"What does your Agent look like?" A Drawing Study to Understand Users' Perceived Persona of Conversational Agent

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ABSTRACT

Conversational agents (CAs) become more popular and useful at home. Creating the persona is an important part of designing the conversational user interface (CUI). Since the CUI is a voice-mediated interface, users naturally form an image of the CA's persona through the voice. Because that image affects users' interaction with CAs while using a CUI, we tried to understand users' perception via drawing method. We asked 31 users to draw an image of the CA that communicates with the user. Through a qualitative analysis of the collected drawings and interviews, we could see the various types of CA personas perceived by users and found design factors that influenced users' perception. Our findings help us understand persona perception, and that will provide designers with design implications for creating an appropriate persona.

KEYWORDS

Conversational agent; Persona design; Drawing study; Conversational user interfaces;

1 INTRODUCTION AND RELATED WORKS

Millions of people talk to a conversational agent (CA) embedded in many devices, including smart speakers such as Amazon Echo and Google Home. As CAs become part of users' lives, some users even personify the CA [5,13]. Then, users naturally guess and imagine the CA's persona through the voice [2,8]. Through conversation, regardless of whether the designer carefully designed the persona or not, users will perceive a persona in their mind. As the persona affects users' interaction with CAs while using a CUI [8,11], understanding users' perceived personas will provide useful implications for designing CAs.

Prior research has studied users' interactions with CAs. Porcheron's study [12] revealed how VUI use is routinely embedded in the home. To understand users' interaction patterns, recorded utterances were analyzed using an Ethnomethodology and Conversation Analysis (EMCA). Sciuto et al. [14] conducted a qualitative analysis of interviews to find the interaction pattern of how households integrate Alexa into their daily lives. Søndergaard et al. [15] presented a critical perspective of the CA's persona based on gender issues through a participatory design fiction methodology. However, these previous studies did not explore the users' own perception of the CA. Few studies have attempted to understand user perceptions of CAs [3,4,13,16]. Purington et al. [13] investigated how people perceive and interact with Alexa through a case study of Amazon customer reviews. They divided users' perception of the CA by specific criteria into interaction types, such as companion, friend, and assistant. However, the perception was divided only by the standard of personification based on the Computers as Social Actors (CASA) paradigm [9]. In addition, there was no attempt to discover if users visualized the CA's persona.

In this paper, we tried to reveal users' perception of CA personas and to understand which factors influence users' image. We used drawing studies to investigate how users perceive CA personas. The drawing method is useful for extracting deeper and more individual perceptions that are difficult to express in words [6,10]. These perceptions can provide various insights for appropriate conversation design. Our study's findings can help designers to create CA personas based on their intentions.

