**Stakeholder Analysis**

**1. Families:**

* **Needs:**
  + Ability to upload images of missing persons.
  + Receive notifications if a match is found for the uploaded images.
  + Access to information and images of missing persons.
* **Impact:**
  + They are the primary beneficiaries of the platform, and the system’s success depends on their active participation.

**2. Missing Persons:**

* **Needs:**
  + Ability to upload their current images.
  + Track their status and know if they are found.
* **Impact:**
  + Their images will be crucial in building the system, and their photos can be used to predict their appearance over time.

**3. Law Enforcement:**

* **Needs:**
  + Access to a database of missing persons' images.
  + Ability to add or update information about missing persons.
* **Impact:**
  + They will have a role in verifying the images and ensuring the data is accurate.

**4. Developers:**

* **Needs:**
  + Develop user interfaces.
  + Build and enhance AI models for facial matching and age progression.
* **Impact:**
  + They are responsible for ensuring the system is effective, secure, and meets the needs of all parties.

**5. System Administrators:**

* **Needs:**
  + Ensure data security and monitor image uploads.
  + Manage access to sensitive data.
* **Impact:**
  + They are responsible for maintaining system stability and ensuring data security.

**6. General Public:**

* **Needs:**
  + Ability to share images through social media platforms.
  + Participate in the community to help families find missing persons.
* **Impact:**
  + They can contribute to raising awareness and increase the chances of finding missing persons by sharing images and tips.

**User Stories & Use Cases**

**User Story 1: Login**

* **As a** user, **I want** to log in with my credentials **so that I can** access my profile and upload images of missing persons.
* **Acceptance Criteria:**
  + I should be able to log in easily, and if my credentials are incorrect, I should be able to recover my password via email or SMS.

**User Story 2: Upload Missing Person Image**

* **As a** user, **I want** to upload an image of a missing person **so that I can** search for potential matches.
* **Acceptance Criteria:**
  + I should be able to upload images in various formats (JPEG, PNG), and provide additional information such as date and location.

**User Story 3: Receive Match Alerts**

* **As a** user, **I want** to receive notifications if a match is found for the image of a missing person **so that I can** take the appropriate actions.
* **Acceptance Criteria:**
  + I should receive the notification via email, SMS, or in-app message when a match is detected.

**User Story 4: Search for Image Matches**

* **As a** user, **I want** to search for matches using an image or keywords **so that I can** find missing persons.
* **Acceptance Criteria:**
  + Search results should be ranked based on similarity scores, with the highest similarity results appearing first.

**Use Case 1: Upload Missing Person Image**

* **Goal:** Upload an image of a missing person to help find matches.
* **Actors:** User (Family member or missing person).
* **Basic Flow:**
  1. The user logs into their account.
  2. The user selects the “Upload Missing Person Image” option.
  3. The user uploads the image and provides additional information such as date and location.
  4. The image and data are stored in the system.

**Use Case 2: Verify Image Matches**

* **Goal:** Compare the uploaded image of the missing person with the database to find matches.
* **Actors:** System, User.
* **Basic Flow:**
  1. The user uploads a new image or searches using an image.
  2. The system analyzes and compares the uploaded image with the stored images.
  3. The system displays the match results based on similarity scores.

**Use Case 3: Receive Match Notification**

* **Goal:** Notify the user when a match is found for the uploaded image of a missing person.
* **Basic Flow:**
  1. The system compares the uploaded image with the database.
  2. If a potential match is found, the system sends a notification via email or SMS to the user.

**Use Case 4: Modify User Data**

* **Goal:** Allow users to modify their data or delete uploaded images.
* **Basic Flow:**
  1. The user logs into their account.
  2. The user navigates to the "Account Settings" page, where they can modify or delete images and information.

**Functional Requirements**

1. **User Registration & Authentication**
   * Users (families, law enforcement, individuals) must be able to register and log in securely.
   * Multi-factor authentication (MFA) should be available for added security.
2. **Image Upload & Management**
   * Users should be able to upload images of missing persons.
   * The system should support multiple image formats (JPEG, PNG, etc.).
   * Uploaded images should be stored securely with metadata (e.g., date, location, last known information).
3. **AI-Based Age Progression & Regression**
   * The system should allow users to generate an age-progressed or age-regressed version of an uploaded photo.
   * Users should be able to compare different age variations.
4. **Facial Similarity Matching**
   * The platform should match uploaded images with a database of previously uploaded faces.
   * The system should notify users if a match is found.
5. **Search & Identification**
   * Users should be able to search for potential matches using keywords or uploaded images.
   * The system should provide ranked results based on similarity scores.
6. **Notifications & Alerts**
   * Users should receive real-time alerts when a potential match is found.
   * Notifications should be sent via email, SMS, or in-app messages.
7. **Community Collaboration & Sharing**
   * Users should be able to share AI-generated images and missing person cases on social media platforms.
   * There should be a forum or discussion section for users to provide tips or leads.
8. **Data Privacy & Security**
   * Users should have control over their data, including the ability to delete uploaded images.
   * AI-generated images should only be shared with user consent.
9. **Audit & Logging**
   * All searches, uploads, and notifications should be logged for tracking and security purposes.
   * Admins should have access to logs for investigation when necessary.

**Non-Functional Requirements**

1. Scalability  
     
   * The system should handle thousands of image uploads and searches simultaneously.
   * The architecture should support future expansion as more users adopt the platform.
2. **Performance**
   * Age progression/regression should take less than 5 seconds per image.
   * Facial similarity matching should return results in under 3 seconds.
3. **Availability & Reliability**
   * The system should have **99.9% uptime** to ensure constant availability.
   * A failover mechanism should be in place to handle server downtime.
4. **Usability**
   * The platform should have a user-friendly interface with intuitive navigation.
   * The system should be accessible on both desktop and mobile devices.
5. **Security**
   * Data should be encrypted at rest and in transit (AES-256, TLS 1.2+).
   * User authentication should include password hashing and optional biometric login.
6. **Compliance & Ethical Considerations**
   * The system should comply with GDPR, CCPA, and other data privacy regulations.
   * Ethical AI principles should be followed to prevent bias and misuse.
7. **Maintainability**
   * The system should have modular code for easy updates and bug fixes.
   * APIs should be documented for potential integrations with law enforcement databases.
8. **Localization & Multilingual Support**
   * The platform should support multiple languages for a global user base.
   * Date and time formats should be customizable based on region.