ClarifiIt -Web Based Messaging Application for Enhanced Communication With Clarity

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Abstract. In the modern era of communication, different people with different temperaments are using chat applications for chatting. In today's digital age, chat applications must address issues such as misunderstandings, distractions, the receiver's mood/feeling, voice-to-text conversion, graceful conversation termination, quick shortcut message forwarding, and profile management tasks. This work proposes a web-based chat application such as clarifiIt to solve these problems. ClarifiIt is a web-based messaging application that improves communication performance and readability by integrating advanced capabilities. ClarifiIt is equipped with mood toners to track the mood and the receiver's feelings about your communication. Acceptance of toners and color coding systems helps to avoid misunderstandings and distractions with sender and receiver identity. In some cases, where users are unable to type messages with language skills, clarifiIt is adapted with voice to text messaging feature to convert voice to text. Every time communication needs to end respectfully, clarifiIt has a graceful conversation termination module to gracefully close chats. ClarifiIt adds a profile maintenance feature to maintain up-to-date profiles. Video and audio-sharing features of clarifiIt facilitate multimedia communication. Further, the User Interface (UI) of clarifiIt is built using React with Redux Toolkit. Socket.Io is utilized to provide message transmission. MongoDB and Cloudinary are used for data storage.

Keywords: ClarifiIt, Web-based messaging application, Mood toners, Voice to text, Graceful Conversation Termination.

1 Introduction

Chat programs play an important part in today's world by allowing for rapid and efficient communication across multiple situations. They enable real-time communications, improve collaboration in professional contexts, and facilitate personal ties across geographical boundaries. These systems provide capabilities including text, phone, and video chatting to meet a variety of communication demands [1]. Chat applications bridge the gap between individuals and teams, making

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them essential for sustaining relationships, coordinating activities, and managing information in an increasingly digitized and fast-paced world [2].

One significant advantage is the app's capacity to reduce misconceptions by making real-time recommendations for clearer language [3, 4, 5, 6]. This ensures that users may express themselves more accurately, reducing confusion. The proposed ClarifiIt opted with Real-time Mood Toner to provide real-time entertainment, Voice-to-Text Messaging Integration to allow message conversions, Conversation Ending Features to allow meaningful conversion endings, Shortcut Forwarding to deal with short messages, Profile Management to manage profiles and media management for sharing and managing multimedia contents [7].

1.1 The proposed ClarifiIt includes the following objectives and outcomes:

- The ClarifiIt is adopted with Real-time Mood Toner which outcomes contextual cues with the help of color-coding messages to improve the clarity of the communique.
- Voice-to-text messaging integration is added with ClarifiIt to offer conversion of voice messages to text messages.
- Gracious Conversation Ending Features are integrated with ClarifiIt to facilitate respectful and polite communication endings.
- Shortcut Forwarding Mechanism integrated with ClarifiIt to extend short messages to form complete messages with information.
- ClarifiIt is equipped with media and profile management for handling multimedia and profiles of users.

2 Related Work

Merelo et al. [8] introduced a messaging platform to collect subject feedback from students and faculty. The messaging application includes chatbots for discussion on subjects. Cascading Style Sheets(CSS) and React JavaScript(JS)are used to build messaging apps. User recommendations are an important factor for any application [9]. Usability recommendation systems are used to collect usability issues for developed systems. Nouwens et al. [10] proposes a single app with multiple communication points for effective communication. In addition, emotions and rules are added to communication spaces to provide reliable communication. Communication spaces are cross-platform and not generic to any system. Furthermore, multi-lingual facilities are an important feature of the proposed app. This study presents a multi-chat application [11] that integrates real-time emotion detection and depression analysis. The application uses direct emotion recognition techniques to detect emotions expressed by users during conversations and includes a depression detection module that evaluates these emotions to detect signs of depression.

Voice to text messaging structures [12] provide widespread accessibility for users with unique communication preferences. The communication preferences are predicted using different natural language processing (NLP) techniques. Lee et al.

