MIND SPRINT-2k25

TITLE:MISSING PERSON DETECTOR

An AI-powered system designed to **identify missing individuals** using advanced **facial recognition** and **DeepFace** technology.

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ABSTRACT:

AI-Powered Real-Time Identifying Missing Individuals

❖ **Missing Person Detection** is an **AI-powered system** that automatically identifies individuals from images or videos by comparing their facial features with a reference image. Using **DeepFace** technology, the system extracts embeddings, matches them using similarity algorithms, and instantly annotates when the person is found. This approach significantly **reduces search time** and **improves accuracy** in locating missing individuals.

- Powered by **DeepFace**
- Developed Using **Python** & **OpenCV**
- Real-time Detection via **Streamlit** Interface

The Challenge: Timely Identification

- ✓ In real-world missing person cases, **time is the most critical factor**.
- ✓ Traditional search methods rely heavily on manual observation, making the process slow, inconsistent, and difficult to scale especially in crowded or fast-moving environments.
- ✓ Our solution tackles this challenge by using **AI-driven facial recognition** to automate identification.
- ✓ By analyzing faces in real time and comparing them with the reference image, the system **significantly reduces search time**, improves accuracy, and supports law enforcement and emergency teams in rapid decision-making.

Introducing the Missing Person Detector

Streamlit-Powered Interface

A user-friendly, web-based application built with **Streamlit** for accessibility and ease of use.

Real-time Detection

Capable of processing both **pre-recorded video footage** and live webcam feeds.

DeepFace Integration

Utilizes the robust DeepFace library for **high-accuracy** facial recognition and **embedding** generation.

FLOW CHART FOR MISSING PERSON DETECTOR

1.Reference Image (Upload photo of the missing person)

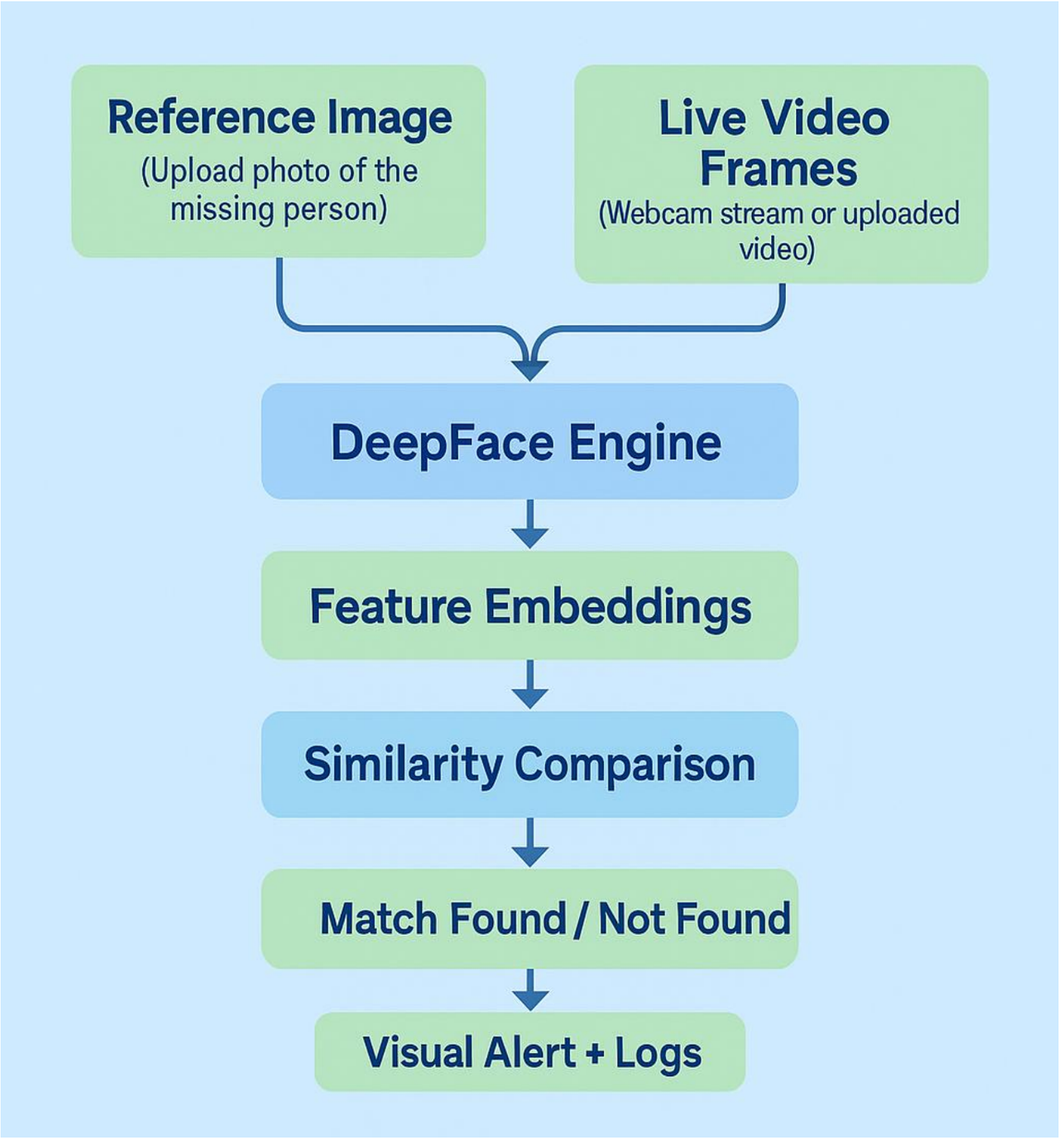
A clear reference photo of the missing individual is uploaded. This image is processed to extract facial features that will be used for identification.

