GPT MeetBot: A Team Collaboration Assistant

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ABSTRACT

The difficulties college students encounter in group projects arises due to unfamiliarity and lack of leadership. It suggests the use of an AI assistant, GPT MeetBot, which integrates ChatGPT into meeting software to improve team coordination, task allocation, scheduling, and leadership. The research reviews existing teamwork tools and identifies a gap in catering to college students, suggesting the potential of GPT in meeting contexts. Formative studies highlight task refinement as a key area for GPT application. The GPT MeetBot system was developed and evaluated based on Heuristic evaluation and SUS (System Usability Scale), focusing on visual presentation, user habits, cognition, interface, and error handling. The study fills a market gap for student project management, catering to small-scale, multi-threaded needs. Personalizing the GPT tool optimizes AI in meeting scenarios, providing enterprise inspiration.

CCS CONCEPTS

• **Human Centered Computing**;

KEYWORDS

AI, LLM, Collaboration, Meeting

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1 INTRODUCTION

University students frequently encounter significant challenges when working on group projects. These challenges primarily stem from unfamiliarity among team members and the absence of a designated leader to oversee and manage project progress. This often results in insufficient supervision and a lack of momentum, hindering the advancement of the project. Additionally, ineffective task assignment frequently leads to an inefficient division of labor, reducing the overall effectiveness of teamwork. Consequently, some team members may become overburdened with tasks, while others might evade responsibilities, resulting in substandard, incomplete, or even failed projects.

To address these issues, we propose the development of an assistant designed for Project Planning, Task Arrangement, Communication, Flexible Regulation, and Documentation—essentially functioning as a project manager. Given ChatGPT's capabilities in natural language interaction, standardized output generation, and extensive creative potential, we considered utilizing ChatGPT as a project management tool.

Our comprehensive research and interviews have demonstrated that integrating ChatGPT into meeting software can significantly enhance team coordination. This integration facilitates task distribution, meeting scheduling, content summarization, and leadership during team discussions, thereby helping teams to complete projects more efficiently and effectively. We have named this innovative tool GPT MeetBot.

This paper explores the potential of GPT MeetBot to transform the operation of student project teams, addressing common challenges, and enhancing the efficiency and quality of collaborative efforts. We will discuss our research methodology, describe the features of GPT MeetBot, and evaluate its anticipated impact on team dynamics and project outcomes.

2 RELATED WORK

There are already several useful tools which have been developed in order to enhance the coorperation, including AI-empowered group tools, project enhancement tools, etc.

2.1 AI-Empowered Group Tools

Initially, within the pertinent domains, we conducted a comprehensive review of the role Artificial Intelligence plays in team collaboration.

Agent Group Chat[2] is envisioned as a sophisticated group communication platform, adept at tailoring interaction styles to the diverse identities of participants. This nuanced approach not only circumvents the potential for awkward mishaps but also facilitates more formal discourse when the situation demands it. The platform's design affirms the viability of AI in group communication contexts, demonstrating the capacity of AI to engage with users through a spectrum of communication styles, thereby enhancing the dynamism and effectiveness of group interactions.

The Agile Meeting Assistant[1] is an innovative online text-based solution crafted to streamline the meeting planning process. This tool empowers individuals to efficiently schedule meetings

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and handle day-to-day responsibilities. While it does not directly facilitate communication among team members, it offers a robust platform for personal task organization and meeting preparation.

2.2 Project Enhacement Tools

SketchComm [4] offers a collaborative canvas, ideal for the early stages of brainstorming among team members.This platform empowers designers to seamlessly incorporate a variety of media, including photos, videos, and hand-drawn sketches, to effectively communicate their conceptual ideas.Nonetheless, upon examining the interface depicted in the accompanying diagram, its cluttered appearance and non-intuitive design raise concerns regarding its potential to streamline team collaboration and augment productivity.

Winder[3] is a linguistically-driven collaboration tool tailored for college students, is designed to enhance communication efficiency by visually distinguishing the dialogues of various participants and accentuating the essential elements of their discussions. Despite its intent, the tool's current iteration simply enumerates conversations, presenting challenges in terms of organization and synthesis of ideas, particularly in settings where each individual contributes their perspectives. This limitation can impede the tool's effectiveness in fostering a streamlined and productive collaborative environment.

2.3 Current Commercial Software

A variety of well-established team collaboration solutions have garnered broad implementation within the corporate sphere, demonstrating their efficacy in enhancing workflow and communication among professionals.