[13] focus on emotion-aware user interfaces. Lee describes the Emotion-Aware UI-authoring platform to help developers to create emotion-aware visual effects. The interface was developed using the DAT4UX tool. Bullen et al. [14] investigates strategies for designing communication systems to support the fascinating conversation. This work explores various design considerations, such as providing clear instructions for ending a conversation, providing options for expressing gratitude or goodbye, and contextual factors. Zhang et al. [15] examine the efficiency of mobile messaging apps when using shortcut forwarding features. Zhang tests how effectively users can understand and use shortcuts (acronyms or predefined phrases). In addition, the work also analyzes the effect of shortcuts on communication speed and accuracy.

A web application [16] for social networking using Real-Time Communication (RTC) enables users to connect promptly over voice, video, and messaging features. RTC tools offer seamless, real-time interactions, attractive user engagement, and teamwork. The Rtisy platform which uses pre-built communication entities for building web applications. The web application can offer call facility, messaging, and video call facilities. Web-Based Chat Application [17] Using REACT is constructed using React. js, and Node.js. The Mongo DB database is used for data storage and processing. Interfaces include user-friendly Graphical User Interfaces (GUI) that enhance the efficiency of the application. Firebase is used to store data related to communication. The front end of the proposed program is built using ReactJS and Firebase as the backend.

3 The Proposed ClarifiIt

The goal of the proposed ClarifiIt is to extend progressive web-based messaging that improves communication performance and readability by integrating advanced capabilities to meet users' needs. The proposed ClarifiIt solves common problems in text-based communication through various upgrades including mood indicators, voice-to-text messaging, graceful communication termination and shortcut forwarding. Table 1 depicts the algorithm of the ClarifiIt.

Real-time Mood Toner Integration: This integration allows real-time mood toners to provide insights into the sender's emotional state or current pastime. It allows for the reduction of misunderstandings and interruptions and provides contextual cues with the help of color-coding messages, thereby improving the clarity of the communique.

Voice-to-Text Messaging Integration: This module converts the voice messages into text content, providing users who decide to speak over typing. This capability ensures continuous and integrated conversational enjoyment, eliminates the need for guide textual content access, and increases general user comfort.

Integration of Gracious Conversation Ending Features: The ClarifiItis aimed with capabilities to facilitate respectful and polite communication endings. It provides polite and optimal conversation endings. By showing predefined sentences to seamlessly unwind conversations, this feature encourages respectful and respectful interactions between users.

Integration of Shortcut Forwarding Mechanism: Users can send short messages that can be extended indefinitely to complete information about system usage.

Integration of Profile Management: This integration allows users to manage and back up their profiles effortlessly.
Integration of Media Management: This integration enhances the experience of interacting with multimedia content, supporting video and audio sharing.

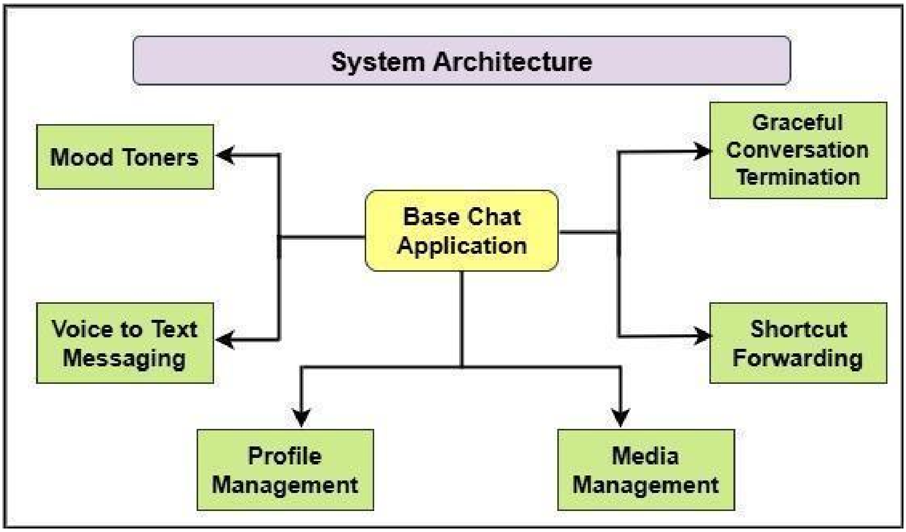

Fig. 1. ClarifiIt architecture

Figure 1 depicts the ClarifiIt architecture. The ClarifiIt architecture integrates all modules with the base chat application. The architecture of the ClarifiIt messaging utility is designed to beautify communication performance and clarity through a modular and feature-rich approach. The architecture combines several significant components, each component is responsible for specific functions that facilitate the communication enjoyment of each person. The base Chat Application acts as the center of the application. The Base Chat Application maintains the various messaging functionalities, such as sending, receiving, and displaying messages. It acts as the foundation upon which additional features are built.

