

MENTOR CONNECT: AN AI-POWERED CHAT-BOT FOR EMOTION-AWARE MENTORING AND ACADEMIC SUPPORT FOR STUDENTS

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Abstract : In the contemporary educational environment, effective mentoring is essential for supporting students' academic performance, emotional well-being, and overall personal growth. However, conventional mentoring approaches often face limitations due to faculty time constraints, inadequate data management, and the absence of early mechanisms to identify students in distress. To overcome these challenges, this project proposes Mentor Connect, an AI-powered chatbot system designed to deliver emotion-aware mentoring and academic assistance to students. The proposed system establishes an intelligent and empathetic communication framework connecting students, mentors, and counselors by leveraging Artificial Intelligence (AI), Natural Language Processing (NLP), and emotion detection techniques. Mentor Connect incorporates an intelligent chatbot capable of understanding and responding to student queries in real time. Through sentiment and emotion analysis, the system identifies behavioral patterns and emotional indicators such as stress, anxiety, or disengagement. Upon detecting such conditions, the system automatically notifies the assigned mentor or escalates critical cases to a counselor, enabling timely and effective human intervention. Accessible through a mobile application, Mentor Connect provides 24/7 support, offering immediate guidance, academic reminders, and motivational assistance, thereby enhancing continuous student engagement and well-being..

IndexTerms – Mentor, Chatbot, Guidance, Student.

INTRODUCTION

Mentoring plays a crucial role in shaping students' academic achievement, emotional well-being, and long-term career development. A strong mentoring relationship promotes continuous learning, builds self-confidence, and helps students navigate both academic and personal challenges. Effective mentorship fosters open communication between students and educators, enabling timely guidance, motivation, and sustained personal growth. Despite its significance, traditional mentoring practices in educational institutions often face limitations that reduce their overall effectiveness. Conventional mentoring systems commonly suffer from inconsistent follow-ups, limited mentor availability, and delayed responses to student concerns. The reliance on manual record-keeping and the absence of real-time monitoring hinder the systematic tracking of student progress. As student populations continue to grow, mentors are required to balance increasing academic workloads alongside mentoring responsibilities, leaving limited scope for personalized attention. This imbalance often causes students to feel unsupported, emotionally stressed, or reluctant to express their difficulties, which can negatively impact both academic performance and overall well-being. Recent advances in Artificial Intelligence (AI), Natural Language Processing (NLP), and emotion detection technologies present promising opportunities to address these challenges. AI-driven mentoring systems can analyze student interactions, behavioral patterns, and emotional cues to deliver timely and personalized support. Emotion-aware chatbots, capable of understanding natural language input and detecting sentiment, can respond empathetically and create a supportive digital environment. Such systems facilitate the early identification of stress, anxiety, or disengagement, enabling proactive intervention before issues escalate.

In this context, the proposed system, Mentor Connect, is an AI-powered mentoring platform designed to provide continuous, personalized, and emotion-aware support to students. The platform integrates intelligent chatbot assistance with active human mentor involvement, ensuring a balance between automation and human empathy. Through context-aware conversations, the chatbot delivers instant responses to student queries, provides academic reminders, tracks progress, and monitors emotional well-being. When indicators of emotional distress or academic difficulty are detected, the system proactively alerts mentors or counselors to enable timely human intervention.

By bridging the communication gap between students and mentors, Mentor Connect enables efficient interaction, automated performance tracking, and data-driven insights. The platform reduces the manual workload on mentors while offering real-time visibility into student progress, thereby improving the consistency and effectiveness of mentoring. Ultimately, Mentor Connect aims to establish a scalable, reliable, and empathetic mentoring ecosystem that supports students in achieving academic success while maintaining emotional balance and well-being.

