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**PROGRAMMING FOR AI (LAB)**

**Lab Task No 06**

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**Face Profiling System**

**1. Introduction**

The **Face Profiling System** is a web-based application designed to analyze facial features from an uploaded image. The system uses **OpenCV's Haar Cascade model** to detect faces and extract measurements such as **face width, height, forehead size, and eye distance**. Additionally, it provides a basic **personality prediction** based on the face’s aspect ratio.

This project serves as an introductory exploration of **computer vision** and **face recognition technology**, offering a practical implementation of **image processing** with Python.

**2. Objectives**

The main objectives of this project are:

* To develop a **simple yet effective** face detection system.
* To extract and analyze basic facial features.
* To provide a **basic personality prediction** using face ratio.
* To build a user-friendly **web interface** for uploading and analyzing images.

**3. Scope of the Project**

This project is **limited to detecting a single face per image**. It provides basic analysis and does not perform advanced **facial recognition** or **deep learning-based** analysis. The results are meant to be **approximate and experimental**, focusing on fundamental face profiling rather than precise biometric measurements.

**4. Technology Stack**

This project is implemented using the following technologies:

**Programming Language:**

* Python

**Libraries & Frameworks:**

* **Flask** – Web framework for creating the application.
* **OpenCV** – Used for face detection and image processing.

**Frontend Technologies:**

* HTML
* CSS

**5. System Architecture**

The system follows a **client-server** model:

1. **Frontend:** A simple **HTML-based web interface** allows users to upload images.
2. **Backend (Flask):** Handles image processing and face detection.
3. **Processing (OpenCV):** Detects faces and extracts measurements.
4. **Storage:** Uploaded and processed images are stored locally.
5. **Output:** The processed image and analysis results are displayed on the web page.

**6. Working of the System**

**Step 1: User Uploads an Image**

* The user selects an image file from their device and uploads it via the web interface.

**Step 2: Image Processing**

* The system loads the image and converts it to grayscale.
* The **Haar Cascade Classifier** detects the face in the image.

**Step 3: Face Feature Extraction**

* Once a face is detected, its dimensions are measured:
  + Face Width
  + Face Height
  + Forehead Length (approximation)
  + Eye Distance (approximation)

**Step 4: Personality Prediction**

* The system calculates the **face ratio (width/height)** and makes a **simple personality prediction**:
  + **If the face is wider (ratio > 0.9):** **Extrovert**
  + **If the face is taller (ratio ≤ 0.9):** **Introvert**

**Step 5: Displaying Results**

* The results are shown on the web page, along with the **processed image** (with a face bounding box).

**7. Error Handling & Edge Cases**

The system includes several checks to ensure **reliable operation**:

* **No Image Uploaded:** Displays an error message.
* **Invalid File Format:** Prevents non-image files from being processed.
* **No Face Detected:** Notifies the user to upload a clearer image.
* **Corrupt/Unreadable Image:** Catches errors and returns a meaningful response.

**8. Applications**

This project can be extended to several real-world applications:

* **Security & Surveillance:** Basic face detection for monitoring.
* **Personality Analysis:** Experimental studies on facial features and behavior.
* **Human-Computer Interaction:** Adaptive user interfaces based on facial analysis.

**9. Limitations & Future Improvements**

**Current Limitations:**

* Only detects **one face per image**.
* Personality prediction is **basic** and not scientifically accurate.

**Future Enhancements:**

* **Multi-face detection** for analyzing group photos.
* **More advanced feature extraction** (age, gender detection).
* **Use of deep learning models** (e.g., OpenCV DNN, TensorFlow).
* **Cloud storage integration** for saving uploaded images.

**10. Conclusion**

The **Face Profiling System** is a simple yet effective demonstration of **face detection and analysis** using OpenCV. While the project has **certain limitations**, it provides a strong foundation for further exploration in **computer vision and AI-powered face recognition**.

This project highlights how **image processing techniques** can be used for analyzing human faces, and it serves as a **great starting point for more advanced AI-based applications**

OutPut:



