

Test Plan – Face Recognition Attendance System

1. Project Overview

The Face Recognition Attendance System is a real-time application built using Python, OpenCV, and Firebase. It captures live webcam input, matches detected faces against a known encoded dataset, logs attendance to Firebase Realtime Database, and updates the interface based on match results.

2. Objectives

- Validate face detection and recognition accuracy
- Ensure Firebase data read/write operations function correctly
- Verify UI response and notification messages
- Test robustness against invalid input, lighting, and camera feed errors
- Confirm encodings are stored and loaded properly

3. Scope of Testing

- **Functional Testing** (face match, attendance log)
- **UI Testing** (real-time webcam view, overlays, feedback)
- **Database Testing** (Firebase Realtime DB & Storage)
- **Regression Testing** (code changes don't break functionality)

4. Testing Types

- **Manual Testing**
- **Smoke Testing**
- **Functional Testing**
- **Integration Testing** (webcam + encoding + Firebase)
- **Usability Testing** (user feedback on accuracy and ease of use)

5. Tools & Frameworks

- **Python** (OpenCV, face_recognition, firebase-admin)
- *Optional:* **Pytest** (for encoding methods), **Postman** (Firebase DB check)
- **Real webcam** (for live tests)

6. Test Environment

- **OS:** Windows 10/11
- **Camera:** Built-in or external webcam

- **Python 3.x** with all dependencies installed
- **Firebase service credentials** set up locally
- **Live internet** for Firebase DB access

7. Roles & Responsibilities

Role	Responsibility
QA Engineer	Write test cases, execute tests, report bugs
Developer	Handle feature updates, bug fixes
Firebase Admin	Monitor DB access & performance

8. Test Deliverables

- **Test Plan**
- **Test Case Document**
- **Bug Report Sheet**
- **Test Summary Report**

9. Risks & Mitigation

Risk	Mitigation
Poor lighting affects recognition	Test with varied conditions; suggest using good lighting
Face not detected due to encoding error	Add fallback or retry mechanism
Firebase not responding	Handle with connection timeout and retry logic
Camera access failure	Add friendly error and logging

10. Exit Criteria

- 90%+ test cases passed
- All high severity bugs resolved
- Firebase operations verified across all users
- Stable performance over 10+ face matches in real-time