Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (COMPUTER SCIENCE & ENGINEERING)

END SEMESTER MAKEUP EXAMINATIONS, DECEMBER 2017

SUBJECT: ELECTIVE – IV– COMPUTER VISION [CSE 4002]

REVISED CREDIT SYSTEM
(30/12/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Missing data may be suitable assumed.

1A. How the colour is perceived by humans? Plot and interpret the spectral responses of receptors in human retina. **2M**

1B. Explain the process of line detection using *Hough transform*. **3M**

1C. What are the motivational factors for using local features? Also explain steps involved in feature matching. What is expected from a good feature detector algorithm? **5M**

2A. Explain the working of *Scale Invariant Feature Descriptor*. **5M**

2B. What is the significance of *Eigen* values in an interest point detector? How does Harris method computes a score *R* to decide if a point of interest or not? **3M**

2C. Mention any four differences between *HoG* and *SIFT* descriptors. Justify each statement. **2M**

3A. Derive the eight point algorithm for estimation of *fundamental matrix*. **5M**

3B. What are intrinsic and extrinsic camera parameters? Derive the camera matrix. **5M**

4A. What is optical flow? Derive motion vectors *U* and *V* using Lucas and Kanade method. **4M**

4B. How do you obtain incremental change in parameter required to align image patches between consecutive video frames used in tracking? **4M**

4C. How do you arrive at the constraint $X_r^T F X_l = 0$, where X_r^T is a point in right image, X_l is a point in left image and F is the fundamental matrix? **2M**

5A. Briefly explain any one classifier to classify objects into classes. **5M**

5B. Derive the gradient descent equation. **3M**

5C. Mention few applications and challenges of computer vision algorithms. **2M**

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