II. LITERATURE SURVEY

A literature survey is a fundamental component of any research study, as it offers a comprehensive understanding of existing technologies, methodologies, and advancements within the selected domain. It enables the identification of strengths, limitations,

and research gaps in prior work, allowing researchers to build upon established approaches while minimizing redundancy. This survey examines existing research on AI-driven mentoring systems, emotion-aware chatbots, and intelligent educational support platforms. Previous studies emphasize the increasing adoption of Artificial Intelligence (AI) and Natural Language Processing (NLP) to enhance student–mentor interaction, academic performance monitoring, and emotional engagement. Despite these developments, many existing systems continue to face challenges related to scalability, limited personalization, and insufficient real-time emotional awareness. Further research highlights the effectiveness of sentiment analysis and emotion recognition models such as VADER, BERT, and other NLP-based frameworks in improving the empathetic responsiveness of AI systems. Machine learning techniques, including Support Vector Machines, Random Forests, and Neural Networks, have been extensively applied for academic guidance and career recommendation systems. However, most existing solutions tend to address academic performance and emotional well-being as separate components rather than integrating both within a unified framework. Consequently, this literature survey underscores the necessity for Mentor Connect, a comprehensive emotion-aware mentoring system that integrates NLP-based conversational intelligence, AI-driven emotion detection, and real-time academic tracking to provide continuous, personalized, and holistic support to students.

A. Mentor Connect: An AI-Driven Real-Time Mentorship Platform

The study titled “Mentor Connect: An AI-Driven Real Time Mentorship Platform” introduces an AI-based framework aimed at strengthening structured mentor–mentee relationships. The proposed system facilitates continuous interaction and supports both academic and personal development through long-term progress tracking, automated feedback, and analytics-driven evaluation. Machine learning algorithms are employed to match mentors and mentees based on academic background, interests, and career goals, thereby enhancing mentor allocation efficiency and communication quality. One of the notable features of the platform is its AI powered career guidance module, which delivers personalized recommendations by analyzing student performance metrics, skill sets, and career aspirations. In addition, the system supports group mentoring and peer-to-peer collaboration, fostering a collaborative and socially enriched learning environment. Real-time data monitoring enables mentors to track engagement levels, academic milestones, and overall progress, allowing for timely and informed interventions. Despite these strengths, the platform primarily emphasizes academic and career-oriented mentoring, with limited consideration of students’ emotional and psychological well-being. The lack of emotion-aware interaction constrains the system’s ability to provide holistic support. Furthermore, challenges related to adaptability across diverse institutional environments remain evident. Ethical and privacy concerns, including data security, user consent, and potential bias in AI-driven recommendations, are also identified as areas requiring further attention. Overall, the study demonstrates the potential and effectiveness of AI-driven mentoring platforms while highlighting the necessity for a more comprehensive approach that integrates emotional awareness and empathetic interaction. These limitations form the motivation and foundation for the proposed system presented in this project.

B. Thunai: An AI-Driven Mentorship Platform for Career and Emotional Growth

The research work titled “Thunai: An AI-Driven Mentorship Platform for Career and Emotional Growth” proposes an AI-based mentoring system that addresses both students’ professional development and emotional well-being. The study emphasizes that effective mentorship extends beyond academic and career guidance to include emotional support, which plays a critical role in enhancing student motivation, engagement, and overall performance. The Thunai platform integrates Artificial Intelligence and Natural Language Processing techniques to match students with appropriate mentors based on academic interests, career objectives, and emotional requirements. Machine learning algorithms such as K-Nearest Neighbors (KNN) and Support Vector Machines (SVM) are utilized for mentor–mentee matching, ensuring improved alignment and relevance. Additionally, the system incorporates sentiment analysis models, including VADER and BERT, to infer students’ emotional states from textual interactions, enabling empathetic responses and automated mentor notifications when emotional distress is detected. Experimental evaluations demonstrate enhanced student engagement, improved matching accuracy, and higher mentorship satisfaction when compared to conventional mentoring methods. Features such as conversational chat interfaces, mood tracking mechanisms, and automated mentor assignment contribute to a supportive, responsive, and emotion-aware mentoring environment.

