

EduBuddy: An AI-Powered Learning and Career Assistant for Students

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Abstract: *In the modern digital era, students often face challenges in accessing reliable learning resources and receiving proper career guidance due to the vast availability of information and lack of personalized support. To address these issues, this paper presents EduBuddy, an AI-powered learning and career assistant designed to provide integrated academic support and career recommendations through a single platform. The system leverages Artificial Intelligence (AI), Natural Language Processing (NLP), and machine learning techniques to understand user queries and generate meaningful responses in real time. EduBuddy offers multiple functionalities, including an AI-based chat assistant, smart study planner, course recommendation system, resume analyzer, profile review, job fit analysis, and mock interview module. The system is developed using modern technologies such as React, TypeScript, Firebase, and Google Generative AI tools, ensuring scalability, efficiency, and user-friendly interaction. It also incorporates personalization features by analyzing user inputs, preferences, and behavior to provide customized suggestions. The results demonstrate that EduBuddy effectively enhances student learning and decision-making by offering real-time assistance and structured guidance. Although the system has certain limitations, such as dependency on data quality and internet connectivity, it shows strong potential in improving educational support systems. Overall, EduBuddy serves as a comprehensive and intelligent solution that bridges the gap between learning and career development.*

Keywords: Artificial Intelligence, Generative AI, Natural Language Processing, Intelligent Tutoring System

I. INTRODUCTION

In today's rapidly evolving digital era, students are exposed to a vast amount of information and learning resources available on the internet. While this accessibility has improved learning opportunities, it has also created challenges in identifying relevant and accurate information. Students often struggle to find the right study materials, understand complex concepts, and receive proper guidance regarding their academic and career paths. The absence of personalized support systems further adds to confusion and uncertainty, especially when making important career decisions.

Traditional methods of learning and career counseling are often limited by time, availability, and accessibility. Students may not always have access to expert guidance or may hesitate to seek help due to various reasons. As a result, there is a growing need for intelligent systems that can provide continuous, reliable, and personalized assistance to students anytime and anywhere.

Artificial Intelligence (AI) has emerged as a transformative technology capable of addressing these challenges. AI-based systems can analyze user inputs, understand natural language, and provide relevant responses in real time. Among these systems, AI-powered chatbots have gained significant popularity due to their ability to simulate human-like conversations and deliver instant support. These chatbots can be integrated into educational platforms to assist students with learning queries, provide study recommendations, and guide them in choosing suitable career options.



In this context, this paper introduces EduBuddy, an AI-powered learning and career assistant designed to enhance the educational experience of students. The primary objective of EduBuddy is to provide a unified platform where students can receive academic support as well as career guidance in an efficient and user-friendly manner. The system is capable of answering subject-related questions, suggesting learning resources, and recommending career paths based on user preferences, skills, and interests.

EduBuddy leverages modern technologies such as Natural Language Processing (NLP), machine learning techniques, and interactive user interfaces to deliver accurate and meaningful responses. The system is designed to understand user queries, process the information, and generate appropriate outputs that are easy to understand. This helps in simplifying complex topics and improving overall learning efficiency.

Furthermore, EduBuddy focuses on personalization, which is a key aspect of modern educational tools. By analyzing user inputs and behavior, the system can provide customized suggestions tailored to individual needs. This not only improves user engagement but also ensures that students receive guidance that is relevant to their goals and abilities.

The proposed system is developed with the aim of bridging the gap between students and accessible, high-quality guidance. It serves as a smart assistant that combines learning support and career counseling into a single platform. By offering real-time assistance, reducing dependency on traditional methods, and enhancing decision-making capabilities, EduBuddy contributes to improving the overall educational experience.

In conclusion, EduBuddy represents an innovative approach to integrating AI into education. It demonstrates how intelligent systems can be utilized to support students in both learning and career planning, making it a valuable tool in the modern digital landscape.

II. LITERATURE REVIEW

In recent years, Artificial Intelligence (AI) has played a significant role in transforming the field of education. Various AI-based systems have been developed to assist students in learning and decision-making processes. One of the most widely used applications is AI-powered chatbots, which are capable of providing instant responses and personalized assistance to users.

