Name of the Programme: M.Sc. in Artificial Intelligence
Course Code: CSI-522
Title of Course: Computer Vision
Number of Credits: 4 (2L-2T-0P)
Effective from AY: 2023-24

Prerequisites for the course	Python programming, linear algebra and calculus , array manipulation	
Objectives	The aim of the course is to introduce the fundamental concept of computer vision and to emphasize the importance of computer vision in developing and implementing different projects	
Theory:	Image Formation - Geometric Camera Models - Light and Shading - Color - Early Vision: Just One Image	6 hours
	Linear Filters - Local Image Features - Texture - Early Vision: Multiple Images - Stereopsis - Structure from Motion - Mid-Level Vision	6 hours
	Segmentation by Clustering - Grouping and Model Fitting- Tracking - High-Level Vision- Registration- Smooth Surfaces and Their Outlines - Range Data - Learning to Classify - Classifying Images	6 hours
	Detecting Objects in Images- Topics in Object Recognition Applications	6 hours
	Image-Based Modeling and Rendering - Looking at People- Image Search and Retrieval - Optimization Techniques	6 hours
Tutorial session/Practical assignments:	1. Open CV setup and demo on getting started up.	3 hours
	2. Image representation and image manipulation using open CV	3 hours
	3. Image storage and manipulation.	3 hours
	4. Photographs and perspective projections	3 hours
	5. Gaussian smoothings	3 hours
	6. Canny edge detection	3 hours
	7. Corner detection	3 hours
	8. Gabor filters	3 hours
	9. Hough transformation for lines	3 hours
	10. Hough transformation for circles	3 hours
Pedagogy:	lectures/Practical/ tutorials/assignments/self-study	
References/Readings:	1. Computer Vision: Algorithms And Applications by Richard Szeliski https://www5.cs.fau.de/lectures/ss-14/computer-vision-cv/mputer-vision-exercises/index.html Read more at: https://viso.ai/computer-vision/computer-vision-books/ 2. Computer Vision: Models, Learning, and Inference Read more at: https://viso.ai/computer-vision/computer-vision-books/ 3. Modern Computer Vision with PyTorch by Yeshwanth Reddy and V Kishore Ayyadevara	

	Read more at: https://viso.ai/computer-vision/computer-vision-books/ 4. Learning OpenCV 4 Computer Vision with Python 3 Read more at: https://viso.ai/computer-vision/computer-vision-books/
Course Outcomes:	1. Acquire and process raw image data and Relate image data to 3D scene structures. 2. Know the concepts behind and how to use several model-based object representations, and critically compare them. 3. Know many of the most popularly used current computer vision techniques by carrying out suitable lab experiments listed above 4. Undertake computer vision work in MATLAB or python OpenCV

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