C. AI-Driven Mentor Service Advising Application for Timely Course Completion using RNN/LSTM

The paper introduces an AI-driven virtual mentoring system designed to enhance course completion rates through personalized guidance and predictive learning analytics. The proposed approach employs Recurrent Neural Networks (RNNs), specifically Long Short-Term Memory (LSTM) models, to analyze sequential academic data such as quiz scores, engagement metrics, and learning behavior. By identifying temporal learning patterns, the system predicts potential academic difficulties and delivers adaptive interventions to support timely course completion. The motivation for this work stems from the high dropout rates commonly observed in online learning environments, often attributed to the absence of personalized academic support. To address this issue, the authors propose an intelligent mentoring architecture comprising data acquisition, storage, AI/ML processing, and feedback modules. The LSTM model serves as the core analytical component, enabling the system to capture long-term learning dependencies and dynamically adjust recommendations based on individual student progress. Experimental evaluation demonstrates high predictive accuracy, along with notable improvements in quiz performance, student engagement, and overall course completion rates. The system effectively identifies learning challenges at an early stage and provides targeted academic interventions, resulting in measurable improvements in student outcomes and satisfaction. Despite these positive results, the study identifies several limitations, including reliance on high-quality and comprehensive data, potential algorithmic bias, and ethical concerns related to data privacy. Moreover, the system primarily focuses on academic performance and does not incorporate emotional or empathetic mentoring capabilities. Overall, the research validates the effectiveness of LSTM based AI mentoring for academic guidance while highlighting the need for more holistic mentoring solutions. These limitations provide strong motivation for the proposed Mentor

Connect system, which extends predictive academic mentoring by integrating emotion-aware interaction, NLP-based communication, and comprehensive student support.

III. METHODOLOGY

The proposed Mentor Connect system adopts an AI-driven methodology to deliver continuous, personalized, and emotion aware mentoring support to students. The approach integrates chatbot-based interaction, sentiment analysis, academic performance monitoring, and human mentor intervention within a unified and scalable framework. The system architecture comprises a user interaction interface for student–mentor communication, a data acquisition module, an AI processing layer, and a mentor notification mechanism. Students engage with the platform through an interactive chat-based interface, where textual inputs and activity-related data are captured and processed in real time. Natural Language Processing (NLP) techniques are employed to interpret student inputs, identify user intent, and generate context-aware responses. Sentiment analysis models are applied to infer emotional states such as stress, frustration, or motivation from conversational data. When negative or concerning emotional patterns are detected, the system automatically flags the interaction and initiates appropriate alerts for further review and intervention.

