Status Report #1 January 31st

**Status Report**

The objective of this report is to provide details on the status of all team members working on the [EZ Tracker Internet of Things project](https://github.com/YamiYukiSenpai/EZTracker), and the current progress we have made so far.

**Hardware**

The hardware components of this project include the integration of three sensors with the [Broadcom development platform (Raspberry Pi)](https://www.amazon.ca/CanaKit-Raspberry-Starter-Premium-Black/dp/B07BCC8PK7/ref=sr_1_3_sspa?s=electronics&ie=UTF8&qid=1548973415&sr=1-3-spons&keywords=raspberry+pi+3+b&psc=1). The sensors we are using include a [LSM303 Accelerometer & Magnetometer](https://www.amazon.ca/Adafruit-Triple-axis-Accelerometer-Magnetometer-Compass/dp/B0149KK6SW/ref=sr_1_1?s=electronics&ie=UTF8&qid=1548973047&sr=8-1&keywords=LSM303+Accelerometer+%26+Magnetometer), a [SSD1306 Monochrome OLED](https://www.amazon.ca/yellow-128x64-SSD1306-display-module/dp/B017SZ847K), and a [MPR121 Capacitive Touch](https://www.amazon.ca/Adafruit-12-Key-Capacitive-Sensor-Breakout/dp/B00SK8PVNA/ref=sr_1_2?ie=UTF8&qid=1548973079&sr=8-2&keywords=MPR121+Capacitive+Touch) sensor.

**Acquisitions & Financial Status**

To date, we have acquired an extra LSM303 Accelerometer & Magnetometer, SSD1306 Monochrome OLED, and MPR121 Touch Sensor. The LSM303 by itself cost [$42](https://www.amazon.ca/Adafruit-Triple-axis-Accelerometer-Magnetometer-Compass/dp/B0149KK6SW/ref=sr_1_1?s=electronics&ie=UTF8&qid=1548973047&sr=8-1&keywords=LSM303+Accelerometer+%26+Magnetometer) including shipping and the SSD1306 was [$14.40](https://www.amazon.ca/yellow-128x64-SSD1306-display-module/dp/B017SZ847K). During production, we believe it is a wise decision to purchase extra parts as mistakes or breakages may occur which can result in a delayed or rushed project. Since we have decided to acquire extra hardware, this is added cost to our budget. Therefore, our financial status have changed marginally.

**Challenges**

Due to the hardware being portable by nature, we are aiming for all sensors to fit onto one PCB as we aim for a compact device. This is a bit challenging since the working space within the Broadcom development platform is limited. However, we have found an [online resource](https://www.instructables.com/id/Raspberry-PI-Multiple-I2c-Devices/) to assist in this regard. Jonas has begun trials using all of the sensors on one breadboard. Once the hardware can interact seamlessly, Jonas will design the PCB on [Fritzing](http://fritzing.org/home/), with added assistance from Delroy and Ryan when required. It might be a good idea to use a [Pi Zero](https://www.raspberrypi.org/products/raspberry-pi-zero/) for a smaller form factor. Our group can discuss this in the following weeks.

**Opportunities**

Delroy and Ryan are currently working on the website and revising the [Android application](https://github.com/rfmaynard/EZ_Tracker/tree/master/eztracker). They are drafting basic designs for it with the plan of having a consistent interface between the website and the application. Their main goal at this point is to read data from Google’s Firebase, and focus on design later. Having worked, and successfully interacted with the database on the Android app, the web based version should flow together with few issues.

Status Report #2 February 28th

Dear Kristian,

This report is to provide an update on the progress of the [EZ Tracker](https://github.com/YamiYukiSenpai/EZTracker) project to date. Its main focus is on the integration of the formerly independent hardware and software components into one cohesive unit.

**Hardware Progress**

As indicated in our last update, the aim is to integrate three sensors into one cohesive unit, operating on a single PCB. That hardware is also to integrate with an Android application working with an online database at the back end. At this point, we are still in the process of designing the PCB for the project, but hope to complete this task by the end of the week. This undertaking shouldn’t be that difficult as we have already integrated a working prototype of the sensors on a single breadboard. We are also in the process of designing the enclosure to be sent to the prototype lab for production. Based on our hardware design, this process requires very little or no modification to the enclosure design used for our individual sensors. We already have the android application working with the database, but now need to have the individual hardware read and write data to and from the database. Since we aim for a compact hardware design, one of the challenges we were facing was to get the sensors to work in a distributed fashion on the PCB, rather than a stackable one. However, our conceptual design overcame that challenge. Therefore, based on our current progress, the project is on track. As outlined in our work breakdown [schedule](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/EZ%20Tracker%20Status%20Report.pdf), and also within [budget](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/EZ%20Tracker%20Status%20Report.pdf). Hence, at this point, we have met all our objectives as defined in our [proposal](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/ProjectProposal_EZTrackerv1.pdf).

**Acquisitions & Financial Status**

No extra purchases have been required or incurred since the last progress report.

**Challenges**

A challenge we were having with the android app was to get the charts to display the dates correctly. We needed to determine how to manipulate the bar chart to get the current day of the week. This was required to display the current day on the right hand side of the graph. However, after much effort, we have resolved the problem and the charts are now presenting the inputted data correctly along with the correct day of the week. Regarding working with the sensors, we ran into issues trying to multi-process the sensors. We are in the middle of coding sensors working with one another and should have it completed within the next week.

