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THE IMPACT OF VOICE ASSISTANTS ON HUMAN-COMPUTER INTERACTION

Umair Paracha[*1], Dr Naeem Fatima[2], Amna Ikram[3]

[*1]*Directorate of ICT, Allama Iqbal Open University, Islamabad.*
[2]*Associate Professor, Air University, Islamabad.*
[3]*The department of Computer Science and IT.*

[*1]umair.paracha@aiou.edu.pk, [2]fatimabeena1@cae.nust.edu.pk, [3]amnaikram@gscwu.edu.pk

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Corresponding Author: *
Umair Paracha

Abstract
The present research investigates the influence of voice assistants on the relationship between computers and users through the lens of language. Within the context of the relationship between users and the computer, the influence of voice-activated technology on the communication framework is examined. This covers the speech acts, the structure of the conversation, and pragmatics. The primary aim is to look into the change in users' communication patterns and determine the degree of fluency of such patterns. This investigation is positioned within the mixed research paradigm where quantitative and qualitative approaches are integrated. Data was collected through 200 participants who interacted with predominant voice assistants such as Siri, Alexa, and Google Assistant. This study utilized a conversation analytic framework to analyze 500 recorded dialogues, and integrated users' surveys on satisfaction and perception of naturalness in the interaction. Arguments for the analysis incorporated patterns of speech, mechanisms of turn taking, conversation repairs, and sequence analysis of the discourse. The study highlights the pragmatic and syntactic changes users made in the context of interaction with computers. Analyses of the collected data indicated that a considerable number of users, more than 76%, demonstrate the declining complexity of grammar and less than 64% expressed the mildly frustrating condition of a voice assistant that misunderstood the context. Comparatively, users engaging computer systems made shorter, more direct speeches with a marked reduction of indirect speech compared to a conversation with another person. The current study reveals the ways voice assistants reshaped the communicative standards and expectations in human-computer interaction. It suggested refinements in sociolinguistic variation and contextual understanding, the incorporation of more advanced natural language processing features, and the introduction of human-like conversational backoff strategies to make the voice interaction more seamless and natural.

INTRODUCTION

The introduction of voice assistants has changed the interaction paradigm of human-computer communication to a more natural voice-focused system from the more traditional methods. Technologies of voice recognition such as Siri,

Alexa, and Google Assistant have integrated with smartphones, smart speakers, vehicles, and a variety of IoT devices. The seamless switch tends to focus on the technology (Kumar et al., 2024), overlooking the equal importance of the human shift in engagement with voice recognition technology (Figueroa, Alaoja et al. 2025). The move from keyboard-and-mouse interfaces to voice interaction suggests a more general and flexible use of computing, a positive predictor for computing access to populations such as people with physical disabilities, people with little literacy, and people with little technological expertise. This change, however, raises issues with the nature of communication. How do the constraints and affordances of voice assistants shape user behavior, language use and communication (Liew, Tan et al. 2020)?

The importance of analyzing voice assistants from the perspective of language is undeniable. Given that language is the primary means of interaction between users and these systems, the understanding of the balance between the possibilities and the challenges of voice-based human-computer interaction warrants a linguistic inquiry. Unlike traditional graphical user interfaces that operated under bounded visual feedback and contained command structures, voice assistants throw users into what feels like a conversation (NGUYEN and FALKENGREN 2019). People expect understanding as well as situational awareness. The systems' capabilities, however, are far from the expectations. There are unsaid rules of conversation and a system automation gap. The gap leads to a breakdown in conversation, speech disturbances, and communicative strategies, and users are forced to alter their expectations (Khan, Paracha et al. 2025). The study of communicative technology informs us of the expectations in human-technology interaction, of how and why technology is developed and modified to meet communicative expectations, and ultimately of the communicative patterns that technology is able to accommodate (Bickel 2005).

