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Question Paper Code: U6G01

B.E./B.Tech. DEGREE EXAMINATION, NOV 2025

Sixth Semester

CSE (Artificial Intelligence and 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. Define Machine Vision. CO1- U
2. Find the no.of bits required to store a 256*256 image with 32 gray levels. CO2-App
3. Write the mechanics of spatial filtering. CO1- U
4. Write about RGB Color Models. CO1- U
5. Define optimum statistical classifiers. CO1- U
6. A Kalman filter predicts a velocity of 5 m/s with an uncertainty variance of 0.4. If the measurement velocity is 6 m/s with a variance of 0.2, calculate the Kalman gain. CO2-App
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. What is the role of LiDAR in autonomous vehicles? CO1- U
10. Determine the object detection application to detect abandoned objects for a surveillance camera system. CO2-App

PART – B (5 x 16= 80 Marks)

11. (a) Perform Histogram equalization on the following 8X8 Image. CO2- App (16)
The grey level Distribution of the image Given Below

Gray Level(rk)	0	1	2	3	4	5	6	7
No of Pixel(Pk)	79	102	850	656	329	245	122	81

Or

- (b) Consider the following image what will be the new value of the pixel (2,2) if smoothing is done using a 3x3 neighbourhood. CO2- App (16)

0	1	0	2	7
2	7	7	4	0
5	6	4	3	3
1	1	0	7	5
5	4	2	2	5

Find (i) Mean Filter (ii) Weighted Average Filter (iii) Median Filter (iv) Min Filter (v) Max Filter And also Explain about the Smoothing Process.

12. (a) Explain how Weiner filter approach can be used to minimize the error in detail CO1- U (16)

Or

- (b) Explain Color and Pseudo color image processing in detail. 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 to train a CNN for recognizing objects like cars or animals, with input layers, hidden layers and output classes. CO2- App (16)

14. (a) Explain the process of disparity map computation in stereo vision. 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)