Taskbot, a Microsoft-integrated bot framework, enables team managers to effectively communicate task reminders and deadline alerts to their team members. Lacking AI capabilities, Taskbot operates strictly based on predefined directives, executing tasks with precision as assigned by users. This straightforward approach ensures reliable and consistent performance, aligning with the specific needs of team coordination.

Feishu serves as a comprehensive project management tool favored by large teams for its collaborative capabilities. It allows all team members to seamlessly edit and integrate their individual schedules into a collective calendar. The platform is intuitive, facilitating easy sharing, presentation, and collaborative editing of content. Nonetheless, the extensive array of features demands a significant investment of time and effort to learn, in order to proficiently utilize the project management functionalities. Furthermore, our research indicates that their AI, currently under development and testing, appears to prioritize enhancing individual productivity over collective team collaboration. This suggests a strategic focus on personal efficiency gains within the broader context of team productivity.

Zoom is a versatile communication platform that seamlessly blends team messaging, voice and video calls, collaborative whiteboarding, and conferencing capabilities. Its integrated AI manifests a multifaceted approach, delivering value in both team collaboration and individual contexts. Throughout meetings, the AI adeptly summarizes discussions, offers real-time insights related to the meeting agenda, and intelligently segments meeting content by topics. In routine chats, it modulates conversation tone, distills key points from discussions, and facilitates meeting organization. During whiteboarding sessions, which are conducive to team brainstorming, the AI supports the ideation process and aids in the creation of mind maps. To encapsulate, Zoom's AI strategically integrates GPT across various touchpoints of team collaboration, echoing the concepts we presented in our preliminary report. Nevertheless, the platform's functions can appear fragmented, with the AI acting as a solitary embedded assistant. Additionally, the tool may not be optimally tailored for the collaborative needs of small-scale, short-term teams such as those commonly found in university settings.

2.4 Summary

Our analysis yields several key insights. Firstly, in the realm of collaborative efforts involving multiple individuals, the deployment of GPT is predominantly centered around summarizing discussions and ideation, without fully embracing the potential for GPT to exhibit distinctive personification, such as having a recognizable character and style. Secondly, existing mainstream applications do not adequately cater to the college student population, as they lack the flexibility and customization options that this demographic might require. Thirdly, the integration of GPT in meeting contexts presents a plethora of untapped opportunities to enhance team collaboration and project management processes, suggesting a rich area for future innovation and development.

3 FORMATIVE STUDY

3.1 Structured Interview

Structured interview is a type of interview that follows a predetermined set of questions and a specific sequence. This format is used to ensure consistency and fairness in the interview process. We divide the interview outline into the following seven parts to understand the pain points of users in team collaboration and their views on GPT assisted team collaboration.

During the structured interview, we covered 8 students of different genders from different schools. Their shared information are: small group size, medium frequency and preference of holding offline meeting once a week to monitor progress.

3.2 Needs Finding

According to the result of interview, finding reliable and unfamiliar teammates has become the biggest challenge before forming a team. However, this function has no relation with ChatGPT, which is more relative to big data model, so this function is abandoned.Similar situation happens on promote and showcase the progress of other teammates. As mentioned before, it's more effective when the leader record the progress of all teammates and mention them with a timer.

The needs most relative to Chatgpt find to be task refinement. As the questions are complex and unfamiliar, they need to be subdivided and concretized. In the early stages of a team project, a lot of time is spent understanding the problem, resulting in low efficiency. For the application of GPT, it fits well with the large language model LLM, especially in terms of refining functions. GPT's associative search ability can bring a lot of inspiration for team collaboration.