Algorithm 1. ClarifiIt– Algorithm

Algorithm: ClarifiIt

Input:

- User messages (text, voice)
- User selected temper
- Shortcut instructions
- Voice to text
- Graceful communication termination alternatives
- Multimedia content material (snap shots, videos)
- User profiles and search queries

Output:

- Mood signs
- Transcribed textual content from voice messages
- Enhanced person communiqué
- Media sharing
- User profiles and search consequences

Steps of ClarifiIt

1. Initialize System
  - Load consumer -> Profiles and Settings
  - Establish ->Database connections
  - Initialize -> Server and Socket.Io for real time communique

2. User Authentication
  - Input ->Login credentials
  - Process ->Verify credentials towards the database
  - Output ->Initiate user consultation upon successful authentication

3. Profile Handling
  - Input ->User profile data
  - Process -> Allow users to create and replace profiles
  - Output ->Updated user profiles

4. User Search
  - **Input ->Search for user with credits**
  - **Process -> Query the database for consumer information**
  - **Output ->Display search outcomes**

5. Message Processing

Text Messages:

- Input **->**User textual content message
- **Process**
  - Tokenize text message
  - Assign mood indicator (e.g., happy, sad, neutral) based on sentiment score
  - Output **->**Display text message with corresponding mood indicator

Voice Messages:

- Input: User voice message
- **Process:**
  - Assign mood indicator based on sentiment analysis
  - **Output ->** Display transcribed text with mood indicator

6. Mood Indicators

- Input **->**Analyzed sentiment from text or voice messages
- **Process:**
  - Display the mood indicator to other customers when interacting

- Output ->Enhanced message display with user mood indicator

7. Shortcut Forwarding

- Input ->User sorts a shortcut command (e.g.,/gtg (got to go))
- **Process:**
  - Retrieve predefined reaction or action connected to the shortcut
  - **Output**->Display brief reaction or execute predefined action in the chat

8. Graceful Conversation Termination

- Input -> User indicators the stop of conversation
- **Process:**
  - Analyze context of the verbal exchange
  - Output -> Display counseled well mannered ending phrases

9.Voice to Text Conversion

- Input ->User voice message
- **Process:**
  - Convert voice message to textual content
  - Output: Display transcribed text within the chat

10. Media Sharing

- Upload -> Multimedia
- Input- > User uploads media (pix, clips)
- Output: Display media content with accessible URL in the chat

11. Real time Updates

- Broadcast actual time updates to all related customers

12. Error Handling

- Detect and log mistakes (e.g., database connection problems, API failures)
- Provide consumer friendly errors messages and recovery options

13. Terminate Session

- Input ->User logs out
- Process -> End person consultation and replace database
- Output -> User is logged out and consultation is terminated

4 Implementation Environment

User Interface (UI) is a significant component of the "ClarifiIt" application constructed by using React with Redux Toolkit. The UI is constructed to be intuitive and responsive to provide a seamless experience for users. Users can interact with the application via a React-based UI to send messages, import media, and use mood toners. The UI provides user interactions in terms of green messaging, and uploading media files. Tailwind CSS guarantees efficient and scalable styling for applications. Socket.Io provides necessary sockets to manage Real-time communication. Socket.Io allows users to send and receive messages with low latency. MongoDB allows users to view their chat history. MongoDB serves as the database for "ClarifiIt”. Cloudinary is used to store and manage photos and movies uploaded by customers. Postman guarantees that APIs are characteristic, efficient and secure.

5 Results

“ClarifiIt" web-based messaging application improves the performance and readability of verbal exchange through a variety of advanced features including mood tones, voice-to-text messaging, elegant conversation ending, shortcut forwarding, and profile and media sharing. This phase discusses the outcomes of ClarifiIt.

5.1 Mood Toners

The Mood Toners feature provides users with visual signals of the receiver's current interest or mood. It minimizes interference by notifying the sender before initiating a communication. Messages are color-coded to distinguish between sender and receiver. By knowing the recipient's mood or taste, users can time their messages as needed, minimizing pointless interruptions. Figure 2 depicts the response of the sender according to receiver taste.

