1. (a) Differentiate between human and computer vision. Mention some features used in computer vision-based object detection and recognition.

(b) Describe a computer vision system for separating two Bangladeshi common fishes, such as Rui and Katla in a fish-processing plant.

1. (a) Compare between Canny and SUSAN edge detectors.

(b) Describe the Hough transformation algorithm for detecting straight lines.

1. (a) What is affine movement invariant? Discuss a practical computer vision application using any moment invariant.

(b) What is optical flow constraint equation? Describe an algorithm for estimating optical flow.

1. (a) Explain an adaptive thresholding algorithm for segmentation.

(b) Describe a window-based image disparity estimation technique in detail.

1. (a) Background subtraction is a useful technique that finds applications in computer vision. Explain an application of the background subtraction technique.

(b) Discuss a color model for face region detection based on skin color.

1. (a) What are the drawbacks of the pinhole camera in forming an image? Write down the perspective projection equation (coordinates) in forming a 2D image from a 3D object.

(b) Lighting is an inherently ill-posed problem in computer vision. Briefly describe an approach to compensate for it.

1. (a) Explain the principle of estimating SIFT and SURF features.

(b) Mention the different noises that can affect image quality. Also briefly describe a technique for removing a particular noise.

1. (a) How texture can be used for object recognition?

(b) Explain three widely used distance metrics used in the field of computer vision. Also, define the following image-quality evaluation matrices: MSE, SSIM, and FSIM.

Question 2020

1. (a) Differentiate between human and computer vision. Mention some features used in computer vision-based object detection and recognition.

(b) Describe a computer vision system for separating two Bangladeshi common fishes, such as Rui and Katla in a fish-processing plant.

1. (a) What are the basic differences of SUSAN technique compared to conventional edge detectors.

(b) Describe the Hough transformation algorithm for detecting straight lines.

1. (a) What is affine movement invariant? Discuss a practical computer vision application using any moment invariant.

(b) Define optical flow? Describe an algorithm for estimating optical flow.

1. (a) Explain an adaptive thresholding algorithm for segmentation.

(b) What do you mean by stereo disparity? Describe a window-based disparity estimation technique.

1. (a) What are the drawbacks of the pinhole camera in forming an image? Write down the perspective projection equation (coordinates) in forming a 2D image from a 3D object.

(b) Lighting is an inherently ill-posed problem in computer vision. Briefly describe an approach to compensate for it.

1. (a) What is skeletonization? List out two principle morphological operations.

(b) Explain with example (any two): i) Discrete Haar transform ii) Principle components transform (PCT) iii) Discrete wavelet transform (DWT) iv) Discrete fourier transform (DFT).

1. (a) Define vanishing point and vanishing line.

(b) Describe an algorithm that computers the K-Means-partition on a point set.

(c) Which properties define a single K-Means-partition?

1. (a) How texture can be used for object recognition?

(b) Explain three widely used distance metrics used in the field of computer vision