Automated Attendance System Requirements

Functional Requirements

User Stories

- **Device Compatibility:** As a TA, I want to capture and upload classroom images from my mobile device so that I can document attendance easily.
- **Face Clustering:** As a TA, I want the system to automatically group similar faces before establishing ground truth so that I can reduce manual effort in identifying students.
- **Ground Truth Establishment:**
    - As a TA, I want to establish ground truth after the first quiz or midterm so that the system improves recognition accuracy and assigns correct labels.
    - As a TA, I want to upload ground truth easily, preferably in CSV format, so that I can save time and avoid manual data entry.
- **Manual Correction:**
    - As a TA, I want to manually assign identities to unclustered or misclustered faces so that I can ensure accurate attendance records.
    - As a TA, I want to correct recognition errors later so that I can fix inaccuracies when needed.
- **Recognition Learning:** As a TA, I want the system to learn from manual corrections so that it improves accuracy over time.
- **Historical Records:** As a TA, I want to access attendance records filtered by date so that I can review past attendance easily.
- **Student Statistics:** As a TA, I want to view individual student(s) attendance patterns so that I can track their consistency.
- **Overall Analytics:** As a TA, I want to generate class attendance analytics and identify trends so that I can assess engagement levels.

Non-Functional Requirements

- **User Interface:** The system shall have a simple, responsive interface for mobile and desktop, displaying processing status, face detection, and matching results.
- **Performance:** The facial recognition system shall achieve at least 90% accuracy after ground truth establishment.
  Response time: 10ms (normal), ~50ms (during image-processing).
- **Security:** All communications shall use HTTPS. The system shall implement secure authentication and session management.

- **Deployment:** The system shall use Docker for containerization and Kubernetes for automatic restarts and zero-downtime updates.
- **Maintainability:** The system shall include documentation, naming conventions, DLD: ER diagrams, UML diagrams, API details, and front-end specifications.