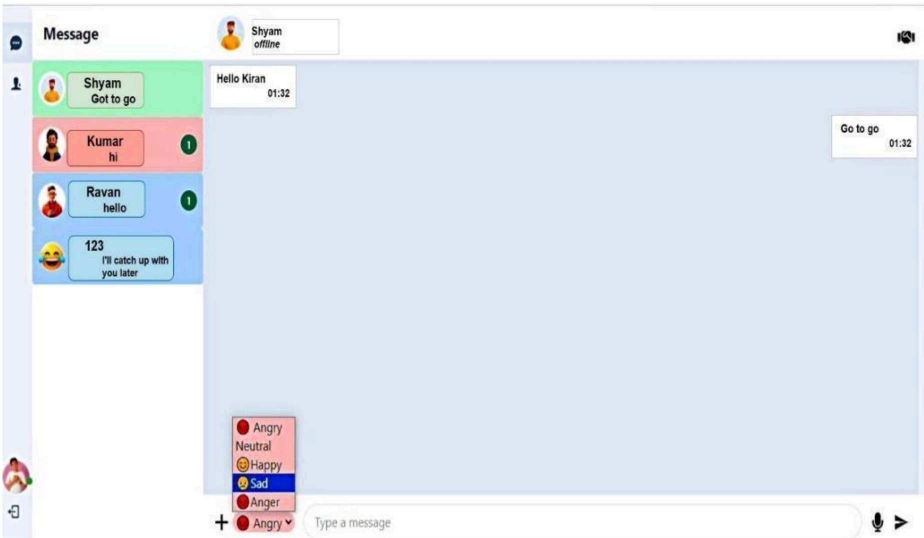

Fig.2. Mood Toners: Response of sender according to receiver taste

5.2 Voice to Text Messaging

The Voice to Text Messaging function allows users to speak their messages, which are then converted into text. This includes users who have trouble calling or typing to ensure seamless communication across various occasions. By providing a variety of options and talents, users can easily communicate results without mercy. Voice-to-text conversion enables faster message composition, saving effort and time. Figure 3 depicts the voice to text communication between two users.

5.3 Graceful Conversation Termination (GCT)

GCT helps well-mannered and respectful communication endings, retaining mutual respect and dignity. Users are guided on how to stop conversations gracefully. Conversations end on a wonderful note and foster respectful interactions. Users recognize the steerage on verbal exchange etiquette, leading to more pleasing verbal exchange reports. Figure 4 shows the graceful conversion ending between two users.

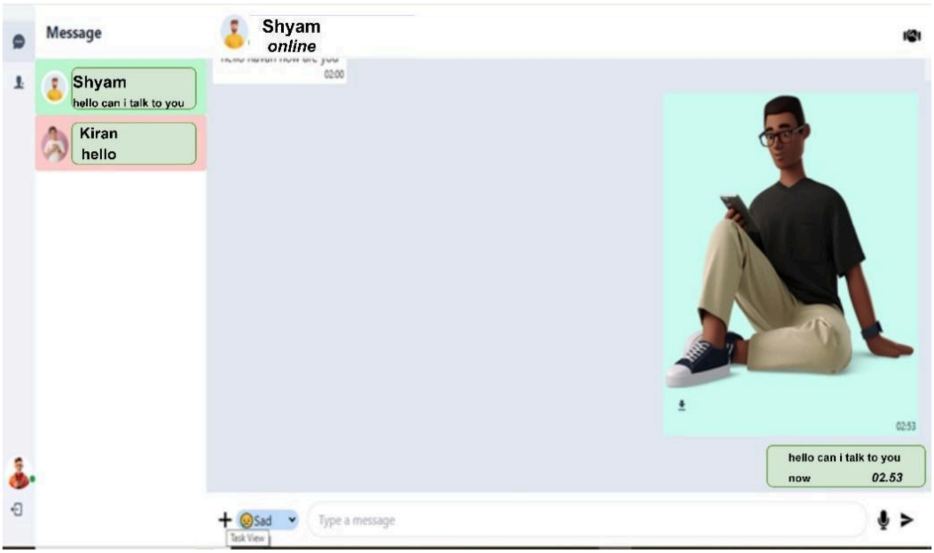

Fig. 3. Voice to text receiver side.

