Project Plan and Cost Estimate - Deliverable E

Nathan Gaudaur (300138966), Brandon Joseph Broderick (0300128727), Michel Pellerin (0300131059), Andrew Bui (300116223), Matthew Yakubu (300123797)

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Introduction

This document will outline our project plan and give an estimation of the cost and components that we will use to build our device. The project plan will include our tasks and the duration for each task that we have established to ensure we have all 3 of our prototypes done by their deadlines. The estimation of the costs section will include all of the components we plan to use, and how much each will cost. Our goal is to have the final price of the device to be under 100$.

First Prototype

For the first prototype, our plan is to build the device with cheap and easily accessible materials so we can have a visual representation of what we are thinking. This will allow us to see if we are forgetting anything important. We will also include the analysis of critical components to make sure these components will perform as expected in our device. These are the tasks and timelines required to complete the first prototype. The first task is the overall design of the device (aesthetics), and block diagram to show the inputs and outputs of how the device will perform. This will be done by Joseph, the task will be completed by February 20th. The next task is the material list and BOM (bill of materials). This will be done by Andrew, and the task will be completed by February 24th. The next task is a program algorithm for how the Arduino will be connected to the sensors. This task will be done by Matthew and will be completed by February 27th. The last task is building the actual prototype and ensuring it will function as expected. This will be done by Nathan and Michel Pellerin, the task will be completed by February 29th.

Second Prototype

For the second prototype, we plan on refining our design from the first prototype and making it look and feel slightly more polished. In order to do this, we will use feedback from our customer as well as fixing anything that we noticed wasn’t working as we intended. One major goal for this prototype would be to eliminate the need for a breadboard, as they are dissalowed on design day.

Third Prototype

The final prototype will be our device that is 90% complete. By this time we will be aware of all the components that will successfully work with our design. We will use our data recorded from the second prototype to see what worked and what needs to be changed. Based on this data we will be able to build a very good prototype that will most likely be our final product.

Potential Risks

When designing a device that is used for medical purposes such as the one that we are, there are many potential risks that are present. Our project group has taken on the task to design a device that can detect opioid overdoses and notify emergency services when one is detected. The risks that are present with this project would be the device not detecting the overdose or the device not sending out a signal.
It is almost impossible to completely remove risks such as these, however, we can take precautions to avoid them by building targeted prototypes to try and make sure that these systems work as best as possible.
In order to prevent our device from not sending a signal when an overdose is detected we have decided to create a prototype of the BlueTooth device we plan to use in the wristband.
We have decided to use the same method to make sure that our device can detect an overdose. This device will be harder to test the functionality of because we cannot test it on someone who is actually experiencing an overdose. To overcome this obstacle we figured that the best approach would be to test the device on people who have normal blood oxygen levels and see if the readings are accurate. We believe by testing these components of the devices with prototypes we can reduce the chance of them failing when the final product is built.
These two risks only deal with the medical aspect of the product, however, there are actually several other components that we would need to test in order to ensure that the product functions and looks the way we intended. These will also be tested using appropriate prototypes.

Bill of Materials

First Prototype

- Arduino Nano (17.65 for 3)
- Arduino board (Matt has it) ($10.98 for 3)
- Velcro(8.99)/buckle (9.99 for 4) /cloth ($3 for 6x12in this is the cheapest fabric)
- Wires from Maker store $1.00/10 wires
- Blood oxygen sensor (MH-ET Live MAX30102 Heart Rate Sensor Module Puls Detection Blood Oxygen Concentration Test for Arduino Ultra-Low Power) (3.85+2.00 shipping)
- Bluetooth module (J-DEAL® HC-05 Wireless Bluetooth Host Serial Transceiver Module Slave and Master RS232 For Arduino) ($10.99)
- AA Battery case ($9.98)
- AA Batteries around $15 but we have some
- Coin battery adapter($14.99)
- Coin Battery $1.25 for 3
- Solder wire ($9.99)

BOM (most likely for the final list of material):

$71.95

- This is cutting the AA batteries and case

$59.30 (final product)

- If materials are bought in singles instead of bulk and cutting AA batteries and case and the Arduino testing board

Maybe 3D print case to protect internal wiring etc

Second Prototype

(Cut some unneeded material)

Due Dates

- Prototype I - March 1, 2020
- Prototype II - March 8, 2020
- Prototype III - March 22, 2020
- Design day - March 26, 2020
- Final project presentation, March 20-27, 2020

Project Schedule

- Task - Completion date; Duration; Person responsible
- Benchmarking existing products -
- Overall design - February 16, 2020; 3 days; Joey Broderick
- Bill of materials - February 16, 2020; 1 day; Andrew Bui
- Order materials - February 17, 2020; 1 day; Andrew Bui

- Develop code - February 23, 2020; 3 days; Matthew Yakabu
- Test materials(sensors and arduino) and code - February 26, 2020; 3 days; Matthew Yakabu
- Build prototype I - February 28, 2020; 2 days; Nathan Gaudaur
- Prototype I presentation and feedback - March 1, 2020; 1 day; Group
- Discuss feedback - March 2, 2020; 1 day; Group
- Adjust design accordingly - March 2, 2020; 1 day; Joey Broderick
- Order materials for prototype II if needed - March 2, 2020: 1 day; Andrew Bui
- Test materials and code - March 6, 2020; 3 days; Matthew Yakabu
- Build prototype II - March 7, 2020; 3 days; Nathan Gaudaur
- Prototype II presentation and feedback - March 8, 2020; 1 day; Group
- Discuss feedback - March 9, 2020; 1 day; Group
- Adjust design accordingly - March 9, 2020; 1 day; Joey Broderick
- Order materials for prototype III if needed - March 9, 2020; 1 day; Andrew Bui
- Test materials and code - March 14, 2020; 3 days; Matthew Yakabu
- Build prototype III(final product) - March 20, 2020; 5 days; Nathan Gaudaur
- Prototype III presentation - March 22, 2020; 1 day; Group

Conclusion

In conclusion, this report discussed the main tasks that need to be completed in order to have our prototypes done by their deadlines. The report also provided a list of items and the estimated cost for each one. Based on the information provided our group is confident we will meet the deadlines for the 3 prototypes if all of the tasks get completed on time.