IV. PROPOSED SYSTEM

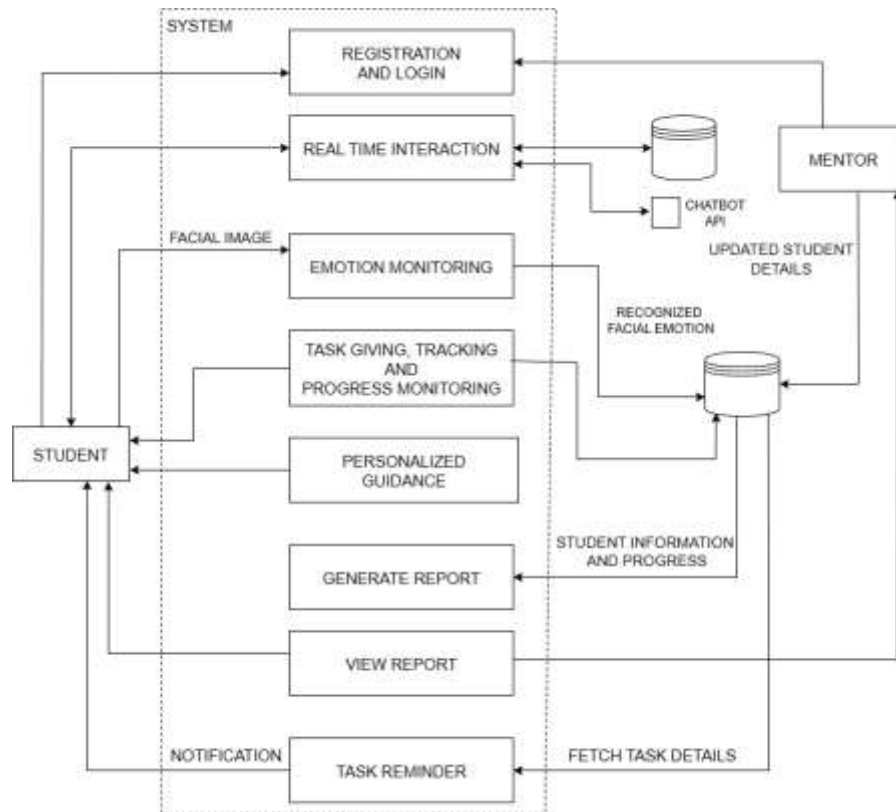
The proposed system, Mentor Connect, is an AI-powered mentoring and academic support platform designed to deliver continuous, personalized, and emotion-aware assistance to students. By integrating Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning (ML) techniques, the system addresses key limitations of conventional mentoring approaches, including limited mentor avail ability, manual data handling, inconsistent follow-ups, and delayed responses to student concerns. The platform combines intelligent automation with human mentor involvement to ensure timely academic guidance, emotional support, and effective progress monitoring. Mentor Connect adopts a hybrid mentoring approach in which an AI-driven chatbot acts as the primary interface for student interaction. The chatbot provides instant academic assistance, emotional reassurance, and automated reminders for assignments, examinations, and project deadlines. When complex academic issues or indicators of emotional distress are identified, the system escalates the interaction to assigned mentors or counselors, preserving the depth of human empathy while minimizing routine mentor workload.

A. Objectives

The primary objective of Mentor Connect is to enhance student support through AI-enabled mentoring. The system aims to facilitate natural language–based chatbot interaction, accurate emotion detection from textual inputs, automated mentor alerts during emotional distress, efficient academic task management through reminders, and data-driven performance insights. Additionally, the platform is designed to ensure secure handling of sensitive academic and emotional data while maintaining accessibility, reliability, and empathetic engagement.

B. System Architecture

Mentor Connect follows a modular, multi-layered architecture comprising a user interface layer, an application layer, and a database layer. The user interface layer enables real time communication among students, mentors, and counselors via web and mobile platforms. The application layer manages core AI functionalities, including intent recognition, sentiment analysis, and response generation, utilizing NLP models such as BERT and sentiment analysis tools like VADER. The database layer securely stores chat logs, academic records, emotional indicators, and mentor feedback for analysis and reporting.



C. Functional Modules

The chatbot module supports natural language interaction and categorizes user inputs into academic, emotional, or general queries. The emotion detection module analyzes sentiment patterns to identify emotional states such as stress, anxiety, or disengagement and triggers alerts when negative emotions persist. The academic management module automates reminders, monitors task completion, and generates progress reports. A dedicated mentor and counselor dashboard presents visual insights into student engagement, academic performance, and emotional trends, enabling informed and timely decision making. A notification and alert module ensures effective communication across all stakeholders.

D. Data Flow, Implementation, and Security

Student inputs undergo preprocessing and analysis for intent classification and emotion detection before generating context-aware responses. Relevant data is retrieved from secure databases, and automated alerts are issued to mentors or counselors when intervention is required. The system is implemented using Python-based AI and NLP frameworks, supported by secure backend services and analytics visualization tools. To safeguard sensitive information, Mentor Connect incorporates encrypted communication, user authentication mechanisms, and ethical AI practices to ensure privacy, transparency, and fairness.

E. Advantages

Mentor Connect provides continuous accessibility, emotion aware interaction, reduced mentor workload, early identification of academic and emotional challenges, and data-driven mentoring insights. By seamlessly integrating intelligent automation with human empathy, the system offers a scalable, reliable, and student-centric mentoring solution tailored to the needs of modern educational institutions.