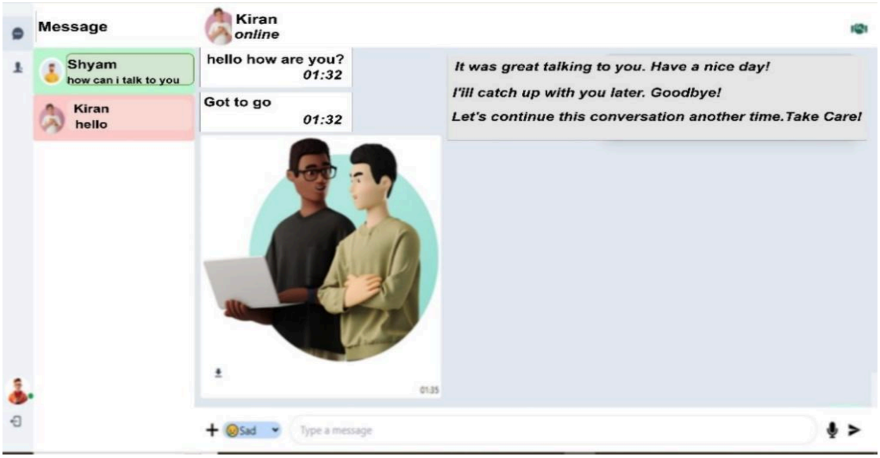

Fig.4. Graceful Conversation Termination.

5.4 Shortcut Forwarding

Shortcut forwarding allows users to send short messages, which the app expands to complete the context. Users can quickly send messages without typing full sentences, which improves communication performance. The app expands abbreviations into full context, which ensures the recipient fully understands the message. Figure 5 depicts the shortcut forwarding received by the receiver.

5.5 Profile and Media Sharing

Profile and media sharing functions allow users to seamlessly share their profiles, pictures, and movies in conversations. Users can share snapshots and movies to supplement their messages, adding intensity to conversations. Figure 6 depicts the media sharing scenario of ClarifiIt.

6 Comparative Data analysis and Feedback

This work makes use of the Nielsen usability heuristic-based approach to determine the effectiveness and value of the ClarifiIt. The cause of the Nielsen usability heuristic-based overall questionnaire is to finish an interface's usability by comparing how definitely it follows Jakob Nielsen's ten key concepts. It lets in the identification of capability layout enhancement areas to boom customers experience. The foremost goals are to evaluate usability, direct layout picks, decorate user studies, and screen enhancements. ClarifiIt's great features such as mood toners, voice-to-text messaging, graceful conversation termination, shortcut forwarding, profile and media sharing are evaluated against Nielsen's 10 rules. Evaluation will be done among 100 users in Bangalore region through Google Forms. A Google Forms link is often shared with users to hear feedback about ClarifiIt. Questions have 5 options from 1 to 5. 1 indicates least preference and 5 indicates highest preference/highest satisfaction. Table 1 shows Nielsen's 10 rules and users feedback about ClarifiIt on the scale of 1 to 5. Furthermore, ClarifiIt is evaluated with additional questions with the same set of users to get more feedback about the usage of ClarifiIt. 10 questions were framed as an "additional questionnaire" for ClarifiIt. Table 2 shows an additional questionnaire. The additional questionnaire concentrates more on core details and the specific usage of ClarifiIt at the customer level. Various types of users with the age factor from 18 to 50 are considered for the evaluation of ClarifiIt for 10 questions.

