Eduke – A Smart Academic Management System

Introduction

Eduke is an advanced, **AI-powered academic management system** designed to enhance the learning experience for students, streamline communication among teachers, parents, and students, and provide actionable insights for improving academic performance. The system leverages modern technologies to simplify academic tasks, such as attendance tracking, grade management, performance evaluation, and quiz administration, while also incorporating an AI chatbot for personalized assistance and academic guidance.

The system supports four distinct user roles: **students**, **parents**, **teachers**, and **admin**, each with unique responsibilities. Students can access their grades, attendance records, and evaluations, they can access study tips from the AI chatbot. The AI chatbot analyses their data and the tells the student about his/her current academic situation whether he/she should adjust their studying method to make good performance. Students can participate in quizzes arranged by teachers, and their responses are stored and evaluated, providing immediate feedback. Parents can monitor their child's progress, provide evaluations on factors like study time and stress management, and communicate with teachers. Teachers can manage attendance, input grades, evaluate student performance, and conduct quizzes using the system. Admins oversee user account creation, assign classes and subjects, and manage the overall system.

Eduke also incorporates **AI-driven performance prediction**, powered by analysing a combination of academic and behavioral factors that influence student outcomes. Attendance plays a vital role, as consistent participation ensures regular exposure to lessons. Marks from previous assessments and internal exams highlight academic trends and areas of strength or weakness. Parent feedback, including factors like study time, sleep patterns, and stress management, offers a view of the student's home environment, while teacher feedback, covering aspects such as homework completion, class participation, focus, and test preparation, provides classroom-specific insights. Additionally, quiz results and other evaluation metrics, such as ratings for class difficulty and overall performance, are incorporated to create a comprehensive profile. By integrating these diverse data points, Eduke predicts outcomes and offers actionable recommendations to improve academic performance.

Features

For Students

- Participate in quizzes created by teachers and answer multiple-choice questions.
- View detailed quiz results, including correct answers and performance insights.
- Receive personalized assistance from the AI-powered chatbot about their progress, including areas to improve based on quiz results, attendance, and marks.
- Access attendance records, marks, quiz results, and evaluations.
- Interact with teachers through the integrated chat feature for academic discussions or clarifications.

For Parents

- Access their child's attendance, marks, quiz results, and evaluations.

- Provide performance evaluation data for factors like study time, sleep patterns, and stress management.
- View their child's quiz performance and insights, helping them support their child's learning effectively.
- Submit an overall "Parent Rating" for their child as part of the evaluation process.
- Communicate with teachers via chat to discuss academic progress and address concerns.

For Teachers

- Create quizzes with multiple-choice questions, including options and the correct answer.
- Publish quiz results for students to view, including performance summaries.
- Manage attendance and marks records efficiently for their classes.
- Evaluate students on various metrics like focus, participation, homework completion, and test preparation.
- Provide "Teacher Ratings" and input detailed feedback to contribute to evaluations.
- Interact with students and parents through the chat feature for academic discussions and feedback.

For Admin

- Manage user accounts for students, parents, and teachers, ensuring proper role assignments.
- Assign classes, subjects to teachers and students.
- Oversee the system's operations and generate detailed reports on academic performance, quiz participation, and overall engagement.

AI-Powered Chatbot

- Assists students with insights into their progress, providing feedback on marks, attendance, quiz performance, and areas of improvement.
- Offers personalized academic advice based on quiz results and evaluations.
- Helps students and parents with study tips and strategies for improving academic outcomes.
- Provides tailored responses based on the user role (student, parent, or teacher), ensuring relevant and meaningful interactions.

Database Design

Eduke's database is structured with 10 relational tables to store and manage data efficiently:

1. **Users Table:** Stores common details for all user roles.
2. **Students Table:** Manages student-specific data, including roll numbers and class associations.
3. **Parents Table:** Links parents to their child and stores login credentials.
4. **Teachers Table:** Maintains teacher profiles and their class assignments.
5. **Classes Table:** Defines classes and links them to teachers.
6. **Subjects Table:** Stores subject details and unique codes.
7. **Attendance Table:** Records attendance for students by class and subject.

8. **Marks Table:** Maintains students' percentage scores for subjects.
9. **Student Evaluation Table:** Tracks detailed performance evaluations with inputs from teachers and parents.
10. **Chat Table:** Supports real-time messaging between students, parents, and teachers.
11. **Quizzes Table:** Stores metadata about quizzes, such as title, description, teacher, and subject.
12. **Questions and Options Table:** Combines quiz questions and their corresponding options, including the correct answer.
13. **Student Responses Table:** Tracks student responses to quiz questions and records their selected options.

Objectives

1. To develop an AI-powered academic management system that simplifies and automates essential processes like attendance tracking, marks management, and student evaluations.
2. To enable personalized insights into student performance using data-driven approaches and machine learning models.
3. To foster better communication and collaboration between students, parents, and teachers through integrated features like chat and AI chatbot.
4. To create a centralized system that enhances decision-making for educators and parents.

Process

1. **Requirement Analysis**: Identify the specific needs of students, parents, teachers, and admins.
2. **System Design**: Develop database schema, define user interfaces, and plan system workflows.
3. **Database Setup**: Design relational tables to store user data, attendance, marks, evaluations, and chats.
4. **Feature Development**:
    - Build role-based access for users.
    - Implement chat functionality for communication.
    - Design and train an AI chatbot for academic advice and personalized interactions.
    - Develop a performance prediction model using machine learning.
5. **Testing**: Perform thorough testing to ensure accuracy, reliability, and user satisfaction.
6. **Deployment**: Host the system on a cloud-based platform for accessibility.
7. **User Training and Feedback**: Educate users about system features and gather feedback for continuous improvement.

Resources

Hardware Requirements:

- **Processor**: Dual-Core, 2.0 GHz or higher (e.g., Intel Core i3 or equivalent).
- **RAM**: Minimum 4GB.

- **Storage**: 500GB or more.
- **Operating System**: Windows 7/8/10/11 (64-bit), Linux, or macOS.
- **Web Browser**: Google Chrome, Mozilla Firefox, Brave or Microsoft Edge (latest versions).
- **Display**: 1024x768 resolution or higher.
- **Network**: Stable internet connection with a minimum of 5 Mbps.

Software Requirements:

- **Backend**: Python with Django Framework.
- **Frontend**: HTML, CSS, JavaScript, Bootstrap.
- **Database**: MySQL.
- **AI Tools**: TensorFlow or Scikit-learn for machine learning, OpenAI's GPT for chatbot.
- **Version Control**: Git/GitHub.

Hardware:

- A reliable server machine with sufficient processing power and memory.
- Devices like laptops or desktops for user access.

Software:

- Python 3.x
- Django Framework
- MySQL Database Server
- TensorFlow/Scikit-learn for AI modules
- OpenAI API for chatbot functionality
- Web browser for user interface interaction.

Limitations

1. The system’s performance prediction accuracy depends on the quality and quantity of data.
2. Limited functionality of the chatbot for non-academic queries.
3. Initial implementation requires significant training and familiarization for users.
4. Resource-intensive AI models may increase system latency or hosting costs.

Conclusion

Eduke is a comprehensive solution to modernize academic management by automating routine tasks, predicting student performance, and enhancing collaboration between stakeholders. By integrating AI technologies and user-friendly features, Eduke provides actionable insights and fosters an environment conducive to academic success. While the system has certain limitations, its scalable architecture and innovative approach make it a valuable tool for educational institutions.

References

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