

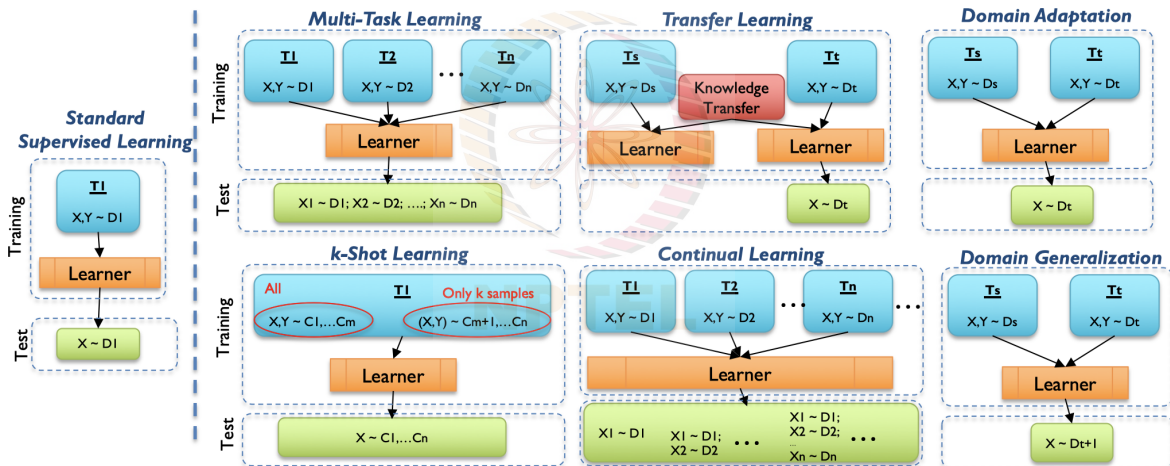
Course Conclusion

Vineeth N Balasubramanian

Department of Computer Science and Engineering
Indian Institute of Technology, Hyderabad

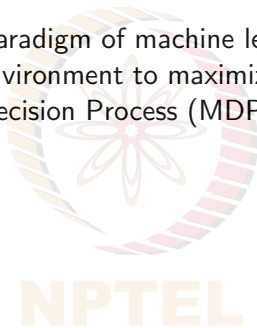


Other Topics: Learning with Limited Supervision



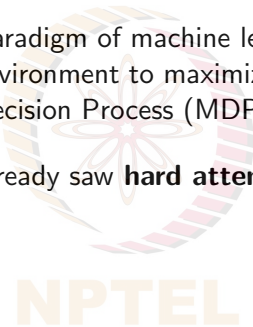
Other Topics: Reinforcement Learning and Vision

- **Reinforcement Learning:** A paradigm of machine learning based where an agent takes actions and interacts with an environment to maximize total, potentially delayed, rewards; usually modeled as a Markov Decision Process (MDP)
- Uses in computer vision?



Other Topics: Reinforcement Learning and Vision

- **Reinforcement Learning:** A paradigm of machine learning based where an agent takes actions and interacts with an environment to maximize total, potentially delayed, rewards; usually modeled as a Markov Decision Process (MDP)
- Uses in computer vision? We already saw **hard attention** and **NAS** - which in turn have many applications!
- Other example use cases:
 - Games
 - Visual servoing
 - Visual tracking



Other Contemporary Topics

Methods

- Egocentric Vision
- Embodied Vision
- Visual Perception and Robotics
- Visual Tracking
- Hyperspectral Image Analysis
- Computer vision for Augmented/Virtual Reality
- Fair, Explainable and Trusted Computer Vision

Applications

- Vision for Autonomous Navigation
- Vision for Drone Imagery
- Vision for all Seasons: Adverse Weather and Lighting Conditions
- Vision for Healthcare and Biomedical Imaging
- Vision for Agriculture
- Vision for Fashion and Retail
- Vision for Sports

Course Topics

Segment 1: The Journey So Far

- Image Formation, Linear Filtering
- Edges, Blobs, Features
- Visual Descriptors, Matching

Segment 2: The Building Blocks

- Review of Neural Networks
- Convolutional Neural Networks (CNNs)
- CNN Architectures, Visualizing and Understanding CNNs

Segment 3: The Many Forms and Uses

- Recognition, Verification, Retrieval, Detection, Segmentation

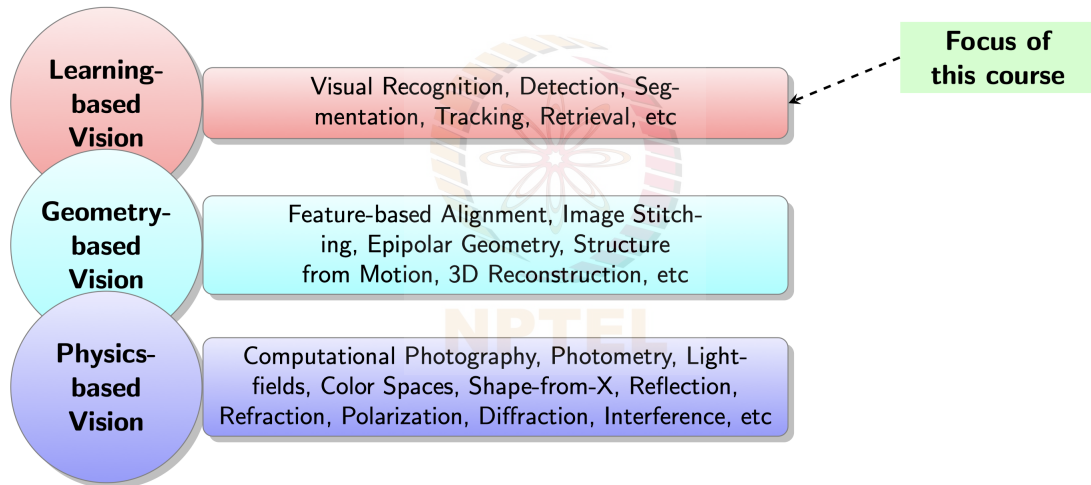
Segment 4: A Dimension Beyond

- Recurrent Neural Networks
- Spatio-Temporal Models
- Attention, Vision-Language Tasks

Segment 5: Staying Contemporary

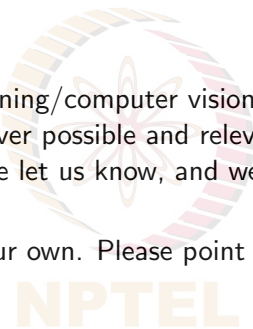
- Deep Generative Models
- Learning with Limited Supervision
- Recent Trends

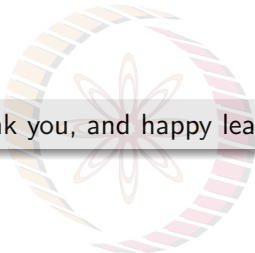
Computer Vision: Topics



Acknowledgements

- We are grateful to the deep learning/computer vision courses and their contents that are publicly available online. Wherever possible and relevant, these sources have been cited. If you notice an oversight, please let us know, and we will be glad to acknowledge.
- Any errors in the material are our own. Please point out such issues, and we will be glad to rectify.



The NPTEL logo is centered in the background. It features a stylized flower or star shape with eight petals, rendered in a light pinkish-red color. This central motif is enclosed within a circular border composed of many small, overlapping rectangular segments in shades of yellow and orange. Below the circular logo, the word "NPTEL" is written in a bold, sans-serif font, colored in a light yellow or orange hue.

Thank you, and happy learning