Milestone 5

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Milestone 5 Report

Design Change:

Since Milestone 4, my project has undergone only two changes, both of which had negative effects that caused issues (will discuss in the assembly process). The first change is the box's size, which was originally designed to be larger than 60mm in width, 70mm in length, and 40mm in height, to accommodate the Arduino Uno R3 size 53.4mmx68. The original idea was to make the box as large as possible under DVTPA, so design in Milestone 4 is 115mmx90mmx55mm. However, when I attempted to purchase the box for milestone 5. I realized that it was out of stock, and ordering form another shop will have taken two weeks to arrive. Consequently, I decided to reduce the box's size. In my mind, it should larger than 70mmx60mmx40mm. So, the result of new box's size is 75mmx61x50mm, which was larger the required.

The second change involved the design of PCB, Initially, the PCB was designed to be the same size as Arduino Uno R3. However, after consulting with Dr. McGary about PCB printing, I learned that the optimal size for route tracks when using bantam tools was 0.6mm. Additionally, the two 0.6mm route tracks on the side may not be valid. Dr. McGary suggested enlarging the board by 1.5mm on both sides. Therefore, I modified the PCB by increasing its width by 3mm and reducing its length by 6mm, resulting in a final size of 56.4mmx62.6mm.

assembly process:

Even though the smaller box can still accommodate the PBC and Arduino Uno R3, the decision to shrink the box and enlarge the PCB resulted in a highly compact box. The RIP sensor was initially intended to be placed outside by drilling a hole in the box. However, when sensor is mounted on the PCC, the width of the PCB is larger in width(15mm). It can't put into the hole after it have already been mounted to the PCB. Also, solder for PCB can't be down in the box. The to place the sensor outside the box through a hole is no longer feasible. I need to cut the hole all the way down to place the sensor. This experience taught me the importance of considering potential assembly issues during the design phase and designing with assembly in mind. Additionally, the last-minute changes made to the design were not adequately thought out, as discussed in our class.

Furthermore, the solder PCB connections were not particularly robust, and a certain pressure could damage the connections. Unfortunately, I had to repair the broken connections four times.

An assessment of functionality:

1. Click Bluetooth icon to connect Bluetooth (with instruction on the top of icon)
2. Click locked lock icon to lock the lock.
3. Click opened lock icon to unlock the lock.
4. When someone passes by and the user is connected, it can detect whether someone has passed and notify the user
5. When someone passes by but the user is not connected, it can detect whether someone has passed and store it, and notify the user the next time the user connects

Testing Plan:

Cost --- use Excel.

Weight --- use electronic scale measurement 10 times.

Lock responding time --- use two processes:

- two people, one person clicking on and off on the phone, another person with a stopwatch timing the responding time.
- Use a camera with slow motion timing responding time frame by frame.

Running memory Usage --- time for long (on for 1 hrs. get data every 5mins) time, also use different software timing tools.

Size ----- Use metric ruler measurements 10 times.

The sensor detects Accuracy ---- personally move under the sensor 100 times. If possible, have some auto-move machine to test it more than 100 times.