2 METHOD
2.1 Drawing study and debriefing interview

We used a drawing study to investigate the CA persona perceived by users. Participants were asked to draw an image of the CA that communicates with the user. The drawing method is an evocative way to access the internal perception that is difficult to explain in words [6,10]. As such, a drawing study is essential for understanding users deeply. Therefore, this method was appropriate for understanding how users perceive the persona behind these interactive agents. After drawing, we conducted a debriefing interview about the drawings and asked users to describe their reasons. This interview allowed us to identify design factors that influence perceived CA images.
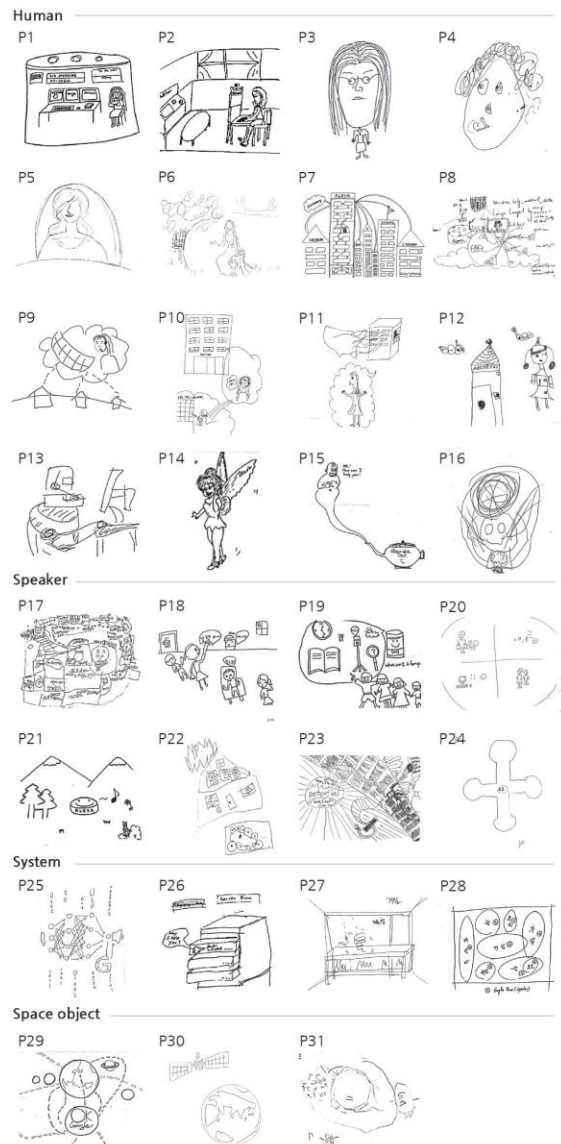
Figure 1: Drawings of users' perceived CA personas and 4 types of CA images.

2.2 Procedure

A comfortable environment and familiar drawing materials are important factors for relieving pressure when the users draw [7]. We used A4 paper, commonly used for many types of drawing studies. We limited users to black ink pens and black pencils so the analysis could focus on the outline of the images. Through pilot tests, we found that participants felt burdened when someone else watched the drawing process. Therefore, we let participants draw images without the moderator, and they shared or sent the result.

2.3 Target devices and participants

We set Alexa and Google Assistant as target devices for observation. To focus on images formed through conversation, we selected VUI-only smart speakers without screens. We recruited 19 Amazon Echo users (4 for Echo and 15 for Echo Dot) and 12 Google Home users (4 for Google Home and 8 for Google Home mini). Because the current speakers were designed for a family, we recruited the widest range of ages as we could. The average age was 29.9 years (from 4 to 51, SD=14.73); 17 were men, and 14 were women. The average usage time for initial users and for long-term users was 7.16 months (from 1 to 24, SD= 6.05).

2.4 Analysis

The main priority of our analysis was to focus on types of user drawings and then zoom in on the details of each image, as is common in drawing studies [1]. The analysis process produced drawings and interview data. To support our initial interpretation of the user drawings, we also analyzed the debriefing interviews. Then, we supplemented our initial interpretations with our debriefing interviews analysis and focused on factors that influenced the drawings.

