

GNG1103

Deliverable G

Prototype 2 and Customer Feedback

Submitted by

A01, TEAM 14

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Abstract

Throughout this paper, the team will outline a prototyping test plan and develop a prototype that will be used to achieve the objectives of the plan. The team will also analyze critical subsystems, the results of which will allow the team to reduce uncertainty in future prototypes.

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List of Acronyms

Acronym	Definition
CEED	Centre for Entrepreneurship & Engineering Design
SD	Secure Digital
STEM	Science-Technology-Engineering-Mathematics
ETC	Estimated Time of Completion

1 Introduction

The goal of this document is to display and explain the purposes of our second and third prototypes. We will be revamping the layout of the DashBoard and the functions behind it based off feedback from our first prototyping. Hardware prototyping will also be done, the circuit that will capture the state of the limit switch along with its connection to the NodeMCU will be designed. The team will also design the wifi connection of the NodeMCU to the DashBoard panel. Our second prototype will allow the team to fully envision the final look of the DashBoard panel layout. We will also be getting a more in-depth understanding of how the facilitation of the limit switch data will be projected to DashBoard through a listener server.

2 Prototyping

2.1 Testing Purposes

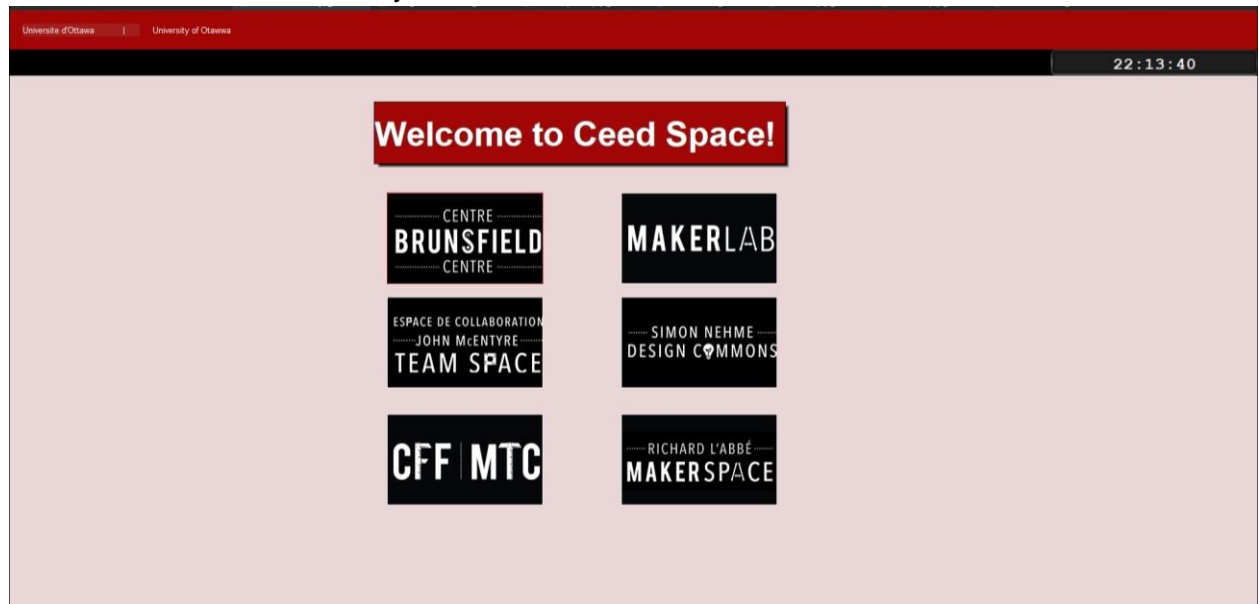
- Revamp layout of DashBoard interface in response to customer feedback
- Circuit design to connect limit switch to NodeMCU
- Develop a method to power the NodeMCU
- DashBoard listening server to allow NodeMCU to give data
- NodeMCU local Wi-Fi connection to DashBoard
- Design NodeMCU enclosure to attach to 3D printer

Overall: Finalize the design of the DashBoard panel. Ensure that all hardware components are theoretically functional along with the connection being feasible within time and current level of experience.

2.2 Design Concept

After the pitch presentations, we decided to rethink our website idea as the client did not seem too enthusiastic about it.

