Project 17

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Deliverable G: Prototype II and Customer Feedback
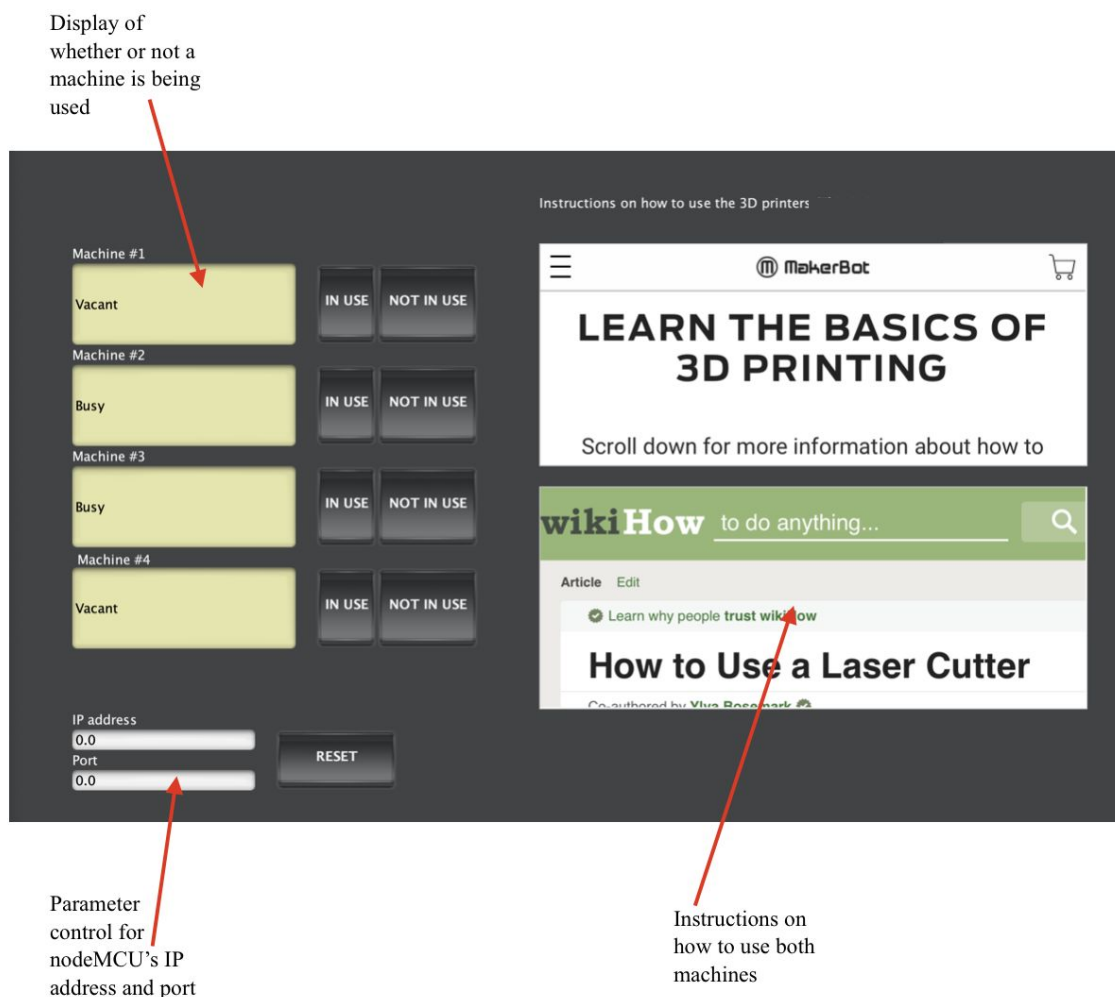
Innovation of the CEED Space

Synopsis

The staff, students, and community that use the CEED space need an interactive system in order to time and inventory manage more efficiently.

This week's focus revolved around the creation of prototype II. After receiving feedback on our first prototype, the plan was adjusted accordingly. This report will summarize the development of the plan, technicalities of prototype II, objectives of the prototype, testing that will be done, and an analysis of the current accomplishments.

Results and Development

In the last prototype, a website that was compatible with the dashboard was found. It was discovered that the dashboard could be coded to be displayed on a website once given a URL. Additionally, materials were ordered online so that the process of building the second prototype could begin. In order to make the process of putting the final design together easier, block diagrams were drawn. The diagram created a visual of the input and output of our design, easily demonstrating how our design works. Lastly, a very basic dashboard was made. The dashboard demonstrated the input and output parameters for the 3D printer availability system.

