Analyzing the Relationship between Gender and Emotions in Chatbots

Jimmy Zhou, Veronica Rivera, and Tiffany Thang
University of California, Santa Cruz

Introduction

Chatbots serve a variety of purposes including serving as conversational partners, assisting with customer service for a company, or being used as tools for learning. While the uses of chatbots are plentiful, it is important to acknowledge how they can be improved to increase usability and customer interest. Through a survey consisting of questions pertaining to user preferences with respect to chatbots in different settings and contexts, we have decided to suggest improvements to chatbots through analyzing responses concerning chatbots and their displays of emotion. Analyzing the data, we believe that both male and female users prefer chatbots to display emotions, and that this preference supports suggestions made towards improving their emotional abilities.

In previous literature the use of embodied agents and embodied conversational agents for healthcare and social purposes were found to be more effective and desirable when they displayed emotion. In [1], researchers used an embodied agent that displayed emotions and one that did not on participants seeking guidance on healthier eating habits. Participants were asked if their eating habits improved, and if they enjoyed using the embodied agent. The study found that individuals who used the emotional embodied agent found the experience of learning to eat healthier more enjoyable, than those who did not have an embodied agent that displayed emotions. They also found that those who used the agent that displayed emotion found the experience of learning healthy eating habits more positive than those who did not. Researchers in [2] found that embodied conversational agents were more effective in gaining and maintaining interest in participants when they displayed emotions, amongst other human-like qualities. The study found that participants were more likely to converse longer and consider their conversations more interesting with embodied conversational agents when they displayed such qualities, making them more relatable and interesting. chatbots serve similar purposes to embodied agents and embodied conversational agents, suggesting that chatbot users would prefer to interact with a chatbot that displays emotions. With this in mind, we believe that male and female participants in the chatbot survey will prefer to use chatbots that display emotion.

Survey

The survey consisted of questions concerning participant interactions and preferences with chatbots. For the purposes of our analysis, we decided to focus on questions concerning participant preferences with respect to chatbots and emotions. The questions are as follows: (1) What emotions should a chatbot have, if any?; (2) Do you prefer if textual chatbots write like humans (with emoticons, acronyms, internet slangs)?; and (3) Do you think chatbots should be able to interact emotionally? There were 25 individuals that participated in the survey. Of these individuals, 60% identified as male, while 40% identified as female. Of the 25 participants, 68% of them were between the ages of 19 and 26, and the remaining 32% were between the ages of 28 and 53.

Quantitative Analysis

Participants were asked *do you prefer if textual chatbots write like humans (with emoticons, acronyms, Internet slangs)?* and *do you think chatbots should be able to interact emotionally?* The former question refers only to chatbots that interact with the user in writing, while the latter includes all types of chatbots. Nine participants said “yes” to textual chatbots writing like humans, twelve said “no” and four said “maybe”. Eleven participants said “yes” to chatbots interacting emotionally, eight said “no” and six said “maybe”.

We also looked at the gender of the participants who responded. Of the nine participants who said "yes" to textual chatbots writing like humans, six were female and three were male. Interestingly, of the eleven participants who replied "yes" to chatbots interacting emotionally, only four were female and seven were male. Of the twelve participants who said "no" to textual chatbots writing like humans, two were female and ten were male. Of the eight participants who said "no" to chatbots interacting emotionally, three were female and five were male. Figure 1 shows the responses of males and females to the question *do you prefer if textual chatbots write like humans (with emoticons, acronyms, Internet slangs)?* Figure 2 shows the responses of males and females to the question *do you think chatbots should be able to interact emotionally?* We investigated (1) whether gender correlates with people's preferences for textual chatbots to write like humans, and (2) whether gender correlates with people's preferences for chatbots to interact emotionally. A Chi-square analysis at a 0.05 significance level shows that there is no significant relationship between gender and preferences for textual chatbots to write like humans ($x^2 = 5.6$, $p = 0.06$) and that there is no significant relationship between gender and preferences for chatbots to interact emotionally ($x^2 = 0.3$, $p = 0.8$).

