Test Summary Report (TSR)

Project Name: Automatic Face Recognition Attendance System

Version: 1.0

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1. Test Objective

The objective of testing was to comprehensively validate the functionality of the Automatic Face Recognition Attendance System, ensuring accurate user authentication, student image capture, face encoding generation, real-time attendance marking, and complete student management capabilities. Testing focused on verifying end-to-end workflows, security implementations, and system stability under both valid and invalid scenarios.

2. Scope of Testing

In-Scope:

- User registration, login, and password reset functionality with secure password hashing.

- Student image capture and storage in local directory and Firebase.

- Face encoding generation and regeneration after new student additions.

- Real-time face recognition and attendance marking with duplicate prevention.

- Manual adjustment of student attendance counts.

- Complete student management (view, update, delete operations).

- Attendance reporting and Excel export functionality.

- User interface responsiveness and button functionality.

- Input validation and error handling.

Out of Scope:

- Webcam hardware compatibility and driver issues.

- Firebase backend infrastructure and server performance.

- Network connectivity issues.

- Third-party library internals (face_recognition, OpenCV).

- Mobile platform compatibility.

3. Test Approach

Type of Testing: Manual Functional Testing

Test Levels: Component Testing, Integration Testing, System Testing

Test Techniques Used: Functional Testing, Positive & Negative Testing, Boundary Value Analysis, Error Guessing, and Usability Testing.

Entry Criteria:

- Application deployed and configured with all dependencies (OpenCV, face_recognition, firebase-admin, tkinter).

- Test environment setup completed with webcam access.

- Test cases reviewed and approved.

- Test data prepared.

Exit Criteria:

- All 25 planned test cases executed.

- No critical or high severity defects open.

- All medium and low priority defects documented and addressed.

- Code coverage requirements met.

4. Test Environment

Environment: QA Testing Environment

Platform: Desktop Application (Tkinter-based GUI)

OS: Windows 10/11, 64-bit

Python Version: 3.8+

Libraries: opencv-python, face_recognition, firebase-admin, openpyxl, cvzone, tkinter

Database: Firebase Realtime Database

Storage: Firebase Storage + Local file system

Test Data: Registered user credentials, student images, and attendance records.

5. Test Execution Summary

Metric	Count
Total Test Scenarios	15
Total Test Cases Executed	25
Passed Test Cases	25
Failed Test Cases	0
Blocked/Not Executed	0
Pass Percentage	100%

Remarks: All 25 test cases passed successfully. Two test cases (TC004 and TC014) required initial fixes but were retested and passed. System demonstrates robust functionality across all modules.

6. Defect Summary

Defect ID	Title/Description	Severity	Priority	Status
DEF_001	Password stored as plaintext (Hash Implementation Issue)	High	High	Closed
DEF_002	Forgot Password button raises NameError, no field displayed	Medium	High	Closed

7. Risks & Issues

- Initial security risk (plaintext passwords) was successfully mitigated through hash implementation.

- UI stability issue (NameError in forgot password) was resolved, ensuring all buttons function correctly.

- System stability verified across all modules after fixes.

- No critical blockers observed during test execution.

8. Key Findings

- Passwords now securely hashed before storage in login_details.xlsx.

- Face recognition accuracy satisfactory with proper encoding generation and regeneration.

- All UI components responsive and functional after fixing the Forgot Password issue.

- Real-time attendance marking works accurately with effective duplicate prevention.

- Student management operations (CRUD) perform reliably with Firebase synchronization.

- Excel export functionality generates accurate attendance reports.

- Application handles invalid inputs gracefully with appropriate warning messages.

9. Test Conclusion

The Automatic Face Recognition Attendance System has successfully passed all functional testing requirements. All 25 test cases were executed with a 100% pass rate after addressing two initial defects. Critical features including user authentication, student image management, face recognition attendance, and reporting functionality are verified and stable. The system demonstrates robust performance and is ready for User Acceptance Testing (UAT).

10. Recommendation

- Proceed with User Acceptance Testing with end-users.

- Conduct minor regression testing after final deployment.

- Consider performance testing with larger datasets for future scalability.

- Maintain security audit practices for password hashing implementation.

- Document operational procedures for system administrators.