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| 1. | Title of the course | Computer Vision |
| 2. | Course number | EE507L |
| 3. | Structure of credits | 3-0-0-3 |
| 4. | Offered to | PG |
| 5. | New course/modification to | Modification To EE5113/3 |
| 6. | To be offered by | Department of Electrical Engineering |
| 7. | To take effect from | July 2022 |
| 8. | Prerequisite | CoT |
| 9. | **Course Objective(s):** Students will be able to understand the concepts,theory and computational algorithms needed for several advanced real world inference tasks from given images. Aid them in understanding how machine can accomplish recognition, reorganization and 3D reconstruction of objects of the scenes from images. Can simulate and develop several exciting examples in generating descriptions and inferences from images in several domains ranging from medical, economical,engineering to state of the art industrial needs. | |
| 10. | **Course Content:** Image Formation Models, Monocular imaging system, Orthographic & Perspective Projection, Camera model and Camera calibration, Image representations (continuous and discrete), Edge detection. Image Processing and Feature Extraction: Harris corner detector, SIFT, HoG descriptor; Displacement and Motion models, Global motion estimation: Affine and Projective; Motion Estimation: Optical flow computation, Laplacian and Gaussian pyramids, Robust optical flow estimation; KLT tracker, Advanced Trackers such as KCF; Structure from motion; Depth estimation, Active stereo: Fringe projection techniques; Binocular imaging systems, Stereo Vision, Fundamental matrix estimation, RANSAC, Image rectification and disparity estimation; Viola Jones face detection, Face representation: Eigen faces and 2D PCA. Deformable curves and surfaces, Snakes and active contours; Image Segmentation. Machine Learning and Deep Learning paradigms for Computer vision. | |
| 11. | **Textbook(s):**<br>1. Shah M, *Fundamentals of Computer Vision*, (1977).<br>2. Szeliski R, *Computer Vision: Algorithms and Applications*, Springer (2011). | |
| 12. | **Reference(s):**<br>1. Forsyth D and Ponce J, *Computer Vision A Modern Approach*, Prentice Hall (2002). | |