Several studies have focused on the development of educational chatbots that help students understand academic concepts and resolve their doubts. These systems use Natural Language Processing (NLP) techniques to interpret user queries and generate appropriate responses. Such chatbots have proven to be effective in improving student engagement and providing real-time support without the need for human intervention.

In addition to learning assistance, research has also been conducted on career recommendation systems. These systems analyze user data such as interests, skills, and academic performance to suggest suitable career paths. Machine learning algorithms are commonly used in these systems to identify patterns and make accurate predictions. Career guidance systems have been shown to help students make informed decisions and reduce confusion regarding future opportunities.

Some existing platforms combine both learning support and career guidance features. However, many of these systems lack proper personalization, user-friendly interfaces, or real-time interaction capabilities. Additionally, some systems are limited in scope and do not provide a comprehensive solution that addresses both academic and career-related needs effectively.

The review of existing literature highlights the importance of integrating AI technologies, particularly NLP and machine learning, to build intelligent systems that can support students in multiple aspects. It also indicates a gap in developing a unified platform that offers both learning assistance and career guidance in a simple and efficient manner. To address these limitations, the proposed system, EduBuddy, aims to provide an integrated solution that combines AI-based learning support with personalized career recommendations. By leveraging modern AI techniques and focusing on user-friendly design, EduBuddy seeks to enhance the overall educational experience and assist students in achieving their academic and career goals.



III. METHODOLOGY

A. System Overview

The proposed system, EduBuddy, is an AI-powered platform designed to assist students in learning and career guidance. The system provides a unified interface where users can ask academic questions, explore career opportunities, and receive personalized recommendations.

EduBuddy uses Artificial Intelligence and Natural Language Processing (NLP) techniques to understand user queries and generate meaningful responses. It aims to deliver real-time assistance and simplify complex information, making learning and career planning easier for students.

B. Working of the System

The working of the EduBuddy system is carried out in the following steps:

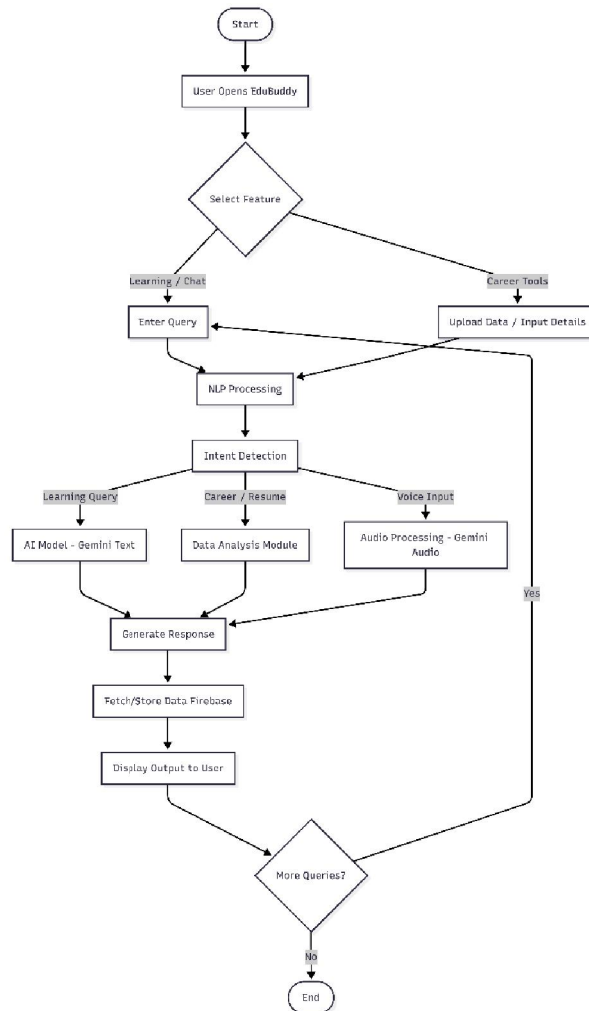


Fig. 1 Workflow of EduBuddy System

User Input: The user enters a query related to learning, career guidance, or uploads data such as a resume or profile.

Input Processing: The system processes the input using Natural Language Processing (NLP) techniques such as tokenization and keyword extraction.



Intent Detection: The system identifies the type of query, such as learning assistance, career recommendation, or resume analysis.

Data Processing: The system uses AI models and predefined logic to analyze the query and retrieve relevant information.

