Summary

* Pixar animator Alonso Martinez’s Mira (2017) is an expressive “baby robot”. Mira is part of a family of robots by Martinez, crafted to expound upon the way characters are made to feel alive in movies by making them not only something a consumer can watch but someone they can interact with. The simple-looking little robot smoothly follows people around with its blinking inquisitive eyes and makes an 8-bit chortle when a face disappears and then reappears as part of a game of peek-a-boo.

Theory and Context

Inspired by previous robots like R2D2 which communicate through emotional rather than verbal language, Martinez set out to “bring characters to life” off the screen, by using simple organic shapes along with fluid responsive motions, he created a canvas which allowed people to find emotion in the robot’s subtle movements and responses without using any explicit language. In search of natural ways people communicate without words, Martinez looked to the games like “peek-a-boo” which parents play with their kids before they’re able to speak. These “unspoken games” are a central feature of Mira’s emotional means of communication which Martinez says “really allows you to project yourself and be like ‘Is it sad? Is it mad? Is it happy?’ With very small, kind of little design cues”.

uses simple organic shapes along coupled with fluid responsive motions in order to get people “to project themselves onto the character”.

Mechanism and Design

At her core, Mira is an egg-shaped robot meant to evoke the nature of a baby which can rotate its head around in three directions (roll, pitch, yaw) to look around its environment and visual cues in it. The head’s in-line three-axis movement is achieved using a microservo-powered floating-joint mechanism inspired by a video game controller. This mechanism allows Mira to follow people around using facial-recognition data from a pin-hole camera mounted between the eyes which is processed using OpenCV on a Raspberry Pi. As it looks around its environment and collects this data, Mira blinks. This blinking is controlled by a thin OLED panel behind each eye with a hemi-spherical orb glued onto it. If it sees something worth responding to, Mira is able to make beeps using a piezo-electric buzzer, and change the tint of its body using a single bright RGB LED.

Takeaway

The force which makes Mira such a powerfully expressive robot is the old adage “less is more”. By using subtly to exploit human psychology, Mira is able to steer well clear of the uncanny valley many robots fall into and come off as a warm and playful.

* “Bring characters to life” = embodied computation
* “egg shaped – kind of like the sign of a newborn baby”
* include both computing and mechanism
* include a human-centric rationale or context
  + “Her design is meant to evoke a baby robot”
  + get “people to project themselves onto the character”
* Inspire by games people play with their kids, before they’re vocal (“object persistence” = peek-a-boo)
  + “Unspoken games”
* Communicates through emotions instead of words (R2D2 vs C3PO)
  + “So, with this design, I think it Mira

(face tracking, facial recognition, blinking eyes, emotional communication)

-expressive emotion out of simple geometry

The primary objective of the analysis is to briefly convey the core idea of a project to your fellow students. Here are some prompt questions to consider:

* Who, what, when, where: make sure we know the basic context, what the thing does, etc.
* What was the problem the project is addressing?
* Why is it important? What is the context?
* What new insight was involved in the solution?
* How well did it work?
* What are ways it relates to our themes?
  + How does it exhibit embodied computation?
  + How does it balance mechanism versus computation?
  + Where does it fit into the human world?
  + Can you articulate the energetic and informational processes which cross between the mechanical, electrical, and computational domains?
* What is the one key takeaway lesson?
* Is there a way your peers could apply this solution?

In general, please focus on the thought process of the *author*, not your own reflections. I.e., it isn’t that helpful for your audience to read your personal reactions; once they see the idea themselves they will naturally have their own response, but a fair assessment requires a fair hearing. The text of the analysis should be accompanied by images, drawings, diagrams, and brief video clips which reinforces the explanation.

Sources:

Martinez, Alonso, and Sean Charlesworth. “Alonso Martinez's 3D-Printed Animated Robots!” *YouTube*, Tested, 15 June 2017, youtu.be/0vfuOW1tsX0. Accessed 12 Sept. 2018.