After receiving feedback and comments for the first prototype, it allowed for improvement on the second prototype. It was advised that the focus should be on the dashboard and the breadboard system, rather than the website itself. As a result, prototype II focused more on breadboard and its ability to work with the sensor.

Display of whether or not a machine is being used

Parameter control for nodeMCU's IP address and port

Instructions on how to use both machines

Prototype II

Analysis of Objectives and Testing

The second prototype is very critical to the final design because it includes subsystems that allow the solution to work. The following are the objectives of this prototype:

1. Connecting the sensor to the board

For this objective, the PIR sensor, NodeMCU, and breadboard will be needed. The goal is to wire and put the pieces together in preparation for the next objective. Thus, this needed to be done before the lab on thursday so that the testing could be done. After receiving the materials, it was time to start putting them together. With the help of online research and knowledge from previous labs, all the parts were successfully connected.

In order to test the functionality of the system, the second objective needs to be complete. Once both are complete, they will work together to test their functionality.

Note: testing is in the following objective since they rely on one another to function.
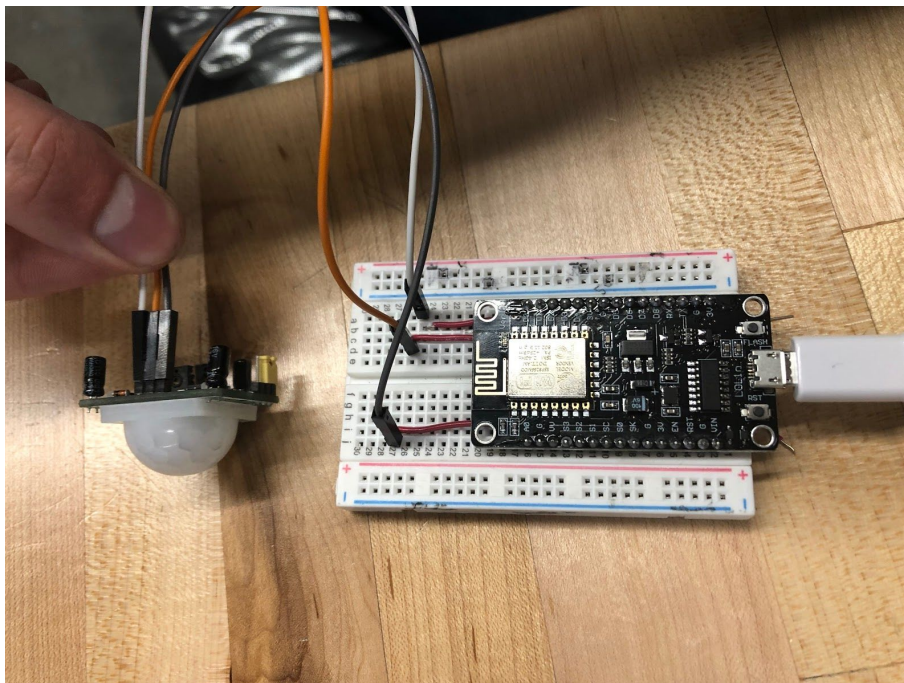
2. Sending signal to the arduino when motion is detected

After the pieces are put together, it is time to set up a code for the system to actually be useful. The code allows for the PIR sensor to detect motion and send signals to the NodeMCU that there is movement. The code needed to be ready by Thursday for testing to be done with the breadboard.

In regards to testing code with the board, the board connects to the computer with a micro USB cable. Using the Arduino IDE software and a nodeMCU driver, the sensor should interact with the computer and board. Testing was done in the lab section on November 7th. Interestingly to note, the board that was picked up about a week and a half ago was not a NodeMCU 1.0 (ESP-12E). It was some other ESP8266 module, but smaller and had different functions. This board was switched out with the right one. The code was successfully uploaded to the board and the serial monitor was displaying the changes.

```
/*  PIR sensor tester  */

int ledPin = D7;                // choose the pin for the LED
int inputPin = D2;               // choose the input pin (for PIR sensor)
int pirState = LOW;             // we start, assuming no motion detected
int val = 0;                    // variable for reading the pin status

void setup() {
  pinMode(ledPin, OUTPUT);      // declare LED as output .
  pinMode(inputPin, INPUT);     // declare sensor as input

  Serial.begin(9600);
}

void loop(){
  val = digitalRead(inputPin);  // read input value
  if (val == HIGH) {            // check if the input is HIGH
    digitalWrite(ledPin, HIGH);  // turn LED ON
    if (pirState == LOW) {
      // we have just turned on
      Serial.println("started moving (in use)");
      // We only want to print on the output change, not state
      pirState = HIGH;
    }
  } else {
    digitalWrite(ledPin, LOW); // turn LED OFF
    if (pirState == HIGH){
      // we have just turned off
      Serial.println("No longer moving (vacant)");
      // We only want to print on the output change, not state
      pirState = LOW;
    }
  }
}
```