The different branches of conversation analysis, pragmatics, sociolinguistics, and human-computer interaction studies inform the theoretical framework for this study. Each conversation analysis unit includes analytical detail for the micro-structure of interaction, such as turn-taking, adjacency pairs, repair sequences, and the openings and closings of conversations. Pragmatics informs the analysis of how users employ various speech acts, implicature, and the speech acts' contextual meaning when interfacing with low-compatibility systems (Saygin and Cicekli 2002). Sociolinguistics describes how voice assistants might respond differently and thus reinforce, or counter, inequities and access patterns. The synergy of these theories allows for a more comprehensive study on the interaction with voice assistants that incorporates the social, cognitive, and linguistic elements of human-computer communication, rather than focusing only on the technological aspects (Zellou and Holliday 2024).

Modern voice assistants integrate advanced Natural Language Processing, Machine Learning, and large Language Resource databases for response generation and user input analysis. Users, however, still experience gaps in understanding and contextual inaccuracies, and feel the need to oversimplify their speech to accomplish communication. These communication challenges indicate that current faulty technologies presenting voice assistants still resemble people. Users' personal interfaces with voice assistants need to be defined in terms of speech and pragmatic shifts to determine where advancements in technology should be designed to improve user experience (Alexakis, Panagiotakis et al. 2019).

The present research develops a mixed-method study that examines the interactions of 200 users with the primary voice assistant technologies. For the study, 500 conversation snippets were analyzed and paired with user survey assessments that described user engagement satisfaction and the level of naturalness perceived. The study offered a comprehensive understanding of the influence of voice assistants upon communicative behavior, through the integration of qualitative and quantitative methods of data collection. The

analysis highlights that users alter their communicative behavior, often using voice assistants as a dominant tool, to through integration of subordinate grammatical structures and direct speech, as well as, stripping the utterances of implicatures. The explanation of the shifts suggests a dual reason: the communicative limits of the voice systems and the adapting social realities of human-computer interfaces. The rationale that the communicative systems that human use and the relationships that they maintain with advanced systems of computation, are core to the social questions that the research aims to address.

RESEARCH OBJECTIVES

1. To examine the communicative shifts and limitations users impose when using voice assistants, focusing on grammatical, speech, and use of pragmatic structures as compared to conversation with other human users.
2. To describe the user assessment level of naturalness, satisfaction and communicative efficiency during engagement on various voice assistant systems in different contexts and communicative settings.
3. To identify particular instances of communicative breakdowns and contextual misunderstandings among user interactions with voice assistants and suggesting recommendations for improving conversational design and natural language processing.

RESEARCH QUESTIONS

1. In what ways do users change their linguistic strategies when communicating with voice assistants as opposed to conversations with other people, especially with respect to the grammar, complexity, and type of speech acts used?
2. How do users assess the interactions with voice assistants in terms of the perceived naturalness and effectiveness, and what elements account for dissatisfaction and frustration?
3. What pragmatic and contextual elements contribute to the challenges voice assistants encounter in sustaining natural conversations, and in what ways do these challenges result in communicative breakdowns and the repair processes that follow?

SIGNIFICANCE OF THE STUDY

This study offers valuable insights into focal areas of human-computer interaction and the impact of voice assistants on communicative habits and expectations of users. For developers and designers of voice interfaces, the research results offer areas for improvement in their voice technologies. For users, voice technologies can be made more comfortable to use. From the standpoint of theory, the study enriches the fields of conversation analysis and pragmatic theory by applying these theories to human-computer interaction, illuminating the changes in communicative patterns users employ when engaging with technology. The study also responds to the concerns of equity by exploring the impact of communication technology and contextualized understanding in design on voice technologies. Moreover, the mixed-methods approach shows methodological creativity in researching interactions with voice assistants through the integration of quantitative measurements and qualitative assessments of dialogue frameworks, thereby contributing valuable analyses of the intricacies of human-computer interactions, particularly the evolving forms of communicative integration.

