Reports and Discussions

Is your prototype perfect? What did you learn?

The primary functions of the physical prototype are working correctly. While an encasement wasn't able to be produced, the PCB has no physical issues such as broken solder contacts or unintended connections. The sensors are working as expected, although the GPS sensor required the use of an external antenna to be able to obtain a signal. The most significant hardware issue with our prototype came during the development process when the Nucleo-32 development board that interfaced with the keypad failed to properly communicate with the Raspberry Pi using i2c and eventually failed altogether. This required us to directly interface with the Keypad with the Raspberry Pi.

Furthermore, as our team began to integrate the prototype into the rest of the system and worked through the sign-in/pick-up flow we discovered some design aspects that could be improved upon. Firstly, there is no way to indicate the success status of an RFID tap or keypad entry to students signing in on the prototype, as there are no programmable lights or speakers built into the Raspberry Pi or included on the PCB. The initial plan was to have the system be Raspberry Pi configured to run headless and the web-connected computer at the Parts Crib would provide audible status feedback using the computer's feedback, however, our dashboard needs to incorporate an alert system for incoming requests and it became clear that having an audible alert for both sign-ins and incoming requests would overwhelm the staff and make it difficult to distinguish what the alert was for. Additionally, there is no way for users to intuitively

reset or correct an incorrect Keypad entry or reset the sign-in process altogether. We discussed assigning one of the unused keys on the Keypad (* and #) for this purpose but decided it would slow the process down further as there is no way for students to know the current state of the login system (as stated above). Another design obstacle we came across during the development of the platform was the use of the Firebase real-time database to store our data. As the database stores data in the form of documents using JSON notation, it made it more difficult to store inventory, user and request information. While there are methods to flattening data in NoSQL databases, a traditional relational database would have better served the needs of our platform.

Conclusion

In conclusion, while the social distancing requirements and closure of facilities due to the SARS-CoV2 outbreak have created challenges for our team, we've still managed to accomplish much of what we set out to do. The issues surrounding working remotely with team members on different components of the project are relatable to those that arise in larger workplaces where multiple teams have to coordinate with one another to complete projects. We feel that the communication skills developed in producing deliverables over the latter period of this course lend themselves well to the workplace and can be valuable to future employers. Furthermore, the lessons learned during the integration phase of this project taught us the value of taking the fully integrated system (software and hardware) and how it'll be used by others into account when designing the prototype. Our team would like to thank and acknowledge our instructors Austin Tian and Kristian Medri for providing us with the necessary support to complete this project over the course of our final school year.

April 14/15 Results and Discussion, Conclusion, Prescreening, Report Mechanics and Structure Checklist: (section 10 of https://www.oacett.org/getmedia/9f9623ac-73ab-

[4f99-acca-0d78dee161ab/TR_GUIDELINES_Final.pdf.aspx](#)) your

repository/Documentation/GroupNameConclusionandChecklists.pdf

Prescreening Checklist

1. Has a Proposal for a Technology Report been submitted and accepted and a copy of the approved proposal included in the Technology Report?

Yes, we had submitted a proposal in the previous semester, approved by

professor Austin Tian who was our previous instructor for the first half of the

project in Fall 2019. (CENG 319,317). Yes, a copy of the approved proposal is

included in the report on Github.

2. Has the Technology Report been submitted within one year since the proposal was approved?

Yes.

3. Is the Technology Report consistent with the Proposal (as approved and with the comments and suggestions made by the proposal reviewer)?

Yes.

4. Is the Technology Report typed, double-spaced and justified left?

Yes.

5. Has a 12 point Arial, Univers, or similar Sans Serif font been used?

Yes, the font type used is Arial.

6. Is the body of the report a minimum of 3,000 words?

Yes.

7. Are the components included and in the following order: Title Page; Declaration of

Authorship; Approved Proposal; Abstract/Executive Summary; Table of Contents;

Lists of Illustrations/Diagrams; Body of the TR; Conclusion(s), and if applicable

Recommendation(s); Bibliography/Technical References; and Appendices?

Yes.

8. Is there a signed Declaration of Authorship?

No, because our group decided to not upload private signatures for security

purposes to our repository as it is public to everyone.

9. Is the report dated?

Yes, date of April 15th,2020 to coincide with the final report submission.

10. Is the Technology Report current? (The Technology Report should be less than 5 years old.)

Yes.

11. Is there a Title Page?

Yes.

12. Is there a Table of Contents?

Yes.

13. Does the Table of Contents correctly reflect the Components: Headings,

Illustrations/Diagrams and Appendices?

