

The Chatbot as a Medium of Communication

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INTRODUCTION

The meteoric rise of artificial intelligence (AI) in the past decade has fuelled an equally rapid growth in the adoption of chatbots. Chatbots have been infiltrating the world of instant messaging. As such, this paper seeks to provide a brief analysis of the properties of chatbots and its impact on language, communication and society. Additionally, the paper will compare the characteristics of chatbots to David Crystal's (2006) seven distinguishing features spoken and written language. Two local chatbots, Bus Uncle and Ask Jamie, will be the focus of analysis.

LITERATURE REVIEW

A Brief History of Chatbots

A chatbot is a software that can interact with a human user by processing the user's natural language input and returning a smart and relevant response in real-time (Khan & Das, 2018; Shawar & Atwell, 2007). The advent of chatbots can be marked by the creation of ELIZA by Joseph Weizenbaum in 1966. ELIZA was a chatbot designed to simulate a psychotherapist and also the first winner of the widely-popular Loebner Prize in 1991. Along with other chatbot competitions, the Loebner Prize, which is awarded to the most human-like chatbot, motivated the development of many chatbots (Io & Lee, 2017). This led to the invention of other noteworthy chatbots, such as A.L.I.C.E. and Jabberwacky (Khan & Das, 2018).

In 2001, SmarterChild was launched by Active Buddy. It was the first chatbot that could do more than just "chat" — it could provide the user with information on topics such as the weather and stocks too. Having amassed more than 30 million users on its AOL Instant Messaging buddy list, SmarterChild paved the way for modern chatbots like Apple's Siri and Amazon's Alexa (launched in 2011 and 2014 respectively) (Khan & Das, 2018).

Chatbots Today

Today, chatbots are independent programmes running on a range of messaging platforms that are opened to developers, including Facebook Messenger, Telegram and Slack (Khan & Das, 2018). Most of them are developed using Artificial Intelligence Markup Language (AIML), which teaches the chatbot to identify patterns in the user's input and return a response from a template (Io & Lee, 2017). That being said, building a convincing chatbot takes time to train. Mitsuku was launched 11 years before it won its first of 5 Loebner Prizes in 2013.

The presence of a host of chatbot development platforms, like Pandorabots and Chatfuel, has meant that almost anyone can be a chatbot builder. 250,000 developers on Pandorabots have built more than 300,000 chatbots ("About Pandorabots", n.d.). This accessibility has fuelled the explosive growth in the adoption of chatbots, which have entered various industries, from e-commerce to education.

Therefore, it comes as little surprise that the chatbot market size is predicted to more than triple in just 5 years, from USD2.6 billion in 2019 to USD 9.4 billion in 2024 (“Global Chabot Market”, 2019). Many people across the globe have taken to chatbots. A survey by LivePerson (2019) revealed that more than half of its respondents¹ had interacted with a chatbot at least once in the past year. Closer to home, Microsoft’s China-based Xiaoice has some 660 million users worldwide (Spencer, 2018). On Facebook Messenger alone, there are 300,000 active chabots (“F8 2018”, 2018). Thus, chatbots are not only widely adopted, but also growing in popularity.

CHATBOTS IN SINGAPORE

While there is little information on the exact figures regarding chatbots in Singapore, statistics on local mobile usage reveal that Singaporeans are heavily engaged in instant messaging, with WhatsApp and Facebook Messenger being the two most downloaded apps (Kwang, 2019). There has been an increasing number of local chatbots in recent years too, such as Kris (Singapore Airlines) and Ask Mindy (M1). However, for the purpose of discussion, this paper will focus on two local chatbots:

Bus Uncle (www.busuncle.sg) is a Singlish-speaking chatbot with a personality. It runs on both Facebook Messenger and Telegram and provides users with real-time information on bus arrival timings and public transportation directions. Built by Abhilash Murthy in 2016, Bus Uncle has garnered more than 36,000 “likes” on Facebook and receives between 40 to 50 requests per minute during peak hours (Chua, 2016). This paper will use examples of Bus Uncle on Facebook Messenger.

AskJamie (www.lta.gov.sg) is a chatbot developed by the Singapore government. It has been implemented across more than 70 government agency websites and was most recently launched on Facebook Messenger to provide information regarding COVID-19. This paper will provide examples of AskJamie@LTA, which answers general enquiries about the Land Transport Authority (LTA) on its official website.

COMPARING CHATBOTS TO TEXT AND SPEECH

In analysing the medium of Netspeak, Crystal (2006) proposes seven features that “typically” differentiate spoken from written language. This section will draw comparisons between these two mediums and chatbot messaging, specifically via Bus Uncle and Ask Jamie.

