Academic Performance AI: Student performance dashboard

This presentation outlines the development and features of "Academic Performance AI," a Streamlit web application designed to empower students through insightful academic tracking and personalized coaching.

Project Goal
To create a Streamlit web application that enables students to visualize their academic trajectory and receive personalized coaching, leveraging the power of Generative AI.

Key Technologies
The application is built using Python, Streamlit for the user interface, Pandas for data manipulation, Scikit-Learn for predictive modeling, and the Hugging Face API for advanced AI integration.

Impact
Academic Performance AI aims to transform how students understand and improve their academic standing, fostering proactive learning and personalized growth.

At its core, this project addresses critical gaps in traditional academic tracking, offering a dynamic and interactive solution.

Understanding the Challenge: The Problem Statement

Students often struggle to fully grasp their cumulative academic performance (CGPA) over time. While individual grades provide a snapshot, they frequently lack actionable insights into overarching trends – whether their performance is improving, declining, or plateauing.

Furthermore, access to personalized mentorship or guidance is often limited. Students may identify areas of concern but lack the resources to formulate effective strategies for improvement. This application bridges that gap by providing both visualization and tailored advice.

Lack of Trend Visualization
Students see individual grades but cannot easily discern their performance trajectory across multiple semesters.

Limited Actionable Insights
Without clear trends, students find it difficult to understand the impact of their efforts or identify areas needing attention.

Absence of Personalized Coaching
Many students lack access to consistent, tailored advice to help them correct their academic course or optimize their study habits.

## Data Foundation: Dataset & Data Sourcing

The application relies on user-generated content, offering flexibility in how students input their academic records. This can be done either by uploading a CSV file or through manual data entry directly within the application interface.

The structured input ensures consistency and ease of processing. Key columns include:

- Semester: Identifies the academic period.
- Course Code: Unique identifier for each course.
- Unit Load: Credits or units associated with the course.
- Grade: The letter grade received (A-F).

Seamless Data Integration
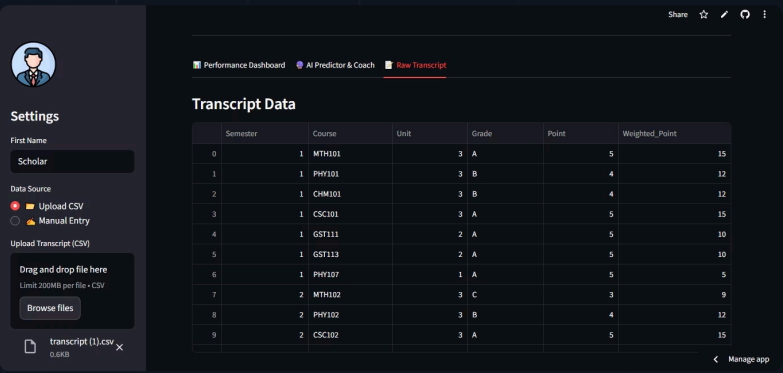
Once the data is ingested, sophisticated processing takes place. Grades are automatically converted into weighted points (e.g., A=5, B=4, etc.), a standard practice for calculating Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA).

This dynamic calculation, powered by the Pandas library, ensures that all visualizations and AI insights are based on accurate and up-to-date academic metrics.

Methodology - AI & Machine Learning

The heart of Academic Performance AI lies in its intelligent integration of predictive modeling and generative AI, offering a dual approach to student support.

Predictive Modeling: Forecasting Future Performance

Using Scikit-Learn's LinearRegression model, the application analyzes historical GPA trends. This allows it to forecast a student's likely academic performance in the upcoming semester, providing a forward-looking perspective.

Generative AI Coach: Personalized Mentorship

We integrated HuggingFaceTB/SmolLM3-3B via the Hugging Face Inference API. This Large Language Model (LLM) analyzes the student's overall trend (improving, declining, or consistent) to generate a personalized, motivational study plan in real-time.