2. Live Video Frames (Webcam stream or uploaded video)

The system continuously captures frames from a webcam or uploaded video file. Each frame is scanned for faces in real time.

3. DeepFace Engine

Both the reference image and detected faces from the video are passed into the DeepFace engine. This deep-learning model analyzes facial structures and prepares them for comparison.



4. Feature Embeddings

DeepFace converts each face into a numerical feature vector, known as an **embedding**. These embeddings represent unique facial characteristics and allow precise identity matching.

5. Similarity Comparison

The system compares the embedding of the missing person with embeddings from the video frames using similarity metrics (such as cosine similarity).

6. Match Found / Not Found

If the similarity score exceeds the predefined threshold, the system flags a **positive match**. Otherwise, the face is ignored and the next frame is analyzed.

This workflow demonstrates how our system seamlessly integrates reference **images** and **live video** streams to **accurately identify missing individuals**. By leveraging **DeepFace embeddings** and **real-time similarity comparison**, the model ensures **fast**, reliable detection and provides instant visual annotates, making it a powerful tool for assisting search and recovery efforts.

How it Works: The Detection Pipeline

Input Reference Image

Upload a clear image of the person to be detected.

Video/Webcam Feed

Provide video footage or activate live webcam stream.

Face Extraction

DeepFace extracts faces from each frame of the input.

Embedding Comparison

Facial embeddings are generated and compared with the reference.

Detection & Notification

If a match is found (similarity > 0.7), the person is identified.

Video Detection: Post-Processing Efficiency

- **Fast Frame Analysis**

The system processes video frames intelligently to detect individuals without unnecessary computation.

- **Frame Skipping**

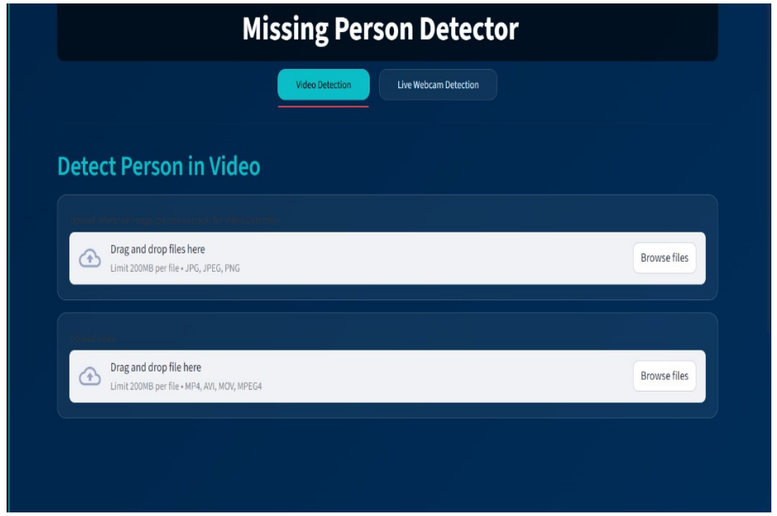
Skips non-essential frames to boost speed while maintaining detection accuracy.

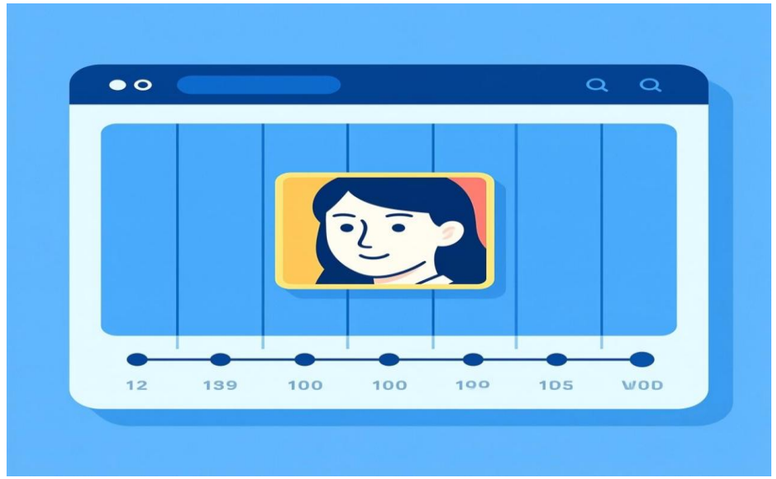
- **Cosine Similarity Check**

Measures how closely a detected face matches the reference face for reliable recognition.

