

DIY FITNESS TRACKER

Group 23

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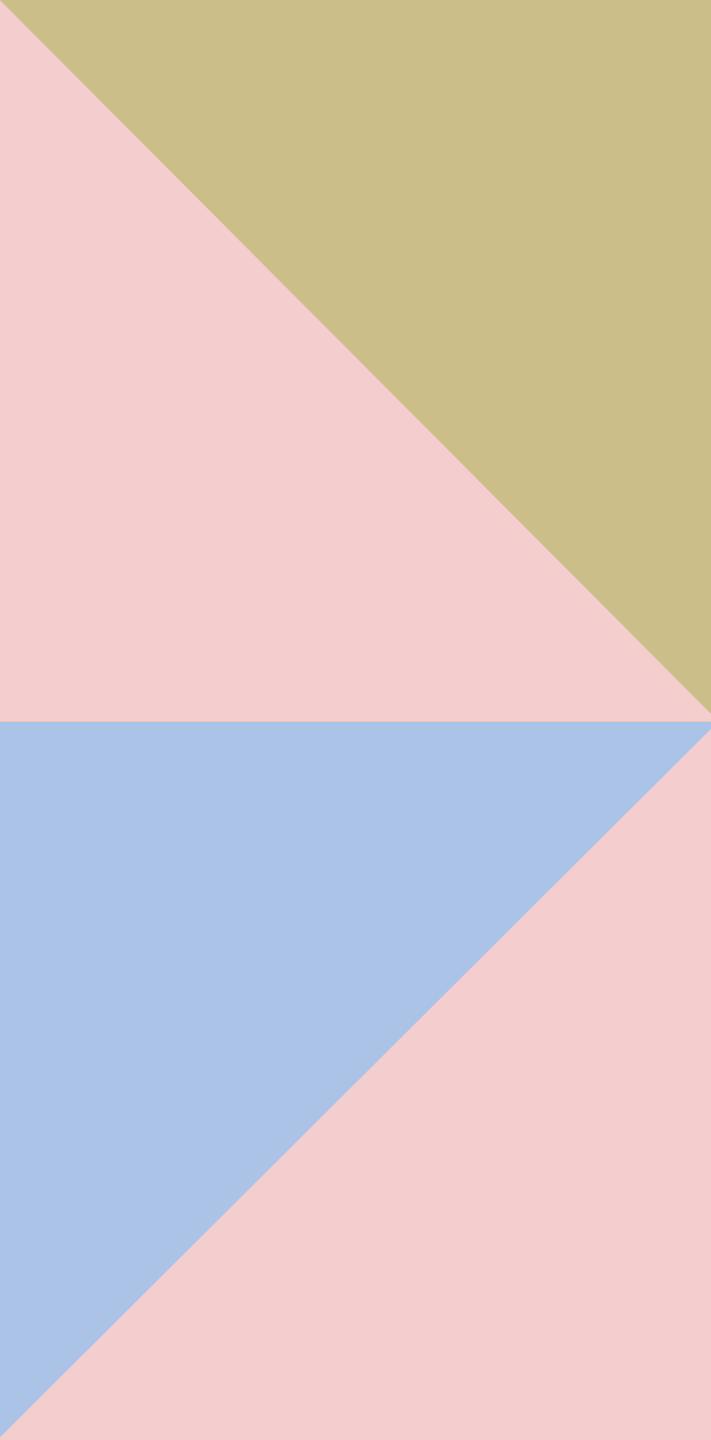
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Background and Motivation



In the era of lockdowns and quarantines, people have been more sedentary than ever before. This resulted in a boom in home exercise equipment and software of all kinds. Coming to college with this fresh in our minds, we realized that the DIY Lab Project was the perfect opportunity to explore the engineering and circuitry behind fitness trackers and attempt to build our own. We are all very thankful to the DIY Lab for giving us this opportunity.

OBJECTIVES

- Identify the various components especially an Arduino with the required sensors.
- Install the necessary software and extensions to operate our Arduino Nano 33 BLE Sense.
- Train the ML model on Edge Impulse by collecting practical data for various exercises using Arduino Nano 33 BLE Sense.
- Create a case for the tracker using Fusion 3G0 and 3D print it
- Assemble the circuit, solder it and fit it in our case.

