PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous) Kanuru, Vijayawada-520007

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (Data Science)

IV B Tech – I Semester (Data Science)

Video Analytics with Open CV

Course Code	20DS4701D	Year	IV	Semester	I	
Course Category	PEC	Branch	CSE (Data Science)	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 su	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)												
	P	P	P	P	P	P	P	P	P	P	P	PS	PS
С	2												
С	3												
С	3												
С		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, Zerocrossings 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