- **Highlighted Output Video**

Generates a processed video with clear indicators showing detected individuals.





The current threshold for detection is set at a cosine similarity of 0.7, ensuring a balance between sensitivity and specificity.

Live Webcam Detection: Real-time Surveillance

- **Instant Identification**

Provides visual feedback on the live stream as soon as a potential match is detected.

- **Continuous Monitoring**

The system constantly scans the webcam feed, adapting to movements and changes in the environment.

- **Efficient Surveillance**

Ideal for checkpoints, public spaces, or controlled areas where fast detection is essential.

- **Swift Response**

Enables users to react immediately to detections, improving overall safety and response time.

OUTPUT:

✓ **Real-Time Identification**

The system successfully detects the missing individual within the uploaded video by comparing facial embeddings generated from the reference image.

✓ **AI-Powered Matching**

The DeepFace engine analyzes each video frame, calculates similarity scores, and confirms a match when the threshold is met.

✓ **Clear Visual Alerts**

A bounding box with the person's **name label** appears instantly on detection, providing a clear and reliable visual confirmation.

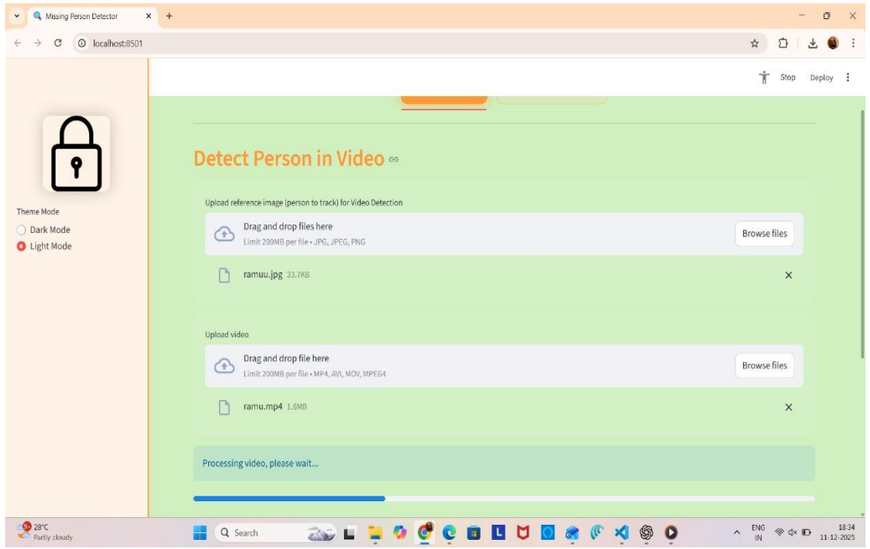
✓ **Efficient Processing**

Video is processed frame-by-frame with optimized speed, ensuring quick detection even in crowded or dynamic environments.

✓ **User-Friendly Output**

The interface displays:

- Uploaded reference image
- Uploaded video
- Detection progress bar
- Final annotated video with highlights



"Our system delivers accurate, fast, and real-time identification turning AI into a powerful tool for locating missing individuals."

Future Enhancements

While robust, the Missing Person Detector has avenues for further development:

Expanded Database Integration

Connect to larger, external databases of missing persons for broader search capabilities.

Alert System Integration

Implement automated alerts (email, SMS) upon successful detection.

Cloud-Based Deployment

Enhance scalability and accessibility for wider deployment.

CONCLUSION:

- **Scalable**

Capable of handling both small and large datasets, making it suitable for diverse real-world environments.

- **Reliable Performance**

Consistent detection accuracy across varying lighting, poses, and video quality conditions.

- **Cost-Effective**

Uses open-source frameworks, reducing deployment and maintenance costs for organizations.

- **Time-Saving**

Automates manual search efforts, significantly reducing the time required to identify individuals.

- **Secure**

Ensures safe handling of images and video streams with proper data protection practices.

- **Future-Ready**

Designed for easy integration with enhanced models, databases, and IoT surveillance systems.

Linkedin Profiles:

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GitHub Repository:

Team lead: https://github.com/jayanth11189121/missing-person-detection
Team Member1:
Team Member2: https://github.com/ganga-mohini-bhavani/Missing-Person-Detector

THANK YOU!