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INTELLIGENT INTERACTION VIA CHATBOTS TRANSCENDING THE CURRENT CONSTRUCTS

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ABSTRACT

Purpose: To study the chatbots' effectiveness in transforming the current business constructs.

Research Method: A comparative study of five chatbots in different domains based on the detailed dialogue flows and instant messenger interface with users.

Findings: The study provides rating to the selected five chatbots as per their efficacy in interacting with the users.

Application: The study would be useful for the business owners of the different domains discussed regarding their investments in chatbots as a cost-effective tool for better customer experience leading to better sales and thereby increased revenues of their business. It would assist chatbot developers for the design factors to be considered while constructing chatbots. It would help future researchers to propose strategies and frameworks to increase customer engagement through chatbots. It would also supply academics with a foundation for further theory building processes regarding chatbot design and engineering.

1. Introduction

A chatbot is a conversational agent and a computer program that can conduct a conversation with the user while using natural language speech [1]. As chatbots

can operate 24 hours a day and 7 days a week, giving companies the chance to serve customers whenever needed [2]. The real-time nature of chat services has transformed customer service into a two-way communication with significant effects on trust, satisfaction, and repurchase as well as WOM intentions [3]. ELIZA [4] is one of the oldest created chatbots [5]; designed in the 1960s by Joseph Weizenbaum to simulate a psychotherapist in clinical treatment [6]. It accepts the type-in queries, analyse it, and then responds by applying the rules that come with input decomposition [5]. Chatbots are also known as machine conversation systems, dialogue systems, virtual agents, and chatterbots [6]. Currently, some of the famous ones are Amazon Alexa, Siri on iPhone, Cortana, and Google Assistant [7]. Chatbots are great tools for retrieving information [8] since they respond to the when, what, where and how of the users. Hence, many businesses are utilising them for answering customers' frequently asked questions [9]. Customer service is one of the highest contributors for the increased use of chatbots & virtual assistants with a 42.52% share [10]. Although chatbots seem to work intelligently by interpreting users' input before providing answers, some chatbots just scan the inputted keywords answer with the most suitable responses from their databases [11]. Hence, chatbots are helping businesses to be more efficient, and capable of providing its customers with relevant and personalized experiences. They are implementing customer-centric approach that imitates human behaviour and has a varied application in fields like healthcare, banking, human resources, travel, e-commerce, etc. In addition, Gartner [12] predicted that by 2021, more than 50% of companies will invest more in chatbots development than in traditional mobile apps development.

2. Literature Review

Selected Chatbot 1: Florence
Owned by- David Hawig
Domain- Healthcare

Named after Florence Nightingale, the founder of modern nursing, Florence is an online personal health assistant chatbot that helps its users to manage their health & wellness care by reminding them with medication and it helps them find specialists and book appointments in their area [13]. Florence has features like symptom checker, health tracking and pill reminder. It was launched in 2017 and currently, it has more than 2K daily users. It offers you to add information about your medication and automated messaging on your goals and activities. It tracks the user's health by taking into consideration user's weight, mood, period cycles and it can also locate the nearest pharmacy or clinic in case of emergency [14]. The user manually informs Florence of all the details like: Drug name, Dosages, Time and the chatbot sets the reminder accordingly. It reminds the user to take pills medicine at the time the user entered and at the prescribed dosages. The chatbot also gives users an option to send a mail to their friends for motivation in case they miss any pill [15].

Selected Chatbot 2: SIA (SBI Intelligent Assistant)
Owned by- State Bank of India (SBI)
Domain- Banking

SIA has the capacity to respond to around 864 million queries a day, making it the largest in the financial sector. SIA has been designed to handle nearly 10,000 enquiries per second. It is about twenty-five percent of the queries processed by Google. State Bank of India anticipates a notable reduction in the operational expense overtime [16]. SIA handles enquiries on banking products and services [17]. This AI banking platform is provided by Payjo, based in Silicon Valley in US and Bengaluru. SIA or SBI Intelligent Assistant, a multilingual chatbot that can respond in 14 languages in speech as well as text. Initially, it provided responses to standard queries like information on products and services and answered the frequently asked questions like ATM locations and IFSC codes [18].

Selected Chatbot 3: Goldie

Owned by- Ernst and Young (EY)

Domain- Human Resources

Goldie was deployed in 2017 to more than 250,000 staff members at EY firms around the world. Powered by IBM® Watson™, Goldie was successful in employee engagement, rapid return on investment and substantial annual savings. It transformed the HR services of EY firms globally and kick-started an expansive AI journey across EY operations [19]. Goldie answered more than 2.2 million questions for employees across 138 countries till date [20].

Selected Chatbot 4: Gia (Goibibo's Assistant)

Owned by- Goibibo

Domain- Travel

Goibibo's chatbot Gia is a 24X7 personal travel assistant that reduced the need for human intervention in the ticket-handling and seat-selection process, as well as post-booking queries, by over 25%. It facilitates the seamless delivery of hotel vouchers on the messaging application of the customer's choice [21]. It is capable of handling about 300 types of queries on travel bookings done through Goibibo [22].

Selected Chatbot 5: Domino's

Owned by- Domino's Pizza

Domain- Hospitality

Domino's chatbot gives the customers the options to track their current order, view the applicable offers, combos and stores in their location as well as ask queries and provide their feedbacks. The customers can re-order their previous orders and link their mail accounts to Domino's account hence ordering from more than one device. The chatbot not only tracks user's order but also estimates the time of delivery of the order [23].