The only problems were that the sensor would send a reading to the monitor around fifteen times per second. Also, there was evidently a sensitivity problem for the monitor would read a certain output for a long time before switching and would not pick up movements in between. This means that the delay is too slow and the sensitivity needs to be increased. As part of our planning, it was found that it is possible to change the sensitivity and delay time of the PIR sensor with two knobs on the side. While testing the sensor, changing the knobs on the sensor did not change anything about the output.

The success in this test allows the team to proceed to the next step. The team now knows that the PIR sensor is able to send signals through the microUSB cable and print desired output on the serial monitor. Now the focus can shift towards connecting the dashboard to the NodeMCU and getting the NodeMCU to communicate over a wireless network.
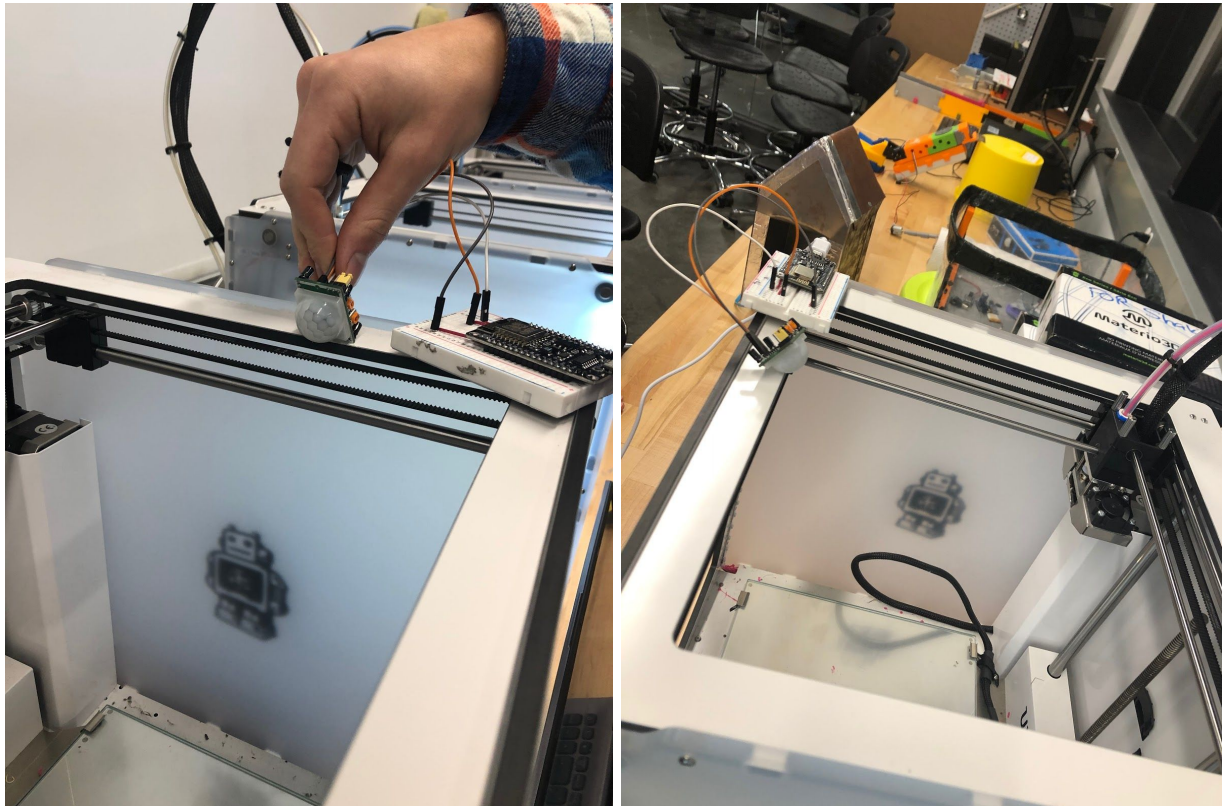
3. Interactive map capable of uploading onto the website

Another main component of the website, is a visual map of the lab. This map will display the workspace and when the mouse hovers over an area in the lab, some information is shown. For instance, it shows what inventory is kept in that area and how it is properly used. The map will be made using WIX and will be uploaded onto a website. The map, or at least a basic version of the map should be done by friday so that testing can be done before the next deliverable.