Response Generation: The system generates a suitable response based on the processed data.

Output Display: The final output is displayed to the user in a simple and understandable format.

C. Technologies Used

The proposed system, EduBuddy, is developed using a combination of modern web technologies, artificial intelligence tools, and cloud-based services to ensure efficient performance and scalability.

1. Frontend Technologies

The user interface of the system is built using React 19, which enables the development of dynamic and responsive components. TypeScript is used to enhance code reliability and maintainability by providing type safety. For styling, Tailwind CSS is utilized to create a clean and modern design. Navigation between different modules of the system is handled using React Router DOM v7.

2. Artificial Intelligence Layer

The core intelligence of EduBuddy is powered by advanced AI tools. The system integrates the Google Generative AI SDK to enable AI functionalities. It uses Gemini 3 Flash (Text AI) for processing and generating text-based responses, and Gemini 2.5 Flash Audio (Voice AI) for handling voice-based interactions.

3. Database

EduBuddy uses Firebase Cloud Firestore Database to store user data, queries, and application-related information. Firestore provides real-time data synchronization and scalability, making it suitable for dynamic applications.

4. Authentication and State Management

User authentication is managed using Firebase Authentication, which ensures secure login and user management. The application state is handled using the React Context API, allowing efficient data sharing across components. Additionally, LocalStorage is used to store temporary user data on the client side.

5. Web APIs

The system integrates browser-based APIs such as the MediaDevices API for accessing input devices like microphones, and the Web Audio API for processing voice interactions. LocalStorage API is also used for client-side data storage.

6. Deployment

The application is deployed using environment-based configuration, where API keys are securely managed to ensure safe interaction with external services.

D. System Architecture

The system architecture of EduBuddy represents the overall structure and interaction between different components of the system. It consists of the user interface, AI processing layer, database, authentication system, and external APIs.

The user interacts with the system through a web-based interface developed using React. The frontend communicates with the AI layer powered by the Google Generative AI SDK, which processes user queries using Gemini models for both text and voice inputs.



The system also integrates Firebase services, where Firestore is used for storing user data and Firebase Authentication is used for secure user management. Additionally, Web APIs such as MediaDevices API and Web Audio API are used to support voice-based interactions. LocalStorage is used to temporarily store user-related data on the client side.

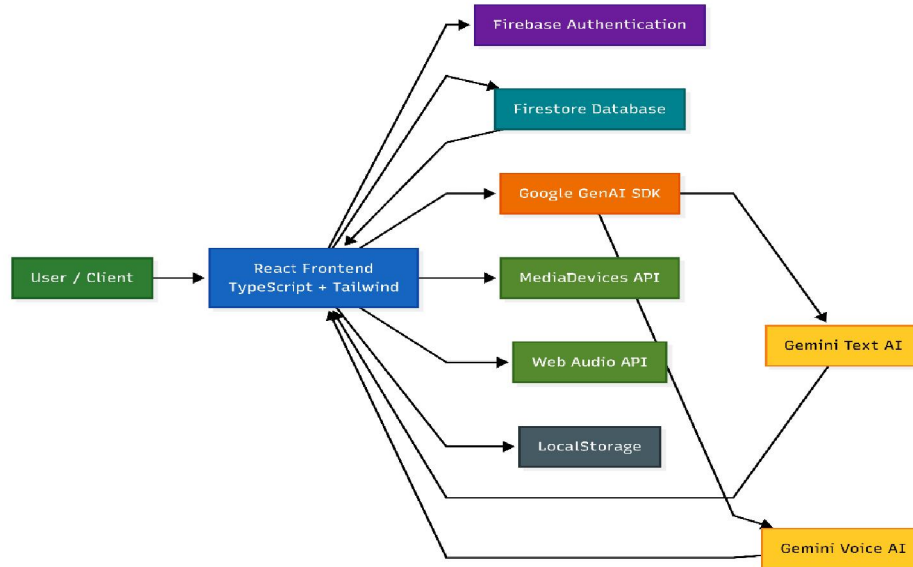


Fig. 2 System Architecture of EduBuddy

All these components work together to process user input, generate intelligent responses, and display the output efficiently, making the system scalable and user-friendly.

