Facial Detection and Recognition with Python

Objective

The primary objective of this project is to develop a robust facial detection and recognition system using Python. We aim to accurately detect faces in images and associate them with known identities.

Problem Statement

Given an input video stream, our system should be able to:

- Detect faces within the image.
- Recognize and label each detected face with the corresponding identity (if known).

Solution

Our solution involves the following steps:

1. **Face Detection**:
   - Utilize pre-trained deep learning models (such as Haar cascades or deep neural networks) to identify regions of interest (ROIs) containing faces.
   - Extract facial features and create bounding boxes around detected faces.

2. **Face Recognition**:
   - Using python libraries to convert facial images into simpler formats. [Numpy ndarray]
   - Use techniques like deep metric learning to learn embeddings for each face.
   - Compare embeddings to recognize faces based on similarity scores.

Literature Review

- Explore existing research papers and articles related to facial detection and recognition.
- Understand the state-of-the-art methods and algorithms.

Tools and Libraries

- Python: The primary programming language for implementation.
- OpenCV: For face detection and image processing.

- Dlib: For face recognition.

Testing Data

- Collect a diverse dataset of labeled face images.
- Split the dataset into training and validation sets.

Future Scope

- Extend the project to real-time face recognition using webcam feeds.
- Improve accuracy by fine-tuning the model or exploring ensemble methods.
- Explore privacy implications and ethical considerations.

Technology Used

- Python
- OpenCV
- Dlib
- Deep Learning

GitHub Repository Link

https://github.com/AkshatRauthan/PBL_Final_Project

Team Members

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