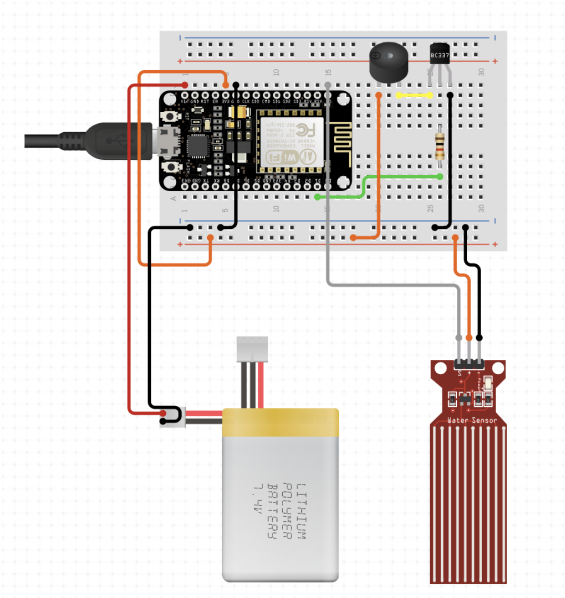
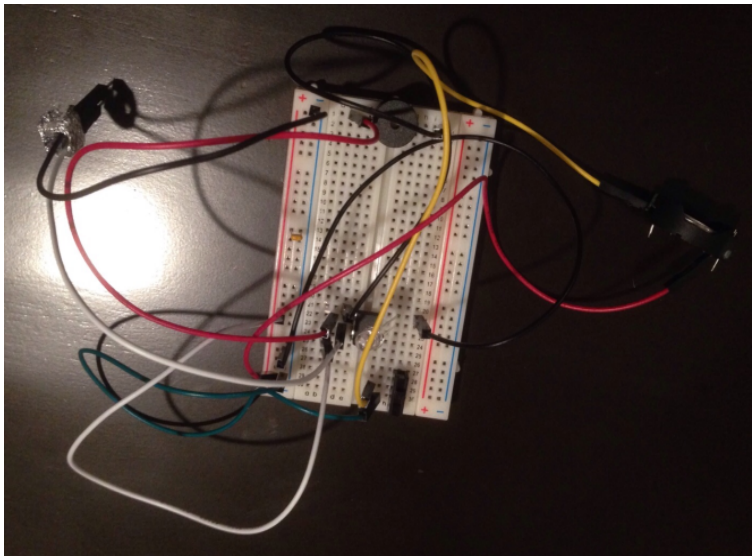
iNappy

Problem/Background: About 27.4 billion diapers are estimated to be used in the USA alone in the hospice care and childcare industries. In addition to the mass amounts of diapers used, each diaper takes about 200-500 years to decompose. To reduce the number of diapers that end up in landfills, I want to create a device that can have infants/toddlers potty trained at a much younger age. The positive benefits of this would help children enroll in preschool sooner than usual thereby leading to better social and language skills and could reduce the number of emollients currently used to prevent or treat diaper rashes as a result of earlier potty training thereby saving money and reducing harmful chemicals that end up in landfills.