E. Advantages of the Proposed System

The proposed system, EduBuddy, offers several advantages that enhance the learning experience and career guidance for students:

All-in-One Platform: EduBuddy integrates multiple features such as learning assistance, career guidance, resume analysis, and interview preparation into a single system.

Real-Time Assistance: The system provides instant responses to user queries using AI, reducing waiting time and improving efficiency.

Personalized Recommendations: It offers customized learning resources and career suggestions based on user inputs, interests, and preferences.

User-Friendly Interface: The system is designed with a simple and interactive interface, making it easy for students to use without technical knowledge.

Accessibility: EduBuddy can be accessed anytime and anywhere through a web-based platform.

Improved Decision Making: The system helps students make better academic and career decisions by providing relevant and structured information.

F. Limitations of the System

Despite its advantages, the proposed system, EduBuddy, has certain limitations:

Dependency on Data Quality: The accuracy of responses depends on the quality and availability of data used in the system.

Limited Understanding of Complex Queries: The system may not always accurately interpret highly complex or ambiguous user queries.



Internet Dependency: Since the system relies on cloud-based services and APIs, a stable internet connection is required for proper functioning.

Limited Personalization Scope: The system provides recommendations based on available inputs, which may not fully capture all user preferences or long-term goals.

AI Response Limitations: The generated responses may sometimes lack depth or context, especially in highly specialized topics.

IV. RESULTS AND DISCUSSION

The proposed system, EduBuddy, was successfully developed and tested to evaluate its effectiveness in providing learning support and career guidance. The system integrates multiple features such as AI-based chat assistance, course recommendation, study planning, resume analysis, and interview preparation.

During testing, the system was able to process user inputs efficiently and generate meaningful responses in real time. The results demonstrate that EduBuddy provides a user-friendly interface and effective solutions for students in both academic and career-related aspects.

1. Home Interface

The EduBuddy system provides a centralized dashboard that allows users to access all features from a single platform. The home interface is designed to be simple and user-friendly, enabling easy navigation between different modules such as learning assistant, career tools, and interview preparation.

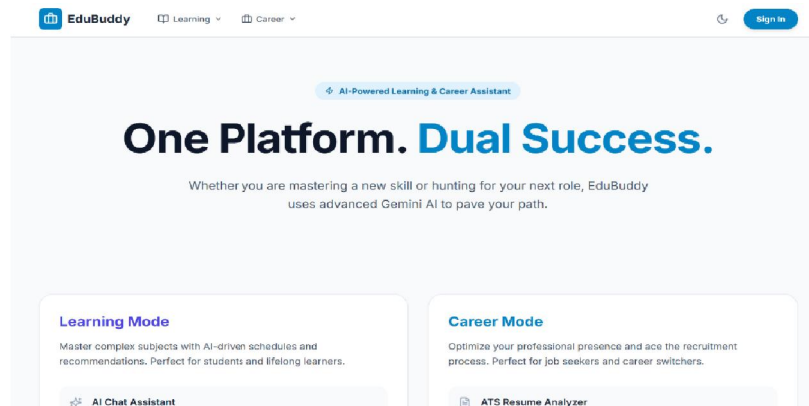


Fig. 3 Home Interface of EduBuddy

2. AI Chat Assistant

The EduBuddy system includes an AI-powered chat assistant that helps users with academic queries and learning support. Users can enter their questions, and the system generates instant responses using AI and Natural Language Processing techniques. This feature helps in understanding concepts and resolving doubts efficiently.



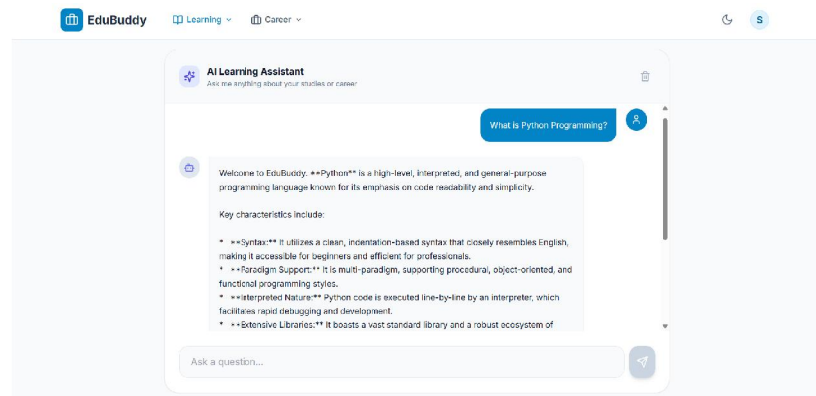


Fig. 4 AI Learning Assistant Interface

3. Mock Viva Module

The EduBuddy system includes a mock viva module that helps students prepare for examinations by testing their conceptual understanding. The system generates questions based on selected topics and evaluates user responses, providing feedback to improve performance

