**Assignment No: 2**

**Problem Statement:**

Develop a facial recognition system using OpenCV and deep learning for binary classification.

**Theory:**

Facial recognition involves identifying or verifying a person’s identity by analyzing their face. This can be achieved through image processing using OpenCV and deep learning techniques for classification.

* Binary Classification: The system will classify whether a face belongs to "Person A" or "not Person A."
* Feature Extraction: OpenCV is used to detect and extract facial features for further processing.

**Methodology:**

1. Face Detection:
   * Use Haar Cascade classifiers in OpenCV to detect faces in images or video streams.
   * Extract the region of interest (ROI) containing the detected face for classification.
2. Deep Learning Model:
   * Implement a simple Convolutional Neural Network (CNN) for binary classification.
   * The CNN will take the detected face as input and classify it as either "Person A" or "not Person A."
3. Training:
   * Prepare a labeled dataset consisting of images, with some images labeled as "Person A" and others as "not Person A."
   * Train the CNN model using Keras or TensorFlow on this dataset.
4. Real-time Detection:
   * Integrate the trained model with OpenCV to enable real-time face recognition using a webcam or video feed.

**Conclusion:**

We successfully implemented a facial recognition system by combining OpenCV for face detection with a deep learning-based CNN for binary classification. The system demonstrated high accuracy in distinguishing between "Person A" and other individuals in real time.

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