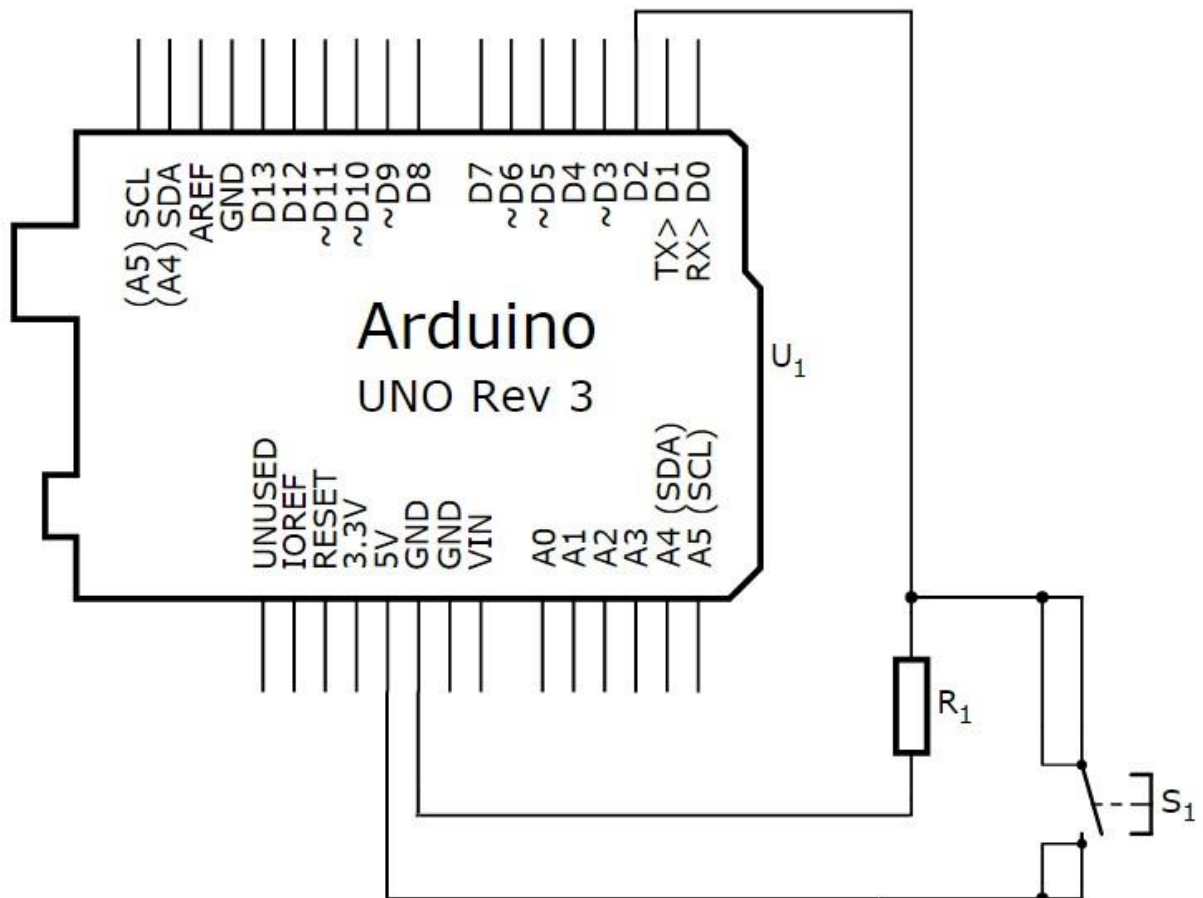
For this prototype, we have improved the aesthetic design and the button functionality. Here is what the dashboard currently looks like:





All the other spaces have the sample template as above (with the functional buttons to the right). A countdown timer is going to be implemented in the upcoming days. (Other pictures not included because they would take up lots of space)

Regarding the availability of the 3d printers, a simple circuit was created according to the layout below:



When the limit switch is pressed there will be a closed circuit, signifying that the machine is not currently being used (natural resting position of 3D printing arm is in the corner where the limit switch is present). When the limit switch is open, the primary circuit is open and thus a signal will relay in the second closed circuit signifying that a machine is now in use. The Dashboard will be listening for the signal and the button will toggle to red.