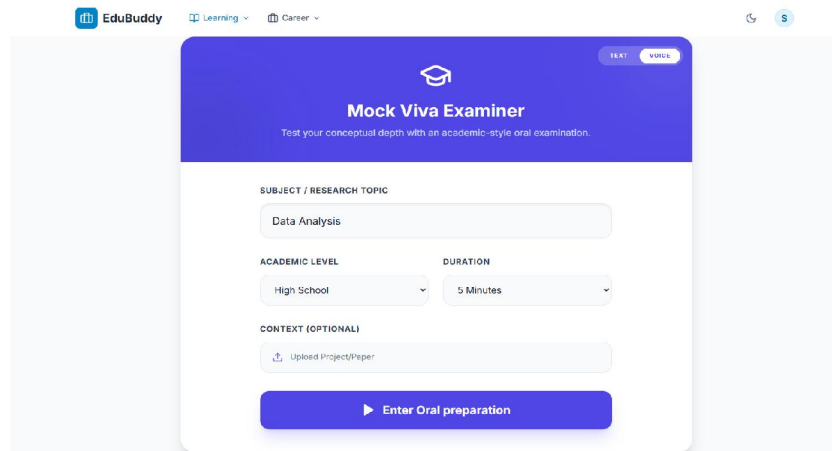


Fig. 5 Mock Viva Module

4. Study Planner Module

The EduBuddy system includes a smart study planner that helps users create personalized study schedules based on their goals and available time. Users can enter the subject, describe their learning objectives, and specify daily study hours and deadlines. The system then generates a structured study plan to help users achieve their goals efficiently.



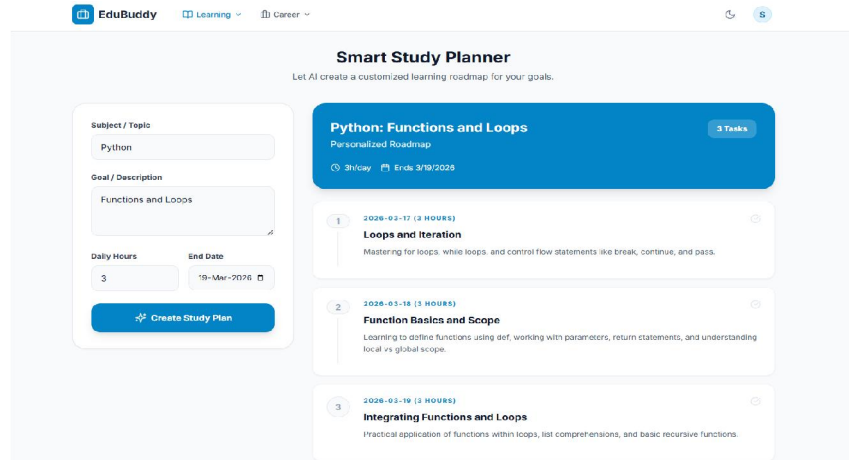


Fig. 6 Smart Study Planner Module

5. Course Recommendation Module

The EduBuddy system provides a course recommendation feature that helps users discover relevant learning resources based on their selected skills or interests. Users can search for a specific skill, and the system generates suitable course suggestions to support their learning and career development.

