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AI Smart College Companion

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ABSTRACT :

Traditional student-management systems mainly store student records and generate reports. The proposed AI Smart College Companion uses a Collaborative Multi-Agent System to analyze student information such as attendance, academic performance, technical skills, CGPA, communication, and placement-related information. Specialized agents process different aspects of the student profile and provide personalized insights and recommendations through an interactive Streamlit dashboard.

Keywords: AI Smart College Companion, Collaborative Multi-Agent System, Student Analytics, Skill Gap Analysis, Placement Eligibility, Job Recommendation, Course Recommendation, Resume Score.

INTRODUCTION

Students need to monitor several aspects of academic and career development, including attendance, academic performance, technical skills, communication, and placement readiness. Conventional student-management systems mainly maintain records and generate reports, but may not provide personalized guidance from the combined information.

The proposed AI Smart College Companion combines these requirements through a Collaborative Multi-Agent System. Different agents are assigned specific tasks such as attendance analysis, performance analysis, skill-gap identification, placement eligibility, job recommendation, course recommendation, event recommendation, and resume score evaluation.

The application uses Streamlit as the interactive frontend and Python for backend processing and agent logic. Pandas is used for data handling, OpenPyXL supports Excel processing, and CSV/Excel files are used as the student data source. The system is intended to help faculty and students understand strengths, identify gaps, and plan placement preparation.

LITERATURE SURVEY / REVIEW

Previous student analytics approaches have focused mainly on attendance monitoring, academic records, and report generation. Career-support systems additionally consider skills, academic performance, and role requirements. However, these functions are often handled separately, making it difficult to obtain a combined view of a student's academic and placement readiness.

Multi-agent systems provide a modular approach for dividing a complex problem into smaller tasks. Each specialized agent can process the information relevant to its responsibility and produce a focused result. This approach also makes the system easier to test, maintain, and extend when new student-support functions are added.

The proposed work brings these ideas together in a college-oriented Collaborative Multi-Agent System that analyzes a common CSV/Excel student dataset and produces personalized academic, skill, placement, and career-support results.

METHODOLOGY

The proposed system follows a dataset-driven multi-agent approach. The faculty or user uploads a CSV or Excel student dataset through the Streamlit interface. The uploaded data is processed using Pandas, while OpenPyXL supports Excel workbook processing. The Coordinator Agent manages the overall flow and invokes the appropriate specialized agents.

The Attendance Agent evaluates attendance status. The Performance Agent analyzes academic performance. The Skill Agent identifies strong and missing skills. The Placement Agent checks placement eligibility using the defined project criteria. The Job Agent suggests suitable job roles, while the Course Agent recommends courses that can help improve identified skill gaps.

The Event Agent recommends workshops, hackathons, webinars, or technical events based on student skills and placement status. These recommendations are generated by the agent logic and do not require a separate event column in the student dataset. The Resume Agent calculates a project-defined resume-readiness score and displays improvement suggestions.

CONTENT

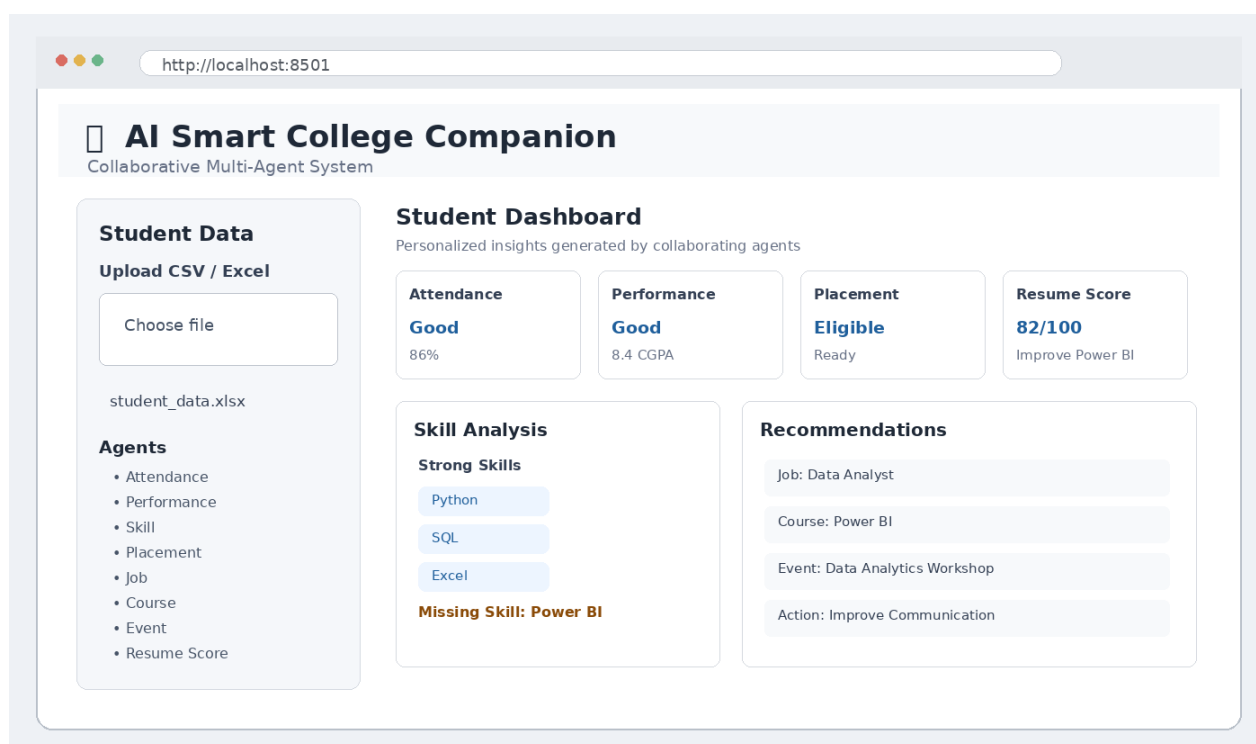
The system accepts student information through CSV or Excel files. The input may contain fields such as Name, Attendance, Maths, Python, AI, SQL, Excel, PowerBI, CGPA, and Communication.