3. Research Method

This research undertakes a comparative case study of five different chatbots from different sectors for their relative merits and demerits. Since chatbots are an innovative method for users to avail the services [24], it is important to understand user's conversation experience with the chatbots. Researchers [25] investigated interaction with a conversational agent, Max, and found that people often used talking patterns typical of interactions with humans, such as saying "hello" or participating in small talk. Keeping in view the importance of

chatbots/virtual assistant in future, deployment of these technologies in different domains is analysed in this research paper. Earlier research showed that the domains of the chatbots greatly influence the design of chatbots [26].

In the study, we had a detailed conversation with the five selected chatbots. In doing so, we compared experience of conversing with the chatbots. English was the chosen language for communication for simplicity purpose. The major factors of comparing the chatbots are listed below:

i) Identity: User perception is influenced by the way the chatbot articulates its messages. Earlier researches conclude that when a chatbot uses first person singular pronouns and signals its identity then it is positively associated with likeability [27]. The chatbot introduced itself and bid goodbye to the user. Greetings and farewells are considered ways to encourage human-like responses by users [28]. The chatbot signalled a personality by introducing itself as "Alex", a gender-neutral name as previous studies indicated that gender stereotypes also apply to computers [29].

ii) Smalltalk: Smalltalk promotes a healthy relationship and reduces the emotional distance between the two people involved in the conversation. The chatbot engages in a short conversation by asking in the beginning of the interaction by asking about the health of the user. Such small talk makes a chatbot appear more sensitive and human-like [30].

On the basis of the above factors, we followed the below procedure for interacting with the chatbots:

(1) Welcomed by the chatbot.

(2) The chatbot enquires how it may help the user. The user then responds either by clicking on the auto-suggestions provided by the chatbot or typing in his/her query. The chatbot responds to the question, confirms if the user has more question and also asks for the feedback in some cases.

(3) User exits the conversation by sending 'Bye' along with the chatbot's name.

4. Discussion and Analysis

After following the three-step procedure, we rated the five chatbots as per the introductory statement of the chatbot, whether the query asked to the chatbot had to be typed by the user or was available as an auto-suggestion to the user or both the options, the content of the response by the chatbot is relevant to the query asked and the concluding statement of the chatbots. Based on the conversations with the selected chatbots, details listed in the below Table 1, it is suggested for the developers to include introductory statements that help create a more natural conversation, query available as an auto-suggestion makes it easier for the user and follow- up questions more likely in case of health chatbot makes the user-experience more human-like fostering user's trust for the chatbot conversation as an experience.

Table 1: Comparison of the five chatbots of different domains

Chatbot Name	**Ways to Connect**	**Introductory Statement**	**Query type (Type in /Auto-**	**Relevant response**	**Concluding statement**	**Rating**

			Suggestion)			
Florence	Facebook messenger, Kik, Skype	Yes	Both	Yes	Yes	4/5
SIA	Bank's website	Yes	Both	Yes	Yes	4/5
Goldie	EY Internal Portal	Yes	Both	Yes	Yes	4/5
Gia	Website and Mobile application	Yes	Auto-suggestion	Yes	No	3/5
Domino's	Facebook Messenger, Twitter, Mobile application, Amazon Echo	Yes	Auto-suggestion	Yes	No	3/5

5. Conclusion

In order to receive better return on investments, it is necessary to imbibe more human-like features in a chatbot as clearly indicated in the table above. Since Gia and Domino's chatbots have only auto-suggestion options available for queries and also do not respond with a concluding statement they are rated as three on five. Florence, SIA and Goldie were found to have almost all the factors in place hence rated four on five. Hence, it can be concluded that chatbots are not only enhancing the customer experience by ease of availing the services in different domains but also ensuring customer loyalty as well as future recommendations in the process.

6. Scope and Future Research Directions

The scope of the research paper is restricted to the five domains of healthcare, banking, human resources, travel and hospitality so future research could be focussed on news, insurance and entertainment domains. The chatbots are subject to technological advancements and hence more literature would be available in coming years. In this research paper, we have considered a normal conversation so in future research, conversation involving some general questions unrelated to the query can be asked to see its response in such case. A conflict that the perceived human likeness is, to some extent, a product of both the behaviour of the chatbot and the perceptions of the user judging the chatbot. In other words, "the judgment of human likeness lies in the eye of the judge himself" [31].

Researchers [32] remarked that due to the rapid advent of technology, users will have to remind themselves while interacting with chatbots that they are not people (p. 3476). Business Wire [33] reported that the global chatbot markets reached about US$ 1.7 Billion in 2017. This value is predicted to be $9 billion by 2023 resulting in compound annual growth rate of 32% which clearly signifies that the chatbots' growth in the current years and years to come will be phenomenal as evident from the data.

Further research needs to discuss characteristics which describe a successful chatbot, identify key performance indicators of the chatbot to make the research more quantifiable. It can use additional methods e.g., conducting interviews with chatbot developers, to obtain further expert information, e.g., design principles and frameworks for the development of long-term advance memory capabilities on domain-specific chatbots. Further suggestions are developing a taxonomy from a chatbot developer's perspective providing valuable insights on relevant chatbot characteristics. Finally, it is recommended to investigate the factors driving the technological development of chatbots at the user, organizational and industry level, as well as to reinforce the investigation on chatbot implementation and adoption, for which the dimensions of the proposed taxonomy can provide a common framework for chatbot developers and practitioners to formulate design principles which guides further development of chatbots. This paper would further promote research among scholars interested in the application of chatbots for easing the most mundane tasks.

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