

Name:
Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2021

Course: Machine Vision
Program: B.Tech Mechatronics
Course Code: MECH4012P

Semester: VIII
Time: 03 hrs.
Max. Marks: 100

Instructions:

SECTION A

S. No.		Marks	CO
Q 1	Classify different types of images and images operation.	5	CO1
Q 2	Define mean and median filtering of noise.	5	CO1
Q 3	List the basic theory of Edge detection.	5	CO2
Q 4	Define template match pattern operator.	5	CO2
Q5	List the duality between dilation and erosion	5	CO3
Q6	List the advantage of morphological edge enhancement	5	CO3

SECTION B

Q 1	Describe the ADE'S EIGENFILTER APPROACH for the texture.	10	CO2
Q 2	Explain the gray level co-occurrence matrices.	10	CO3
Q3	By examining suitable binary images of corners, show that the median corner detector gives a maximal response within the corner boundary rather than half-way down the edge outside the corner. Show how the situation is modified for grayscale images. How will this affect the value of the gradient noise-skimming threshold to be used in the improved median detector?	10	CO4
Q 4	Explain the second order derivative scheme used in corner detection.	10	CO4
Q5	An "extremum" filter is an image-parallel operation that assigns every pixel the intensity value closer to the two extreme values in its local intensity distribution. Show that it should be possible to use such a filter to enhance images. What would be the disadvantage of such a filter?	10	CO3

SECTION-C

Q1	Starting with the following formula for curvature:	20	CO4
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$$\kappa = \frac{d^2y/dx^2}{[1 + (dy/dx)^2]^{3/2}}$$

Prove the equation as shown below. κ of the intensity function I . To obtain a realistic indication of the strength of a corner they multiplied κ by the magnitude of the local intensity gradient g .

$$C = \kappa g = \kappa(I_x^2 + I_y^2)^{1/2}$$

$$= \frac{I_{xx}I_y^2 - 2I_{xy}I_xI_y + I_{yy}I_x^2}{I_x^2 + I_y^2}$$

OR

Prove the statement made in the computational load of the histogram analysis for the global value method can be reduced from $O(N^3)$ to $O(N)$. Show also that the number of passes over the histogram required to achieve this is at most 2.