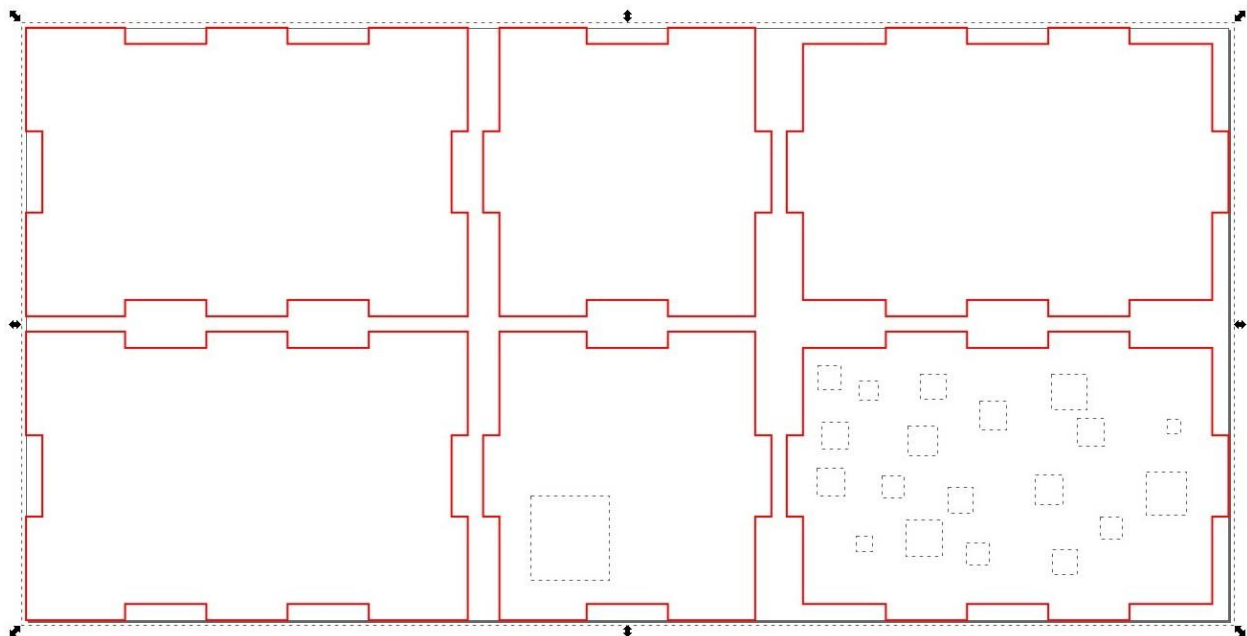
With regards to the sign-in system, when a user presses the sign-in button, they will be prompted to enter their email address, which will be sent to the Arduino. This Arduino is connected to the hotspot of the laptop. After that, the Arduino will save the email address and will send the user an email saying that the print is done when the limit switch is pressed.

These 2 codes, along with the final touches on the aesthetics of the map will be added over the course of the next week.

As for the countdown timer, an assumption will be made that the 3D printer is being used on a weekday, and that is because of time limitations (we do not have enough time to take different cases).

As for the overall functionality of the printer, we assume that the printer is not interrupted during its work cycle, because then the arm will not rest in the corner and signal that the job is done.

The design of the NodeMCU housing is below. It allows cables to be connected through an opening in the side and ventilation through the holes cut on the bottom. This allows for the NodeMCU to be attached to the side of the 3D printer



2.3 Testing

Prototype 2 has implemented more visual cues as well as connections between screens throughout the UI, thus the majority of testing for prototype 2 consisted of testing screen connections as well as solidifying a colour palette for the UI. Further testing was done regarding

status buttons for machines. We have recently received physical components to be utilized into our prototype and testing. So far, a connection to the NodeMCU board has been achieved and slight testing with the limit switch but still nothing definite yet.

Furthermore, we have determined the number of clicks it requires the user to get to a certain point. In order to just view information, only 1 click.

In order to view 3D printer availability, 2 clicks.

In order to sign into the system, 2 previous clicks+1 click to sign in+typing in the email(if they choose to)+1 click to return.

The next prototype will be of high fidelity so the code will be tested until the transition and communication between the dashboard and the node is seamless.

3 Validation

Prototype 2 has provided clear insight into the next steps moving forward. From our testing we now know for sure that our methods for screen connectivity are strong and transitions are smooth. Although further testing was not done in regards to having our Dashboard online, it has been made clear through other avenues that it is not in our best interest to continue down that road. Finally, with physical components we will be able to start testing in that area as well as getting that information to the Dashboard being represented clearly. Moving forward, further testing will be done to see if Dashboard can communicate smoothly with our nodemcu.

For now, the nodemcu has been setup, and simple testing codes have been successful.

4 Transfer of Knowledge

For this deliverable, we have made constant references to previous deliverables to keep us on track. Deliverable E was used along with our Gantt chart to ensure that each member knew what they were doing and when they had to complete it by. This made it easier for us as a team to keep track of all the tasks for this deliverable. Deliverable D was used to ensure that each task in making this prototype was made with the customer's needs in mind. Deliverable F was constantly used to look back at next steps for prototype 2 (Deliverable G) and to keep in mind what we should be focusing on. Examples include the internet connection issues and Dashboard transitions.

5 Conclusion

All in all, this prototype consisted of solidifying the features we have to date as well as adding more now that we have a strong foundation. With the addition of our physical components, we can now begin testing that area more, always keeping in mind if the things we are testing are feasible to complete within our timeframe. This resulted in us dropping the idea of getting our Dashboard completely hosted on a website.

6 Further Thoughts

With access to our components as well as a strong foundation in our dashboard we can now go forward testing final ideas and concepts with the fidelity of our product in mind. Like stated earlier, we need to rethink how we are going to implement an online version of dashboard as the current outlook for that is not very positive. In the coming week we will focus on the physical testing of the limit switch and Dashboard connectivity and, if time allows, remote access.

In addition to that, with the submission of this deliverable and during the next meeting, the Gantt chart will be updated to show a more intricate and precise division of tasks i.e. To also include which team member is responsible for which page.

Bibliography

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