Yes.

14. Are the pages numbered with appropriate page breaks?

Yes, correctly numbered with odd page breaks for the start of each next section of the report.

15. Is there an Abstract/Executive Summary and Introduction?

Yes.

16. Does the body of the report contain Section Headings?

Yes.

17. Are there Conclusion(s), and if applicable, Recommendation(s)?

Yes.

18. Is there a Bibliography with appropriately cited Technical References?

Yes, there is a References section with properly cited references used for the project in APA format.

Report Mechanics and Structure Checklist:

1. Does the Title, in ten words or less, inform readers of the precise subject matter contained in the TR? A title should be concise and include key words for indexing.

No, it is 13 words.

2. Does the Abstract or Executive Summary provide a brief overview of the report in approximately 75 to 100 words?

It is approximately 191 words.

3. Does the Abstract or Executive Summary summarize the Conclusion(s), and if applicable, the Recommendation(s)?

Yes.

4. Does the Introduction state the reason the work was undertaken? What is the industry, organization or context? What is the problem?

Yes.

5. Does the Introduction cover the scope of the report? What is included and /or admitted, and what procedures are used?

Yes.

6. Do the headings and subheadings in the Body adequately and accurately describe the section or subsection content?

Yes.

7. Does the Body include information regarding the methodology? Does it indicate materials, equipment and procedures used and why they were selected over alternatives? Is there sufficient detail so that that the methodology can be duplicated by others?

Yes.

8. Does the Body include recent research findings?

No, there were not any new findings as we've done extensive research from semester five in CENG 317 and CENG 319.

9. Does the Body include results/data from the study?

Yes.

10. Are illustrations, tables, diagrams and charts clearly drawn, labelled and numbered?

Yes.

11. Is each Conclusion, and if applicable, each Recommendation, stated in a separate paragraph and in a positive way? Conclusions should not be qualified with "it seems", "probably", "it may be", or other words that dilute the strength of the conclusion.

Yes.

12. Are the References/Bibliography complete? All materials referenced in the TR should be represented in the list of References/Bibliography.

Yes.

13. Do the Appendices support the study? Do the Appendices include substantiating data and calculations? Extraneous material should not be included.

Yes.

14. Is the spelling correct? Has either the Canadian or USA spelling system been used consistently through the TR.

Yes, we fixed any typos, spelling, and grammatical errors based on feedback we received from our weekly deliverables.

15. Is the language free of jargon? Are acronyms properly introduced? Are abbreviations appropriate and correct? Can someone without specific expertise in the field read and understand the TR?

Yes.

16. Is the same voice (I, one, person, etc.) used consistently throughout the Technology Report? There should not be any switching from third person to first person or vice versa.

Yes.

17. Do the grammar and punctuation follow normally accepted rules of use? Use Ron

Blicq's text Technically Write or a similar grammar reference as a guide.

Yes.

18. Are thoughts and illustrations/diagrams/charts that do not belong to the writer properly identified and footnoted in the text? Are quotations indicated correctly? Are the authors referenced in footnotes and/or reference list? Do they include the author's name, the title of the article/book, the date of publication, and the publisher?

Yes.

Report Content:

This section evaluates the quality of the work completed when addressing the problem

statement/hypothesis. Fulfillment of these criteria leads to a TR that makes a

contribution to the field under study.

1. Are the Problem Statement and Hypothesis significant to the current state of the field/industry?

Yes.

2. Is the Methodology scientifically sound?

Yes.

3. Are the engineering technology and applied science principles used in the

Methodology and Analysis appropriate to the subject area?

Yes.

4. Are the Data and/or Results complete?

Yes.

5. Have the Mathematical formulae been applied appropriately?

No, mathematical formulae were not needed for this project.

6. Are the Mathematical calculations done correctly and accurately?

No, there were no calculations in this project.

7. Are the Illustrations/Diagrams/Charts technically correct?

Yes.

8. Is the Analysis of the results correct?

Yes.

9. Is the Analysis complete?

Yes.

10. Are the Conclusion(s), and if applicable the Recommendation(s), free of discussion, explanation and opinion?

Yes, expressed only in facts.

11. Do the Conclusion(s), and if applicable the Recommendation(s), relate to and resolve the Problem Statement and/or Hypothesis?

Yes.

12. Are the Conclusion(s), and if applicable the Recommendation(s), logical?

Yes, and next-steps are considered for marketing/client purchase, ways to improve the final product, and build on existing features for a wider consumption of the public and move the product into purchasing.

13. Does the report make a contribution to the industry/field of study?

Yes.