

JSPM's

Rajarshi Shahu College of Engineering, Pune

Department of Electronics & Telecommunication Engineering

INNOVATIONS IN TEACHING AND LEARNING

Subject: Computer Vision

Class: Final Year BTech E&TC

Topics: Introduction to Machine Learning

NAME OF THE ACTIVITY: NPTEL Video Lecture

- I. **Concept:** The NPTEL lecture on "Introduction to Machine Learning" introduces students to the fundamental principles, algorithms, and applications of machine learning, with emphasis on its role in computer vision and image processing. The lecture provides an overview of supervised and unsupervised learning, classification, regression, clustering, and the importance of data-driven decision-making in modern engineering systems.
- II. **Objective (Goal):**
 - To familiarize students with the basic concepts and terminologies of machine learning.
 - To help students understand the connection between machine learning and computer vision applications.
 - To introduce various learning paradigms and algorithms used in image processing tasks such as feature extraction, pattern recognition, and object detection.
 - To motivate students towards advanced learning and research in artificial intelligence and visual computing
- III. **Appropriateness (Relevance of Selected Method):**

The use of NPTEL video lectures is highly appropriate as it provides students direct exposure to expert teaching from IIT faculty. The content is conceptually rich, visually supported, and aligned with the curriculum of "Computer Vision and Image Processing." The chosen method effectively bridges theoretical learning with real-world applications, enhancing conceptual clarity through well-structured examples and case studies.
- IV. **Effective Presentation (Implementation Details):**


The lecture was screened in the classroom using a smart board. The session was preceded by a brief introduction highlighting the importance of machine learning in modern image processing systems. Students were encouraged to take notes and list questions for post-video discussions.

After the lecture, a faculty-led interactive discussion was conducted to connect the video content with syllabus topics. Supplementary reading materials from NPTEL were shared for further reference.

**Computer Vision and Image Processing
– Fundamentals and Applications**

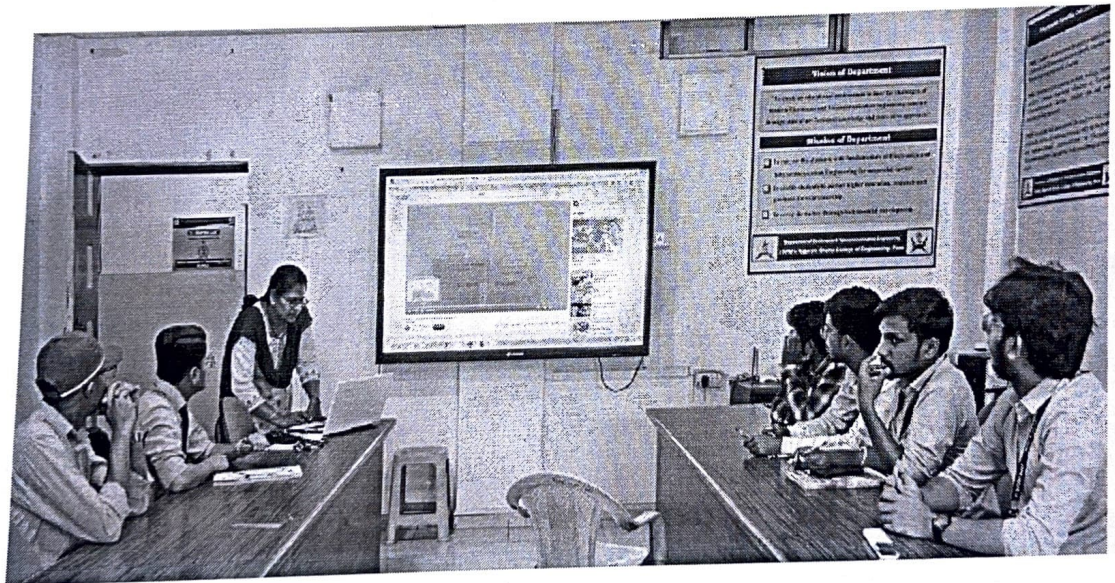
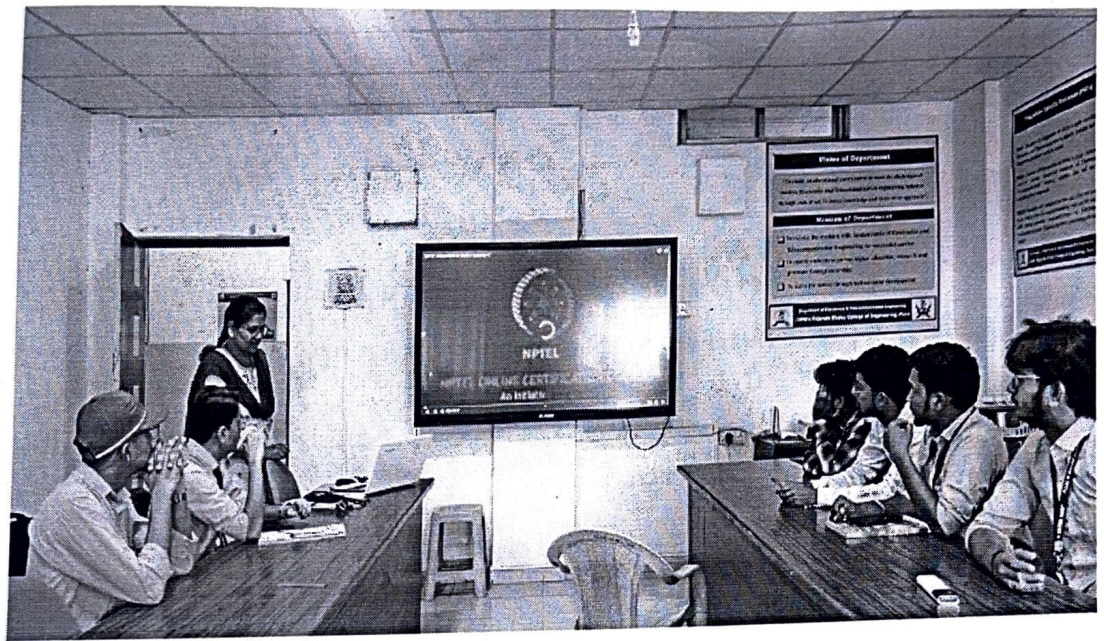
Introduction to Machine Learning