Pandas organizes the tabular data and the agents analyze the information according to their individual responsibilities. The Coordinator Agent manages the workflow between the agents and the dashboard.

The final results include attendance and performance status, strong and missing skills, placement eligibility, job and course recommendations, and a resume score with improvement areas.

WORKFLOW DIAGRAM

Fig. 1: Desktop view of the AI Smart College Companion



RESEARCH AND REVIEW

The proposed system demonstrates how a modular multi-agent architecture can be applied to student support. Each agent has a clear responsibility and uses the student information relevant to its task. This separation reduces unnecessary coupling and makes individual agent logic easier to test.

The system also supports a practical faculty workflow because the application can accept uploaded CSV or Excel class data instead of depending only on a fixed student list. The same dashboard and agent workflow can therefore be used with different class datasets when the required columns are available.

The Collaborative Multi-Agent System also allows future agents to be added without redesigning the complete application. The architecture can therefore be extended for additional academic, career, or placement-support functions.

RESULT AND DISCUSSION

The completed application provides a single dashboard through which student information is analyzed by multiple specialized agents. The system can identify attendance and performance status, summarize strong and missing skills, check placement eligibility, recommend job roles and courses, suggest technical events, and generate a resume score with improvement suggestions.

The Resume Score Agent uses project-defined factors such as attendance, CGPA, communication, strong skills, placement eligibility, and missing skills. Attendance is treated as a supporting consistency indicator in the project logic and is not considered a technical resume skill.

The Event Agent generates event recommendations from the student's skills and placement status rather than requiring an event column in the uploaded Excel or CSV file. The quality of the results depends on the completeness of the student dataset and the rules defined in the agents.

DISCUSSION

The system separates student-support activities into specialized modules. This makes the application easier to understand and allows each agent to be improved independently. The Streamlit interface also provides a simple way to demonstrate the outputs during project review.

The current implementation uses CSV and Excel as the data source instead of a dedicated database. The recommendations are based on the available student information and the logic implemented in each agent. Therefore, the outputs are intended as decision support for student development and placement preparation.

Overall, the collaborative architecture provides a practical foundation for combining academic analysis, skill-gap identification, placement readiness, career recommendations, and resume improvement in one application.

CONCLUSION

The AI Smart College Companion provides a practical Collaborative Multi-Agent System for analyzing student information and supporting academic and placement preparation. The system integrates attendance, performance, skill analysis, placement eligibility, job recommendation, course recommendation, event recommendation, and resume scoring in one interactive Streamlit dashboard.

Python provides the backend processing and agent logic, while Streamlit provides the frontend. Pandas and OpenPyXL handle CSV and Excel data processing. By dividing the work among specialized agents, the system provides a modular architecture that can be tested, maintained, and extended independently.

The application can help faculty and students understand current strengths, identify skill gaps, check placement readiness, and choose suitable next steps for career preparation.

FUTURE SCOPE

In the future, the system can be improved by integrating a dedicated database for persistent student records and by adding authentication with separate faculty and student access.

Additional scope includes machine-learning or LLM-based recommendations, live job/course/event sources, historical progress tracking, and improved resume analysis through direct resume upload and structured skill extraction.

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