

Users Perception and Experience on Intelligent Conversational and Smart Assistance System: A Comparative Study

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Abstract:- This study explores the dynamic progress of artificial intelligence (AI), specifically in conversational AI and smart assistance systems. It conducts a comprehensive comparative analysis, based on their functionalities, strengths, and limitations, aiming to enhance user experiences (UX) across diverse domains. The research entails a meticulous examination of natural language processing capabilities and user interaction mechanisms within these systems. To ensure a rigorous assessment of system functionality, strength, limitations, user's perception and experience, quantitative analysis were carried out using advance statistical tool (SPSS) and Google Sheets. The result of the study provides a detailed understanding of the comparative strengths and weaknesses of intelligent conversational AI and smart assistance systems which revealed that in overall, the Conversational AI system is well-received by users, but there is room for improvement. Noteworthy differences emerged in their adaptability to diverse user preferences, accuracy in understanding natural language inputs, and overall user satisfaction. The study also revealed the need for improvement in understanding human emotions and ensuring data privacy in artificial intelligence implementation.

Keywords: *Conversational AI, Smart Assistant System, NLP, UX, Chatbots.*

1. Introduction

Conversational artificial intelligence (AI) has gone through a lot of changes over time. The whole evolution began as a result of advancements in automatic support for customers and response systems. These early systems had a limit which was their ability to comprehend context, respond coherently, and adapt to various conversational styles.

[3] Refers to artificial intelligence as the development and modeling of systems that can perceive their environment, learn from experience, and make decisions based on that knowledge.

Artificial intelligence (AI) systems have passed through various developmental stages and interesting advancements in both natural language processing (NLP) and conversational systems. Chatbots and smart virtual assistants have transitioned from simple rule-based systems to sophisticated models capable of understanding and generating human-like text interactions. In terms of replicating human-like text interactions and customer services, conversational AI and smart assisted system tools have seen an improvement in use and has positive popularities in recent years. These tools are capable of handling customer inquiries, offering product recommendations, engaging in friendly conversations, providing solutions for straightforward problems, and even resolving complex issues.

By the use of some analytical methods, this study seeks to provide a comparative understanding of the conversational AI and smart assistance system technologies, offering valuable insights into its potential applications and the transformative effects it can bring to industries and daily life while exploring the examination of the complexity surrounding the systems, addressing critical issues such as privacy, ethics, and user acceptance level of both systems.

Aim and Objectives of the Study

The aim of this study is to determine users' perception on the use and efficiency of Intelligent Conversational AI and Smart Assistance System while the specific objectives are as follows;

1. To analyze and evaluate existing conversational AI and smart assistance technologies, their limitations in simulating human-like text interactions using qualitative analysis.
2. To investigate user perceptions and satisfaction on the operational tools.

2. Theoretical Foundations

Recently, AI applications in marketing have attracted significant scholarly attention as witnessed by several recent bibliometric studies and systematic literature reviews [5]. These show that there is a growing trend in the scientific production of AI-related research in the marketing field with an exponential increase over the last two years.

[2] Intelligent conversational AI and smart assistance systems are complex systems that require a deep understanding of a number of different theoretical foundations such as natural language processing (NLP), dialogue management and machine learning.

[4] In their study opined that there are other theoretical ideas which are important and relevant to intelligent conversational AI and smart assistance systems. These concepts include Human-computer interaction (HCI), Cognitive science and Artificial intelligence (AI).

Modeling and deployment of intelligent conversational and smart assistance systems as stated by [1] has the capability and potential impact on human daily lives. These systems could be used to provide a wide range of helpful services in range of areas and field such as customer service, education, healthcare, entertainment etc.

It is worthy to note that various researches has been done on these technologies ranging from Contextual Understanding in Conversational AI, Enhancing User Experience with Empathetic Responses, Intelligent Assistance Integration, User-Centric AI Design, Virtual assistants etc.

[7] Investigated on methods to enhance an AI's ability to maintain context and recommendations with Context-Aware Item Meta-Information. This foundational work has led to further exploration of methods that combine context-aware responses and user intent recognition.

[6] Have explored sentiment analysis techniques to imbue AI models with the ability to detect user emotions and respond in a more empathetic manner. This line of research is directly aligned with the goal of creating a conversational AI tool that offers not only accurate but also emotionally resonant interactions.

