Face Recognition Surveillance System and Communications System

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**Description:**

The Face Recognition Surveillance System and Communication Platform for Missing Persons or Items is an intelligent security solution designed to assist in locating and identifying missing individuals or objects in real time. It combines state-of-the-art computer vision, natural language processing, and multimodal search to enable flexible, fast, and accurate recognition.

**Overview of The Project:**

1. Detection (YOLO-based Object & Face Detection)

* The live video feed from surveillance cameras is processed in real time using YOLO (You Only Look Once) for detecting human faces and Relevant objects (bags, clothing items, etc.)
* This step extracts Regions of Interest (ROIs) for further processing, reducing computational cost and avoiding unnecessary background analysis.

2. Feature Extraction (Deep Learning Embedding Models)

* Face embeddings are generated using FaceNet or ArcFace to create a unique numerical representation of each detected person’s face.
* Object & contextual embeddings are generated using CLIP (Contrastive Language–Image Pretraining), enabling semantic matching between images and text descriptions.
* These embeddings are stored in a FAISS vector database for fast similarity search.

3. Multimodal Search & Communication

* Search can be done using:
  + Image input (upload a photo to find similar matches in the database)
  + Text description (e.g., “woman wearing a red saree and gold earrings”)
* FAISS returns the closest matches ranked by similarity score.
* Matches trigger an alert system to communicate with concerned authorities or a missing-persons network, including location and timestamp.

**Architecture:**