LITERATURE REVIEW

The impact of voice assistants on human-computer interactions has promoted research on voice assistants as a burgeoning and complex interdisciplinary scholarly field, including computer science, linguistics, communication (Ahmed, 2025), and human factors (Silva and Gomez 2025). The earliest research on voice-based systems focused on the technological aspects of the

systems, particularly on the mechanisms of speech recognition, natural language processing, and overall system efficiency. While technological development and feasibility of voice interaction were important milestones, these studies paid little attention to the social and communicative aspects of potential user interactions with the automated systems. When the voice assistants entered the market and were widely adopted, systems become the primary methodological interest and user behavior, satisfaction, and challenges in natural interactions were the focus of subsequent research. This shift reflects the growing recognition, especially in the field of human-computer interaction, that aligning technological development with user satisfaction requires broader considerations beyond system capabilities (Ding, Ji et al. 2024).

The conversation-analytic literature describes the theoretical and methodological approaches to the study of the interactions of voice assistants. Researchers employing conversation-analytic techniques have pointed out systematic differences between human-human and human-computer interaction with respect to the organization of turn-taking and conversation repair, and the structure of sequences. Studies have documented how voice assistants' function with a rigid, turn-taking system of interaction, in which there are no overlaps and no collaborative control of the conversation front. Many users modify their interactions with the voice assistants instead of experiencing the agency offered in the interaction; the agency offered in human interaction contrasts sharply with the agency offered in machine-paced interaction (Todericiu 2025). The voice assistants disable the human ability for emergency-interrupting, emergency-correcting, and emergency-adding in free, flowing interaction. The voice assistants also disable the collaborative incremental repairs that characterize human communication, forcing users to make entire remakes of their utterances in voice repair. However, the voice assistants operate on organizational principles that are fundamentally different from human conversation, and other forms of interaction (Kumar, Pal et al. 2024). Pragmatics offers insights into how individuals derive meaning and how individuals interact meaningfully, even in instances of reduced contextual grasp. Certain studies in this area have examined how individuals construct speech acts, employ strategies, and modulate their use of implicatures and other indirect meaning when communicating with virtual assistants. A notable finding in this area of research is the tendency users have in disregarding other indirect speech acts when interacting with other humans. This is also the general tendency in other instructions, which appear to highlight the direct use of commands. This happens most likely in recognition of the fact that the other participants do not possess the requisite societal and cognitive structures to understand hints, suggestions, or meaning beyond the literal. This instance of direct communication is considerably different from the everyday use of the language where the choice of speech acts is influenced by social and contextual factors (Leech and Thomas 2002). There is a general sentiment in the literature that this propensity towards directness when using virtual communicative devices in social situations may be a reflection of more general changes in communicative interactions, the social use of which, in a more restrictive sense rationalizes communicative inflexibility and highlights disproportionate expectations for directness (Birner 2025).

Sociolinguistic studies mention how AI systems handle diverse forms of communication (Touseef et al., 2023), especially dialects, accents, and sociolinguistic factors like gender, age, and class. Discrepancies in recognition accuracy among voice AI users from different demographics have been consistently documented, resulting in some groups experiencing much higher error rates. This may indicate that voice AI technologies are developing and perpetuating technological inequalities, privileging particular speech patterns and ditching others. Disparities in social design features, like the selection of voice and personality, as well as social assumptions and relations of power, have also been unpacked in the literature. The 'gendering' of voice assistants and the design

of AI systems have been the driven factors for critical social analysis, regarding the implications of subservient AI systems, especially those with feminized voices (Alvero, Sedlacek et al. 2025).