As artificial intelligence system emerges both in visual and audio inputs, it is important to explore how these modalities can be effectively integrated into conversational AI to enhance user experiences [9].

The difficulties are dependent on developing intelligent systems that can generate coherent and contextually relevant responses in multiple modalities for a seamless user experience for text, image and speech. [8]

By addressing these challenges, this study further contributes significantly to the evolving field of conversational AI and smart assistance systems, pushing the boundaries of what these systems can achieve in terms of context awareness, personalization, ethical considerations, and real-world applications.

3. Materials and methods

This comparative study involves the collection of data and the application of various methodologies to gain insights into its performance and user interactions of both systems. The study utilizes a quantitative method to gather information about how users engage with these AI systems and their overall satisfaction.

These approaches will help assess, analyze and evaluate existing conversational AI and smart assistance technologies and their limitations in simulating human-like text interactions and investigate user perceptions and satisfaction with the tools.

For this research, there are some possible questions that will need answers which include,

1. How do current conversational AI systems simulate human-like text interactions, and what underlying technologies or approaches do they employ?
2. What improvements or features do you believe could enhance the realism of text-based conversations with Conversational AI systems?
3. What are the limitations or challenges that Conversational AI systems currently face in simulating human-like text interactions effectively?
4. How do you feel about the privacy and data security aspects of Conversational AI interactions?
5. How do user perceptions of conversational AI's human-like text interactions compare to their expectations, and what factors contribute to user satisfaction or dissatisfaction?

Also, in order to enhance the variability of opinion further questions were posed which include;

1. What types of tasks or interactions do you typically engage in with Conversational AI systems?
2. Can you recall a recent experience where a Conversational AI system exceeded your expectations in simulating human-like text interactions?
3. In your opinion, what are the limitations or challenges that Conversational AI systems currently face in simulating human-like text interactions effectively?
4. What improvements or features do you believe could enhance the realism of text-based conversations with Conversational AI and Smart Assistance systems?
5. How do you feel about the privacy and data security aspects of Conversational AI and Smart assistance system interactions, considering the information you share with these systems?

Population of the study

Gathering data for this study required the dispersal of questionnaires while also getting certain users for interviews. The total number of participants (population size) in different occupations, which was needed for this study, was 89. For this, a marginal error of 5% (4.95) was given and sample size of 85. This was to give a gap for possible errors in the responses or unanswered questions after survey was concluded.

Table 1: Sample and population Size

Occupation	Sample Size	Population Size
Student	25	25
Software Developer	7	8
Web Developer	10	10
Graphics Designer	6	6
Sales Marketer	8	8
Product Lead	6	6
Content Creator	7	8
Employee	3	4
Financial Analyst	4	4
Cashier	1	1
Creative Lead	2	2
Healthcare Professional	3	4
Lecturer	1	1
Teacher	1	1
Tech Enthusiast	1	1
Total	85	89

Table 1 above shows the tabulation of the occupation, population size and sample sizes with number of participant for data collection represented.

Table 2: Occupation and Frequency Chart

What is your occupation?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	25	29.4	29.4	29.4
	Software Developer	7	8.2	8.2	37.6
	Web Developer	10	11.8	11.8	49.4
	Graphics Designer	6	7.1	7.1	56.5
	Sales Marketer	8	9.4	9.4	65.9
	Product lead	6	7.1	7.1	72.9
	Content Creator	7	8.2	8.2	81.2
	Employee	3	3.5	3.5	84.7
	Financial analyst	4	4.7	4.7	89.4
	Cashier	1	1.2	1.2	90.6
	Creative Lead	2	2.4	2.4	92.9
	Healthcare Professional	3	3.5	3.5	96.5
	Lecturer	1	1.2	1.2	97.6
	Teacher	1	1.2	1.2	98.8
	Tech Enthusiast	1	1.2	1.2	100.0
	Total	85	100.0	100.0	

Table 2 above depicts how to get proper and accurate data for this study, questionnaires were sent out and also interviews were conducted on people in different occupations while the response frequency and percentage validity obtained as shown the table above.

