



Indian Institute of Science Education and Research
Bhopal
Computer Vision(DSE-312/EECS-320)
Assignment-2

Deadline: 12-10-2024, 11:59 PM

Max mark: 20

Please follow the instructions carefully.

1. All questions are mandatory. Plagiarism and copying from anywhere (similar submission) can debar you from this course and invite the academic dishonesty policy.
 2. Implement all algorithms purely in Python without using specialized libraries like OpenCV or PIL for the processing. You may use libraries for basic operations (like loading an image), but the algorithms themselves should be coded from scratch. Use of scikit-learn is permissible for implementing the SVM classifier.
 3. Comment on your code extensively to explain your logic and the steps you are implementing.
 4. Make a short 5-10 minute video and explain your code.
 5. A report reflecting on what you have learned. Visualization of the output must be there along with other necessary details.
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1. Implement a face detection algorithm from scratch using Haar-like features and Integral Image computation. (**Marks: 1+2+7**)
 - Capture an image of yourself using a webcam or upload a face image.
 - Compute the Integral Image to efficiently calculate pixel sums over rectangular regions. Use integral image to detect face using Haar features.
 2. Using dataset [link](#), implement a face anti-spoofing model that performs classification based on the below different feature extraction methods to identify fake (spoof) and real image. Compare and analyze your results using metrics accuracy, f1-score, precision, recall and confusion matrix. Document the findings and discuss the failure and success of each method. (*Note: You have to use only 1000 images and not the whole dataset*) (**Marks: 3+3+4**)
 - (a) Using the raw pixel values of the face images as features. Train a Support Vector Machine (SVM) classifier on these raw pixel features to perform face recognition. Evaluate and analyze the performance of the model on the dataset.
 - (b) Extract Local Binary Patterns (LBP) features from the face images for feature extraction. Train an SVM classifier using the LBP features to perform face recognition.
 - (c) Compute edge images using any two edge detectors (canny, sobel, prewitt, etc.), then use them as input features independently to train an SVM classifier and perform classification.

Best wishes