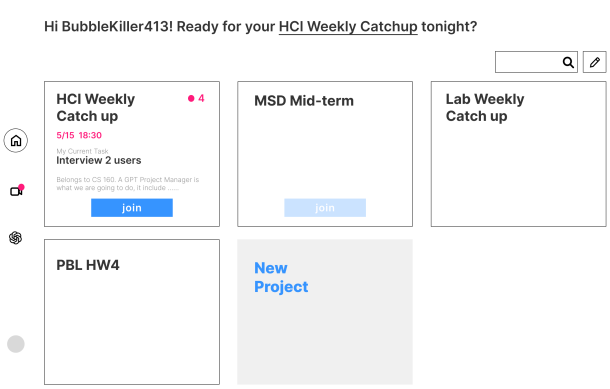

Figure 1: The Overview Interface

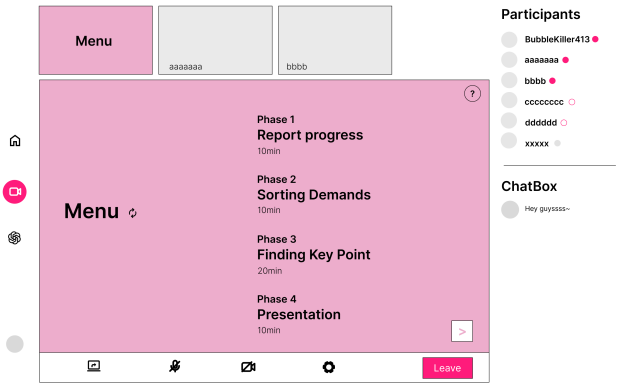

Figure 2: The GPT is a member of the group

For the "refinement" feature, it can not only bring inspiration in the early stages of the project, but also further refine the work for next week's (next stage) tasks in the middle and later stages of the project.

The interview also reflect interviewees' confusion and worry on AI labor distribution, so we left the labor distribution part to the leader, and AI will makes adjustments to task refinement.

3.3 Summary

Combining the functions of GPT, we believe that small scale group meetings of college students are a good starting point. During this process, we will manage to address their needs for macro task refinement, associative information search, and project management, thereby improving the project management ability and team collaboration efficiency of college students.

4 SYSTEM

4.1 Usage Scenario

The product is designed for use on an online computer web platform. Given the widespread adoption of online meetings today, it allows both online and offline users to participate simultaneously and serves as a tool for recording meetings. During in-person discussions, participants invariably utilize electronic devices, which facilitates the sharing of web-based information. Additionally, the choice of a web platform enhances convenience by eliminating the need for users to download a separate application, thereby streamlining the sharing process.

4.2 Core Functions

All features and GPT implementations are organized on a project-by-project basis. Each feature view belongs to a project view, and GPT configurations are independent for each project. This design allows users to clearly view different projects, maintain information sharing between functionalities within a project, and ensure independent operation across different projects.

The following introduces some main views and their corresponding functionalities.

4.2.1 Overview. As shown in the Figure 1, the Overview interface is the first screen you see when you open the web page. Each of the user's projects is arranged as a card on the overview, with meetings sorted by their start time, the nearest ones at the top. A GPT greeting message appears at the very top of the page, highlighting the most urgent meeting details. Each meeting card includes the meeting time, the content the user is responsible for, the number of attendees, and the meeting topic. Users can enter the meeting via the button below the card view.

Clicking directly on a card lets you view all the specific information about the project. Editing options are divided into project-level and meeting-level, with meeting-level belonging to project-level. At the project level, features include creating, editing, deleting, and template projects. Within each project, meeting-level editing includes creating, editing, deleting, templates, and historical meeting reviews.

4.2.2 MeetingBot. When user officially enter a meeting, the project's corresponding GPT takes charge of the entire meeting: arranging the agenda, assisting discussions, summarizing, and organizing follow-up tasks. Figure 2 shows that the GPT assistant joins the meeting as an additional group member, displaying the current stage of the meeting. In the background, GPT continuously records audio to ensure functionality.

At the start of the meeting, GPT generates a timeline for the meeting based on preset information, detailing how the stages will be divided and the corresponding times.

During the meeting, the GPT interface shows the current stage number, topic, and suggested content. These suggestions guide team members in their discussions, providing direction.

At the end of the meeting, GPT can summarize the discussion results for each stage, create a meeting summary report, and refine and allocate tasks based on the next stage's objectives.

To ensure users have some control over GPT, we provide two ways to regenerate GPT content. First, there is a regenerate button next to each segment of GPT-generated content. Second, users can call GPT in the chat box, inputting specific modification suggestions to precisely control and direct GPT regeneration and learning.

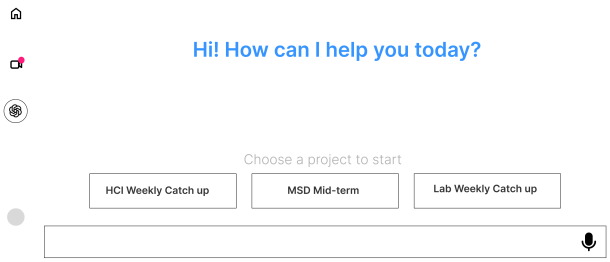

Figure 3: The Chatbot Interface

4.2.3 ChatBot. Figure 3 is the chat interface, a private chatbot is set up to gather information and facilitate discussions around the project. Since its functionality is also designed to be project-centric, it can provide targeted Q&A based on the progress and content of different projects.