In order to test this, the website and map will tried to accessed from another computer. The testing will be done once the map is visually appealing, clean and easy to read. Furthermore, the map must be able to be accessed from another computer.

The map is an important part of the solution because it makes experiences in the CEED spaces more enjoyable for everyone. With the map of the lab, users can see where inventory is kept and how to use it, rather than bothering a CEED staff that may be busy with other tasks. Also, if a user is looking for something specific in the lab, they will be prompted to read more information on it as it right in front of them. As a result, there will be less risk of a user misusing a piece of machinery.
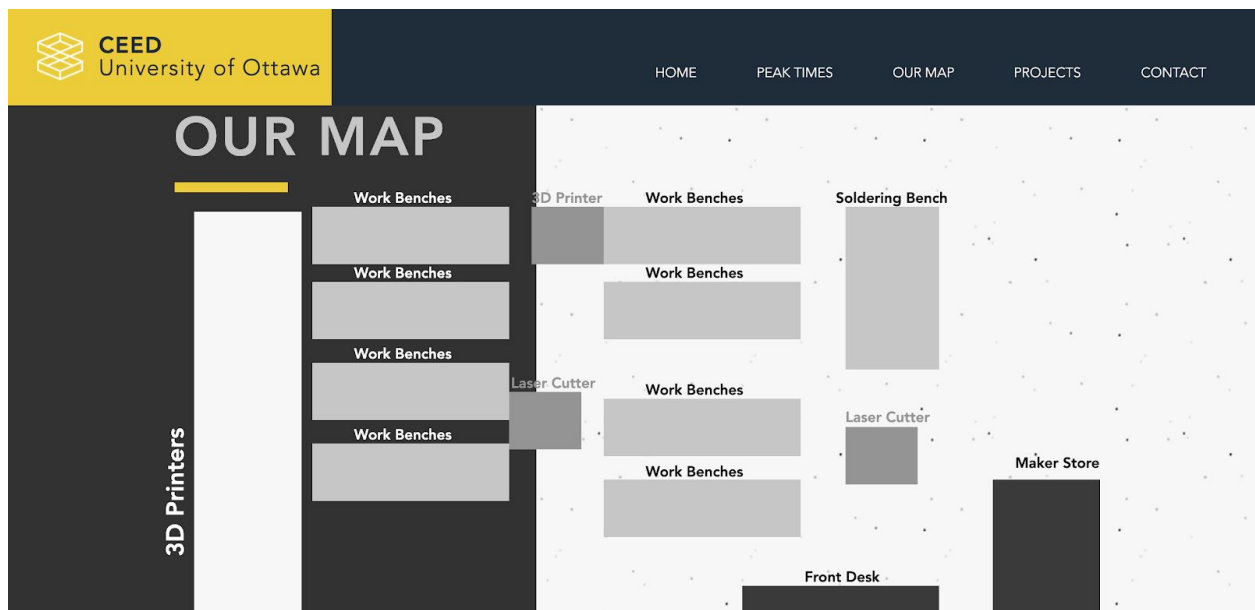
Feedback and Comments

Pitch Presentation Feedback

-Peers in our class on our presentation and idea: The idea was great. The slides on "who is working for you" were

-Selected comments from David on pitch presentation and idea:

Client Feedback

Although the Ross Video Dashboard Representatives did not comment, give feedback, or ask questions on our presentation, even though we left time for it, there were other ideas which were similar to ours which were given feedback.

Cautions were given on the connection between the website and the dashboard as well as the placement on the sensor in the machine. They asked others about the number of machines and the feasibility of outfitting the entire space.

They also commented on the interactive accessessibility of the dashboard through the website. We took this into account when designing our second prototype in order to limit the amount of roadblocks we have to hit in order to reach our final prototype.

We will be taking these cautions into account during our final prototyping and testing stages as they will apply to us as well.