EX/ PG/CSE/T/116A/8/2017

M. C. S. E. 1ST Examination 2017

Image Processing

Time: **Three hours** Full Marks: **100**

Answer the ***first*** question and any ***four*** from others

1. a) Explain the theory of histogram equalization for image enhancement and write a C-like algorithm to implement it.
   b) Write a C/Java/Python program to display an image given in any standard file format.
   c) Write a C-like algorithm for implementing Sobel's operator for edge detection.
   (6 + 5) + 9 + 8

2. Given a gray-scale image describe the Otsu's method for selecting the threshold for converting it into segments.
   18

3. Explain connected components labeling and write a C-like algorithm to implement it.
   10 + 8

4. Propose a set of parameters for characterizing connected components. How can such a set be used to distinguish different connected components?
   8 + 10

5. How is binary dilation a natural candidate for parallel processing? Explain with digital examples, the significance of HMT and K-tolerance template matching. How is the concept of 4- or 8- connectedness going to affect pattern recognition?
   7 + 7 + 4

6. How are opening and closing unique as image processing operations? Propose a morphological algorithm for detecting the parts of a human-like binary image.
   18

7. Develop set of local filters for removing noise from images.
   18

8. Develop set of local filters for edge detection in images.
   18