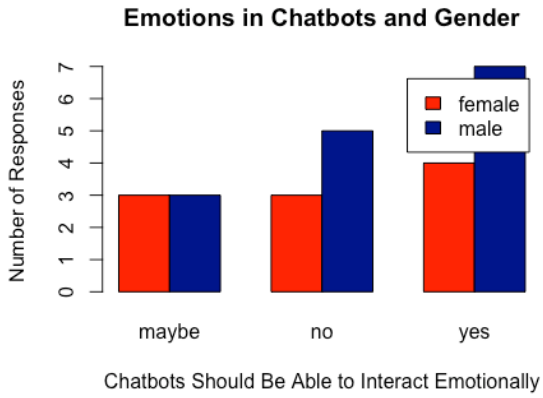

Figure 1: Should Textual Chatbots Have Emotions

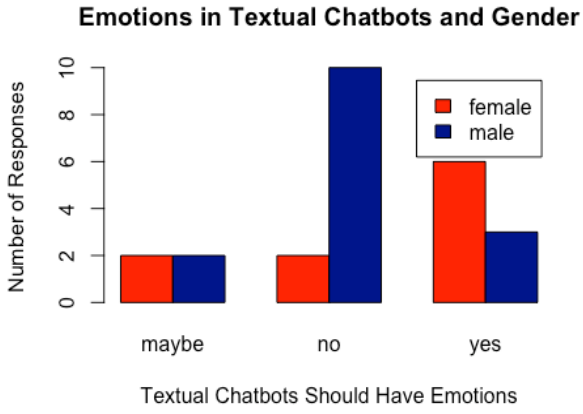

Figure 2: Should Chatbots Have Emotions

Qualitative Analysis

All participants were asked the question, “What emotions should a chatbot have, if any?” Of the participants in this survey, all of them responded with an answer in some way (n = 25). We analyzed all the responses using a content analysis approach. Table 1 presents the most evident themes within the responses collected. The two most dominant responses received, that composed of more than half the participants, showed that people preferred chatbots that either displayed no emotion, or displayed a happy/joyful emotion. There remains a question of whether people actually meant happiness as the actual emotion participants want in chatbots, or if that was meant to symbolize a positive feeling.

Category	Sample Response	# of responses
No emotions	“A chatbot should not have any emotions because that would possibly take away its reliability from being used in business and company settings.”	11
Happy/joyful	“Joy and sensitivity”	6
Empathetic	“To recognize the emotions of the person- so not necessarily having emoticons itself but being able to detect humans emotions”	3
Sad/Compassionate/Emotional/Ambiguous	“I'm hesitant to accept chatbot emotions that merely imitate what it thinks humans want to perceive. If the emotions can reflect internal state--for example, expressing frustration at failing to understand or retrieve data--that feels both important and natural. But imitating happiness with no pleasure seems cruel and misleading to both parties.”	3

4 males and 2 females wanted happy. 8 males and 3 females wanted no emotions. 2 males and 1 female wanted empathy. 2 females and 1 male wanted other emotions that only got 1 response. We compared the responses above to the responses to the questions, “Do you think chatbots should be able to interact emotionally?”, and “Do you prefer if textual chatbots write like humans (with emoticons, acronyms, Internet slangs)?”. 7 participants gave different answers to the two questions posed above, signifying a split in opinions of whether human inflections in text really represent emotion or not. 2 participants who wanted chatbots to display no emotions actually answered maybe on whether chatbots should be able to interact emotionally or not. 4 people responded with different answers than expected to “What emotions should a chatbot have, if any?” and “Do you think chatbots should be able to interact emotionally?”. For example, one male responded that chatbots should be “cheery or none” but said “no” to chatbots interacting emotionally. Most of the participants answered that chatbots should be able to interact emotionally. However, with the information briefly touched upon above, brings up the question of what do they mean by allowing chatbots to interact emotionally?

Discussion and Conclusion

Based on qualitative and quantitative data, we have gained an understanding of user preferences regarding emotional displays of chatbots. We have found that there is no correlation between gender and preferences for emotional displays in chatbots. We have also found that slightly over half of participants

prefer chatbots to display emotion, while the remaining participants prefer chatbots to not display emotion. Of those who prefered chatbots to display emotion, the majority prefered displays of positive emotions, such as joy or happiness. These finding suggest that regardless of gender, participants would prefer to have chatbots display emotions, and more or less positive emotions. This somewhat aligns with our hypothesis of both men and women preferring that chatbots display emotions.

For future studies, researchers should ensure that they understand what users consider as chatbots by including a question such as: "what do you consider a chatbot?" on the survey, to better understand participant perspectives. Researchers should also aim to understand what participants would qualify as an emotion with respect to interactions with a chatbot, such as: "what would you consider an emotional display from a chatbot?". Future research should aim to understand why users would prefer chatbots to display emotions and what purposes these emotional displays serve.

References

[1] C. Creed, B. Russell, and B. Cowan, "The Impact of an Embodied Agent's Emotional Expressions Over Multiple Interactions", Interacting with Computers, vol. 27, pp. 172-188, January 2014. [Online]. Available: https://academic.oup.com. [Accessed Dec. 4th, 2017].

[2] B. Stronks, A. Nijholt, P. Van der Vet, and D. Heylen, "Designing for Friendship: Becoming Friends with Your ECA", University of Twente, 2002. [Online]. Available: https://research.utwente.nl. [Accessed Dec. 4th, 2017].