4.3 Implementation Details

The entire technical execution route of our system is rooted in GPT prompt engineering.

At the inception of a team project, GPT's role is paramount. Our system is configured such that GPT's personality traits and professional expertise can be set in advance. It ensures that the AI assistant aligns with the project's requirements and communicates in a way that is most conducive to the team's dynamics and objectives.

Prior to the commencement of the meeting, GPT plays a role in the strategic planning phase. The meeting is divided into several discussion segments based on the pre-established objectives. GPT, with its ability to provide insights and share industry best practices, can help guide college students and impart mature experiences from the corporate world. This aspect of the system relies heavily on GPT's ability to generate standardized output, ensuring that the information provided is consistent, accurate, and useful.

As the meeting unfolds, GPT's versatility shines. It is configured to dynamically generate content based on the progress made at different stages of the meeting. Furthermore, it has the ability to regenerate content, ensuring that all participants are kept in the loop and have the latest updates at their disposal.

Post-meeting, GPT assumes the role of a meticulous scribe. It synthesizes a standardized response based on the text inputs that were logged during the meeting and the voice inputs that were recorded throughout the session. This comprehensive report serves as an objective record of the meeting, capturing key decisions, action items, and important discussions.

In conclusion, GPT is an integral part of our innovative meeting management system. Its involvement spans the entire lifecycle of a meeting, from preparation to execution to post-meeting documentation. Its capabilities, when harnessed effectively, can significantly enhance the efficiency and effectiveness of team meetings, making it an invaluable tool for project management.

5 EVALUATION

5.1 Heuristic Evaluation

Usability testing is the process of evaluating whether a product is easy for users to learn, use, remember, and whether it makes users feel satisfied and efficient. This testing method simulates real scenarios of users using the product, collecting data on user behavior, feedback, and satisfaction to identify potential issues and shortcomings in the product, providing a basis for improvement and optimization.

We use Nielsen's Ten Usability Heuristics for our usability testing. These heuristics, proposed by human-computer interaction expert Jakob Nielsen, are ten core principles guiding product design and user experience evaluation. They are applicable to both web and mobile platforms and have significant influence and value in the design field.

5.1.1 Work Flow. We invited ten evaluators to test our wireframes. Our usability testing was divided into two phases. In phase one, we introduced the project's main goals, the key issues it addresses, and its presentation format to the evaluators. Then, we let them explore freely.

In the second phase, we answered a series of questions from the evaluators, introduced some of our designs, and highlighted features they might have missed. Based on the evaluators' doubts and concerns, we used the ten principles of heuristic evaluation to identify specific problems and their corresponding solutions.

5.1.2 Data Processing. We invited ten evaluators to test our wireframes. Our usability testing was divided into two phases. In phase one, we introduced the project's main goals, the key issues it addresses, and its presentation format to the evaluators. Then, we let them explore freely.

In the second phase, we answered a series of questions from the evaluators, introduced some of our designs, and highlighted features they might have missed. Based on the evaluators' doubts and concerns, we used the ten principles of heuristic evaluation to identify specific problems and their corresponding solutions.

5.1.3 Assessment Result. For the three key issues regarding visual presentation: Consistency, Minimalism, and Visibility, we particularly focused on optimizing the project overview section. The core objective was to enhance the content hierarchy, ensuring seamless and efficient integration of information generated by GPT into the interface, thereby improving overall viewing experience and information conveyance efficiency.

Regarding adapting to user habits, especially emphasizing freedom, flexibility, and assistance, we received a series of feedback. Among them, there were suggestions about implementing direct switching between private chat with GPT and group chat with GPT during meetings. Although this suggestion reflects users' need for interaction diversity, after thorough discussion and evaluation, we remain cautious.

Our concerns mainly stem from two points: firstly, the current system has set the private chat function outside the meeting framework. Introducing a separate private chat window during meetings may lead users to interact in three different scenarios simultaneously: the meeting, public GPT chat, and private GPT chat, undoubtedly increasing cognitive load, which contradicts our goal of simplifying operations and improving user experience. Secondly, there are technical challenges in synchronizing information and sharing context between different chat modes. Ensuring consistency and coherence between GPT conversations is a major challenge.