Table 3: Interaction Report

How often do you interact with Conversational AI systems in your daily life?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Daily	24	28.2	28.6	28.6
	Several times a week	33	38.8	39.3	67.9
	A few times a month	15	17.6	17.9	85.7
	Rarely	12	14.1	14.3	100.0
	Total	84	98.8	100.0	
Missing	System	1	1.2		
Total		85	100.0		

Table 3 shows the interaction frequency among different users of the system and their perception of the system. These individuals also provided open-ended responses to most of the questions that were asked and they were very helpful in studying and exploring the topic. User personas were also generated for the individuals that were interviewed, both in person and virtually. The personas included the basic details of some users who participated in the interviews, their pain points, and some suggested solutions that they gave to help fix the problems they had.

Since the users represent different fields, it was necessary to understand how they use the conversational systems according to their previous responses of how often they interact with the system. The results are below as shown in table 4

1 = Information Retrieval

2 = Customer Support

3 = Smart Home Control

4 = Assignments and School work

Table 4: Task and Activity

What types of tasks or interactions do you typically engage in with Conversational AI systems?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1.2	1.2	1.2
Information retrieval	22	25.9	25.9	27.1
1, Copywriting	1	1.2	1.2	28.2
1,2	2	2.4	2.4	30.6
1,2,3,4	2	2.4	2.4	32.9
1,2,4	1	1.2	1.2	34.1
1,3,4	1	1.2	1.2	35.3
1,4	16	18.8	18.8	54.1
Customer support	5	5.9	5.9	60.0
2,4	1	1.2	1.2	61.2
Smart home control	4	4.7	4.7	65.9
Assignments and School work	20	23.5	23.5	89.4
Coding assistance	1	1.2	1.2	90.6
Coding help	1	1.2	1.2	91.8
Content research and design in	1	1.2	1.2	92.9
data analysis support	1	1.2	1.2	94.1
Financial data analysis	1	1.2	1.2	95.3
Marketing Strategy advice	1	1.2	1.2	96.5
Medical research assistance	1	1.2	1.2	97.6
Research assistance	1	1.2	1.2	98.8
Research Assistance	1	1.2	1.2	100.0
Total	85	100.0	100.0	

To investigate user perceptions and satisfaction with the tool's human-like text interactions and smart assistance features, sample questionnaires were distributed among the population size and data collected by these systems were analyzed and the responses represented using the charts as shown in table 5 below;

Table 5 User Perceptions and Satisfaction Response

On a scale of 1 to 5 (1 being very dissatisfied and 5 being very satisfied), how satisfied are you with the Conversational AI system's ability to understand and respond to your queries in a human-like manner?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Dissatisfied	1	1.2	1.2	1.2
	Somewhat dissatisfied	5	5.9	5.9	7.1
	Neutral	22	25.9	25.9	32.9
	Somewhat satisfied	40	47.1	47.1	80.0
	Very Satisfied	17	20.0	20.0	100.0
	Total	85	100.0	100.0	

The options of responses in table 6 below included Accuracy of Responses, Response Time, Context Understanding, and Detailed Responses. Table 6 represents the quantitative responses with numbers to help with proper analysis and is denoted as

1 = Accuracy of Response

2 = Response Time

3 = Context understanding

4 = Detailed Responses

Table 6 Satisfaction Response

What factors influence your satisfaction with Conversational AI systems' human-like text interactions? (Select all that apply)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Accuracy of responses	13	15.3	15.3	15.3
	1,2	5	5.9	5.9	21.2
	1,2,3	3	3.5	3.5	24.7
	1,2,3,4	17	20.0	20.0	44.7
	1,2,4	5	5.9	5.9	50.6
	1,3	7	8.2	8.2	58.8
	1,3,4	2	2.4	2.4	61.2
	1,4	1	1.2	1.2	62.4
	1,2,4	1	1.2	1.2	63.5
	Response time	6	7.1	7.1	70.6
	2,1	1	1.2	1.2	71.8
	2,3	4	4.7	4.7	76.5
	2,3,4	1	1.2	1.2	77.6
	2,4	5	5.9	5.9	83.5
	Context understanding	9	10.6	10.6	94.1
	3,4	3	3.5	3.5	97.6
	Detailed responses	2	2.4	2.4	100.0
	Total	85	100.0	100.0	

