

Introduction

As technology in the world continues to advance the human interaction aspect is becoming much more important. This is especially the case with robots from ones that are simple like Cozmo which can move, talk, lift and sing among other actions on its own to more advanced robots like Nao which can move around, have a conversation, and other lifelike actions. While the designs of these robots are friendly could there be a to make their mannerisms more human and invoke empathy to make them seem alive?

Figure 1: Nao



Figure 2: Cozmo



Approach

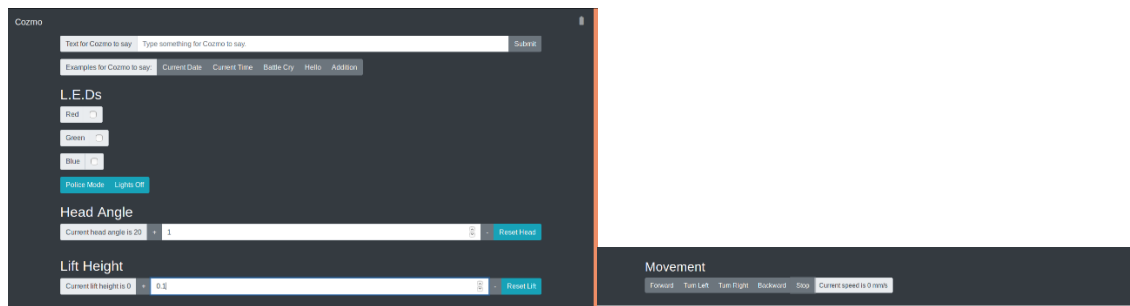
To answer this question, it was necessary to make sure that these robots acted in similar controlled ways each experiment without fail. However, two problems arose from this point. First Cozmo while could talk was unable to listen thus could not respond to questions or hold a conversation. Secondly, while Nao could respond sometimes he would fail to understand commands that he was given. The solution to these issues resided in the Oz paradigm where the robots would be controlled by a hidden third party so that the experiments would be consistent and reliable [1]. This would allow the illusion that Cozmo could listen and respond as well as making sure that Nao was always responding.

Experiments

Setting up the controller required a way to communicate with the robots so that not only could a person could read and send to the robots but that the robots could also send data to one another. The third party middleware Robot Operating System (ROS) allowed for this data transfer to be possible. While control of the robots was possible at this point it was too slow and required too much set up to do tasks such as moving and talking. It would require the third party

to manually type long lines in the terminal for each command. This could cause a large delay which could break the illusion that the robots are “alive” and disrupt data. Using Dr. Chris Crawford’s experience with ROS, a website was chosen as the way to make the controller as it was “Easier to extend and develop user friendly interfaces that interact with robots”. A controller was madding using ros-bridge to link the website to ROS allowing the website to act as the controller. This allowed for much quicker and concise set up and control. Instead of long lines of words in the terminal a simple click would accomplish the way same thing.

Figure 3: The Prototype Website



Analysis and Conclusion

The prototyped website allows for basic control for most of Cozmo’s features. However currently the website still needs a few finishing touches to before the testing can begin. The missing features the camera (which could be useful to keep eye contact) and the face leds (which could react to the person) would need to be mapped. Additionally, the feature already mapped on the website would need to be improve. Currently the website only allows one speed for movement, very basic led control (just Red, Green, and Blue and their combinations), and very precise lift and head control (can move these parts but not as smooth as the robot can during its autonomous mode). However, in the prototype there is an option for a “police mode where Cozmo will flash the leds on his back red and blue while imitating a siren. Using the same techniques that made this it would be possible to make premade actions that would be much more consistent across experiments as they would be the same. However, a big issue that remains is that sometimes the ros-bridge that links the website to ros crashes which causes Cozmo to no longer respond to the webpage. This can be quickly remedied by restarting both the web bridge and the website however this is still a big problem because a crash during the experiment could cause big issues with data. This is because unless the third party is constantly monitoring the ros-bridge server at the same time as the Cozmo the operator will click a button and Cozmo will just fail to respond. Fixing these issues and concerns is vital to move on the actual experimentation of this project.

Citations

[1] Paul Green and Lisa Wei-Haas, “THE WIZARD OF OZ: A TOOL FOR RAPID DEVELOPMENT OF USER INTERFACES” (June 1985).