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Question Paper Code: U6G01

B.E./B.Tech. DEGREE EXAMINATION, APRIL /MAY 2025

Sixth Semester

CSE (Artificial Intelligence & Machine learning)

21UAM601- INTELLIGENT MACHINE VISION

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Write short notes on Image Formation. CO1-U
2. Find the no. of bits required to store a 256×256 image with 32 gray levels. CO2-App
3. Write the steps involved in Frequency Domain Processing. CO1-U
4. What is Pseudo Color Processing? CO1-U
5. List out the components of an object recognition system. CO1-U
6. What are the key differences between Kalman filters and mean-shift tracking? CO1-U
7. Given two stereo images, if the disparity between a feature in the left and right images is $d=10$ pixels and the camera baseline is $B=0.1$ m with a focal length $f=500$ px, compute the depth Z of the object. CO2-App
8. What are the main applications of 3D object reconstruction? CO1-U
9. Determine the object detection application to detect abandoned objects for a surveillance camera system. CO2-App
10. What is the importance of sensor fusion in autonomous vehicles? CO1-U

PART – B (5 x 16= 80 Marks)

11. (a) Explain the levels of Intelligence Machine Vision in detail. CO1-U (16)
Or
(b) Illustrate the Image Formation Model with neat diagram. CO1-U (16)

12. (a) Explain how Wiener filter approach can be used to minimize the Error in detail CO1-U (16)
- Or
- (b) Explain the various types of Noise. Consider that image is corrupted by Gaussian noise. Suggest suitable method to minimize Gaussian noise from the image and explain step by step Process. CO1-U (16)
13. (a) Given the following set of Points use Hough Transform to join these points A(1,4) B(2,3) C(3,1) D(4,1), E(5,0). Explain about Edge Linking and Discontinuity. CO2-App (16)
- Or
- (b) Apply neural networks to solve an object recognition problem for train a CNN for recognizing objects like cars or animals, with input layers, hidden layers and output classes. CO2 - App (16)
14. (a) Explain feature matching in the context of structure from motion CO1 - U (16)
- Or
- (b) Explain multi-view stereo and its applications in 3D object reconstruction. CO1 - U (16)
15. (a) A patient undergoes an MRI to determine if they have suffered a stroke. How could Intelligent Machine Vision identify the MRI scans in real-time to detect early signs of a stroke, such as blocked arteries or brain tissue damage, and alert the doctor with a potential diagnosis or recommendations for further testing? CO2 - App (16)
- Or
- (b) Imagine you are using an AR-based fitness application that tracks your movements and provides real-time feedback. How could Intelligent Machine Vision be used to detect your posture and gestures to give personalized corrections, ensuring a more engaging and realistic workout experience? CO2 - App (16)