

***Assignment No:2***

***Software Engineering V20***

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***Topic: Ai for Tracking Missing People***

***USER REQUIREMENTS***

***1. General Requirements***

***Ease of Use:***

The system should have a simple interface that is easy for anyone to understand and use.

**Accessibility:**

It should be available on both web and mobile platforms so users can access it anytime, anywhere.

**Reliability:**

The system should work consistently and provide accurate results when identifying and tracking individuals.

**Scalability:**

The system should be flexible enough to support both small-scale and large-scale operations, from local teams to nationwide organizations.

***2. Functional Requirements***

**Facial Recognition:**

The system should recognize people based on facial features, even if their appearance changes due to aging or other factors.

Tools like OpenCV, TensorFlow, or AWS Rekognition should be used to ensure accuracy greater than 98%.

**Attribute Recognition:**

The system should identify individuals based on details such as clothing, accessories, or physical traits.

Users should be able to search using descriptions, such as "blue shirt, black backpack."

**Re-Identification Across Cameras:**

The system should track individuals across multiple cameras and match their movements and traits over time.

**Real-Time Alerts:**

Notify users immediately when a match is found.

Integrate with RFID tags or GPS trackers to monitor vulnerable individuals.

**Database Integration:**

Use a centralized database to store images, videos, and identification information.

Allow connection to public or government datasets for advanced searches.

**Reporting and Analytics:**

Provide detailed reports on performance, matches, and movement patterns.

Include visual tools like heatmaps to highlight crowded areas, common routes, and locations of interest.

***3. Performance Requirements***

**Accuracy**:

The system must achieve at least 98% accuracy for recognizing faces and matching individuals.

**Response** **Time**:

Alerts and processing should happen in real time, with a maximum delay of 5 seconds.

**Fault** **Tolerance**:

The system should be able to handle failures in hardware or software without losing data or experiencing downtime

***System Requirements:***

The system requirements for AI-based platforms designed to help locate missing persons vary depending on the specific implementation, but common elements include:

***Key Components***

***1. Hardware Requirements:***

**Surveillance Cameras:** High-resolution cameras for capturing detailed footage.

**Computing Power:** Systems often require GPUs for deep learning tasks, particularly for facial and person attribute recognition.

**Storage:** Sufficient capacity to maintain extensive video footage and image databases.

**Networking:** High-speed internet for real-time data processing and cloud integration.

***2. Software Requirements:***

**AI Algorithms:**

Deep Neural Networks (DNNs) for feature extraction and matching.

Facial recognition libraries like OpenCV or cloud-based solutions such as AWS Rekognition.

Person re-identification systems that track and match individuals across different cameras.

**Databases:**

Centralized databases for storing images, attributes, and identification data.

Integration with public or government-issued identity datasets (e.g., Aadhaar in India) for advanced applications.

**Development Tools:**

Python with libraries like Numpy, OpenCV, and TensorFlow.

Graphical User Interfaces (GUIs) developed using frameworks like Tkinter.

**Cloud Platforms:**

Cloud computing platforms (e.g., AWS, Microsoft Azure) for scalable processing and storage.

***Use Cases***

Facial recognition systems can identify missing persons even with cross-age or altered appearance accuracy exceeding 98% in advanced solutions like AWS Rekognition and ResNet.Attribute recognition can identify individuals based on descriptive details, such as clothing and accessories, when facial images are unavailable.RFID tags and GPS-enabled wearable devices can aid in tracking vulnerable individuals, though they rely on the person wearing the device.

For deployment, robust combination of hardware and software tailored to the scale of operations, from small localized searches to large-scale urban tracking systems is needed.