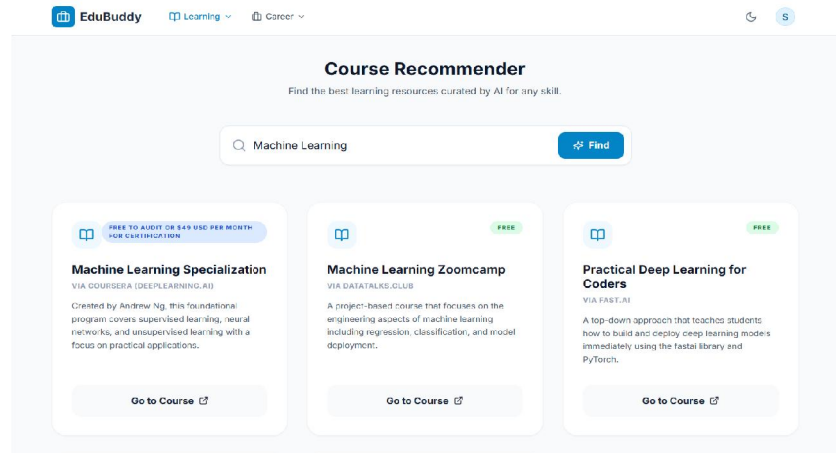


Fig. 7 Course Recommendation Module

6. Resume Analyzer Module

The EduBuddy system includes a resume analyzer feature that helps users evaluate their resumes based on industry standards. Users can upload their resume, and the system analyzes it to provide feedback, compatibility scores, and suggestions for improvement. This feature assists users in optimizing their resumes for better job opportunities.



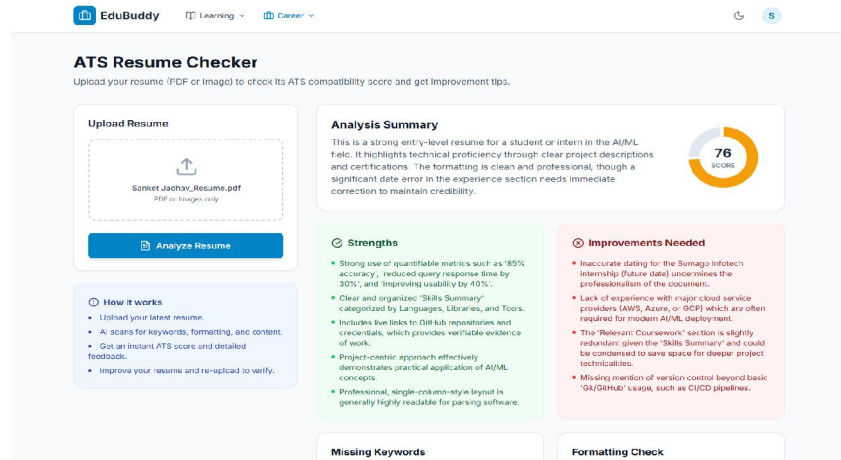


Fig. 8 Resume Analyzer Module

7. Profile Review Module

The EduBuddy system includes a profile review feature that helps users improve their professional profiles such as LinkedIn and GitHub. The system analyzes user profile details and provides suggestions to enhance visibility, content quality, and overall presentation.