This combination empowers students not only to understand where they are headed but also to receive actionable advice on how to get there effectively.
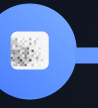
Visualizations & Key Features

Academic Performance AI provides intuitive visualizations that bring a student's academic journey to life, coupled with features designed for immediate impact.
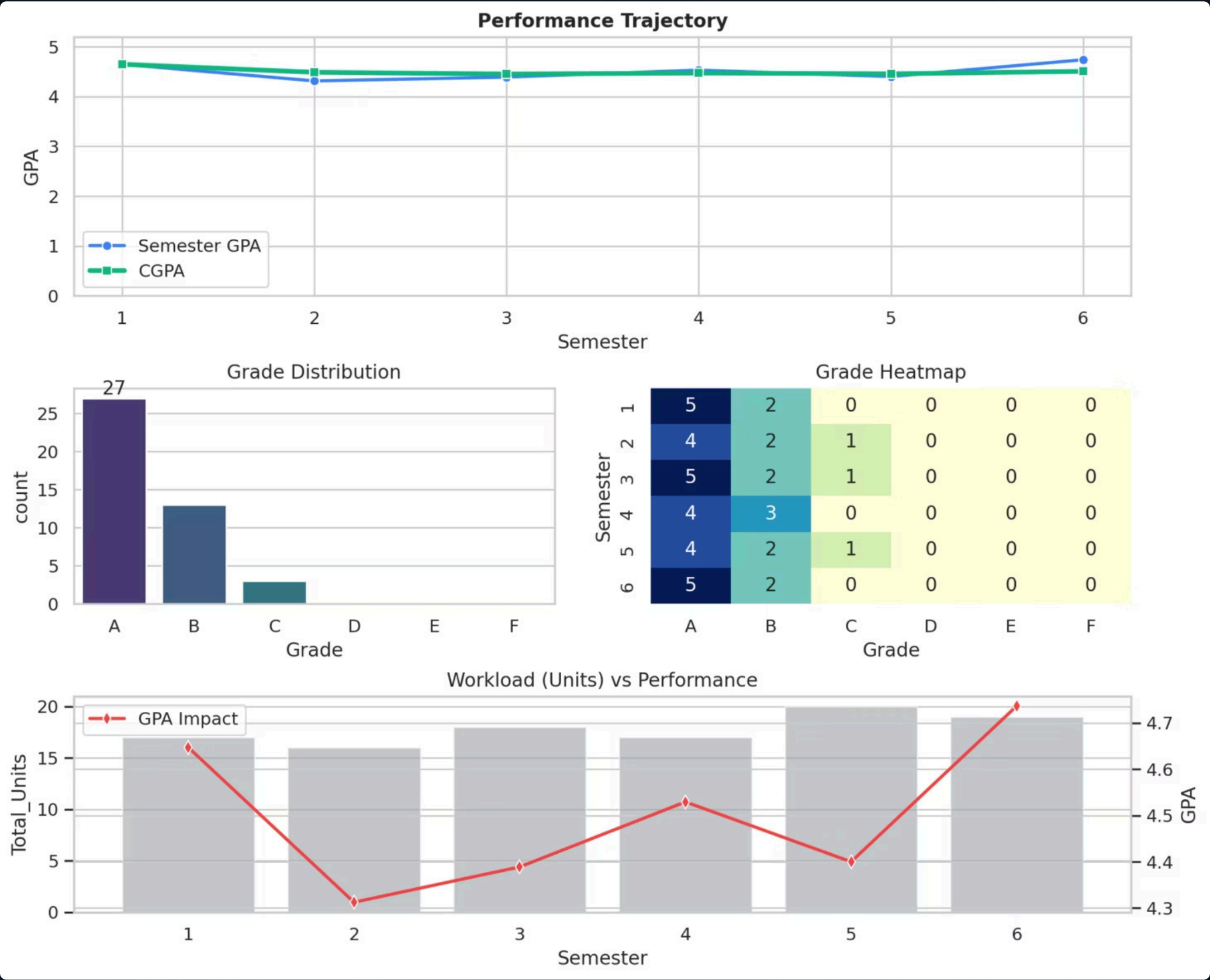
Performance Trajectory
A dynamic multi-line chart provides a clear comparison between Semester GPA and Cumulative GPA over time, making trends instantly visible.

Grade Heatmap
A visual grid illustrates the frequency of different grades across various semesters, highlighting subjects or periods where performance might fluctuate.

Workload Analysis
A bar chart visually correlates the unit load (credits) taken each semester with the corresponding academic performance, helping students manage their course selections more strategically.

These features collectively create a comprehensive dashboard, allowing students to monitor their progress, identify patterns, and engage with AI-driven insights to foster continuous academic improvement.