NFC Inventory Management System

4.0 Results and Discussion

Over several months of development, troubleshooting, and testing, the final product had to be demonstrated. Even though the basic concept and the components of the system have been completed there are certain things that still need to be addressed. Due to unforeseen circumstances, the project was unable to reach its full potential. The current hardware prototype is operational but was only tested within known conditions. Due to the general experience of the team and lack of facilities to test in, there may have been certain factors that may have been missed with the hardware. Also, since the team had only several months of experience with Android Visual Studio, and troubleshooting NFC protocols had taken several weeks to create a stable working application without it completely crashing. The app does crash but it is a rare issue that has yet to be solved because the cause is still unknown. With all the troubleshooting that had to be done between the hardware and the Android application, there was a limited amount of time that had remained for the web application which was not a requirement for the course. Only simple aspects of the web application were done to display the communication of data between the hardware, the mobile application, and the webserver /database. Regardless of its current flaws, it is able to demonstrate a basic concept of how the components of the NFC inventory Management System interact with each other through requesting items, tapping the mobile device to a built hardware prototype with an NFC reader, and the data within the database being managed over a web application. The app still maintains its core functions of singing in and out parts.

5.0 Conclusions

To make this solution a more viable one and applicable in the industry, the size must be reduced because the size in its current state would seem very unappealing. More research and development would be required to put all components on to a single PCB. This would require understanding how the PN532 NFC reader and VCNL410 proximity sensor chips operate to eliminate unnecessary interfaces that are not required for this solution such as SPI and UART. Also, developing coiled wires for the NFC reader is essential for the PCB because it will determine how far the mobile device can be picked up when it is being scanned. When all of these things are put onto a single PCB it will reduce the number of wires, headers, and solder which will also reduce the price to create the prototype when components are bought in bulk. In addition, with the compactness of the PCB, a smaller enclosure will need to be designed and tested so that it operates similarly to the current prototype. Following these steps will help in the production of the new prototype in much larger volumes.

With the app in its final stages of troubleshooting and polishing, other applications of the NFC Inventory Management System need to be found. Even though the project overall revolves around handling inventory, adjustments can be made to the system so that it can be applied to any industry that involves cards and/or memberships. To further the improvement of this system, it will be made open-sourced for anyone to contribute and/or use for their implementations of the system. Making it open source will allow the concept to gain popularity and be a more common concept in the near future.

Prescreening Checklist	Yes	No	IF NO, explain why.
Has a Proposal for a Technology Report been submitted and accepted and a copy of the approved proposal included in the Technology Report?	✔		
Has the Technology Report been submitted within one year since the proposal was approved?	✔		
Is the Technology Report consistent with the Proposal (as approved and with the comments and suggestions made by the proposal reviewer)?	✔		
Is the Technology Report typed, double-spaced and justified left?	✔		
Has a 12 point Arial, Univers, or similar Sans Serif font been used?	✔		
Is the body of the report a minimum of 3,000 words?	✔		
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?	✔		
Is there a signed Declaration of Authorship?		✔	No, due to privacy concerns.
Is the report dated?	✔		
Is the Technology Report current? (The Technology Report should be less than 5 years old.)	✔		
Is there a Title Page?	✔		
Is there a Table of Contents?	✔		
Does the Table of Contents correctly reflect the Components: Headings, Illustrations/Diagrams and Appendices?	✔		
Are the pages numbered with appropriate page breaks?	✔		
Is there an Abstract/Executive Summary and Introduction?	✔		
Does the body of the report contain Section Headings?	✔		
Are there Conclusion(s), and if applicable, Recommendation(s)?	✔		
Is there a Bibliography with appropriately cited Technical References?	✔		

Report Mechanics and Structure Checklist	Yes	No	IF NO, explain why.
Does the Title, in ten words or less, inform readers of the precise subject matter contained in the TR?	✔		
Does the Abstract or Executive Summary provide a brief overview of the report in approximately 75 to 100 words?	✔		
Does the Abstract or Executive Summary summarize the Conclusion(s), and if applicable, the Recommendation(s)?	✔		
Does the Introduction state the reason the work was undertaken? What is the industry, organization or context? What is the problem?	✔		
Does the Introduction cover the scope of the report? What is included and /or admitted, and what procedures are used?	✔		
Do the headings and subheadings in the Body adequately and accurately describe the section or subsection content?	✔		
Does the Body include information regarding the methodology?	✔		
Does the Body include recent research findings?	✔		
Does the Body include results/data from the study?	✔		
Are illustrations, tables, diagrams and charts clearly drawn, labelled and numbered?	✔		
Is each Conclusion, and if applicable, each Recommendation, stated in a separate paragraph and in a positive way?	✔		
Are the References/Bibliography complete?	✔		
Do the Appendices support the study?	✔		
Is the spelling correct?	✔		
Is the language free of jargon?	✔		
Is the same voice (I, one, person, etc.) used consistently throughout the Technology Report?	✔		
Do the grammar and punctuation follow normally accepted rules of use?	✔		
Are thoughts and illustrations/diagrams/charts that do not belong to the writer properly identified and footnoted in the text?	✔		

Report Content	Yes	No	IF NO, explain why.
Are the Problem Statement and Hypothesis significant to the current state of the field/industry?	✔		
Is the Methodology scientifically sound?	✔		
Are the engineering technology and applied science principles used in the Methodology and Analysis appropriate to the subject area?	✔		
Are the Data and/or Results complete?	✔		
Have the Mathematical formulae been applied appropriately?		✔	Not applicable, major calculations or formulas were not utilized for this project.
Are the Mathematical calculations done correctly and accurately?	✔		
Are the Illustrations/Diagrams/Charts technically correct?	✔		
Is the Analysis of the results correct?	✔		
Is the Analysis complete?	✔		
Are the Conclusion(s), and if applicable the Recommendation(s), free of discussion, explanation and opinion?	✔		
Do the Conclusion(s), and if applicable the Recommendation(s), relate to and resolve the Problem Statement and/or Hypothesis?	✔		
Are the Conclusion(s), and if applicable the Recommendation(s), logical?	✔		
Does the report make a contribution to the industry/field of study?	✔		