Course Instructor: Dr. M.K. Bhuyan
Professor



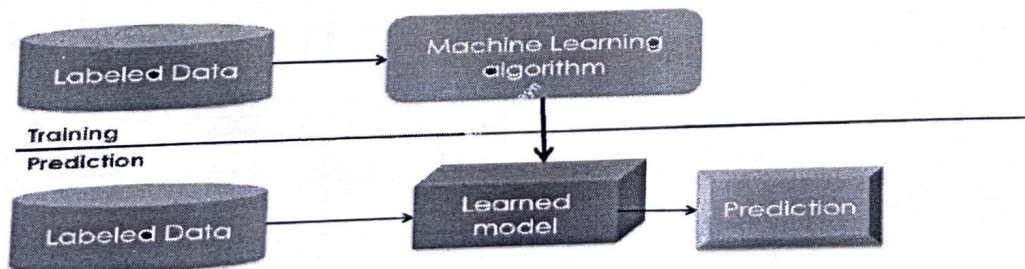
Department of Electronics and Electrical Engineering,
Indian Institute of Technology Guwahati, India.





Machine Learning Basics

Machine learning is a field of computer science that gives computers the ability to learn without being explicitly programmed



Methods that can learn from and make predictions on data

Ismiini Lourentzou, Introduction to Deep Learning (Material from CS224 NLP with DL course at Stanford)

Types of Learning

Supervised: Learning with a labeled training set

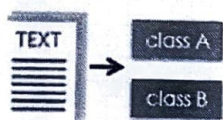
Example: email *classification* with already labeled emails

Unsupervised: Discover patterns in unlabeled data

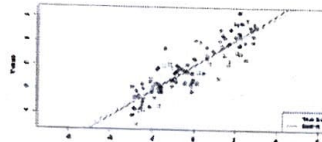
Example: *cluster* similar documents based on text

Reinforcement learning: learn to act based on feedback/reward

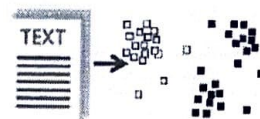
Example: learn to play Go, reward: win or lose