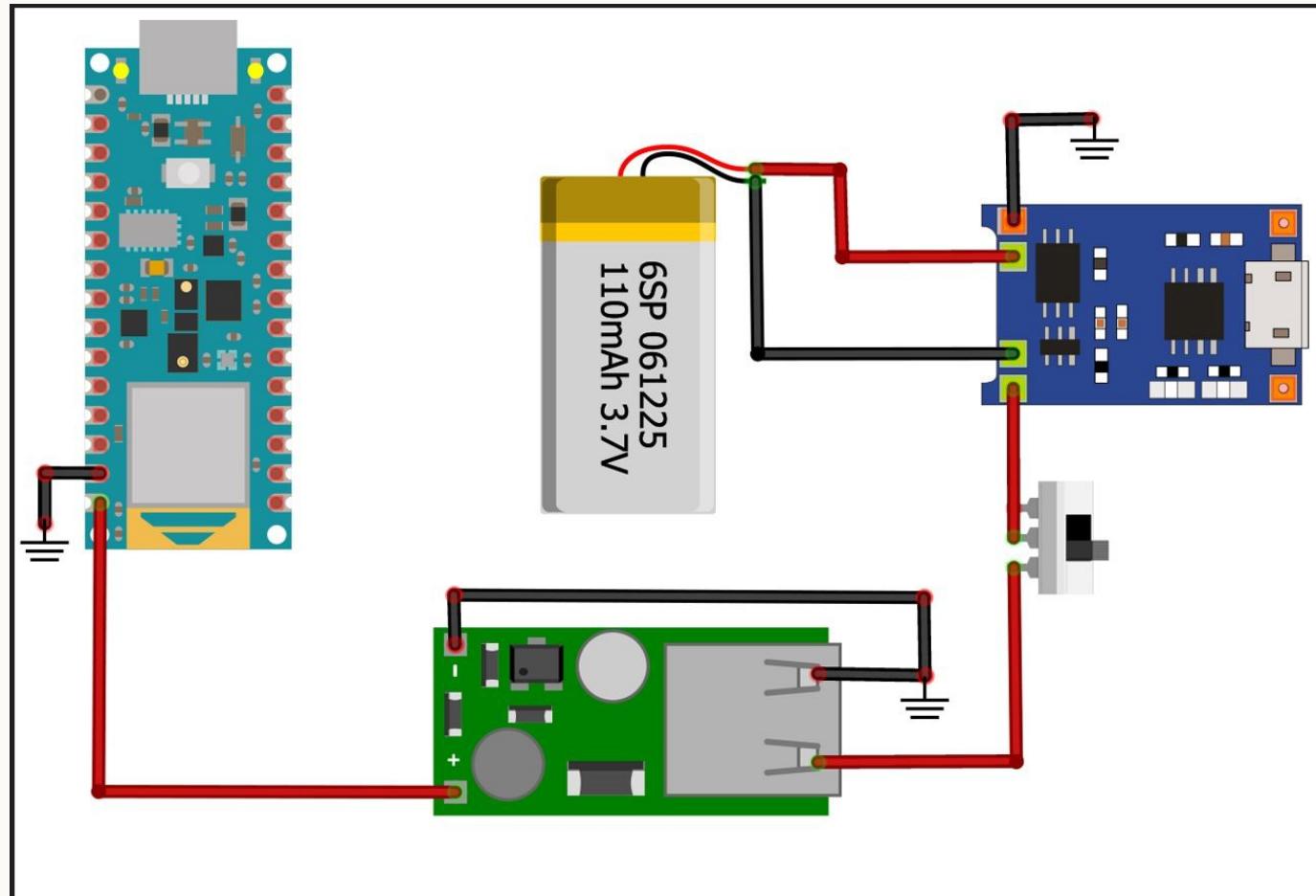
Components and Specifications

- Arduino Nano 33 BLE Sense
- 3.7V Li-Ion Square Type Small Battery
- Mini 3G0 Step-Up Buck Converter Power Module
- TP405G 1A Li-ion Lithium Battery charging module with Current Protection – Micro USB
- 3-Pin Mini Slide Switch SPDT
- 3D printer
- Soldering Iron, Wire, Flux

CIRCUIT

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DIAGRAM



Details of Code

- Majorly, we had 2 different codes. Those being the code used in the Arduino and the code used in our web app.
- For the Arduino code, we imported a custom extended library which contained the data we had used to train our ML Model on Edge Impulse.
- For the web app, we used HTML, CSS and JavaScript.
- Due to the memory constraints of our Arduino, we had to rewrite our Arduino code decreasing the use of global variables to make the code more memory efficient.
- We used Firebase as a real time database to host our data.

Challenges Faced and Solutions Found

- Identifying the Arduino we needed and having it delivered on time was quite doubtful at one point. Fortunately we were able to source the component from RoboCraze.
- Connecting the Arduino to Edge Impulse was a complicated process requiring various extensions and downloads. After following the process , we were able to link them.
- Adding enough data to train the ML Model was quite tiring as we had to repeat the exercises multiple times.
- None of us were familiar with web app development so we enlisted some help from friends and were able to create our app.
- Most of the components we needed in our circuit were not found in the lab and we had to find them in the market ourselves.
- Initially we used too many global variables which was using excessive memory so we had to rewrite the code more efficiently.
- We struggled to connect our web app to Bluetooth and had to implement a lot of custom preferences in the browser.

FINAL SYSTEM

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CONTRIBUTIONS

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YASH CHAWLA **22PH10053**

- Trained and managed the ML Model on Edge Impulse.
- Assembled the circuit.
 - Worked on app development.
 - Demonstration Video

JAGTAP SOHAM ANAND **22MT10025**

- Performed various exercise to collect data for ML Model.
- Trained and managed the ML Model on Edge Impulse.
- Demonstration Video

PRAKHAR SREEGURU **22MA10042**

- Performed various exercise to collect data for ML Model.
- Created the case in Fusion 360.
 - Created PPT.
 - Demonstration Video

DEVANSH RUNGTA **22AG30010**

- Performed various exercise to collect data for ML Model.
- Assembled the circuit.
- Wrote Project Report.
- Recorded and edited the Video.

