PVP 20

PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)
Kanuru, Vijayawada-520007

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)

IV B.Tech I Semester

Video Analytics with Open CV

Course Code	**20AM4701D**	**Year**	IV	**Semester**	I
Course Category	Professional Elective Core	**Branch**	CSE (AI&ML)	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Machine Learning and Deep Learning
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes		
Upon successful completion of the course, Student will be able to		
CO1	Describe the basics of image processing to understand its role in computer vision tasks.	**L2**
CO2	Use object detection techniques to design face and gesture recognition algorithms.	**L3**
CO3	Apply video processing methods and video analytics principles to solve real-world engineering problems.	**L3**
CO4	Analyze object detection to evaluate methods, frameworks, and metrics for effective machine learning solutions.	**L4**

Contribution of course outcomes towards achievement of program outcomes & Strength of correlations (3: Substantial,2: Moderate,1: Slight)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PO11	PSO1	PSO2
CO1	2												
CO2	3												
CO3	3											2	
CO4		3									2		

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Unit No.	Syllabus Contents	Mapped CO
I	Introduction: Computer Vision, Image representation and image analysis tasks, Image representations, digitization, properties, Color images, Data structures for Image Analysis, Levels of image data representation, Traditional and Hierarchical image data structures.	**CO1, CO2**
II	Image Pre-Processing: Local pre-processing, Image smoothing, Edge detectors, Zero-crossings of the second derivative, Scale in image processing, Canny edge detection, Parametric edge models, Local pre-processing in the frequency domain, Line detection by local pre-processing operators, Image restoration.	**CO1, CO2**
III	Object Detection Using Machine Learning: Object detection, Object detection methods, Deep Learning framework for Object detection, Bounding box approach, Intersection over Union (IOU).	**CO1, CO3, CO4**
IV	Deep Learning Architectures: R-CNN, Faster-R-CNN, You Only Look Once (YOLO), Salient features, Loss Functions, YOLO architectures.	**CO1, CO3, CO4**
V	Face Recognition and Gesture Recognition: Face Recognition, Introduction, Applications of Face Recognition, Process of Face Recognition, Deep Face solution by Facebook, Face Net for Face Recognition, Implementation using Face Net, Gesture Recognition.	**CO1, CO3, CO4**

Learning Resources
Text Books
1. Image Processing, Analysis, and Machine Vision, Thomson Learning, Milan Sonka, Vaclav Hlavac, Roger Boyle 2013 2. Computer Vision Using Deep Learning Neural Network Architectures with Python and Keras, Vaibhav Verdhan, 2021, A Press.
References
1. Computer Vision: Algorithms and Applications, Richard Szeliski , 2nd edition,2022, Springer 2. Computer Vision: Principles, Algorithms, Applications, Learning, E. R. Davies, 5th edition, 2017, Academic Press 3. Digital Video Processing, A. Murat Tekalp, 2nd edition, 2015,Pearson, 2015
e-Resources and other Digital Material
1. https://www.labellerr.com/blog/video-intelligence-tools/ 2. https://facit.ai/insights/video-analytics-guide