Writeup

1. Although the Zeno has a number of useful and compelling options for human expression and interaction, there are a few design choices which have a significant impact, whether positive or negative, on the overall effectiveness of the robot and the animation system. First among these is the speed of animation; the Zeno appears to excel at changing numerous features very quickly. Too often do animatronic systems have to slowly proceed through an animation, which severely hurts their location in the uncanny valley. Human’s typically cycle through various facial states very quickly; the developers’ decision to try to emulate that speed was an important one, and it ultimately benefits the overall state of interaction with the robot.

On the negative side, the decision to have the robot’s idle face be slightly slackjawed is somewhat disconcerting, especially when transitioning between animations, The time between animations always looks rather strange, as the robot’s idle position evokes a doll or some other toy that isn’t meant to move. There is a definite moment of discomfort when this face begins to animate; an idle expression with the mouth closed, and maybe the eyes closed as well, might have been a more convincing starting point for animation.

Another design choice that was effective, however, was the ability to animate brow movement. Eyebrows seem to be often neglected in these types of animation systems, which is unfortunate, because eyebrows carry a vast amount of expression on their own. Adding eyebrow movement does a lot for an expression’s plausibility, and due to its relative simplicity in humans, is a relatively easy way to improve expressiveness.

1. The Furhat expression system is very different from the Zeno in a number of ways, chief among them in the fundamental way in which its expressions are created. While the Zeno has a mechanical system for changing its expression, the Furhat is actually a projection onto the back of a translucent mask. This makes for a wider range of facial degrees of freedom, but also limits its ability to make substantial facial movements or contortions past the range of the mask.

The Furhat is has a number of sensors for gathering data, a feature which Zeno definitely lacks. Because all of Zeno’s expressive capabilities are constrained to the animation program, its feature are limited to the program’s own constraints. Although not much information is given about what Furhat is able to do with the information it gathers, this feature alone establishes it as a far different project than Zeno.

Finally, although this relates heavily to the prior decision, Furhat apparently has the ability to learn and modify its behavior as a result. This ties in directly with the prior point about its ability to gather data through a series of sensors, but it is certainly a significant differentiation from Zeno and warrants mention as such.

1. Although the Zeno has a number of decision features and decisions which positively impact its ability to convincingly portray human expression, there are a few omissions in the robot’s animation suite which hurt its overall efficacy. First among these is the lack of precise eye movement; although there exists an option to animate the robot’s lateral eye movement, this feature does not really effectively convey human eye movement. Much of human eye movement is slight movements in both the x- and y-axes; very rarely do we have perfectly horizontal or vertical eye movement. As such, the robot’s ability to move only in one of these axes is debilitating, as eye movements look very constrained and artificial. Adding the option for two-axis movement would have definitely improved this issue, although I’m not sure how simple this might have been to accomplish given the small scale at which the eyes have to function.

Especially given its ability to speak via audio files, more options for mouth movement pertaining to speech would have gone a long way to improving interactions with the robot. Currently, speech mouth movement is constrained to “smile” and jaw manipulations; however, speech in humans has a number of important parameters beyond this. Inclusion of more parameters like two-axis jaw movement and independent lip movement (also in more than one dimension) would help very much in making speech more convincing. However, these improvements would almost certainly be very difficult to build into the actual robot, due to their presumed mechanical complexity in such a small space.