

Programming Assignment-2: CSL536

Q1. Experiment with using either top hat or bottom hat as a preprocessing before applying global thresholding to the image `morf_test.png`. This image contains letters on a very noisy background with varying illumination. Try to compute a good estimate of the background, and subtract the estimated background from the original. Then try to use global thresholding on the resulting image. Do you also need a noise filter? Can you segment out the numbers fairly well? Also consider if there are gaps or connected symbols that you can improve by applying simple binary morphological operations.

Q2. Segment the given images (`white-flower.png`, `butterfly.jpg` and `camel.jpg`) using Kmeans and mean shift clustering approach and compare the results.

Q3. Detect corners in the given chessboard image using Harris corner detector method.

Q4. Develop a program to detect circles in the image `coins.jpg` and lines in chessboard image by utilizing the Hough transform technique.

Q5. Develop a program to match an object in two specified images utilizing the Feature Matching technique. Use the builtin SIFT algorithm/descriptor for feature detection and employ a brute-force method for feature matching. Test the program using the images `image1.png` and `image2.png`. (if you are using opencv, please ensure to install "pip install opencv-contrib-python" to access the built-in SIFT descriptor).

Q6. Develop a program that identifies moving vehicles through the application of the median differencing background subtraction method, and provide an analysis of your findings based on the results obtained. Utilize the `traffic.mp4` video clip to evaluate your code.