The empirical evidence about adoption, satisfaction, and frustration with voice assistants' technologies come from voice assistant's user experience research. For surveys, a focal point in the literature due to user frustration and surveys repeatedly identify contextual understanding as the central problem. Users become exasperated when voice assistants do not maintain a conversation's context, do not remember previous encounters, or misinterpret vague referents. Users expect voice assistants to remember referents and contextualize conversations, a cognitive expectation absent from human communicators (Pal, Arpnikanondt et al. 2019). Qualitative studies using interviews and diary studies offer insight about the cognitive load users adopt for voice assistants as they adjust communication to perceived limitations in the system. Users expect voice assistants to adapt to their communication. Users apply cognitive burdens in the communication to voice assistants without human communicators. Predictable studies on system boundaries articulate disparate enthusiasm and limitations to voice use as contextualized evidence in research. The gaps between expectations and limitations appear to reflect a downward shift in the users' affective states. Those gaps, as seen from the research evidence of system boundaries, affect their use of technology in a routinized, instrumental manner, instead of in a more enthusiastic, expressive manner (Zwakman, Pal et al. 2020).

The integration of voice assistants into artificial intelligence has sparked discourse on the nature of machine intelligence and the expectations we should have of computer-communicative counterparts. Some researchers argue against anthropomorphism, for ascribing human comprehension to these systems breeds unrealistic expectations followed by disappointment. Others argue that voice assistants, while machines, can be viewed as social actors, and people apply social scripts and communicative patterns even when they know they are interacting with machines. This discourse has the design philosophy inquiries on whether voice assistants should be crafted to appear human, or, in contrast, whether the ambiguity between human and machine interaction should be preserved. Some research indicates the best approach may be a mixture of human-like design features and unambiguous indications of the system's limits and what it can do (Radin 1992).

RESEARCH METHODOLOGY

The researchers utilized a mixed research design vertically integrated a qualitative and a quantitative approach. This was to provide a comprehensive assessment of the extent to which the voice assistant has any impact on human computer interaction. The researchers purposefully selected 200 voice assistant users to capture varied dimensions of distinct demographic clusters of age, gender, tech savviness, and language. The subjects performed standardized interaction tasks with Siri, Alexa, and Google Assistant. 500 dialogues were generated, which were all recorded, ensuring participants consented to the recording for academic use and analysis. The quantitative data for the study were the structured survey responses on user satisfaction, perceived naturalness of voice assistants and frequency of breakdowns in conversation. The qualitative data were structured in terms of conversation analytic framework, where recorded dialogues were systematically coded for grammatical complexity and other interactional elements...turn- taking, repairs, sequences, speech acts and pragmatics. The qualitative data was thematically analyzed for patterns on user experience and perceptions towards the voice assistant retrieved from open ended questions in the survey, and the interview. Triangulated approaches strengthened the validity of the findings through data comparison across qualitative and quantitative dimensions of a survey. Ethical principles were followed in terms of consent, confidentiality, and withdrawal. All data were anonymized for the purpose of analysis and during the reporting stage.

RESULTS AND DATA ANALYSIS

QUANTITATIVE ANALYSIS

Table 1: Grammatical Complexity Modification in Voice Assistant Interactions

Linguistic Feature	Human-Human Communication	Voice Assistant Communication	Percentage Change
Average sentence length (words)	14.2	8.6	-39.4%
Subordinate clauses per utterance	1.8	0.6	-66.7%
Complex sentence structures	68%	24%	-64.7%
Simplified grammar usage	32%	76%	+137.5%

The data presented in Table 1 reveals substantial modifications in grammatical complexity when users interact with voice assistants compared to human conversation partners. The average sentence length decreased by nearly 40 percent, from 14.2 words in human-human communication to just 8.6 words when addressing voice assistants. The reduction in subordinate clauses was even more pronounced, declining by approximately 67 percent, indicating that users systematically simplify their syntactic structures. The finding that 76 percent of users demonstrated simplified grammar usage when interacting with voice assistants, compared to only 32 percent in human conversations, suggests a conscious or unconscious adaptation strategy to accommodate perceived system limitations. These modifications reflect user recognition that voice assistants process shorter, less complex utterances more reliably than sophisticated grammatical constructions.