Table 7 Privacy and Data Security

**How do you feel about the privacy and data security aspects of
Conversational AI interactions, considering the information you share
with these systems?**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Concerned	22	25.9	26.8	26.8
	Somewhat concerned	17	20.0	20.7	47.6
	Neutral	29	34.1	35.4	82.9
	Not Very Concerned	10	11.8	12.2	95.1
	Not Concerned at All	4	4.7	4.9	100.0
	Total	82	96.5	100.0	
Missing	System	3	3.5		
Total		85	100.0		

4. Results and Discussions

The actualized results and findings from the analysis and evaluation that was conducted in the research and responses gathered showed several significant insights and conclusions were drawn as per perceptions, experience and user satisfactions of both systems.

Considering the table 2, we have a representation of the participants and perceptions which numbered a total of 87 and chart shown in figure 1 below

Figure 1 Chart of Participants

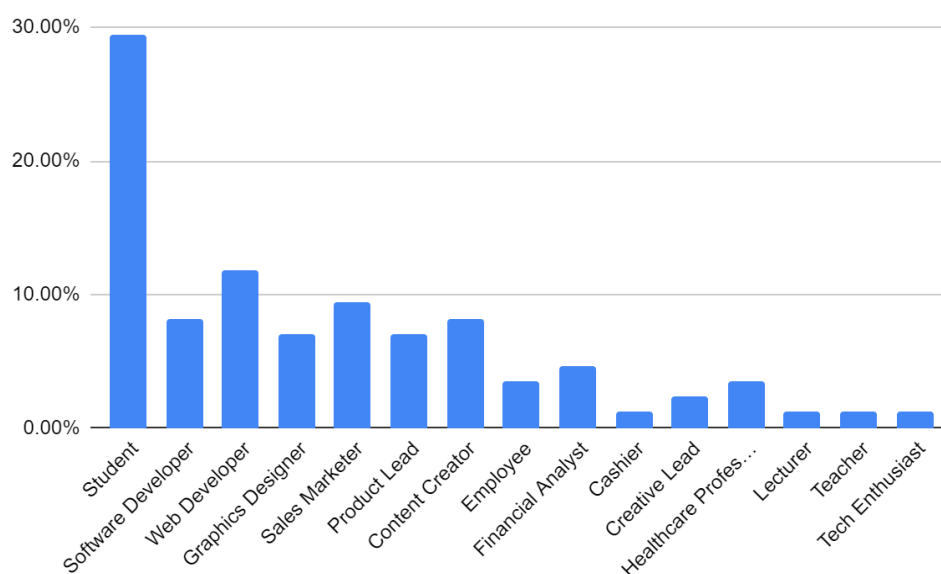


Fig 1 Occupational and Perception Chart

The analysis in figure 1 above shows the percentile data for occupations of people who use conversational AI and smart assistance systems which depicts that the most common occupations among these users are students, software developers, and web developers. This suggests that people who use conversational AI and smart assistance systems are more likely to be interested in technology and early adopters of new technologies which they perceived to be useful.

The percentile data also shows that some occupations that are typically associated with conversational AI and smart assistance systems, such as customer service representative and sales representative, are less common among these users. This suggests that these occupations may not be as reliant on conversational AI and smart assistance systems as other occupations.

This analysis suggests that conversational AI and smart assistance systems are being used by a diverse group of people, including students, software developers, web developers, and other early adopters of new technologies. However, it also suggests that these systems may not be as widely used in some occupations, such as customer service and sales.

This information can be used to understand the needs and interests of people who use conversational AI and smart assistance systems. For example, developers of these systems can focus on features that are relevant to the needs of students, software developers, and web developers. Additionally, developers can explore ways to make conversational AI and smart assistance systems more useful for occupations that are not currently using them as widely.

Overall, the percentile data provides valuable insights into the occupations of people who use conversational AI and smart assistance systems.

User engagement and tasks in table 3 shows the analysis of how often people interact with these systems and the most common frequency of interaction with conversational AI systems is several times a week (33%). This is followed by daily (24%), a few times a month (15%), and rarely (12%). This suggests that conversational AI systems are becoming increasingly integrated into our daily lives, but there is still a significant portion of people who interact with them less frequently as can be seen in figure 2 below.