Sincerely,

Team EZ Tracker

Status Report #3 March 14th

This report is to provide an update on the progress of the [EZ Tracker](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/EZ_Parts_Budget.xlsx) project to date. Its main focus is on the integration of the formerly independent hardware and software components into one cohesive unit.

**Hardware Progress**

As mentioned in the previous report, the [PCB](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/Pictures/pcb_solder.jpg) has been fully designed to take into consideration the integration of the [three sensors](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/Pictures/pcb_sensors.jpg). It was subsequently sent to the prototype lab for etching and has since been soldered and integrated into the Pi. However, the headers to accommodate the sensors are yet to be soldered. We are anticipating the design and hardware integration will be fully functional the first time around. To this end, Jonas is continuously working on integrating the sensors into a single working unit. Additionally, we are still contemplating migrating the project to a [Pi Zero](https://www.amazon.ca/Raspberry-Pi-v1-2-raspberry-zero/dp/B01L3IU6XS/ref=sr_1_8?hvadid=208253734008&hvdev=c&hvlocphy=9000980&hvnetw=g&hvpos=1t1&hvqmt=e&hvrand=2069421811900632789&hvtargid=kwd-298365187131&keywords=pi+zero&qid=1552598071&s=gateway&sr=8-8&tag=googcana-20). However, that consideration is dependent on the success of the PCB integration with the hardware sensors. That will make the migration to a new platform much easier. As it relates to the enclosure, Delroy is in the process of determining placement for a battery pack to power the device independently. Not to mention the added challenge of thinking about a design if we decide to downsize for the Pi Zero.

**Challenges**

The process of integrating the [software](https://github.com/YamiYukiSenpai/EZTracker/tree/master/Software/EZ_Tracker%20Beta%200.7) with the hardware is a bit tricky. Authenticating the Firebase portion is proving to be tedious, as the guide for Python-Firebase on [PyPi’s](https://pypi.org/) website did not work. After further research however, [Pyrebase](https://github.com/thisbejim/Pyrebase), a more up-to-date alternative, was the solution Jonas was able to utilize to successfully create an authenticated connection to our database. This portion of the work is proving to be the most time consuming part of the project. However, we are working assiduously to ensure the entire database completion and hardware integration by the end of next week.

**Financial Status and Remaining Work**

There has been no change to our current financial status as no new purchases have been made. Hence, our [budget](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/EZ_Parts_Budget.xlsx) has remained the same. However, that might change if we decide to migrate the project to the Pi Zero platform. So as it stands, as indicated in our [project breakdown schedule](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/EZ_Tracker_Schedule.PNG), we are currently on track and within budget. By the end of next week, we hope to have the entire project fully integrated and working together as one cohesive unit.

Sincerely,

EZ Tracker Team

Status Report #4 March 28th

Dear Kristian,

This report is to provide an update on the progress of the [EZ Tracker](https://github.com/YamiYukiSenpai/EZTracker) project to date. Its main focus is on the integration of the formerly independent hardware and software components into one cohesive unit.

**Overall Progress and Troubleshooting**

As mentioned in the previous report, the PCB had been fully designed. Unfortunately, it did not work as we had intended. Our PCB would detect the sensors correctly, but when running our program it would not work correctly and errors were thrown we had not seen before. We had determined it to be faulty wiring as the project would succeed on a breadboard. We reduced the number of Pi GPIO pins (as indicated between [v1](https://github.com/YamiYukiSenpai/EZTracker/blob/master/pcb%20files/ez_v1.png) and [v2](https://github.com/YamiYukiSenpai/EZTracker/blob/master/pcb%20files/ez_v2.png)) we were connected to and branched our vias to accept inputs from the 3 sensors at once, essentially simplifying the overall design.

In addition, we had [our case](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/Pi2CaseEdit.pdf) designed by Delroy as per our group discussions. We had proposed a compartment below to house the rechargeable battery, and a port to charge and power our device. After receiving the [completed product](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/Pictures/caseResult2.png), we realized we had measured [incorrectly for the battery](https://github.com/YamiYukiSenpai/EZTracker/blob/master/Documentation/Pictures/caseResult1.png), charging, and power source compartment. We have re-measured and Delroy will be in the process of re-designing in Corel Draw over the weekend, to be ready for next weeks milestone.

Lastly, Jonas is in the process of working with the Raspberry Pi’s WiFi direct system. This will allow the user to access an apache website hosted on the device, from their phone. This makes it easier for logging in and running the program from the mobile device. Jonas is still in the process of configuring this system and managed to get it working. Unfortunately, the WiFi direct had spontaneously stopped co-operating and is trying to figure out reasons and solutions to correct it.

**Financial Status and Remaining Work**

There has been no change in our financial status and our budget remains the same. Given the amount of remaining work left, we will most likely not be able to make the switch to a Pi Zero. We realize that further improvements can be made as revisions occur just like in any other product. We have opted to have a well working device the first time around rather than something that is smaller. By the end of next week we hope to have a functional standalone unit, the only thing left after that would be tweaking of the sensors for accuracy, and WiFi direct configuration. We also plan on completing all of the requirements of our Android application as well, which includes caloric calculations and launching the webpage to log into the Pi.

Sincerely,

EZ Tracker Team