UNIT TESTING REPORT FOR AI-Powered Student Management System

**Team Members:**

Sudhamsham Reddy Kondareddy Gari (Y00871179)

Tarun Kumar Reddy Mulagani (Y00870434)

# Project Description:

With the use of AI-powered insights, the AI-Powered Student Management System assists educational institutions in tracking and managing student performance, attendance, and assignments. Using real-time data and AI predictions for student achievement, the technology empowers educators and administrators to take decisive action.

# SYSTEM TESTING

System testing guarantees that every component of the integrated software system operates in accordance with the specifications and user expectations. Through testing of all parts, sub-assemblies, and assemblies as a single product, it seeks to find any flaws and vulnerabilities.

## Types of Testing:

• Unit testing: Verifies that each software component is operating as intended.   
Integration testing confirms that the integrated software components function as intended.

* Functional testing verifies that the system operates as intended for both valid and incorrect inputs.
* Verifies that the integrated system operates in accordance with the design specifications through system testing.

## Testing Approaches:

• White Box Testing: This method requires an understanding of the software's fundamental structure and operations.   
• Black box testing: This method involves testing the program just for input-output validation without having any knowledge of its internal structure or language.

# Test Strategy and Objectives:

To verify the user experience, functional components will undergo manual testing in the field.   
Ascertain that all user data, including grades, attendance, and assignments, is appropriately kept and presented.   
Making sure reports powered by AI are created and presented on time.

# Modules Tested:

## 1. Student Module

• Functionality: Allows students to view and submit assignments, check performance, and track attendance.  
• Tests Performed:  
 - View assignment scores: Passed  
 - View attendance percentage: Passed  
 - Submit assignments: Passed  
• Results: All student-related functionalities performed as expected.

## 2. Professor Module

• Functionality: Enables professors to monitor student performance, generate reports, and receive AI-driven insights.  
• Tests Performed:  
 - View student performance reports: Passed  
 - Generate AI-based performance insights: Passed  
• Results: All professor functionalities worked as intended.

## 3. Admin Module

• Functionality: Admins manage the entire system, including assigning students to courses and overseeing AI-driven reports.  
• Tests Performed:  
 - Assign students to courses: Passed  
 - Monitor real-time student performance: Passed  
• Results: Admin functionalities passed without issues.

## 4. AI Report Generation

* Functionality: Uses AI models (e.g., CNN) to predict and generate reports based on historical student data.
* • Tests Performed:  
   - Generate AI report for a student: Passed  
   - Handle invalid student input: Passed  
  • Results: AI-driven report generation performed flawlessly, with accurate data predictions.

# Integration Testing

The seamless operation of all software components, such as the admin, professor, and student modules, is confirmed by integration testing. The system's ability to integrate AI report production with real-time data handling was tested.

## Test Results:

• All modules successfully merged, and no issues with data processing or system communication were discovered; AI predictions were produced accurately using historical performance data, and integration with real-time data updates operated as planned.

# Acceptance Testing

User Acceptance Testing (UAT) ensures that the system meets user expectations and functional requirements.

## Test Results:

• Every test case was completed successfully, and no errors were found. End users (students, instructors, and administrators) experience the system operating as intended.   
The AI-powered reports were produced in real time, and all functionalities were available on desktop and mobile devices.

# System Requirements:

## Software:

* Python frameworks (Django or Flask) for the backend.
* Frontend :JavaScript, CSS,HTML.
* Postgre SQL or MongoDB is the database.
* AI Tools for machine learning models include pyTorch and TensorFlow.

# Code Example (AI-Driven Report Generation in Python):

import json  
  
# Sample student performance data  
student\_performance = {  
 "Vikramadithya Kolasani": {"assignments": 85, "attendance": 90, "overall": "Excellent"},  
 "Tejaswi Kasukurthi": {"assignments": 80, "attendance": 95, "overall": "Very Good"},  
 "Mounika Eslavath": {"assignments": 78, "attendance": 92, "overall": "Very Good"}  
}  
  
# Function to generate AI-based performance report  
def generate\_ai\_report(student\_name):  
 if student\_name in student\_performance:  
 print(f"Performance Report for {student\_name}: ")  
 print(f"Assignment Score: {student\_performance[student\_name]['assignments']}")  
 print(f"Attendance: {student\_performance[student\_name]['attendance']}%")  
 print(f"Overall Performance: {student\_performance[student\_name]['overall']}")  
 else:  
 print("No data available for this student.")

A screenshot of a computer program

Description automatically generatedA screenshot of a computer screen

Description automatically generatedA screenshot of a computer

Description automatically generatedA screenshot of a computer

Description automatically generatedA screenshot of a computer

Description automatically generatedA screenshot of a computer

Description automatically generatedA screenshot of a computer

Description automatically generatedA screenshot of a computer

Description automatically generatedA screenshot of a computer program

Description automatically generated

# Conclusion:

In conclusion, the AI-Powered Student Management System has undergone extensive testing, and every major feature operates as planned. By integrating AI-driven insights, administrators and instructors can get actionable data that enhances student performance monitoring. The system satisfies all functional and non-functional needs, guaranteeing academic institutions a dependable and effective solution.