However, before carrying out the analysis, it is perhaps important to note that chatbots are quite unlike other mediums of communication, in that language is not produced and received solely by humans. Instead, the interaction involves a human and a computer, though the chatbot is ultimately programmed and trained by a human.

Firstly, chatbot messaging is largely time-bound since interaction with an ever-present chatbot occurs in real time. Additionally, its transient nature can be attributed to the fact that messages sent by the user only have relevance to the present or to subsequent parts of the same

¹ Total of 5,031 respondents from USA, UK, France, Germany, Japan and Australia.

conversation. For one, user's chat history with AskJamie is completely deleted once a user leaves the LTA website. While platforms like Facebook Messenger archive past messages and could serve as a permanent record for users (unless intentionally deleted), information contained within these messages are usually not retained by the chatbot beyond the present conversation. Additionally, Bus Uncle's answers vary based on the time of interaction. When asking for information regarding bus arrival timings, a different response is returned depending on whether public buses are in operation during that time of day, as seen Figure 1.

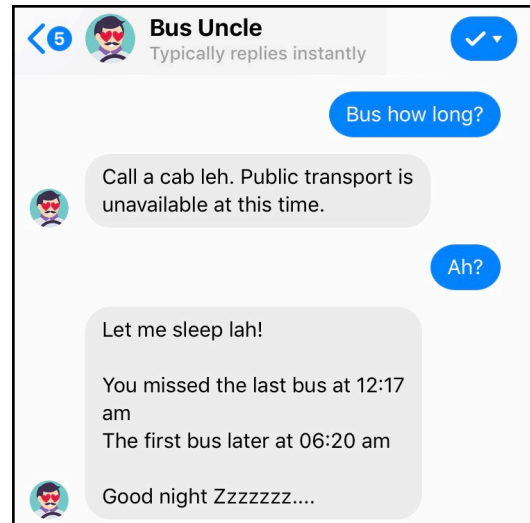


Figure 1. Bus Uncle's response to bus arrival timings at 1am.

Chatbot messaging is arguably more spontaneous than it is contrived, by virtue of how there is barely a time lag between production and reception. Given that chatbots operate 24/7, all messages produced by the user are immediately received by the chatbot, indicated by its almost simultaneous response. This often sets the pace for quick turn-taking between the user and chatbot. Spontaneity is further reinforced by the fact that messages cannot be edited once they are sent. Thus, errors and rephrasing are common on the user's end.

However, not all messages sent by the chatbot may be immediately received by the user, since this would depend on whether the user is online. For example, when updates and notifications are enabled, Bus Uncle would initiate a chat when the user has not engaged with it for a period of time (see Figure 4).

Given that chatbot messaging is a form of computer-mediated communication (CMC), it is visually de-contextualised. As such, extralinguistic cues present in face-to-face interaction are largely absent. That being said, many chatbots make use of punctuation, emoticons, emojis and GIFs in a bid to mimic extralinguistic cues, such as intonation or facial expressions. Not only does it use a range of emojis and punctuation in its replies, Bus Uncle also allows users to send stickers, GIFs and emojis. It immediately responds with a sticker or emoji that mirrors the same emotion or feeling — similar to behaviour in face-to-face interaction. On the contrary, AskJamie only allows the use of letters and numbers, sans symbols. This can perhaps be interpreted as an attempt to make Bus Uncle more human-like and as a way to convey its personality.

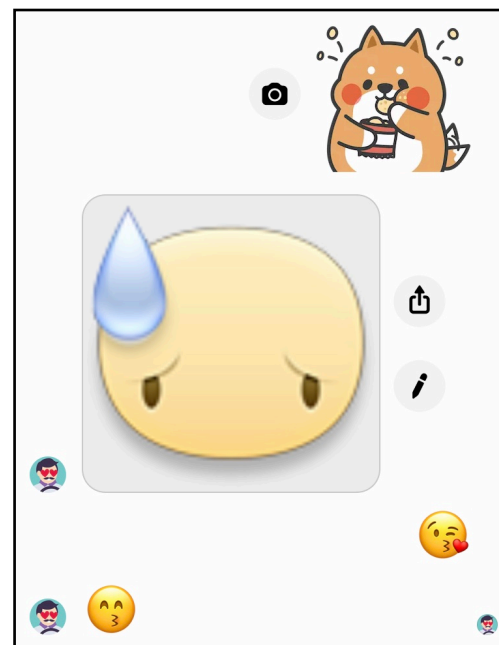


Figure 2. Bus Uncle responds to stickers and emojis.

