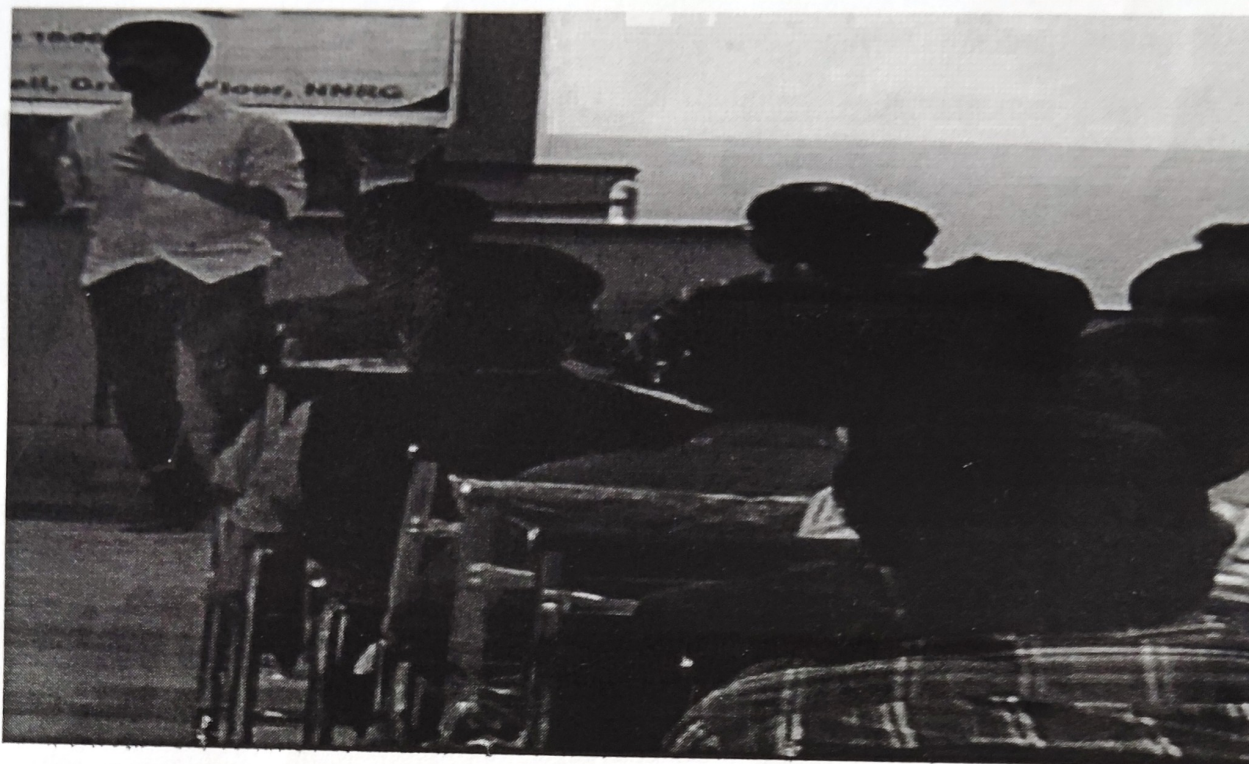
4. Medical and Satellite Imaging Applications

Students were exposed to the practical applications of image restoration techniques in medical imaging, satellite image processing, remote sensing, and surveillance systems. The resource person demonstrated how restored images improve the accuracy of disease diagnosis, environmental monitoring, disaster management, and geographical analysis. These real-world examples helped students understand the significance of digital image processing in solving societal and industrial challenges while highlighting the interdisciplinary nature of image processing technologies.

5. Emerging AI-Based Image Restoration Techniques

The lecture concluded with an overview of recent advancements in Artificial Intelligence (AI) and Deep Learning for image restoration. Students learned how Convolutional Neural Networks (CNNs) and other deep learning models are being used to remove noise, restore damaged images, and enhance image quality with greater accuracy than conventional methods. The speaker also discussed current research trends and career opportunities in Artificial Intelligence, Computer Vision, and Image Processing, motivating students to develop programming, analytical, and research skills to contribute to next-generation intelligent imaging systems.

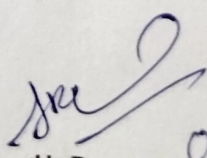




Outcome of Program

Students gained knowledge of the SoC FPGA boot process, embedded system architecture, and industrial applications. The lecture enhanced their understanding of FPGA technologies and motivated them to pursue advanced learning in embedded systems.

Guest Lecture	Mapped POs & PSOs	Mapped SDGs
Image Restoration Techniques in Image Processing (09-05-2023)	PO1, PO2, PO4, PO5, PO12 PSO1, PSO2	SDG 3: Good Health and Well-being SDG 4: Quality Education SDG 9: Industry, Innovation and Infrastructure


 HoD 11-05-2023
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