3   RESULTS AND FINDINGS

From the respondents, we collected 31 drawings showing how participants visualize their CAs. Based on those images, we divided the results into four types: human, speaker, system, and space object. Figure 1 shows the drawings in each type. In addition to focusing on the images, we also investigated what qualities of the CAs prompted participants' visualizations. In this section, we present findings on the CA personas and on what prompted participants to create those images.
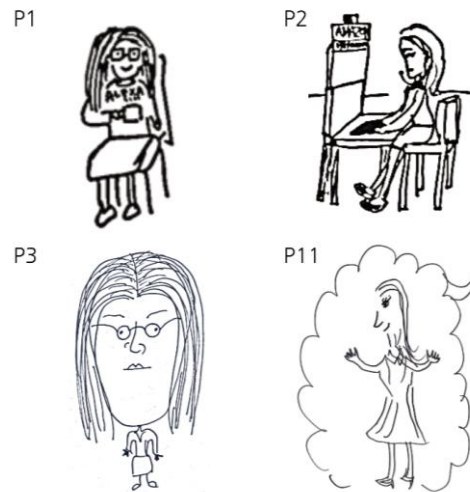
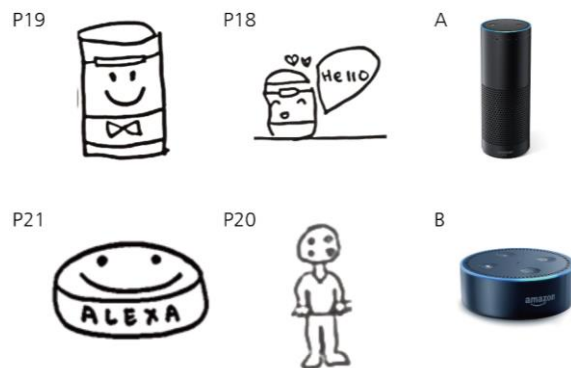**Figure 2: Details of CA drawings depicting a woman.**

Figure 3: Detailed drawings of Personified speaker and comparison with exterior of smart speaker: Amazon Echo(A), Echo Dot(B)

### 3.1 The voice of the CA more easily influences user perceptions than conversation scripts.

There were 13 drawings illustrating the CA as a complete human. As seen in Figure 2, a woman with long hair wearing a skirt and pointy-toed shoes was depicted most frequently. Interestingly, however, when users asked the Google Assistant, "Are you a woman or man?" the agent answered, "I try to stay neutral" per the designed script. This exchange indicates that, regardless of what the agent explicitly says, users perceive the CA as a woman based on the voice. Participant 6 (P6) drew a woman because of the CA's voice. *"My Google Assistant is originally set to female voice. The voice is very intelligent and the nuance is sophisticated, so I have an image that the agent seems to be very beautiful."* This response indicates that voice can be more critical than the designed script in causing users to visualize certain images. Even though there is a male voice option in the Google Assistant, the female voice is set as the default, and no other options are directly offered. When providing multiple voice options, the default setting needs to be carefully designed because the voice can easily affect users' first impression.

These findings imply that designers need to focus on the voice as well as the script when they create the persona. That is, designers should consider the voice's importance when designing CA personas to make users perceive the designer's intended persona. In short, how the script is spoken is as important to users as what is said; therefore, designers should give more attention to the voice.

3.2 The form factor allows the user to accept CA as the speaker itself.

Eight users expressed the CA as the speaker's personified form factor. Most of these drawings showed speakers with human characteristics. In Figure 3, each speaker had a smiling facial expression, as shown in P18 and 19, or the speaker is a head on a human body, like P20. We also found that the speaker's appearance is directly reflected in drawings. P19 said that the speaker's exterior had a lot of influence on this perception, and P21 said, *"[The] speaker is always in the most noticeable place, living room, I cannot deny Alexa's appearance."* Moreover, the person who personified the speaker's appearance shared their positive experience and expressed this by drawing a smiling facial expression. Through this, the form factor and the positive user experience are reasons for the user's perception of the personified speaker.

