The Invisible Naked Guy: An exploration of a minimalistic robot

Michael Partridge, Christoph Bartneck
HITLab New Zealand, University of Canterbury, Private Bag 4800
8140 Christchurch, New Zealand
Email: michael.partridge@pg.canterbury.ac.nz, christoph.bartneck@canterbury.ac.nz

***Abstract*—The development of convincing androids is currently constraint by the limitations of artificial intelligence. Instead of developing even more realistic human-like robots we attempt to push the opposite design direction to its extreme. We developed a most minimalistic robot that can still maintain an interesting interaction with users. It consists only of two animated slippers on a box. We exhibited this design exploration at in front of a museum and the responses very highly encouraging. With only a minimal set of clues we were able to create an anthropomorphic illusion.**

I. Introduction

People to anthropomorphize objects and creatures in their environment. We see faces in the clouds and cars, and we ascribe human trades to our pets. It is therefore not surprising that people also perceive robots to be anthropomorphic. One direction in robotics has been to build ever more realistic androids, such as the models build by the company Kokoro. With the increased human likeness of robots we also increase the expectations humans have towards them. But since the interaction technology, such as speech recognition, is not yet fully developed, the interaction can often result in disappointment. The field of human-robot is constraint by the progress made in artificial intelligence in general.

Another approach is therefore to develop robots that are barely anthropomorphic but still offer a rich interaction. This does not mean that these robots need to look machines with exposed mechanical parts. The work of Michio Okada with his variety of agents and robots comes to mind when thinking about simple interaction robots. His minimal design strategy may indeed lead to robots that never bore [1].

The goal of our research project was to push the minimal design idea to its limits. What would be the most minimalistic robot that still offers rich interaction opportunities? We took inspiration from the Living Statues street performance art. These performance stand perfectly still in their costume and only start acting once a donation is made. The great attention these performers receive despite them doing absolutely nothing is an indication of the power of anthropomorphism. One remarkable performer put the idea of a Living Statue to an extreme by not even being present at all (see figure **??**). The performer simply put a sign entitled“Naked Invisible Man” in front of a box with slippers on top. We decided that this street performance is an ideal starting point for a robotic user interface exploration. Our goal was to enhance the interaction between the robot and the audience while maintaining the minimal design strategy.

Fig. 1. Naked Invisible Man

II. Design

The interaction between the Naked Invisible Guy (NIG) was structured into three phases. First, the attention of the audience needs to be captured. We achieved this by putting up a large cardboard sign reading “Naked Invisible Guy”. The use of the word “naked” does attract attention due its sexual nature. The second phase is the moment of wondering. The audience has to ask itself if they really believe that there is a naked invisible guy standing on the box. To strengthen the impression we motorized the sandals. They randomly moved a little bit to the right and left similar to what a person would do when standing. The last phase is the reward phase. The audience can decide to reward the NIG with a coin donation. In return the ING speaks out a funny pick up line such as “I am new in town, can you please tell me the way to your apartment?”

A. Implementation

The NIG was constructed from a minimum number of parts combined with straight forward electronics. The final iteration of NIG was made from: a spare beer crate, a pair of used flip flops, two Arduinos, a boom box, and various electronic parts and cables.

An Adafruit wave shield was constructed and attached to an Arduino Uno for the playback of the audio recordings. A french student was recorded speaking 30 English pick up lines, since his strong French accent was appealing and funny. The recordings were stored onto an SD card that was inserted into the wave shield to provide audio for NIG. The wave shield was then attached to the boom box to provide output audio (see figure 2).

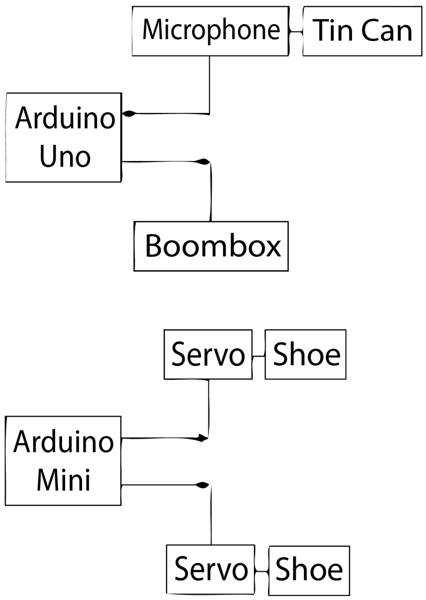

Fig. 2. System Architecture of the NIG.

We used a microphone to sense when a coin was thrown into the tin can. The microphone was directly attached to the tin can and it was easy to detect the loud noise of the coin hitting the tin can. This noise then triggered the playback of a random pick up line. The beer crate was flipped upside down to create a stand and two servos were attached between the slats so that they just protruded from the crate. The two flip flops were attached to the servos to give the illusion of someone standing on the crate. Because the Arduino Uno only contains a single clock an Arduino Mini was used to control the flip flops. A first attempt for random movement of the feet caused the Arduino Mini to freeze. Therefore a simple loop of preset movements was programmed into the Arduino Mini for the flip flops to follow. This was assembled, shown in figure 2, together so that as little of the electronics and the boom box were visible under the beer crate. To aid this illusion a cardboard sign was erected in front of the crate.

III. Results

NIG was placed in front of a museum in Christchurch. This location typically attracts many people. Moreover, before entering and after their visit to the museum, people often wait for a short while to either discuss their next destination or to wait for other friends. We set up, watched and video recorded the NIG over the course of two hours. Like with most street performances, the majority of people was too busy to pay attention to NIG. However, a good number of people stopped and observed the NIG for a little while. They entered the "wonder phase" and had to decide whether they do or do not believe that there is a naked invisible guy standing on top of the box. The fact that so many people stopped and obviously wondered is a indiciation for the strength of the illusion. Many people took out their mobile phones or cameras and photographed the NIG.

Fig. 3. Naked Invisible Guy

At times people approached the NIG up closed and waved their hands over the box as to test whether there really was anybody standing on it. Unfortunately, only very few people actually donated money to the installation. As a matter of fact, one passing homeless person actually gripped into the tin can and stole all the coins in it. Children were also interested in ING and would use rocks or reuse coins to hear pick up lines. A short video summary of the NIG is available at http://youtu.be/YRVndIr5aWQ.

IV. Conclusions

It was the individuals that interacted with NIG that gave the most insight. The people that ran their hand through NIG showed that the experiment could cause people to question what they were seeing. The pure presence of slightly animated slippers in combination with context in which they appeared was sufficient to make some people believe that there actually might be a person standing on the box. One person even waved her arms over the box to test this idea. It is interesting that such little hints can already evoke a strong perception of anthropomorphism.

We would like to expand the NIG by adding a sensor onto the box that can sense movement on top of it to be able to react to people waving their hands over the NIG. We would then be able to play some dedicated utterances such as "That tickles!". This would again strengthen the illusion and enhance the interaction. The Invisible Naked Guy is a successful example of how a set of minimal clues can create a powerful anthropomorphic illusion.

V. Conclusion

The conclusion goes here.

References

[1] N. Matsumoto, H. Fujii, M. Goan, and M. Okada, "Minimal design strategy for embodied communication agents," in *Robot and Human Interactive Communication, 2005. ROMAN 2005. IEEE International Workshop on*, pp. 335–340.