Project Deliverable 3

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In this experiment as I am working with a simulated version of the robot and I do not possess a robot in real world, I am going to work with videos of the robot performing a task. I am going to manipulate some performance-related features of the robot and study the effects of those on human-robot interaction.

The robot that I am going to use for the purpose of this experiment is the stretch robot. It is aimed to assist people with hearing disability. As human with hearing disability cannot hear the doorbell, the robot is aimed to open the door or take some information from people behind the door and inform the human user about that.

Experiment Design

In this experiment I am going manipulate the method that the robot adopts for conveying information to human user. I consider having two robots with similar appearances and different performances. There is only one main difference among these two robots' performance. First robot interact with human is text-based method. The robot has a screen on it and human can see some written information in the screen. The second robot also has a screen, However, rather than showing written information to the human, the robot shows a video to the human user.

In this experiment I am going to make two videos of the two robots, doing the same task. The doorbell ring and robot goes to the door to see who is there and provide human with information about the person who is in the back of the door. First robot return with some written information on the screen and human can read the information and tells robot what it should do next. The second robot return with some videos of the person in the back of the door and shows the video to human.

Experiment Procedure

1- Recruiting participants from MTurk
2- Asking participants to read and sign a consent form
3- Asking participants to read a scenario:

> *Imagine you are a person with hearing disability. Imagine you can have a robot helping you with taking doorbells task in your everyday life. The robot can build some database about your belongings and known people by the passage of the time.*

4- Then I will tell people that in the next step you will be shown of two robots, and you have the option to choose you assistant between those two robots.
5- In the next step I ask people to watch two videos from first and second robot performing the same task.

6- After watching videos, I ask people to select one of the robots as their assistant for taking the doorbells and mention the reason behind their choice.
7- Then I assign half of the participants to have first robot as their assistant and other half to have the second robot as their assistant.
8- At the end I ask them to fill a questionnaire about how they like and how they evaluate the robot that they are assigned to have as their assistant.

Research Question and hypothesis

Q: Whether people with hearing disability would rather the information by the assistive robot to be presented to them in written format or visual format (i.e., video)?

H: I believe the people would like video-based information presentation by the robot better for multiple reasons. First, it is easier to get the information from the video and videos are sometimes more informative that written data. Second, some people with hearing disability might not have be literate to be able to read the written information.

Q1: is it an exploratory or a confirmatory experiment?

It is both exploratory and confirmatory. It is exploratory as I have not seen any similar studies and this experiment is not built over another experiment by any other research groups. In addition to that, as I ask participants to choose between the two robots and mention some reasons for their choice, I expect the results of this experiment detect some hidden facts, advantages, and disadvantages about each of these two robots and the way the convey information.

It is confirmatory as I have a hypothesis and I have some reasons for my hypothesis, and I expect the results of this experiment confirm my hypothesis.

Q2: Do the methods used in this experiment are qualitative, quantitative, or mixed? And what type of metrics will be used in this experiment?

I am going to use a mixed method in this experiment. I have a step in this experiment in which I ask participants to choose their preferred assistant among the two available robots and mention their reason for their choice. These reasons mentioned by people are qualitative. However, I also have a questionnaire at the end of the experiment which provide me with quantitative results.

All the measures that I am going to use in this study are subjective measures, as they are all reported by human and there are no measures based on human behaviors or errors etc.

Q3: Is it a between subject study or a within subject study?

It is a between subject study. Although all participants see both videos, half of those are assigned to fill the questionnaire for robot one and the other half fill the questionnaire for robot two.