Because CAs are often embedded in different types of products, the form factor does not matter as much in a CA persona's design as other design factors such as tone, nuance, and personality [2,4,8,11]. CAs are often embedded in different types of products, so designers can easily think of the product's form factor and the CA's persona as independent from each other. Unlike our expectation, however, we could see from the drawings that the speaker's form factor is imprinted on the user's perception. This suggests that designers should remember that the device's exterior can significantly impact the user's perception of CAs.
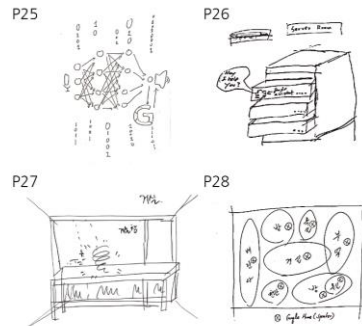
Figure 4: Drawings by users with engineering knowledge.
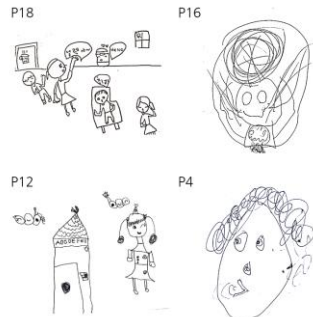
Figure 5: Drawings from children aged less than 15 years.
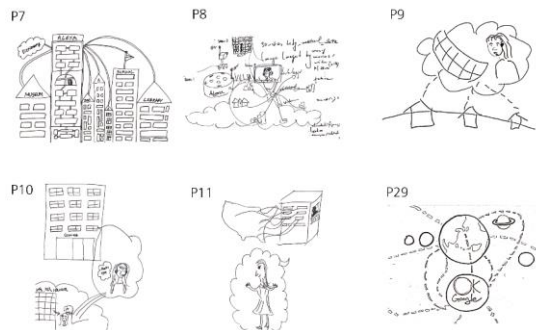
Figure 6: Details of drawings that perceive a shared CA.

3.3 The user's knowledge of engineering influences the CA to be perceived as the system.

Of the 31 drawings, 4 represent the CA as the system or the computer. Those users did not think of the CA as any personification or persona, so CAs were perceived as a developed machine rather than as human, as Figure 4 shows. P25 said, *"As I am an engineer, I already had background knowledge, so I thought that Google Assistant would talk to me in the Google headquarters server room."* Users who perceived the CA as a system (P25, 26, and 27) had basic engineering background knowledge, and their knowledge was a reason for their perception. P26 even said that when CA talk like a human, he feel discomfort due to cognitive dissonance. This contrasts with the tendency to personify CAs in the drawings from children under 15 years old who did not have any background knowledge (P4,12,16, and 18), as shown in the differences between Figure 4 and 5.

This finding suggests that different personas are needed for different users. This is because, depending on users' background knowledge and their characteristics, expectations for the CA and the interaction pattern can be quite different. Therefore, designers have to design a persona not only from their point of view but also from the user's viewpoint. This allows personas to be differentiated according to users.

3.4 The ready-made answer makes the user feel the one CA is shared by all users.

Seven people think that the only one CA is located in one place, and it always gives the same answer to every user, as shown in Figure 6. Users felt that this shared CA would always answer the same way and that users would always receive the same information, even if they ask questions in different situations. In this perception, one CA is connected to the home or the American continent (P7, 8, 9, 10, 11, and 29). It is also interesting that cloud-like shapes commonly appeared. In the case of the space object, they depicted the CA as looking down at users from space. P30 said, *"The Google Assistant knew everything about diverse knowledge, such as today's weather. So I felt like a space object [was] looking down at me from above and helping me."* Users also feel that the CA seems to read what is already stored because it mostly answers the same way. This showed that prestored and nonpersonalized responses affect this perception.

It means that the CA's design may make users perceive the CA as their own, but they may also think of it as shared with other users. The ready-made answer makes users perceive a shared CA, which can be appropriate for situations where consistency is needed. On the other hand, the personalized answer would let users perceive the CA as their own. It is possible for users to have a personalized CA, and people are more likely to perceive it as a personal assistant that cares about users' personal information. This finding shows that designers can control the script to influence the users' perception based on designers' intentions

4 CONCLUSION

In this study, we aimed to understand users' perceptions of conversational agent personas via drawing method. Through a qualitative analysis of the collected drawings and the debriefing interviews, we discovered various types of CA personas perceived by users and design factors that influenced the visualizations. Our findings provide a deep understanding of users, and

these insights will help designers create an appropriate persona for users. For future work, we plan to research how users perceive CAs in complex situations using multiple devices.

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