Figure 2: Frequency of interaction

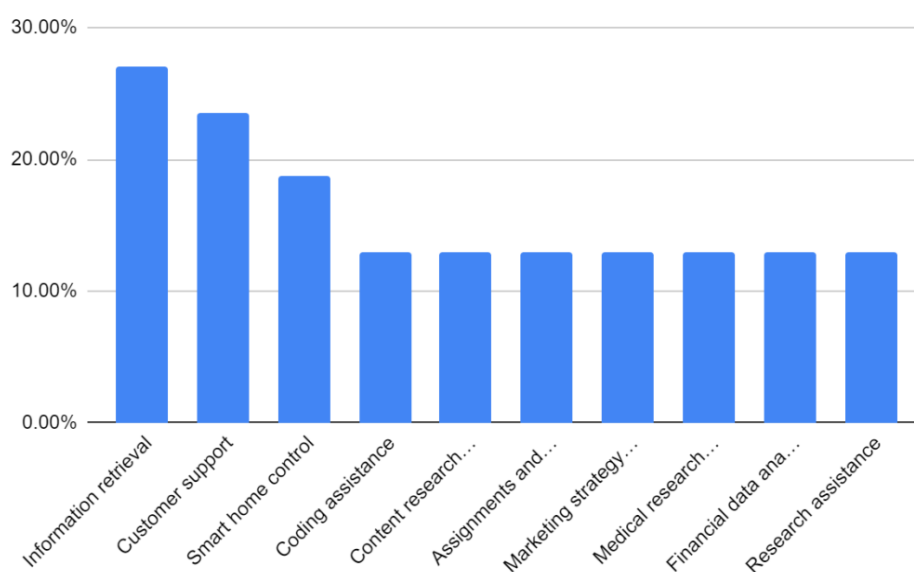


Fig 2 Interaction frequency

The analysis in figure 2 above shows that the most common tasks or interactions with conversational AI systems are information retrieval (27.1%), customer support (23.5%), and smart home control (18.8%). These tasks are all relatively simple and straightforward, which suggests that people are using conversational AI systems to automate tasks that they would otherwise have to do manually.

Other tasks or interactions that are commonly used with conversational AI systems include coding assistance, content research and design, assignments and school work, marketing strategy advice, medical research assistance, financial data analysis, and research assistance. These tasks are more complex and require a higher level of

expertise. This suggests that people are using conversational AI systems to get help with more complex tasks, such as writing code, designing content, and conducting research.

The human-like interaction experiences in table 3 shows an overall 50% of respondents reported having a recent experience where a conversational AI system exceeded their expectations in simulating human-like text interactions while the rest recorded Nil.

The most common scenarios where respondents experienced human-like text interactions from conversational AI systems were as shown in figure 3 below:

Figure 3: User Experience

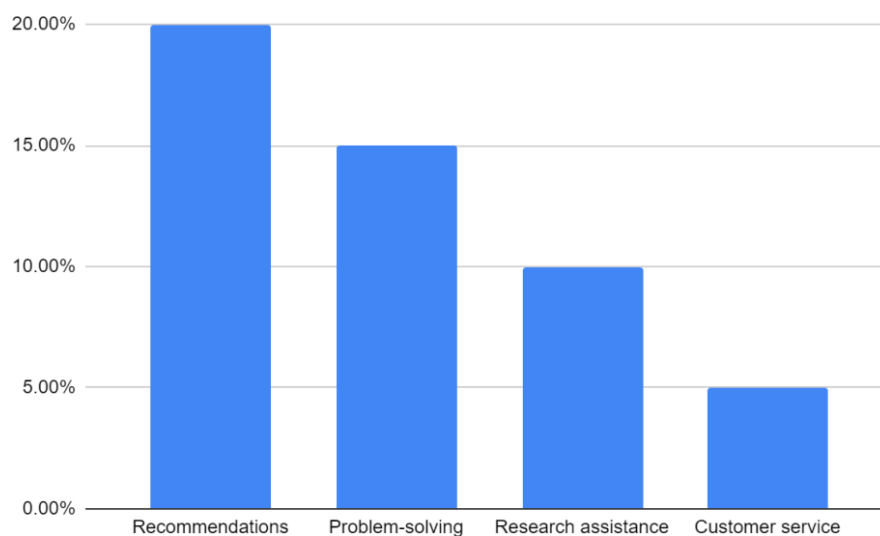


Fig 3 User Interaction Experience

The survey data in figure 3 above suggests that conversational AI systems are becoming increasingly capable of simulating human-like text interactions. Respondents were particularly impressed by systems that were able to understand and respond to complex questions, provide personalized recommendation, convey empathy and understanding, crack jokes, and share interesting facts. These findings suggest that conversational AI systems have the potential to be valuable tools for a variety of tasks, including customer service, research assistance, and problem-solving.