Table 2: Speech Act Distribution Across Interaction Types

Speech Act Type	Human-Human (%)	Voice Assistant (%)	Difference
Direct commands	18%	64%	+46%
Indirect requests	42%	12%	-30%
Questions	28%	20%	-8%
Statements	12%	4%	-8%

Table 2 demonstrates dramatic shifts in speech act selection patterns between human-human and human-voice assistant interactions. Direct commands increased from 18 percent in human conversation to 64 percent when addressing voice assistants, representing a shift toward more explicit, unambiguous communication forms. Conversely, indirect requests decreased substantially from 42 percent to just 12 percent, suggesting users abandon the politeness strategies and pragmatic indirectness common in human social interaction. The reduction in statements from 12 percent to 4 percent indicates that conversational contributions serving phatic or social functions are largely eliminated in voice assistant interactions. These patterns reveal that users strategically modify their speech act choices to align with the transactional, command-oriented nature of voice assistant technology, sacrificing the social and relational dimensions of natural conversation.

Table 3: User-Reported Contextual Understanding Failures

Type of Contextual Failure	Frequency of Occurrence	User Frustration Level (1-5)
Pronoun reference resolution	78%	3.8
Multi-turn context maintenance	64%	4.2
Ambiguity resolution	71%	3.6
Previous conversation recall	82%	4.4
Situational context awareness	69%	3.9

The contextual understanding failures documented in Table 3 represent significant pain points in user experiences with voice assistants. The inability to recall previous conversations affected 82 percent of users and generated the highest frustration rating of 4.4 out of 5, indicating that users expect voice assistants to maintain longer-term conversational memory. Multi-turn context maintenance failures, experienced by 64 percent of participants with a frustration level of 4.2, suggest that even within single interaction sessions, voice assistants struggle to track conversational threads and maintain coherent exchanges. Pronoun reference resolution failures affected 78 percent of users, demonstrating limitations in anaphoric processing and reference tracking that humans perform effortlessly. The consistency of these contextual failures across different failure types indicates systemic limitations in current natural language processing capabilities rather than isolated technical issues.

Table 4: User Satisfaction and Perceived Naturalness Ratings

Platform	Overall Satisfaction (1-5)	Perceived Naturalness (1-5)	Likelihood to Recommend (%)
Siri	3.2	2.8	54%
Alexa	3.6	3.1	62%
Google Assistant	3.8	3.4	68%
Average	3.5	3.1	61.3%

Table 4 presents comparative user satisfaction and naturalness ratings across the three major voice assistant platforms examined in this study. Google Assistant achieved the highest ratings across all measured dimensions, with an overall satisfaction score of 3.8, perceived naturalness of 3.4, and recommendation likelihood of 68 percent. However, even the highest-performing platform failed to exceed a moderate rating, suggesting widespread recognition among users that current voice assistants fall short of truly natural interaction. The gap between overall satisfaction and perceived naturalness across all platforms indicates that users may find voice assistants functionally useful while simultaneously recognizing their conversational limitations. The average recommendation likelihood of 61.3 percent suggests that while users acknowledge voice assistant utility, significant reservations persist regarding the quality and naturalness of interactions.

Table 5: Repair Sequence Frequency and Success Rates

Repair Type	Frequency per 100 Utterances	Successful Resolution (%)	Average Attempts Required
User self-correction	12.4	78%	1.8
System misunderstanding	18.6	52%	2.6

Complete reformulation	8.2	84%	1.4
Clarification requests	15.3	68%	2.1

The repair sequence data in Table 5 reveals the substantial interactional work required to achieve successful voice assistant communication. System misunderstanding occurred at a rate of 18.6 instances per 100 utterances, representing nearly one failure in every five exchanges, and achieved successful resolution only 52 percent of the time even after multiple attempts. The average of 2.6 attempts required to resolve system misunderstandings indicates significant user effort and potential frustration. Complete reformulation, while less frequent at 8.2 instances per 100 utterances, achieved the highest success rate of 84 percent, suggesting that abandoning repair attempts in favor of entirely new formulations may be the most effective strategy. User self-correction occurred at a moderate frequency of 12.4 instances per 100 utterances with a 78 percent success rate, indicating that users often recognize in advance when their initial formulation may cause confusion and proactively adjust their speech.