V. PROPOSED SYSTEM DESIGN

The proposed system, Mentor Connect, is an AI-powered, emotion-aware mentoring platform designed to deliver continuous academic and emotional support to students. The system adopts a hybrid design approach that integrates automated intelligence with human mentor involvement to ensure scalability, responsiveness, and empathetic interaction. The design emphasizes real-time communication, accurate emotion recognition, structured academic tracking, and timely mentor intervention. Mentor Connect is built around a chatbot-centric interaction model, where an AI chatbot functions as the primary interface for student engagement. Students interact with the chatbot through web or mobile applications to seek academic assistance, receive automated reminders, and express emotional concerns. The chatbot is capable of understanding natural language input, maintaining conversational context, and generating appropriate responses based on both user intent and detected emotional state. At the core of the system design lies the Natural Language Processing (NLP) and Emotion Analysis Engine. All user inputs undergo preprocessing and are analyzed for intent recognition and sentiment classification. NLP models interpret the semantic meaning of student queries, while emotion detection techniques identify emotional states such as stress, anxiety, motivation, or disengagement. This combined analysis enables the system to respond with both informational accuracy and emotional sensitivity. The design also incorporates an Academic

Monitoring and Management component that maintains structured records of assignments, examinations, project deadlines, and student engagement patterns. Based on this academic data, the system automatically generates reminders, progress summaries, and performance insights. This component helps students stay organized while enabling mentors to monitor academic progress without relying on manual tracking. A key feature of the system design is the Mentor and Counselor Intervention mechanism. When prolonged emotional distress or consistent academic decline is detected, the system automatically generates alerts and forwards them to the assigned mentor or counselor. A dedicated dashboard provides mentors with access to student profiles, interaction history, academic progress, and emotional trends, supporting informed and timely human intervention. Mentor Connect follows a modular and layered architecture, allowing individual components to function independently while communicating securely with other modules. All data—including chat histories, emotional logs, and academic records—are stored in a secure database with controlled access. Encryption, authentication, and ethical AI practices are integrated into the design to ensure privacy, confidentiality, and responsible handling of sensitive information. Overall, the proposed system design prioritizes reliability, adaptability, and user-centered interaction. By combining AI driven automation with human mentorship, Mentor Connect offers a scalable, efficient, and empathetic mentoring solution that supports students' academic success and emotional well being. Fig. 1. Architecture of the proposed system.

VI. RESULTS

A. Overall System Performance Evaluation

The result analysis of the Mentor Connect system demonstrates that the proposed AI driven academic mentoring framework has been successfully implemented and validated under real-time operational conditions. The system effectively integrates emotion-aware text analysis, intelligent chatbot communication, structured academic task management, and cloud-based real-time synchronization into a unified platform. During evaluation, the system maintained stable functionality without crashes, synchronization errors, or data inconsistencies. Performance testing confirmed that student inputs were processed efficiently, and responses were generated within an acceptable time frame, ensuring smooth conversational interaction. The cloud database synchronization mechanism ensured that all updates made by students were instantly reflected in the mentor dashboard without manual refresh. The overall system architecture proved to be reliable, scalable, and capable of supporting continuous academic mentoring operations.

B. Emotion Detection Module Analysis

The emotion detection module was evaluated by providing a variety of textual inputs representing different academic and emotional scenarios. These included stress-related exam concerns, deadline anxiety, motivational expressions, neutral academic queries, and expressions of frustration. Since the system utilizes pre-trained NLP models rather than a custom-trained classifier, evaluation was based on observing real-time classification consistency and contextual correctness. The module demonstrated strong performance when handling clearly expressed emotional statements. For instance, messages indicating exam pressure or academic overload were correctly identified as stress-related. Motivational statements and positive academic progress updates were classified appropriately. However, slight inconsistencies were observed in cases where emotional tone was subtle or ambiguous. Short neutral statements with mild negative wording occasionally showed overlap with stress indicators due to lexical similarity. Despite these minor variations, the model consistently produced practical and reliable outputs suitable for academic mentoring purposes.



