Team Clarity Progress Report 1 11/10/25

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Progress Summary:

We met after class on Monday to finish our project proposal, fleshing out and selecting some ideas that had been floating around, including a clearer input stage and seeding. We met in class on Wednesday and finalized our BOM for the first order, including accelerometer, speakers, motors and motor drivers, buttons, hot glue, and paints.

Our group roles and input mapping also received an update. We have a nearly final version of the code that will map accelerometer data to pseudo-random direction, count, and speed as well as the 8 distinct outputs. We also started developing the code to drive the motors from the seed this code produces.

Additionally, we fleshed out the audio message that will be outputted for each dimension of wellness and researched AI text to speech options for creating a soothing audio experience.

Overall, we didn't do much testing physically with the Pi, motors, or accelerometers, but we made significant progress on the software side and nailing down specific details of our project.

This week, we plan to start driving the motors using our pseudo-random code, we hope to have some initial versions of our output audio messages, and a prototype of the wheel driving system to attach to the motors.

Figure 1: The team, completing various tasks at the lab table

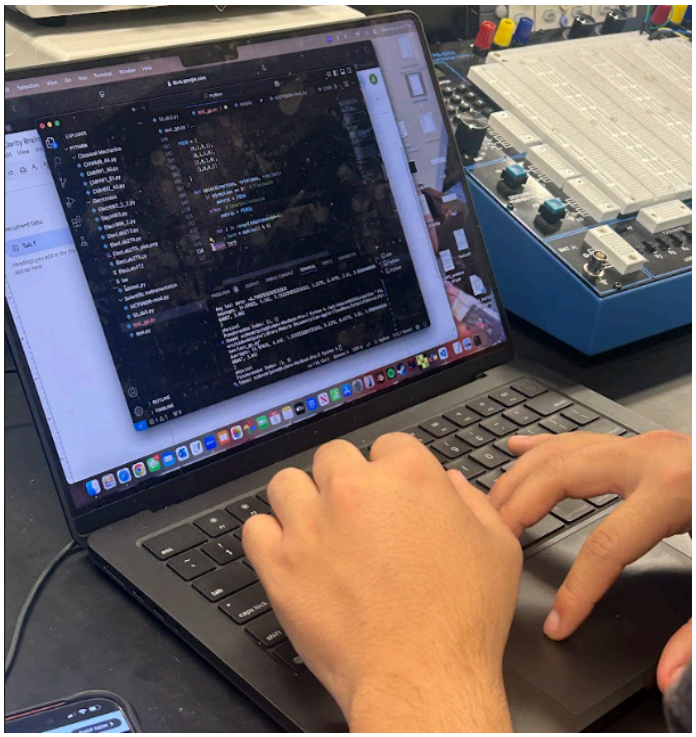

Figure 2: Aidan developing Psuedo-Random Code

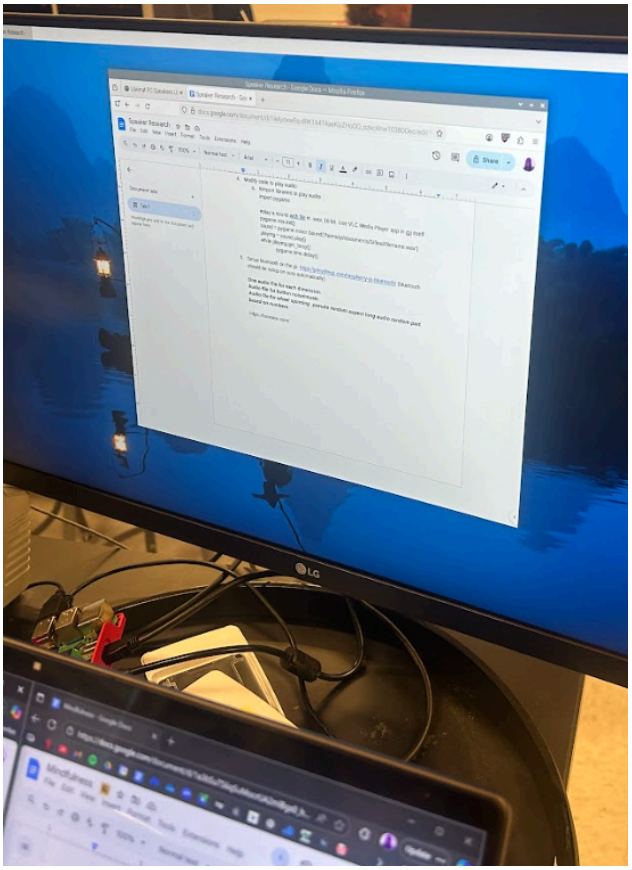

Figure 3: Charlotte researching speakers

```
================== RESTART: C:\Users\jlguy\Downloads\SI_final.py ================
Averages: [4.97025, 4.142, 7.153333333333333, 3.2275, 6.4775, 2.61, 3.8566666666
66667, 3.06]
2
Dimension is physical
Pseudorandom Index: [1, 7]
```

Figure 4: Output of input-interpreting code for an example data set

In figure 4, we created a set of sample data for each of the IMU axes. From this data, our code determined the dimension of wellness for this input to be physical, and that the wheel would spin clockwise (index of 1) for 7 rotations (index of 7). The number 2 represents the index of the axis in which the IMU dominantly moved. We still need to develop code to determine the speed of rotation. The code producing this output in the terminal can be found in our github repo.

Updated Task Table:

Week	Task	Owner
11/10/25	Develop Audio Messages (First draft of AI voice output)	Charlotte
11/10/25	Test Motor code	James
11/10/25	Experiment with accelerometers already in lab (Our IMU is still on the way but this could generate some helpful input)	Aidan
11/10/25	Develop pseudo-random speed determination	Aidan
11/10/25	Clean up software UX	James
11/17/25	Wellness wheel and interface with motors prototype	Charlotte
11/17/25	Experiment with IMU to finalize Input mapping	Aidan
11/17/25	Wellness wand prototype	James
11/24/25	Thanksgiving Break!	No class on Wednesday this week, James, Aidan, and Charlotte will meet virtually to check in and update specific details
12/1/25	Demo Week!	See below
12/3/25	Final Implementation	James constructs wellness wand and oversees electronics setup, Charlotte constructs wellness wheel and oversees audio output, Aidan oversees software implementation and performs necessary troubleshooting

Updated BOM:

Our major materials, such as IMU, speakers, motors and drivers, and various craft materials are all ordered.

However, we plan to source our own cardboard, so we will have some of that in the lab this week to start constructing our physical setup. Additionally, we still may need some PVC pipe for the motor shaft construction, so we will make sure to research that and get it in the BOM before the next order.

In conclusion, no updated BOM is needed as of now.

Risks & Mitigations:

One of the main things we still need to develop and prototype is our mechanism for the two parts of the wheel to rotate in opposite directions. We have some concepts but I think we are struggling to understand them spatially so we will need to construct some prototypes and see what works and what doesn't, and potentially go back to the drawing board.

Another thing that may prove tricky is ensuring the button on the wellness wand starts and stops data collection and initiates pseudo-random movement once collection has stopped.

Finally, our code as it is probably will not work with the IMU out of the box. Once we have received it we will need to perform some bench tests and alter the code as necessary so it still maps the correct inputs and outputs.

Links & Code:

Github: https://github.com/aidandelpino/SI-Lab-Final-Project
Youtube: https://www.youtube.com/@JamesGuymonWM

(No video for this week, but plan to have one of motor operation for week 2)