Classification

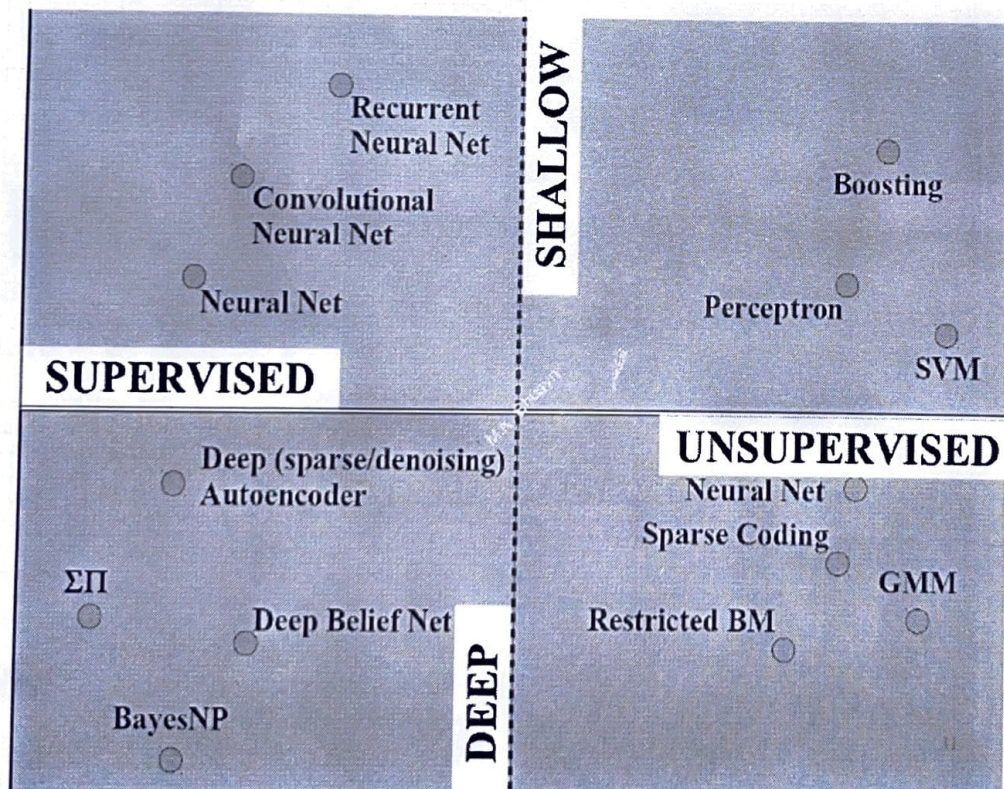


Regression



Clustering

Anomaly Detection
Sequence labeling



V. Results (Impact):

- Students gained a foundational understanding of how machine learning is applied in vision-based systems.
- The session enhanced their ability to differentiate between traditional image processing and machine learning-based approaches.

- C. Improved participation and curiosity were observed during the post-lecture discussion.
- D. The activity contributed to better conceptual linkage between academic learning and industrial applications in AI and computer vision.

VI. Reproducibility and Reusability by Other Scholars for Further Development

Sr.No	Innovation Used by	Details of User	Purpose of Reproducibility and Reusability
1.	Dr. S.A. Patilane	Mtech faculty	The same methodology can be reused for related topics such as deep learning, NN, pattern recognition

VII. PEER REVIEW AND CRITIQUE

NAME OF THE ACTIVITY: ~~Machine Simulator~~

NPTEL VIDEO LECTURE

Category: Internal/External/Interdepartmental

Score: (1:Least 2: Moderate 3:Highly)

Question 1. Is this Innovative Teaching and Learning Methodology useful during content delivery?

Question 2. Did this innovation increase student motivation or participation?

Question 3. Will it show improvement in student learning?

Question 4. Suggestions for improvement in future iterations.

Category	Name of Peer	Organization	Q.1	Q.2	Q.3	Q.4 Suggestion/Critique
Internal	SAB Dr. Swati Bhisikar	RSCOE E&TC	2	2	2	The lecture was highly relevant and effective.
External	Dr. Priya Charles		2	2	2	The NPTEL resource selection was excellent. Suggested adding real-life examples or datasets from industry appl ⁿ for deeper understanding.
Interdepartmental	A.V. Shivashimpi	A&R Dept				Appreciated the interdisciplinary approach, recommended conducting a comparative session on machine learning vs deep learning for broader perspective.

Course Co-ordinator
Dr. Rane Charushila Vijay

Module Co-ordinator
Dr. Rane C.V.

HOD E&TC
Dr. S.C. Wagaj