Therefore, we decided not to adopt this direction for improvement. Instead, we chose to focus on enhancing the optimization of existing features, such as adding more intuitive help buttons and detailed operation guides, to better support users' various needs during meetings without adding additional complexity, ensuring that each participant can easily navigate the tools and enjoy an efficient and smooth meeting experience.

In terms of optimizing user cognition, we focused on two main areas: Recognition and Mapping. Firstly, to make the management of meeting processes more efficient and intuitive, users need a real-time timer function that accurately displays the progress of each agenda item, ensuring that meeting time is reasonably allocated and fully utilized, thereby improving participants' awareness of and compliance with the overall time schedule. Secondly, evaluators also mentioned that GPT can dynamically capture and highlight key information during the meeting process. This feature not only instantly summarizes and displays real-time feedback from participants but also facilitates rapid information dissemination and deep understanding, enhancing the interactivity and efficiency of discussions.

Regarding the user-friendliness of the user interface, evaluators suggested replacing some icons to ensure that users can quickly identify functions intuitively, reducing the learning curve.

Optimizing error handling mechanisms specifically involves two core aspects: Error Prevention and Error Recovery. To improve user experience, secondary confirmation dialogues need to be introduced to enhance the accuracy of operations, ensuring that users can review critical operations before execution to effectively prevent errors. Similarly, the login interface also requires more user-friendly error prompts, such as clearly displaying guidance information such as "Forgot password" and "Incorrect password".

5.2 Design Iteration

Based on the results of usability testing, we made a series of design iterations. The most significant upgrade was the comprehensive overhaul of our project view, which integrated a groundbreaking feature: instant activation of the associated GPT knowledge base based on preset tags. This innovation greatly expands the application boundaries of GPT, allowing users to conveniently access highly relevant intelligent suggestions and information triggered by tags while browsing projects, thereby deepening the level of intelligent interaction.

5.2.1 Icon update. In the process of optimizing the meeting view interface, we deliberately adjusted the icon design to maintain visual consistency with widely recognized meeting software in the market, thereby reducing user cognitive barriers and learning costs.

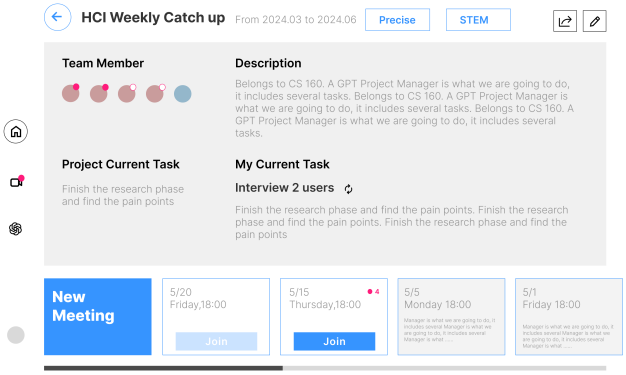

Figure 4: The Project Details Page

5.2.2 Error Issues. We added an intuitive help icon on each meeting page. Users only need to tap this icon to trigger a pop-up prompt window containing many practical operation guides and feature tips. These tips cover efficient techniques such as "how to request data queries in the chat box using the '@GPT' command" and "regenerating meeting outlines by clicking the 'Regenerate' button" to quickly enhance users' understanding and application capabilities of advanced system features.

5.2.3 Confirmation. Regarding error prevention and recovery in usability, we added a secondary confirmation interface to prevent users from accidentally exiting meetings.

5.2.4 Project Management. After clicking on the project card on the homepage, users will be directed to a comprehensive project details page, which integrates project overview and meeting management functions, aiming to promote efficient collaboration and information management. This is shown in Figure 4.

The upper part of the interface is specifically designed for project overview, clearly displaying key information, including but not limited to the project member list, project description summary, and currently set short-term and long-term goals. This design ensures that team members can quickly grasp the overall project situation, promoting task transparency and synchronization among teams.

The lower part of the interface introduces a meeting card layout, effectively distinguishing between past, current, and future meetings. Historical meetings are identified with gray cards, supporting the review of meeting summaries; ongoing or upcoming meetings are highlighted with white cards for quick access. Additionally, the newly added "New Meeting" button streamlines the meeting creation process, ensuring users can flexibly respond to meeting scheduling needs. This layout strategy achieves an intuitive presentation of the meeting timeline, enhancing the flexibility and efficiency of meeting management.