Chatbot messaging is more loosely structured from the perspective of the user. Given the spontaneity of instant messaging, as well as the more informal nature of instant messaging, it is expected that users adopt a more informal language style. This includes the use of contractions, slang and missing punctuation and capitalisation.

Since a chatbot's responses are programmed, whether they are loosely or elaborately structured depends very much on the nature of the chatbot. Chatbots like Bus Uncle are intentionally programmed to respond in an informal language style, as seen from its responses that include Singlish particles. On the other hand, AskJamie is a government chatbot that uses the standard variety and complex syntactical structures characteristic of official documents, which lends the chatbot credibility and legitimacy.

Chatbot messaging is both factually communicative and socially interactive. The former is more apparent in chatbots that are built to provide users with relevant information or services, such as those adopted by e-commerce businesses and government services. With these chatbots, interaction mainly revolves around the communication of facts, which are presented in ways such that the information is both clear and accessible to the user. For instance, Bus Uncle presents lists of possible bus stops in the form of a carousel that users can scroll through, while AskJamie returns a relevant questions users might have in a bulleted list that provide mnemonics.

However, Bus Uncle and AskJamies are not entirely incapable of phatic communication. Bus Uncle has a knack for dishing out humorous jokes and puns, while AskJamie cleverly deflects personal requests (see Figure 3 and 4). There are also many examples of purely socially interactive chatbots, including Xiaoice and Mitsuku, which are designed to function as emotional companions as opposed to solve problems.

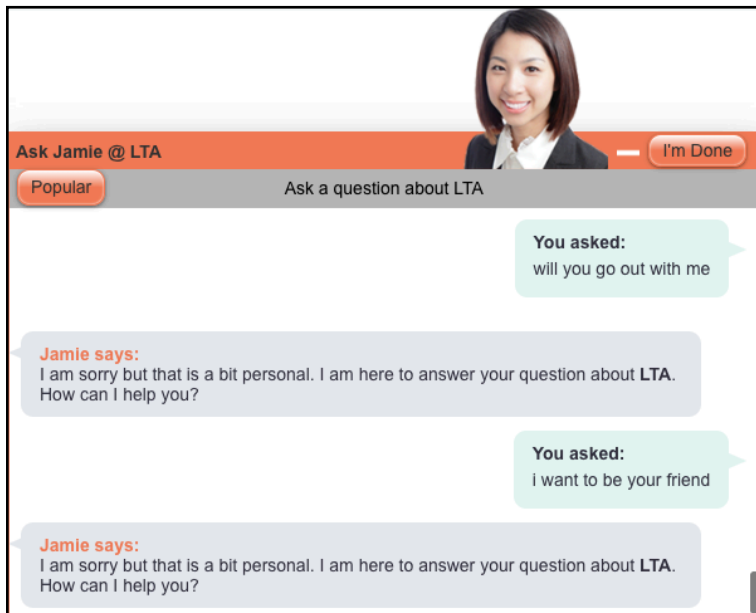


Figure 3. AskJamie responds to a personal question.

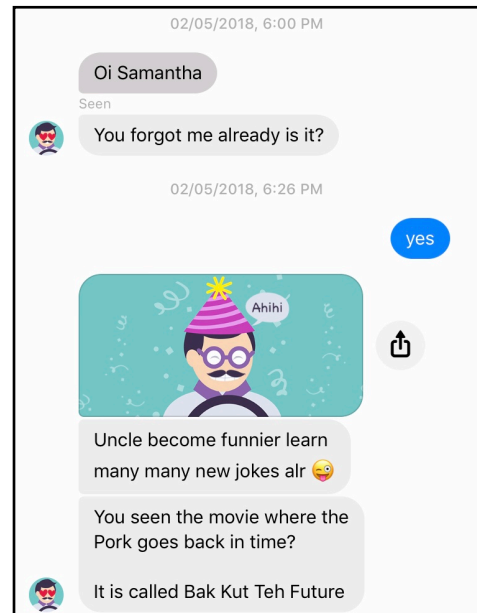


Figure 4. Bus Uncle tells jokes and initiates a chat after the user had not engaged with it for a period of time

Chatbot messaging is unlike speech and writing in that opportunities for revision are limited. Once sent, messages cannot be withdrawn and users have to live with the consequences of sending erroneous messages, such as having to repeat their intended message. That being said, well-trained chatbots can still understand messages with minor typological errors. When it fails to understand the user's message, some chatbots also provide users with the opportunity to rephrase or restart. Although platforms like Facebook Messenger allows users to delete messages they have sent, this function simply removes the message from the chat history and does little to change the consequences of having sent it in the first place.