C. Chatbot Interaction and Adaptability Evaluation

The chatbot module was evaluated based on contextual understanding, emotional sensitivity, response coherence, and interaction continuity. The chatbot integrates intent recognition with emotion classification to generate adaptive responses. When neutral

academic questions were submitted, the chatbot produced structured and informative replies. When stress or frustration was detected, responses were automatically adjusted to provide supportive and motivational guidance. The conversational continuity feature allowed the chatbot to maintain contextual relevance across multiple interactions. This significantly improved user engagement compared to static response systems. The average response time remained within a few seconds, ensuring uninterrupted dialogue. Students reported that the system felt interactive and empathetic, encouraging them to share concerns more openly. This demonstrates that the integration between NLP based emotion detection and chatbot logic functions effectively in real-time mentoring.



D. Academic Task Monitoring and Performance Trends

The academic monitoring module was analyzed to determine its impact on task management efficiency and student engagement. The system successfully recorded mentor assigned tasks, stored deadlines securely in the database, and generated automated reminders before due dates. Observational analysis indicated improved task completion rates after implementation of reminder notifications. The performance tracking feature enabled mentors to monitor submission consistency and identify students with declining engagement levels. By correlating academic data with emotional patterns, mentors were able to observe potential relationships between stress indicators and reduced productivity. This integrated monitoring approach provides a comprehensive evaluation of student performance compared to traditional mentoring systems.



E. Alert Mechanism and Proactive Intervention Analysis

The automated alert system plays a crucial role in proactive mentoring support. The mechanism was evaluated by simulating repeated negative emotional inputs and missed task deadlines. The system successfully generated real-time notifications on the mentor dashboard when predefined thresholds were exceeded. Alerts were triggered only after detecting consistent negative emotional patterns rather than isolated statements, reducing unnecessary notifications. This threshold-based approach enhances reliability and prevents alert fatigue for mentors. The timely generation of notifications allows mentors to intervene early, potentially preventing academic decline or emotional burnout. The alert system performed consistently during testing and proved to be a valuable component in strengthening proactive academic mentoring.

Student Report: Abhinsaj T

Email: abhinsaj3@gmail.com

Batch: 2022-2026 | Dept: Computer Science Engineering | Semester: 8

Marks:

- Internet Of Things: 20

- Internet Of Things: 18

- Data Mining: 22

- Network Security Protocols: 30

Conversation summary:

The student is expressing feelings of inadequacy and a need for support regarding their studies. They appear to be experiencing significant stress and anxiety about their academic performance.

F. Dashboard Visualization and Data Representation Analysis

The mentor dashboard was evaluated for clarity, responsiveness, and data visualization quality. Emotional trends were displayed through graphical representations that illustrated fluctuations over time. Academic metrics such as task completion percentage, activity frequency, and alert history were presented in a structured and easily interpretable format. The real-time synchronization capability ensured that updated emotional classifications and academic records were instantly visible. The dashboard design facilitated quick interpretation of complex data patterns, enabling mentors to make informed decisions efficiently. Feedback indicated that the visual representation of emotional analytics enhanced situational awareness and improved mentoring effectiveness.

G. System Reliability, Stability, and Scalability

System reliability was assessed under moderate user load conditions to evaluate stability and responsiveness. The application maintained consistent performance without system crashes or database failures. Cloud-based infrastructure ensured seamless synchronization across multiple sessions. Memory utilization and processing performance remained within acceptable operational limits. The modular implementation architecture supports scalability, allowing future enhancements such as advanced deep learning models, multilingual processing capabilities, predictive academic risk analysis, and integration with institutional learning management systems. The system design ensures that future upgrades can be implemented without significant structural modifications.