The top of the interface introduces two iconic tags, "PRECISE" and "STEM," as meta-tags attributes of GPT services. These tags not only define the nature of the project (such as design, literature, etc.) but also indicate the expected communication style (precise or creative). During the project creation phase, administrators can choose suitable tags based on project characteristics, and these selections

Table 1: The System Usability Scale

Question	Score(Before)	Score(After)
I think that I would like to use this system frequency.	2.50	3.00
I found the system unnecessarily complex.	2.75	3.00
I thought the system was easy to use.	2.50	3.75
I thought that I would need the support of a technical person to be able to use the system.	3.25	3.25
I found the various functions in this system were well integrated.	3.50	3.25
I thought there was too much inconsistency in this system.	2.75	3.00
I would imagine that most people would learn to use this system very quickly.	3.00	3.25
I found the system very cumbersome to use.	2.25	2.75
I felt very confident using the system.	3.00	3.00
I needed to learn a lot of things before I could get going with this system.	2.75	3.25

will serve as instruction prefixes to optimize the response content and style of the built-in GPT. For example, when tagging a project as "PRECISE" and "STEM" for a human-computer interaction (HCI) project, GPT interactions during meetings will reflect precision and expertise in the technology field, aligning closely with project requirements.

This design, by predefining the "innate traits" of GPT, ensures the high relevance and practicality of GPT assistance in project management and meeting discussions, marking an important step towards a more intelligent and customized project collaboration environment.

5.3 System Usability Scale

In the second evaluation of our system, we utilized the System Usability Scale (SUS) to assess the usability improvements before and after the system enhancements. SUS is a widely recognized tool used to evaluate the usability of a system. It consists of a ten-item questionnaire that users complete after using a system, providing a quick and reliable assessment of usability across various dimensions. The scores range from 0 to 100, where higher scores indicate better usability. We had four individuals rate each version of the system. After processing all the data, we calculated the average scores. The results are showed in Table 1.

For the initial iteration of the system, the results indicated poor performance in terms of complexity, consistency, and overall system size. Some icons were not intuitive, causing users to be uncertain about their functions. Consequently, the final score for the initial system was 70.625. In the subsequent updated version, we achieved improvements in consistency and user fluency. This version demonstrated better guidance for the users, resulting in a final score of 78.75, which meets the standard rating of "Good."

6 DISCUSSION

6.1 Limitation

Due to technological constraints, we have not tested GPT MeetBot in formal meeting environments, which limits our ability to accurately assess the product's effectiveness. Given the extensive scope of the actual product, we were able to implement only a small portion of its intended features. Consequently, the product cannot fully showcase its complete functionality. Additionally, the complexity of our product requires a significant learning curve for new users, making it challenging for individuals to become proficient with GPT MeetBot in a short period.

6.2 Reflection

Reflecting on our development process, if our team had initially focused less on the broad product architecture and avoided incorporating extraneous features, we might have achieved better results by concentrating on specific, well-researched steps. Moreover, there were some issues with task handovers among team members, which resulted in unnecessary time wastage. A more streamlined approach to task delegation and communication could have improved our efficiency.

6.3 Future Work

As GPT technology continues to advance, future iterations of GPT MeetBot could benefit from pre-set personalities tailored to different team dynamics, enhancing its adaptability to various team styles. We also envision GPT MeetBot continually learning from meetings to become an expert in specific fields. Additionally, with the emergence of GPT-4's multimodal capabilities, integrating features like screen sharing along with voice and text input could provide GPT MeetBot with new avenues for content delivery and interaction.

7 CONCLUSION

This study explores and addresses the challenges of multi-project management faced by university students, focusing on the weekly project meeting time as the core entry point. It provides a personalized GPT meeting assistant tool that offers macro task detailing and associative search assistance during meetings. Additionally, it imparts project management experience and techniques to help

students adapt to corporate project management processes in the future.

The results of this study fill a market gap in project management for university students, offering a solution for individuals with small-scale, multi-threaded project management needs. By personalizing the GPT tool, different modes of information processing are enabled, further optimizing the application of AI in current meeting scenarios and providing inspiration for enterprises.

The real-world effectiveness of this solution in actual meetings is yet to be verified, especially regarding the recognition of multiple speakers discussing different topics. The potential for GPT to enhance future project meetings through voice intervention optimization may be a key focus for subsequent research.

In the future, advancements in image recognition capabilities will provide continuous optimization of product performance and deeper user experience, aiming to collaboratively explore efficient and intelligent meeting management assistants. This will offer university students a beneficial integrated project management platform.

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