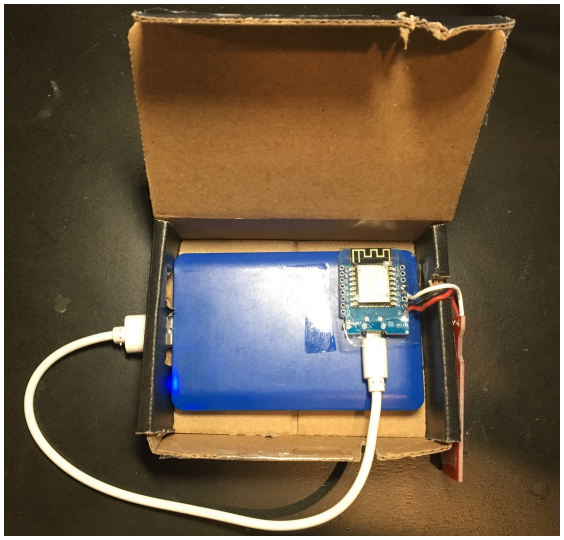


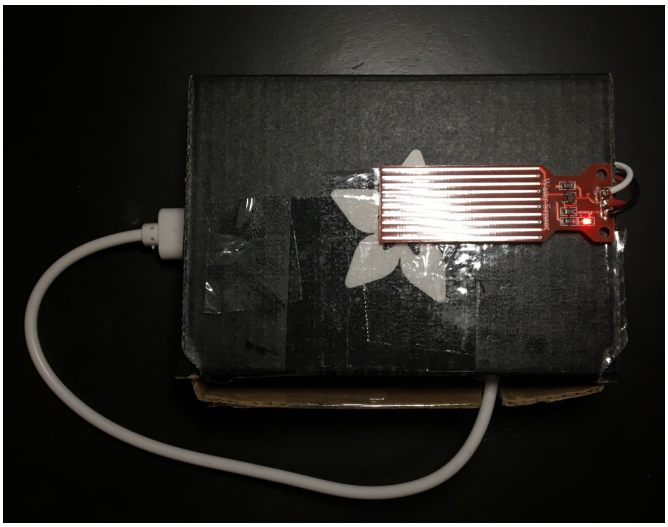
Design Process: I started with creating an Apache Web server that would take data coming from the Arduino, parse the data, and send a message to a pre-programmed number. After creating this server, I connected it with my home router via ethernet for a fast and reliable connection. I then, created the schematic for my project using a website called circuito.io. This website allowed me to drag and drop any items I wanted in the project and then gave me a recommended layout. After attaching the battery, water sensor, and buzzer to the Arduino, I started programming the device. Using LuaLoader, I was able to connect the Arduino to the Raspberry Pi and upload my script to the device. Then, I just had to test the device which is shown in the Proof of Concept.

Proof of Concept: All the individual parts of the circuit were put on a breadboard to ensure it works before soldering them on the PCB (Printed Circuit Board). The way I tested the components was by placing water on the water sensor. When the water makes contact with the sensor, the circuit is completed and the Wi-Fi module sends a ping to the Raspberry Pi which sends an SMS to my phone to tell me that water was detected. This was tested in different device orientations, temperatures, climate types, etc.



Proposed Solution: [Video Link]

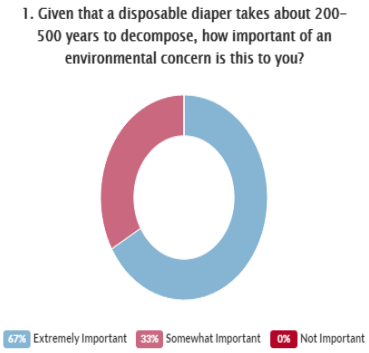


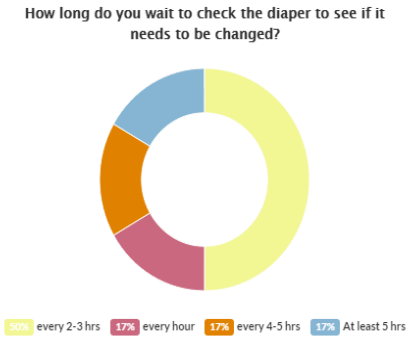


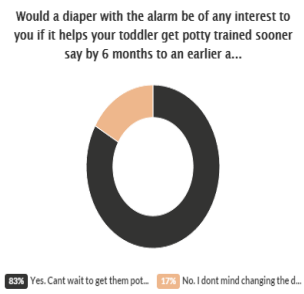
Survey/Market Data: Through Facebook, I put out surveys to gather data on how my device would impact the lives of actual parents and members of the care-taking industry.

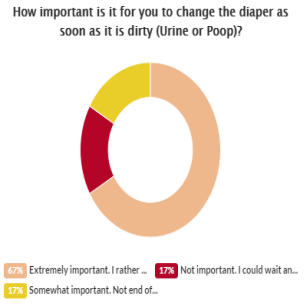
About 67% of survey takers believed that the time it takes to compose diapers is an extremely important environmental concern.

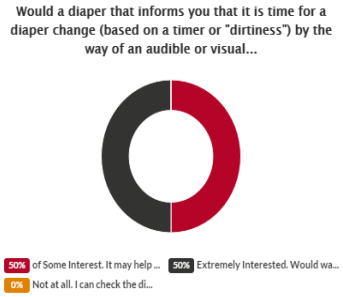
About 83% of the survey takes felt that a diaper that can help their children both potty train faster and a diaper that can reduce the total number of diapers in landfills would be something that they would buy at any store if the cost per diaper is under $1.00.











Next Steps: I want to collect more inputs from parents, caregivers, and industry experts to gain further insight and understand concerns about the use of iNappy. I would also like to explore the possibilities of making iNappy affordable by redesigning the circuit so that it is smaller and cheaper to manufacture the product and creating a starter pack that contains the alarm kit that can be sold separately so that it is used in standard diapers.