The four most important factors influencing user satisfaction with Conversational AI systems' human-like text interactions are:

1. Response time (95.2%)
2. Accuracy of responses (92.6%)
3. Detailed responses (89.9%)
4. Context understanding (87.3%)

These findings suggest that users want Conversational AI systems to be able to respond quickly, accurately, and in a comprehensive and informative way. They also want the systems to be able to understand the context of their conversations so that they can provide relevant and helpful responses.

It is also worth noting that there is a significant overlap between the factors that influence satisfaction. For example, a system that is able to respond quickly and accurately is likely to be perceived as having a better understanding of the context of the conversation. Similarly, a system that provides detailed and informative responses is likely to be perceived as being more accurate.

Overall, these findings suggest that Conversational AI systems should be designed to focus on the four factors that are most important to users: response time, accuracy, detail, and context understanding.

Percentage Analysis:

1. Very Satisfied: 20.0%
2. Somewhat Satisfied: 47.1%
3. Neutral: 25.9%
4. Somewhat Dissatisfied: 5.9%
5. Very Dissatisfied: 1.2%

Figure 4: Satisfaction

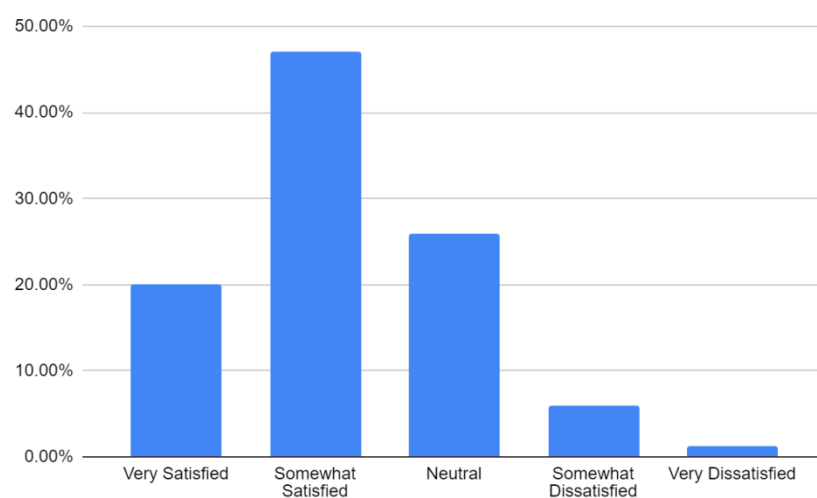


Fig 4 User's Satisfaction chart

Figure 4 above shows that a significant majority (67.1%) of people are satisfied with the conversational AI system's ability to understand and respond to their queries in a human-like manner, with 20% being very satisfied and 47.1% being somewhat satisfied. However, a quarter of people (25.9%) are neutral, and a small number of people (7.1%) are dissatisfied, with 5.9% being somewhat dissatisfied and 1.2% being very dissatisfied.

5. Conclusion

In conclusion, this comparative study sheds light on the different features and functionalities of intelligent conversational AI and smart assistance systems. It highlights that intelligent conversational AI systems excel in natural language understanding and generating human-like responses, making them suitable for virtual assistants, customer support, and chatbots. On the other hand, smart assistance systems, while also capable of understanding natural language, primarily focus on specific tasks, offering highly efficient solutions.

The choice between these technologies should depend on the specific application and the desired user experience. Intelligent conversational AI may be preferred when natural, human-like interactions are essential, while smart assistance systems are more efficient in domain-specific tasks such as home automation, healthcare, or data analysis. Furthermore, the research emphasizes the continuous evolution and improvement of these technologies, and future developments may lead to even more versatile and integrated solutions.

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