Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VIII.EXAMINATION – WINTER 2016

Subject Code: 182006 **Date: 24/10/2016**

Subject Name: Machine Vision (Department Elective - II)

Time: 02:30 PM to 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary and clearly mention the same.**
3. **Figures to the right indicate full marks.**
4. **Draw neat diagrams. Diagrams with inferior quality may not be awarded credit.**

Q.1 **(a)** Explain the effect of checker board and false contouring. Also discuss the cause of their occurrences in a digital image. **7**

(b) Describe the working of a smoothing filter. Discuss the variables which alter the working of smoothing filters. **7**

Q.2 **(a)** Schematically represent the following transformations and their inverses illustrating their needs for specific application on digital image. **7**

1. Identity transformation
2. Logarithmic transformation
3. Power law transformation

(b) Define histogram of a digital image. Describe various contrast stretching operations for different types of histograms. **7**

OR

(b) Explain the working of Laplacian filter in spatial domain. Also differentiate between the working of Laplacian filter and High Boost filter. **7**

Q.3 **(a)** Compare and contrast the working of normal median filter and adaptive median filter. Also bring out the relative merits and demerits of these filters. **7**

(b) Evaluate the following statements. **7**

1. The only way to obtain perfectly filtered image is to accept somewhat smaller filtered image by limiting the excursion of the center of filter mask.
2. Alpha trimmed mean filters are useful in situations involving multiple types of noises.

OR

Q.3 **(a)** 1. Show that the 2-D DFTcan be computed by successive computations of two 1-D DFTs, one after the other, one for all rows and the other for all columns. **7**
2. Show that the Forward Fourier Transform algorithm can be utilized to compute Inverse Fourier Transfer.

(b) Evaluate the following statements. **7**
1. Laplacian filtered image gives blurred image when histogram equalization is applied to it.
2. Iso-preference curves tend to become more vertical as the details in the image increases.

Q.4 **(a)** Graphically show the following filters explaining their practical applications in digital image processing. **7**
Ideal high pass filter; Ideal low pass filter; Band reject filter

(b) Explain the different ways to identify and characterize the additive noise present in the image. Assume suitable data for explanation. **7**

OR

Q.4 **(a)** Evaluate the following statements. **7**
1. Although there are areas of overlap, image enhancement is largely a subjective process, while image restoration is an objective process.
2. A high pass filter can be constructed from two low pass filters or by subtracting the low pass filter from unity.

(b) With the help of derivation and block diagram, describe the procedure used in homo-morphic filtering for image enhancement. How is gray level compression achieved in homo-morphic filtering? **7**

Q.5 **(a)** Compare and contrast various image enhancement techniques used for the application of character recognition. **7**

(b) With the help of neat sketches explain the morphological hit-or-miss transformation method for shape detection. **7**

OR

Q.5 **(a)** Graphically represent and explain the Ringing effect for different values of cut off frequencies and order of filters for Butter Worth Low Pass Filter. **7**

(b) Explain with suitable example: “Instead of using histogram directly for image enhancement, one can use some statistical parameters also for image enhancement. **7**

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