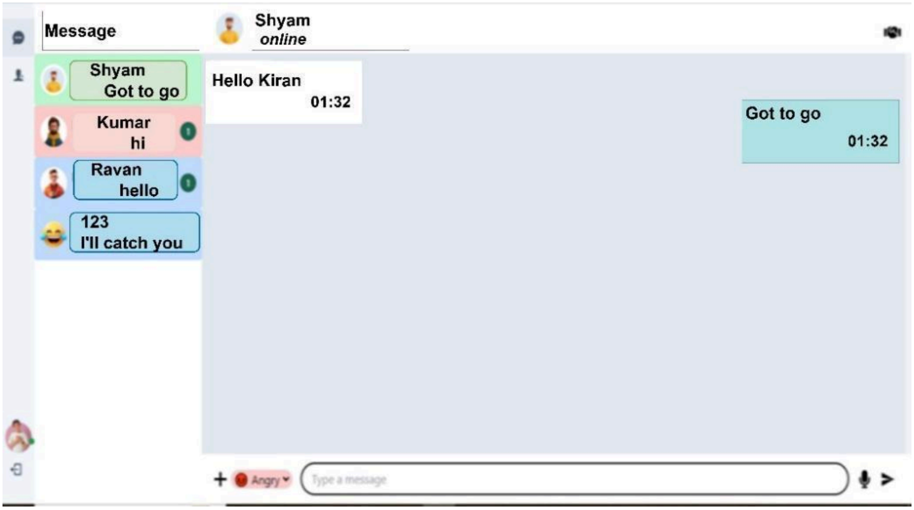

Fig.5. Shortcut Forwarding received on receiver side.

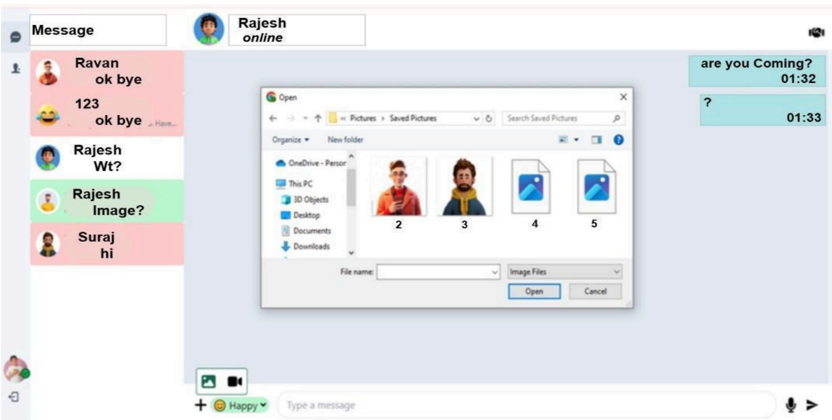

Fig.6. Selection of media sharing.

Table 1. Nielsen's 10 rules and user's feedback for ClarifiIt

SNo	Nielsen's Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Ensure system status visibility.	4%	6%	5%	10%	75%
2	System alignment with real-world scenarios	3%	6%	4%	10%	77%
3	User control and autonomy	6%	7%	5%	8%	74%
4	Consistency and Standards	6%	6%	8%	7%	73%
5	Preventing errors	4%	8%	7%	5%	76%
6	Using recognition instead of recall	6%	7%	5%	8%	74%
7	Flexibility and Efficiency of Use.	4%	6%	5%	10%	75%
8	Aesthetic and minimalist design.	7%	8%	5%	8%	72%
9	Assist users in detecting and diagnosing	8%	8%	6%	8%	70%
10	Help and documentation.	3%	4%	4%	11%	78%

Table 2. Additional questionnaire

S No	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Is the application complicated to use?	10%	20%	60%	2%	8%
2	Does the app support multimedia calls?	70%	20%	5%	1%	4%
3	Should the application support video?	4%	6%	5%	5%	80%
4	Are duties straightforward?	6%	2%	10%	4%	78%
5	Are error messages displayed as text?	4%	2%	10%	4%	80%
6	App require time to recover from errors	5%	10%	33%	40%	12%
7	Are the functions well-integrated?	2%	1%	2%	6%	89%
8.	Are the functions user friendly?	4%	6%	5%	5%	80%
9	Is the app's navigation up to the task?	1%	2%	4%	12%	81%
10	Does it show the status of messages?	2%	3%	1%	1%	93%

7 Conclusion

ClarifiIt" introduces a web-based messaging application designed to enhance the performance and readability of verbal exchange through revolutionary functions such as mood tones, color coding systems, voice-to-text messaging features, graceful conversation termination, shortcut forwarding, media, and profile management functions. ClarifiIt provides users with an extra personalized messaging experience. Key features including mood tones, voice-to-text messaging, swish communication termination, shortcut forwarding, and media sharing collectively create a dynamic and responsive communication platform. The limitations of the proposed ClarifiIt are its lack of multi-language features and cross-platform support. In the future, we aim to improve ClarifiIt by adding predictive emojis and avatars, nonverbal communication, better search capabilities, and a video feature for dynamic avatar interactions.

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