QUALITATIVE ANALYSIS

Theme 1: Strategic Linguistic Simplification

Among the identified themes, participants remarked regarding their efforts to simplify their language toward a voice assistant by shortening responses, deleting subordinate clauses, and using key terms instead of full sentences. Considering their responses, voice assistant communicators seem to form mental models that stress simplification to the detriment of a more conversational style where peripheral elements may be skipped to enhance clarity and assistance. Participants noted that the simplified register used with voice assistants would, and could, never be used in related conversations with human interlocutors, supporting the hypothesis of a noticeable difference in the voice of computers, and highlighting the elimination of conversational norms and expectations in human–computer dialogues. While the communicative system of the voice assistant may be limited, the user consciously employing a simplified register is a form pragmatic accommodation. The cognitive burden of maintaining these dual communicative registers represents an often-unacknowledged cost of voice assistant interaction.

Theme 2: Frustration with Context Loss

Across all platforms, users expressed frustration with the inability of voice assistants to conversationally contextualize interactions. Participants articulated their displeasure when the systems were incapable of remembering different parts of a conversation, tracking pronouns, or maintaining a coherent multi-turn dialogue. Users talked about having to interact in a transactional manner with no consideration of the conversational partnership, which made the voice assistants feel alienating. Some users commented that voice assistants were only useful for very simple tasks. The contextual limitation on the voice assistant made problem solving with the assistant difficult, as complex tasks require ongoing dialogue and interaction. The emotionally charged context failure user descriptions implied a violation of basic expectations of conversational behavior and communication norms.

Theme 3: Adaptation of Politeness Strategies

Humans tailor their interactions according to the social context and the communicating partners even when the partners are human. As some social norms become less necessary, some interactions can become much less formal. However, it is noted that some social norms should be maintained. The removal of those social norms will refine the social config. Areas of interest include voice assistance and human interaction. Within voice assistance, the level of social norms has been noted to vary and become more neutral-over time. In initial interactions, users are more polite- socially neutral best describes their interaction. With more

interactions, users start removing elements of politeness. The social config is interesting, as it can be neutral according to interaction or formal, focusing on the partner or activation. In the case of voice assistance, social config and interaction change concurrently- the more polite the configuration, the more the interaction decreases. Within the voice assistance paradigm, it has been noted that users report less guilt when giving direct orders and removing politeness when addressing assistance.

Theme 4: Platform-Specific Learning Curves

Participants articulated differentiated learning adaptations across the various voice assistant platforms, thereby acquiring idiosyncratic knowledge regarding which phrases, commands, and restrictions each platform used or encountered. Users felt that effective voice assistant interaction required the user to understand, on an experiential level, the nuanced workings and the persistent failures of each assistant. This cognitively demanding knowledge configuration, especially for users who engage multiple systems across various devices and in differing contexts, is a remarkable phenomenon. Users, in particular, expressed a sense of anger that voice interaction strategies that proved effective on one assistant, uncommonly translated to another, thereby blocking the person from obtaining generalized voice interaction skills. The requirement for adaptive strategies that are specific to the platform in use points to the fact that current generation voice assistants are still a considerable distance from achieving any sort of uniform standard in natural language comprehension.

Theme 5: Reduced Conversational Richness

Users frequently expressed that voice assistants did not replicate the conversational richness, nuances, and relational aspects of human communication. Many participants identified the absence of humor and empathy, and the sense of commonality necessary for constructing meaning together, and the various bonding functions of fast or phatic communication. A number of users contrasted voice assistants and human interactions along the dimensions of functionality, describing voice assistant communication as primarily instrumental and functionality driven. Several respondents indicated that although voice assistants fulfill certain tasks of practical utility, they do not replace human communication or provide the meaningful engagement that conversational partners seek. Such recognition of basic differences suggests that voice assistants represent a unique and distinct communicative experience, rather than a seamless substitute for human conversation.