Lastly, chatbot messaging is generally graphically rich. The organisation of text, as well as other writing conventions like that of bulleted lists and punctuation, are largely similar to that of writing. Certain graphic conventions are adopted to mimic the prosody of speech, such as the use of punctuation or upper-case (to indicate a marked increase in volume that mimics shouting or screaming), though these are limited. Additionally, the use of emojis and stickers also convey certain prosodic features like pitch by expressing the emotions related to the message.

THE CHATBOT AND ITS EFFECTS

Given that chatbots are still a relatively new medium of CMC, there is little research done on how it has influenced the language used to communicate. However, there are some observable ways in which the medium has impacted the way language is used.

Firstly, it appears that Grice's Maxim of Quantity, which requires one's contribution to be as informative as is required, is often flouted without consequences. For example, Bus Uncle is able to understand one's intention of enquiring about bus arrival timings simply by sending the words "bus", "long" or "time" (see Figure 5). However, using any one of those words in isolation during a conversation about public buses is most likely to leave a fellow interlocutor perplexed, given the lack of information. While it reinforces a deviation from conversational norms, chatbots are often trained to return the relevant response when certain keywords are used to make it more convenient for users to access its functions or services.



Figure 5. Bus Uncle interprets "bus", "long" and "time" as the same request.

There is also a tendency to avoid the use of distant anaphoric references given the transient nature of messages, as discussed previously. This is contrary to what one would expect in any medium of communication involving two human participants, in which past information is

either recorded or stored in one's memory. Frequent users of chatbots would be able to pick up on this and adapt by repeating information that had been previously shared.

The unique properties of chatbots have not only influenced language use, but has also impacted the way people communicate, as well as society at large. For one, chatbots function 24 hours a day, 7 days a week. This is a game-changing feature for businesses and service providers in terms of customer service, since they are now able to entertain customer's enquiries and requests around the clock. Both the customer and businesses stand to gain from the use of chatbots. Customers are now able to obtain the information or help they need at their convenience, without being limited by the working hours of customer service staff or having to scour an entire website.

Businesses benefit from cost savings in the long-run, saving up to 30% in customer support services (Maruti Techlabs, 2017). As such, many have started to replace human agents or telephone-based call support with chatbots (Go & Sundar, 2019). Chatbots have also been found to live up to their human counter parts - they can answer up 80% of routine questions (Reddy, 2017). Additionally, given its customisable personality (and the novelty of interacting with a chatbot), chatbots are also an effective way for businesses to build their brand image and are increasingly adopted in marketing campaigns.

Most chatbots have a widespread reach, which allows for messages to be easily disseminated to a mass audience. Firstly, this provides a good opportunity for advertising, since messages are delivered directly to the target audience, who is very likely to read the message notification. Bus Uncle takes advantage of this by offering branded Facebook Messenger content that can be tailored by geography, waiting times and sentiments, as well as its iconic jokes.

More crucially, this feature of chatbots allow for the widespread dissemination of information in times of national crises. Not only does it provide a quick way for the government to communicate essential information to citizens, citizens are also able to have their questions about the situation promptly answered. This goes a long way in educating the public, curbing the spread of fake news and reducing panic amongst citizens. A prime example of this would be the launch of the Ask Jamie Bot on Facebook Messenger to help with enquires regarding COVID-19, including details about mask collection (www.facebook.com/pg/askjamiesg/posts).

The ability of chatbots to engage in phatic communication, coupled with their 24/7 presence, make them good emotional companions. Although they cannot replace professional psychological help, they function as a mental health tool, providing emotional support and talk therapy. Human-chatbot interaction can help to resolve the isolation experiences by people with mental disorders like depression (Oh et al., 2017), as well as help people gain greater self-compassion (Lee et al., 2019). Replika, which was downloaded more than 2 million times within 3 months of its launch, is one such emotional chatbot that has limited functions except for its ability to talk back (Pardes, 2018). Therefore, the popularity of such emotional chatbots seems to suggest that they are highly effective in providing mental health support.

CONCLUSION

The chatbot is a relatively new medium of CMC that boasts a number of distinctive features. At the same time, an analysis of two local chatbots, Bus Uncle and AskJamie, revealed how chatbots share certain characteristics with written and spoken language. The way chatbots are trained and the transient nature of language have influenced the way language is used on the medium. Additionally, the unique properties of chatbots, including its 24/7 accessibility, widespread reach and ability to engage in phatic communication, have impacted both society and communication in various ways.

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