Total No. of Questions – [06]

Total No. of Printed Pages: [02]

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MAY 2022 - ENDSEM EXAM

B. TECH. (E & TC) (SEMESTER - II)

COURSE NAME: Image and Video Processing

COURSE CODE: ETUA40181A

(PATTERN 2018)

Time: [1Hr] [Max. Marks: 30]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4, Q.5 OR Q.6.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1 a What are SIFT features? Describe Scale space with reference to SIFT features. [4]

Q.1 b In Harris corner detection, if the equation for change in intensity is given by the equation of E(u,v) where M is covariance matrix, apply cornerness measure R to the given M matrix and decide whether the given point is a corner or edge? Justify the answer. Given K=0. 15 [6]

$$E(u,v) = (u \quad v) M \begin{pmatrix} u \\ v \end{pmatrix}$$

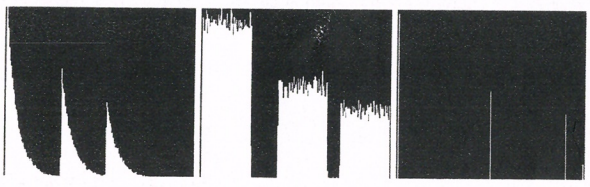
$$M = \begin{bmatrix} 1.27 & 0 \\ 0 & 0.045 \end{bmatrix}$$

OR

Q2 a With suitable example describe how minimum distance classifier is used in classification task? [4]

Q2 b Describe the SURF algorithm. Differentiate between SIFT and SURF features. Justify how the speed of operation is improved in SURF features? [6]

Q.3 a Identify and Comment on type of the noise from their histogram in the following image. Give the mathematical model for any one of the identified noise. [4]



Q.3 b With reference to JPEG scheme for Image compression, which block decides the compression ratio and the quality of the image after compression? Discuss how it does so? [6]

OR

Q.4 a Justify that Weiner filter reduces to Inverse filter if the noise in the image is zero. [4]

Q.4 b Refer the following image. Obtain the image after application of DCT transform. Analyze the energy of the image before and after transformation and comment on the result. [6]

2	2
2	2

Q.5 a Describe the video CODEC for H.264 and MPEG-4 Video Compression [4]

Q.5 b Refer following conversion formulae for RGB to YCbCr and YCbCr to RGB conversion. [6]

$$Y = 0.299R + 0.587G + 0.114B \qquad R = Y + 1.402Cr$$
$$Cb = 0.564(B - Y) \qquad G = Y - 0.344Cb - 0.714Cr$$
$$Cr = 0.713(R - Y) \qquad B = Y + 1.772Cb$$

Compute the Y,Cb and Cr values for normalized White color with RGB color triplet [1 1 1] and justify that reverse transformation also gives the same white color.

OR

Q.6 a Justify that the interlaced scanning help reducing the flicker in video [4]

Q.6 b Describe how block based approach is applied in video codec for motion estimation? [6]