Total No. of Questions : 8]

SEAT No. :

P7284

[Total No. of Pages : 2

[6181]-383A

B.E. (Robotics and Automation)

MACHINE VISION SYSTEM

(2019 Pattern) (Semester-VII) (411501)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable data,if necessary.***

Q1) a) Explain in detail geometic mean filters with relevant mathematical equations. **[8]**

b) For the below given 5×5 image find out following: **[10]**

Image-

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

i) Probability Density Function (PDF) of each pixel value.
ii) Huffman's Code for each pixel value.
iii) What is the Huffman's code length for highest & lowest probability for pixel and why? Justify your answer.

OR

Q2) a) Below is the 5×4 binary image. **[8]**

Image-

0 0 1 1 1
1 1 1 0 0
0 0 1 1 1
1 1 0 0 0

For the given image calculate following:

i) Total number of Run length vectors.
ii) Compression ratio.
iii) Predict if data is compressed? Justify your answer.

P.T.O.

b) Write a short note on transform coding compression technique. **[5]**

c) What is the significance of probability density function in machine vision systems? Explain in detail. **[5]**

Q3) a) Explain region-based segmentation technique in detail. **[9]**

b) How the image is segmented with technique-based approach and explain an one type in detail? **[9]**

OR

Q4) a) Write a short note on approach-based segmentation in an image segmentation. **[9]**

b) How the image is segmented with technique-based approach and explain Structural technique in detail? **[9]**

Q5) a) Explain Fourier based alignment in motion estimation & how it is different from hierarchical motion estimation? **[9]**

b) Write a note on rotation & scale motion estimation techniques with relevant example. **[8]**

OR

Q6) a) Write a note on hierarchical motion estimation and explain how it is used & why it is common? **[9]**

b) Explain windowed correlation in motion estimation with relevant mathematical expression. **[8]**

Q7) a) What is supervised learning algorithm and explain in detail. **[9]**

b) What are deep neural networks and how it can be implemented in humanoid robots? **[8]**

OR

Q8) a) Explain in detail unsupervised learning algorithm and explain in detail. **[9]**

b) What are convolutional neural networks and explain how it is feasible to use in robotics applications. **[8]**