Theme 6: Anticipatory Communication Behavior

Anticipatory communication strategies were attributed to predicted limitations of the system, and thus, participants described simplifying language and avoidance of constructions that were likely to create confusion. Users described rehearsed utterances before speaking to voice assistants, and pre-selecting linguistic options that would yield successful recognition, which is the active recognition of the utterances made. This anticipatory behavior is a significant deviation from spontaneous human conversations, and speaks to the cognitive load the individual must engage in when dealing with a voice assistant. Several participants said the cognitive load resulted in a pre-planning that was designed in order to meet the voice assistant, which therefore made the communication more monotonous. The voice assistant communication was described more as composing a document, as opposed to a natural speech. However, the needed pre-planning offered the most insight, as the assistants provide no immediate seamless dialogue in order to allow the user to use unconstrained speech.

DISCUSSION

This study shows how voice assistants have changed the fundamental patterns of human-computer interaction and how users are required to change their communicative styles to be voice assistants. This includes the simplification of grammar, the pragmatic directness of their

communicative goals, and the lack of contextual complexity. The modifications users apply to the grammar of their sentences, the acts of speech they choose, and their politeness levels suggest that the most advanced voice assistant technologies still lack conversational ease. The frequent contextual failures and associated repair sequences suggest limitations of natural language processing, especially concerning anaphoric reference, multi-turn interaction coherence, and situational awareness. The gap between naturalness and user satisfaction suggests voice assistants deliver task completion functionality and utility, but users will to engage and converse with voice assistants, which highlights the areas contextual flexibility and the ease of conversational shifts. This interaction also suggests that the regular use of a conversationally simplified assistant may influence an individual's communicative competence and expectations concerning technology and interpersonal interaction.

CONCLUSION

This study on voice assistants and their impact on human-computer relations shows how new technology affects user communicative behavior and how users adapt their linguistics behavior and communicative behavior. The empirical evidence shows the user gap, how users expect voice assistants to engage in conversation and the assistants' contextual and multi-turn coherence conversation capabilities. Users develop communicative registers for voice assistants and conversation as a whole that grammatically simplistically, directly, and pragmatically indirectly. The voice assistant technology serves a purpose and is ubiquitous, but it lacks the promise of truly integrated human-computer conversation. The contextual gaps, high edit rates, and error repair loops in the conversation indicate a technological gap that needs to be addressed. To obtain a seamless speech interaction more than technological touch-ups are needed in situational awareness, discourse memory, and conversational pragmatics. Voice assistants need to be able to converse in human complexity rather than the echoes of human communication.

RECOMMENDATIONS

It is recommended that voice assistant developers improve the problem of contextual understanding, including the resolution of anaphoric reference, tracking multi-dialog turns, and long-term memory of interactions, in an effort to lessen the frustration of users and lower the frequency of repair sequences. The problem of inflexibility in the processing of natural language due to the expectation of user's adaptation to simplified speech and the lack of attention to indirect speech acts and-between-clastic communicative registers. Creating more advanced systems of dialogue management that include, in addition to the management of dialogue and the expected role behaviors, the anthropological equilibrium, the system of-equal unilateral distribution of the collaborative repair of the dialogue system, abstraction, and interruption control is an urgent problem in the field of dialogue systems. The absence of voice recognition systems is equitable and concentrically aligned to the lower and upper control of the range of the varieties of language relative to depriving recognition of most voice systems to diverse populations has to be addressed in systems. The longitudinal impact of habitual voice assistant uses on human communicative competence and the use of adaptation and control strategies of human-computer interaction in social interactivity systems, and the social interaction patterns on the voice systems remained uninvested.

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