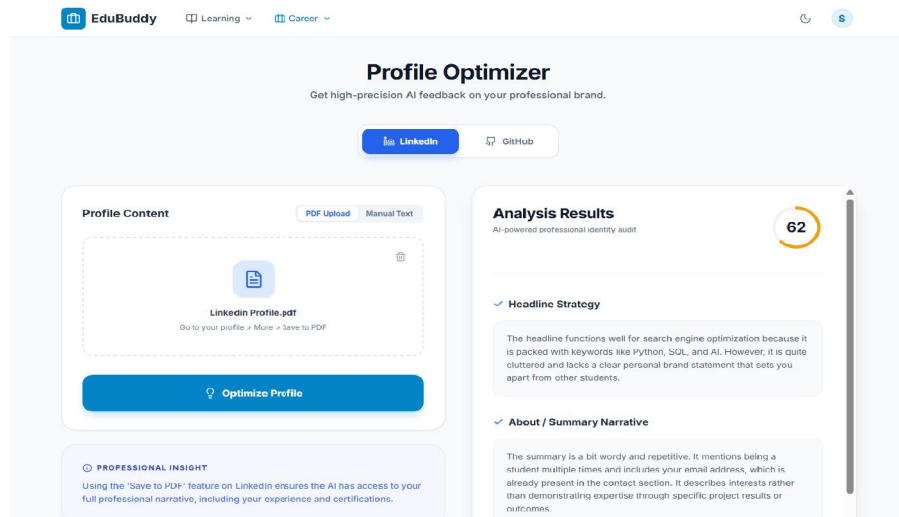


Fig. 9 LinkedIn Profile Review



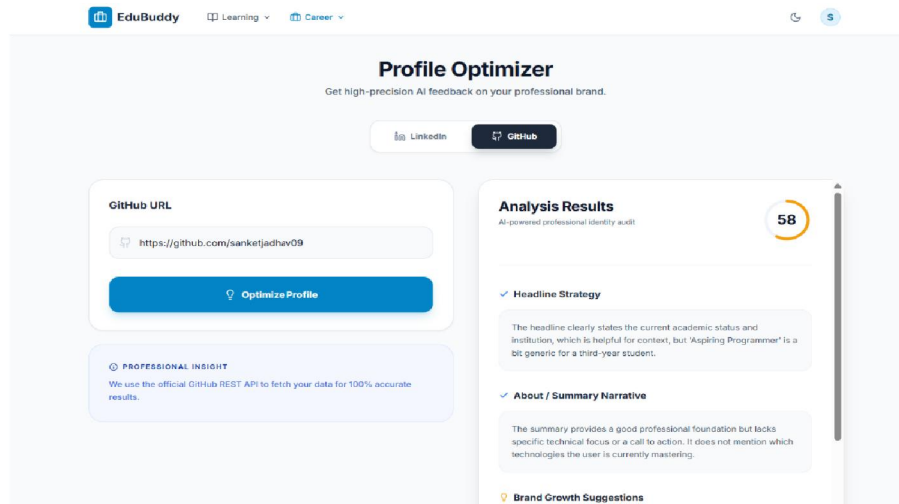


Fig. 10 GitHub Profile Review

8. Job Fit Analysis Module

The EduBuddy system includes a job fit analysis feature that helps users evaluate their suitability for a specific job role. Users can upload their resume and provide a job description, and the system analyzes the compatibility between the two. It then generates insights and suggestions to improve the chances of selection.

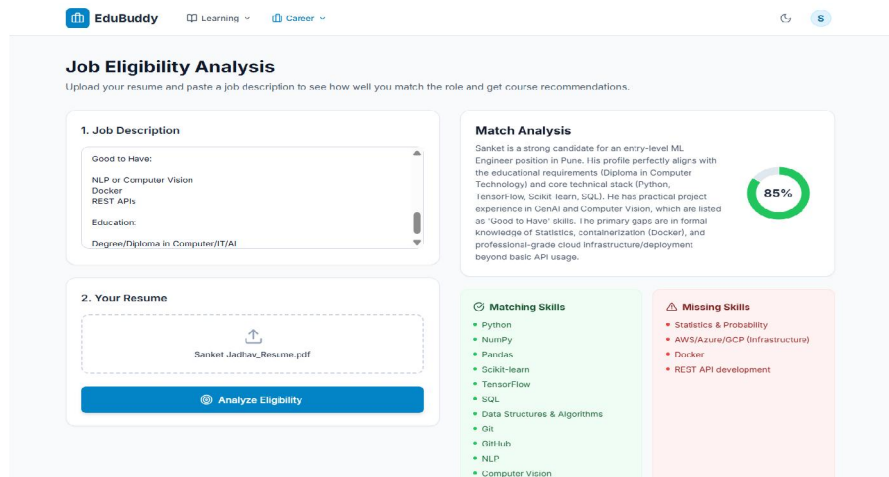


Fig. 11 Job Fit Analysis Module

9. Mock Interview Module

The EduBuddy system includes a mock interview module that helps users prepare for job interviews by simulating real interview scenarios. Users can select a job role and difficulty level, after which the system generates relevant interview questions and may provide feedback based on responses. This feature helps improve confidence, communication skills, and overall interview performance.



