**Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam – 603 110**

**(An Autonomous Institution, Affiliated to Anna University, Chennai)**

**Department of Information Technology**

**Model Practical Examination**

**Question Paper**

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| **Degree & Branch** | **B.Tech. Information Technology** | **Semester** | **VII** |
| **Subject Code & Name** | **UIT2729– IMAGE PROCESSING AND COMPUTER VISION** | | |

**Course Outcome:**

CO1- Use the different techniques used for feature detection and matching.  
CO2- Apply the different techniques used for image segmentation.  
CO3- Understand depth estimation and 3-D reconstruction.  
CO4- Apply the different types of recognition used in computer vision.  
CO5-Apply the different deep learning models and networks used in computer vision.

K1: Remembering K2: Understanding K3: Applying K4: Analyzing K5:Evaluating

**KL – Knowledge Level CO – Course Outcomes PI – Performance Indicator**

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| **Q. N.** | **KL** | **Questions** | **CO** |
| 1 | K3 | **Exercise 1**   1. Load two images (Input Image 1, M1 and Input Image 2, M2)  * computes the pixel-wise difference between the two images: * computes an output image where each pixel of coordinates (x,y) contains the absolute difference of the corresponding pixels on M1 and M2:   Out(x,y) = abs(M1(x,y) – M2(x,y))   * Displays on a window the output image.   **Exercise 2**  **Implement the following feature extraction techniques using HOG:**   1. Preprocess the Data (64 x 128) 2. Calculating Gradients (direction x and y) 3. Calculate the Magnitude and Orientation 4. Calculate Histogram of Gradients in 8×8 cells 5. Normalize gradients in 16×16 cell 6. Features for the complete image | CO1 |
| 2 | K3 | **Exercise 1**   1. Demonstrate the use of Python for image processing: contrast stretching and linear filtering and plot its histogram.   **Exercise 2**   1. Classify the images using Horse and Human dataset, and do the following using binary classification:    1. Load the dataset    2. View the no. of testing and training images    3. plot some images    4. Normalizing the training data    5. Build a convolutional neural network (ResNet) to train and testing the images    6. Show the training and testing accuracy | CO1 |
| 3 | K3 | **Exercise 1**  Demonstrate geometrical transformations (scaling, rotation and shearing) of an image.  **Exercise 2**  Implement the following feature extraction techniques using SIFT (Scale Invariant Feature Transform) technique:   1. Constructing a Scale Space 2. Key point Localisation 3. Orientation Assignment 4. Key point Descriptor | CO1 |
| 4 | K3 | **Exercise 1**  Extract images from the video  **Exercise 2**   1. Classify the images using Horse and Human dataset, and do the following:    1. Load the dataset    2. View the no. of testing and training images    3. plot some images    4. Normalizing the training data    5. Build a convolutional neural network (ResNet) to train and testing the images    6. Show the training and testing accuracy | CO4 &  CO5 |
| 5 | K3 | Classify the images using MS-COCO dataset using image augmentation, and do the following:   * 1. Load the dataset   2. Show the no. of testing and training images   3. Plot some images   4. Do the image augmentation – contrast, flipping and rotation   5. After augmentation, show the no. of testing and training images   6. Normalizing the training data   7. Build a convolutional neural network to train images   8. Show the training and testing accuracy   9. Normalizing the training data   10. Build a Faster R-CNN to train images   11. Show the training and testing accuracy   Compare the training and testing accuracy before and after augmentation  **Description of the data set:**  COCO is a large-scale and rich for object detection, segmentation and captioning dataset. It has 330K images, 80 object categories, 5 captions per image, 250,000 people with key points | CO2 &  CO3 |
| 6 | K3 | Classify the images using the BCCD dataset using image augmentation, and do the following:   * 1. Load the dataset   2. Show the no. of testing and training images   3. Plot some images   4. Do the image augmentation – contrast, flipping and rotation   5. After augmentation, show the no. of testing and training images   6. Normalizing the training data   7. Build a convolutional neural network to train images   8. Show the training and testing accuracy   9. Build a convolutional neural network to train images   10. Show the training and testing accuracy   11. Compare the training and testing accuracy before and after augmentation   **Description of the data set:**  There are 364 images across three classes: WBC (white blood cells), RBC (red blood cells), and Platelets. There are 4888 labels across 3 classes (and 0 null examples). | CO2 &  CO3 |
| 7 | K3 | **Experiment 1**  In this experiment, you are going to implement an edge detector for grayscale  images. Edge detection is an image processing technique to find boundaries of objects in images using (Canny Edge Detection)  Perform the following operation    * Smoothing * Gradient calculation * Non-maximum suppression   **Experiment 2**  Consider any image, apply region-growing segmentation techniques and show the segmented results for an input image. | CO1 & CO2 |