KUMAR SHREYY **21GG10020**

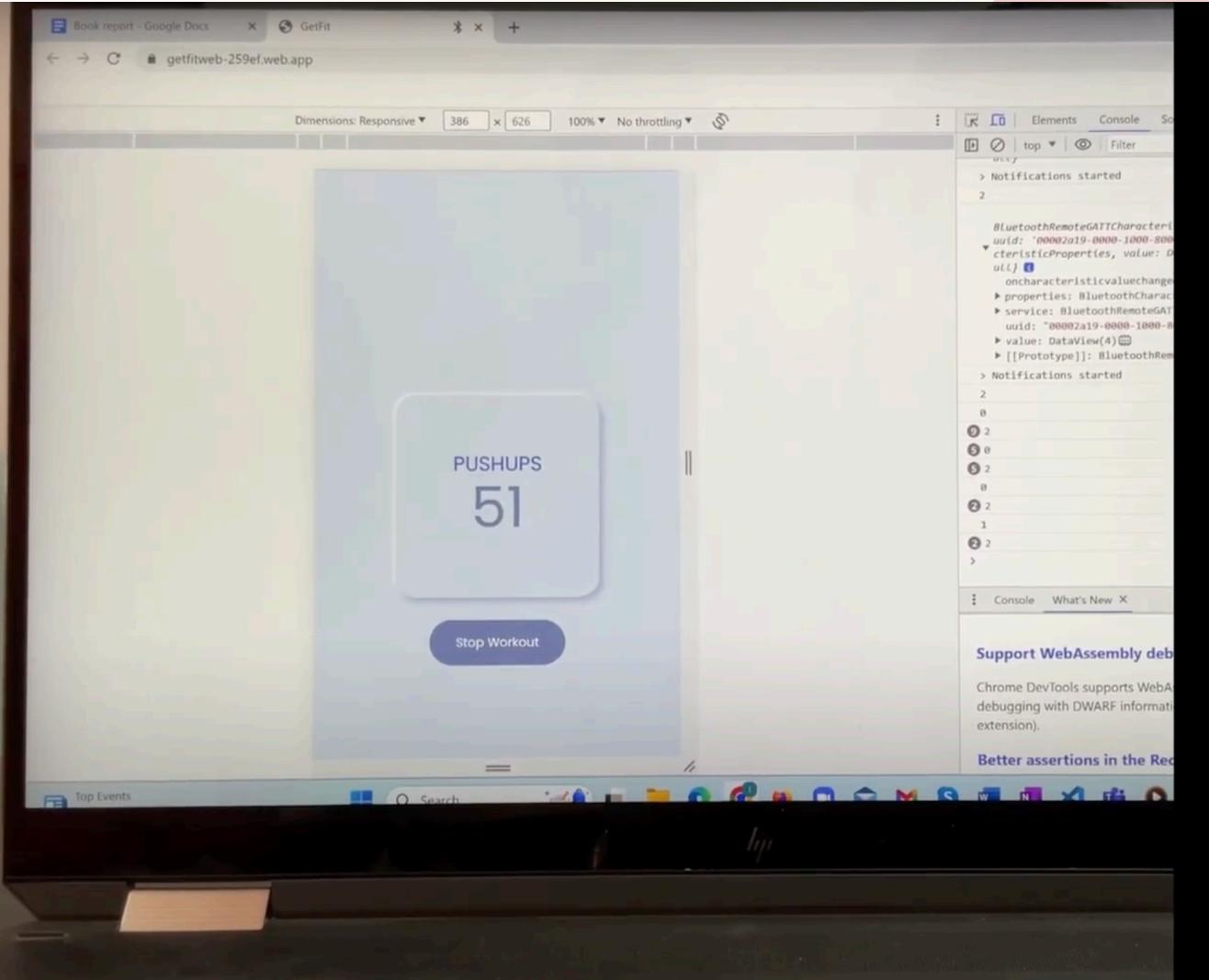
- Performed various exercise to collect data for ML Model.
- Co-ordinated the app development.
- Wrote the code for Arduino.

Conclusions

- It was fascinating to see and learn about each and every different moving part of a project involving an electrical circuit plus web application.
- It made us understand how sensitive and challenging it is to implement technology in the consumer electronics market .
- Coming to our technology, it is something that will continue to grow in relevance in today's busy world where everyone is short on time.
- One of the significant benefits of our project is that it is teachable because of the ML component.
- Thus, a user can upload any number of custom exercises through the Arduino and Edge Impulse as per their preference.
- Though our project is a relatively elementary version , we feel it is an effective demonstration of the power of this technology.

Demonstration

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Youtube Link : <https://www.youtube.com/watch?v=r95m4hqeNVE>