1. Project Title

AI-Based Student Performance Prediction and Analytics System

2. Abstract

This project presents an AI-based student performance prediction and analytics system developed using machine learning and data visualization techniques. The system analyzes key academic parameters such as attendance percentage, daily study hours, and internal assessment marks to predict students' final examination scores.

The project integrates data preprocessing, exploratory data analysis, machine learning modeling, and explainable AI techniques into a single interactive dashboard built using Streamlit. The system provides predictive insights along with visual analytics and recommendations, enabling educators to identify at-risk students early and take preventive actions.

The proposed solution demonstrates how data-driven decision-making and artificial intelligence can enhance academic monitoring and improve student outcomes.

3. Objectives

- To analyze student academic data efficiently
- To predict final exam marks using machine learning
- To identify performance-influencing factors
- To visualize academic patterns using interactive dashboards
- To provide explainable AI insights for improvement
- To deploy a user-friendly web-based application

4. Problem Statement

Educational institutions often face difficulty in identifying students who are at risk of poor academic performance. Traditional methods rely on manual evaluation, which is time-consuming and lacks predictive capability.

There is a need for an intelligent system that can:

- Analyze student performance automatically
- Predict academic outcomes in advance
- Provide data-driven insights and recommendations
- Support early intervention strategies

5. Tools & Technologies Used

Category	Technology
Programming Language	Python
Data Processing	Pandas, NumPy
Machine Learning	Scikit-learn
Visualization	Matplotlib, Streamlit Charts
Web Framework	Streamlit
IDE	VS Code / Jupyter
Deployment	Streamlit Cloud
Dataset	CSV-based student dataset

6. Dataset Description

Input Features:

- Attendance (%)
- Study Hours per Day
- Internal Marks

Target Variable:

- Final Examination Marks

The dataset contains structured academic data collected for predictive modeling and analysis.

7. Machine Learning Algorithm

Linear Regression

Used to model the relationship between:

- Attendance
- Study Hours

- Internal Marks

and final exam score

8. Conclusion

The AI-Based Student Performance Prediction and Analytics System successfully demonstrates how machine learning and data analytics can improve educational monitoring. By combining prediction, visualization, and explainable AI within an interactive web application, the system enables early identification of academic risks and supports informed decision-making.

The project provides a scalable foundation for future intelligent educational systems.