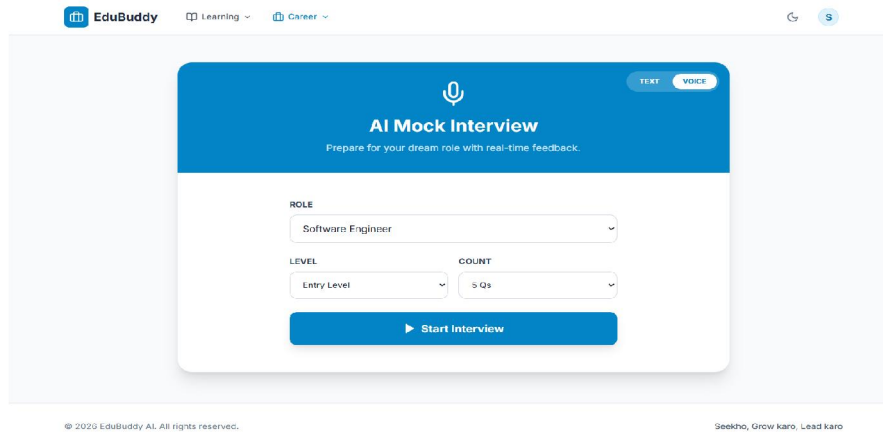


Fig. 12 AI Mock Interview Module

10. Dashboard (Activity Command Center)

The EduBuddy system includes a dashboard that provides users with a comprehensive overview of their activities and performance. The dashboard displays key metrics such as total activities, average scores, and a timeline of actions including job analysis, profile reviews, and other interactions. This feature helps users track their progress and understand their overall performance in learning and career development.

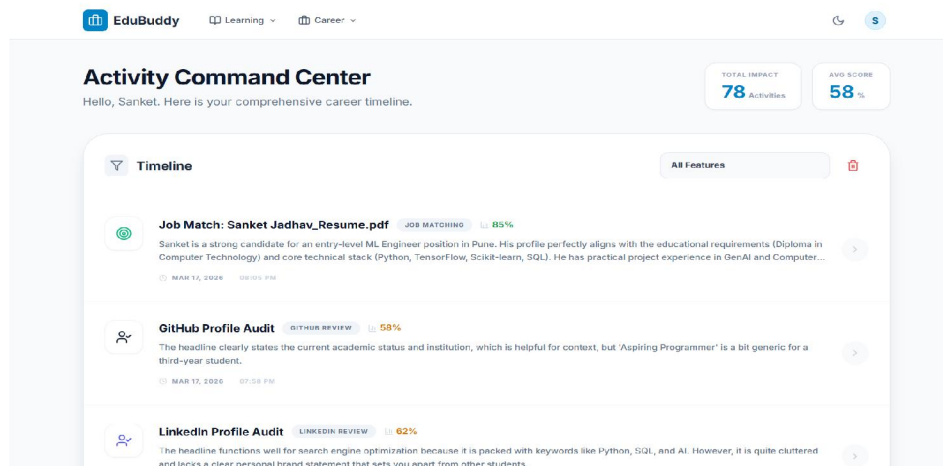


Fig. 13 Activity Command Center Dashboard

V. CONCLUSION

The proposed system, EduBuddy, successfully demonstrates the application of Artificial Intelligence in enhancing both learning and career guidance for students. The system integrates multiple features such as AI-based chat assistance, course recommendations, study planning, resume analysis, profile review, and interview preparation into a single unified platform.

The results show that EduBuddy is capable of providing real-time, personalized, and user-friendly support to students. The system effectively processes user inputs and generates meaningful outputs, helping users improve their academic understanding and make informed career decisions.



Furthermore, the inclusion of tools like job fit analysis, resume evaluation, and mock interviews adds practical value by preparing users for real-world challenges. The dashboard feature also enables users to track their progress and performance over time.

However, the system has certain limitations, such as dependency on data quality and potential challenges in handling highly complex queries. These limitations can be addressed in future work by integrating more advanced AI models and expanding the dataset.

In conclusion, EduBuddy serves as an efficient and intelligent assistant that bridges the gap between learning and career development. It has the potential to significantly improve student productivity and decision-making, making it a valuable contribution to AI-based educational systems.

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to our respected faculty members and project guides for their continuous guidance, encouragement, and valuable suggestions throughout the development of this project. Their support played a crucial role in shaping the direction and successful completion of this work.

We are also thankful to our institution for providing the necessary infrastructure, resources, and a conducive learning environment that enabled us to carry out this research effectively. The technical support and academic facilities provided by the institution were instrumental in completing this project.

Additionally, we would like to acknowledge the contributions of various online resources, documentation, and tools that assisted us in understanding and implementing different aspects of this system. Their availability greatly enhanced our learning and development process.

Finally, we extend our appreciation to all those who directly or indirectly supported us in completing this project successfully.

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