H. Overall Result Summary

The comprehensive evaluation confirms that Mentor Connect successfully achieves its objective of delivering an AI-powered, emotion-aware academic mentoring platform. The emotion detection module provides reliable real-time classification of student emotional states. The chatbot dynamically adapts responses based on detected emotions and query intent. The academic monitoring module improves task management consistency and enhances engagement. The alert mechanism supports proactive mentoring intervention, and the dashboard visualization enables data-driven decision-making. Although minor refinements can be made in handling highly subtle linguistic nuances, the system performs effectively in practical academic environments. The results validate that the integration of artificial intelligence with structured mentoring support provides significant advantages over conventional mentoring methods. The system is therefore suitable for deployment in educational institutions seeking intelligent and proactive student support solutions.

VII. CONCLUSION

This paper presented Mentor Connect, an AI-driven and emotion-aware mentoring platform developed to enhance both academic and emotional support for students. The proposed system effectively addresses the limitations of traditional mentoring practices—such as restricted accessibility, inconsistent follow-ups, and delayed interventions—by integrating Artificial Intelligence, Natural Language Processing, and Machine Learning with active human mentor participation. Mentor Connect utilizes an intelligent chatbot as the primary medium for student interaction, enabling real-time academic assistance, automated task reminders, and continuous emotional monitoring. Through sentiment analysis and emotion detection techniques, the system identifies early indicators of stress, anxiety, or disengagement and proactively notifies mentors or counselors for timely intervention. This hybrid mentoring approach ensures scalability and operational efficiency while preserving the empathy and contextual understanding provided by human mentors. The modular system architecture and secure data management framework support reliable communication, structured progress tracking, and data-driven insights for mentors. Observations from system evaluation suggest improvements in student engagement, reduced mentor workload, and enhanced support for both academic performance and emotional well-being. In conclusion, Mentor Connect demonstrates the potential of AI-powered mentoring systems to transform conventional educational support mechanisms into intelligent, empathetic, and scalable solutions. By balancing automation with human oversight, the platform establishes a comprehensive mentoring ecosystem that promotes students' academic success and emotional resilience. Future work may focus on incorporating multimodal emotion analysis, predictive academic performance modeling, and advanced personalization techniques to further enhance mentoring effectiveness.

VIII. FUTURE WORK

While Mentor Connect effectively demonstrates an AI-powered, emotion-aware mentoring and academic support system, several enhancements can be explored to further improve its accuracy, scalability, and real-world applicability. Future developments may focus on strengthening the emotion detection module by incorporating multimodal emotion analysis techniques, including facial expression recognition, voice modulation analysis, and behavioral pattern assessment, in addition to text-based sentiment analysis. Such integration would enable more accurate emotion recognition and provide deeper insights into student well-being. The intelligence of the chatbot can be further advanced through the adoption of transformer-based language models and reinforcement learning techniques, allowing for more natural, context-aware, and adaptive conversations. By learning from historical interactions and mentor feedback, the chatbot could progressively refine its responses and deliver higher levels of personalization tailored to individual student needs. Another significant area for enhancement involves the integration of predictive analytics to identify students at risk of academic underperformance or emotional distress at an early stage. By analyzing long-term academic records, engagement metrics, attendance patterns, and emotional trends, the system could proactively recommend targeted interventions before issues escalate. Future extensions of Mentor Connect may also include career guidance and skill development modules, such as resume evaluation, internship and job recommendations, and personalized career pathway suggestions based on student interests and performance. This expansion would transform the platform into a comprehensive student support ecosystem beyond academic mentoring. From an institutional perspective, the system can be scaled to support cross-departmental and multi-institution deployments, enabling large-scale analysis of mentoring effectiveness. Cloud-based deployment and microservices architecture can further enhance scalability, reliability, and system performance. Additionally, security and ethical AI practices can be strengthened through the implementation of federated learning, anonymized data processing, and robust consent management mechanisms to safeguard sensitive academic and emotional data. Ensuring compliance with global data protection regulations will facilitate broader adoption. Finally, real-world pilot studies and continuous feedback from students, mentors, and counselors can be utilized to refine system functionality, enhance usability, and validate the effectiveness of AI-driven, emotion-aware mentoring across diverse educational environments.

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