Advanced Digital Image Processing and Computer Vision

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Objectives of this course

- Advanced level selected topics on Computer Vision and Image Processing.
- Assumption: Foundation on 1st Level DIP course, Linear Algebra and Programming.
  - Self-reading
  - A first level assignment will be floated within a week and you have to submit by two weeks. This is a part of TA evaluation.
- Major themes:
  - Fundamentals of Image processing, Image Transforms, Feature extraction, and description, Color Image Processing, Deep learning based processing, Video Processing, Multi-view camera geometry, Object Tracking

Syllabus

- Fundamentals of Image Processing
- Color Image Processing
  - Color Fundamentals, Enhancement, Color demosaicing
- Image Transforms
- Feature extraction, and description
- Deep learning based Processing
  - CNNs, Object classification and localization, Semantic segmentation,
- Video processing
- Camera Geometry
  - Projective geometry
  - Single View, Stereo, Multi-view
- Object Tracking

Text and reference books

- Multiple View Geometry in Computer Vision: R. Hartley and A. Zisserman, Cambridge University Press.
- Computer Vision: Algorithms & Applications, R. Szeleski, Springer.
- Computer vision: A modern approach: Forsyth and Ponce, Pearson (Indian Reprint).
- Digital Video Processing - A. Murat Tekalp, Prentice Hall, 1995
- Image and video processing in the compressed domain: Jayanta Mukhopadhyay, CRC Press, 2011.
- https://nptel.ac.in/courses/106/105/106105216/

Assignments and evaluation

- Implementation using MATLAB / OpenCV, etc.
- Three in numbers:
  - The first one on fundamentals.
  - Others on solving a few interesting problems.
- Moodle based submission.
- Penalty for copy cases: -10 for each irrespective of the role of students.
- Distribution: Mid Semester:20, End Semester: 40
  Assignment: 40

Thank You