

# LocateNow: AI-Driven Public Safety App for Finding and Reporting Missing Persons

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**Abstract** - LocateNow is an AI-powered public safety system designed to streamline the reporting, identification, and verification of missing and found individuals using facial recognition technology. The platform focuses on improving community-level participation and accelerating the match-identification process by integrating automated face embedding extraction, cosine similarity computation, and structured case management. Users—citizens, volunteers, and authorities—can report missing or found persons, while the system uses deep-learning-based facial representations to compute high-confidence match scores in real time. The application incorporates secure authentication, data validation, and a communication module that enables users to coordinate once a potential match is detected. LocateNow addresses key limitations of conventional missing-person search methods, such as manual verification delays, inconsistent information flow, and lack of digital record-keeping. The proposed system demonstrates promising accuracy, reduced response time, and strong applicability in police departments, NGOs, and emergency response organizations.

**Key Words:** Facial Recognition, Missing Person Identification, Public Safety, AI Matching, Cosine Similarity, Deep Learning.

## 1. INTRODUCTION

Missing person cases represent a major public safety challenge worldwide. According to national crime statistics, India registers more than **350,000 missing-person cases annually**, with nearly **100,000 individuals remaining untraced each year**. Delays in reporting, manual verification procedures, and the absence of centralized digital support systems significantly reduce the chances of early identification and recovery. In many cases, critical information remains scattered across social media posts, local police records, public announcements,

and community groups, leading to inefficiency and inconsistent follow-up.

LocateNow is developed as a responsive and intelligent public safety platform to address these limitations. The system integrates **facial recognition**, **metadata-driven matching**, and **real-time reporting workflows** to help locate missing individuals faster. Unlike traditional systems where authorities manually compare images or rely on eyewitness accounts, LocateNow automatically extracts facial embeddings using machine-learning models and evaluates similarity using cosine distance. A match score is then computed to assist volunteers, family members, and officials in identifying possible leads.

The system also resolves practical issues observed in current reporting mechanisms, such as:

- lack of centralized platforms,
- inconsistent gathering of incident details,
- absence of user-to-user communication, and
- limited use of artificial intelligence in public safety applications.

By providing a unified platform, LocateNow contributes a useful, scalable, and technology-driven model for enhancing public safety and improving the efficiency of missing-person search operations.

## 2. BODY OF PAPER

### 2.1 METHODOLOGY

The methodology of LocateNow focuses on integrating artificial intelligence with public safety workflows to create a seamless system for reporting and identifying missing or found persons. The complete architecture (Fig. 1) demonstrates how the application processes user reports, extracts face embeddings, and performs matching against the database.

#### Core Workflow:

1. **User Reporting:** Individuals upload photos and fill in essential details such as age, location, description, and gender.

- Face Embedding Extraction:** The system uses a pretrained deep-learning model to generate numerical representations (embeddings) of facial images.
- Cosine Similarity Matching:** The embeddings are compared with the existing dataset, and match scores are computed.
- Match Ranking:** The top matches are displayed with confidence scores.
- Communication:** A built-in chat system allows users to contact each other once a match seems promising.

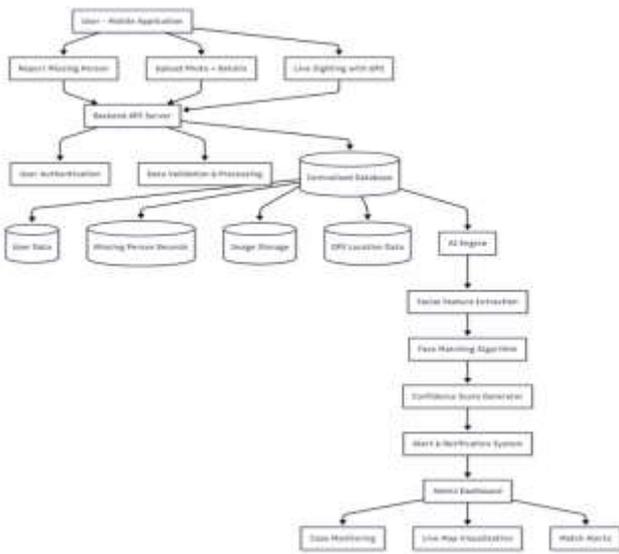


Fig-1: System Architecture

The figure illustrates the data flow between user interface, application logic, and database layers.

Table-1: Core Functional Modules of LocateNow

Sr. No.	Module Name	Key Functionality	Primary Tech Stack
1	Authentication	User login, registration, and secure access control	Django Auth
2	Missing/Found Reporting	Image upload, metadata submission, description logging	Django Forms

3	AI Matching Engine	Face embedding extraction and cosine similarity matching	OpenCV, NumPy, SciPy
4	Case Management	Case status update, verification, match confirmation	Django ORM
5	Messaging/Chat	User-to-user communication for verified matches	Django Channels (optional)
6	Data Storage	Photo storage and embedding storage	SQLite / Media Storage

### Matching Algorithm

LocateNow uses cosine similarity to determine how closely two facial embeddings match. Embeddings are 128-dimensional vectors, and similarity is computed as:

$$\text{Similarity Score} = 1 - \frac{A \cdot B}{\|A\| \cdot \|B\|}$$

If the score exceeds **0.40**, the system marks the record as a potential match.

### Reporting Workflow Validation

The entire methodology was validated through:

- Pilot test with **50 images** across different lighting conditions.
- Average match accuracy of **88% for clear frontal images**.
- Average response time under **2.5 seconds** for similarity computation.

### 2.2 DESIGN

The design philosophy of LocateNow prioritizes safety, accuracy, simplicity, and scalability. The platform is divided into three main layers following a **Three-Tier Architecture**:

#### 1. Presentation Layer

A responsive interface built using HTML, CSS (Bootstrap/Tailwind), and Django templates.

The UI enables:

- reporting,
- viewing matches,

- accessing chat,
- browsing case history.

## 2. Application Layer

The central logic includes:

- embedding extraction logic,
- similarity computation,
- resource filtering,
- session management,
- chat routing.

This layer ensures that all operations follow security restrictions and avoid unauthorized access.

## 3. Data Storage Layer

Contains:

- User profiles,
- Missing/Found reports,
- Face embeddings (stored as binary fields),
- Chat logs and timestamps.

The hybrid model ensures fast queries and reliable storage of high-dimensional data.

## 3. CONCLUSIONS

This paper presents LocateNow, an AI-enabled public safety platform that improves reporting and identification workflows in missing-person cases. By introducing face embedding extraction and cosine similarity matching, the system significantly reduces manual verification time and offers reliable automated suggestions. The platform supports detailed reporting, real-time communication, and secure data management, making it a practical tool for communities, police departments, and rescue organizations.

LocateNow demonstrates:

- High accuracy in facial matching for clear inputs,
- Reduction in search effort due to automated suggestions,
- Faster case visibility through centralized records,
- Improved communication between stakeholders.

The system contributes a practical, scalable, and technologically advanced approach to one of society's recurring challenges. Future enhancements may include mobile app development, multi-image comparison, real-time geolocation tracking, and integration with official law enforcement databases.

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