COMP 491 – Capstone Preparation

California State University Channel Islands,
Computer Science Program

Title of Project: Field Management System (FMS)

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1. Introduction

- *a brief paragraph about the background of the project (video game, simulator, mobile app...). What is the vision or view that motivates the work?*

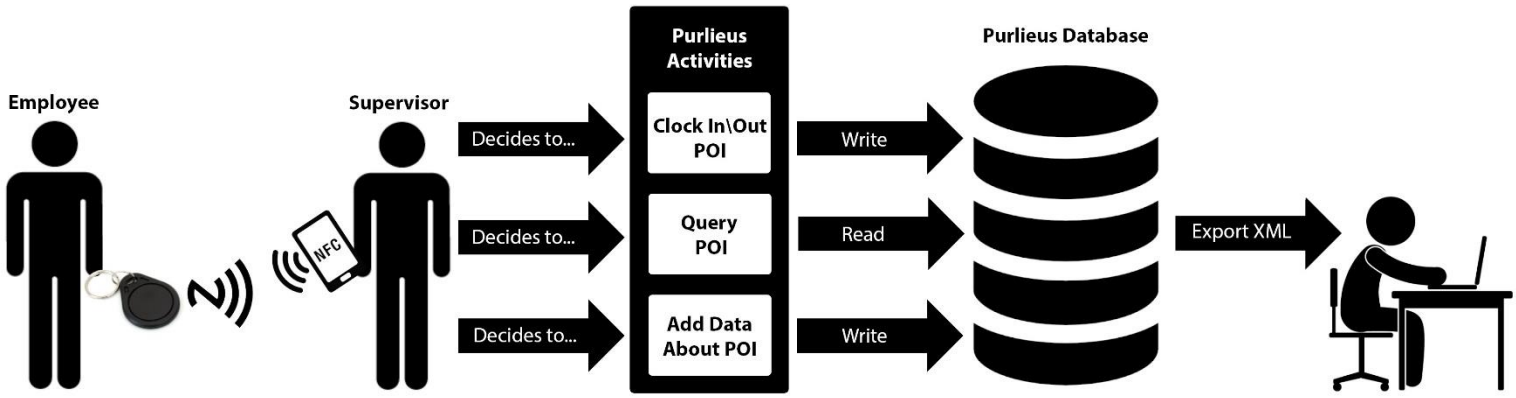
In the Agricultural industry, many of the supervisor's clock in farm workers on paper. They log hours, lunches, and keep track of the produce that was picked throughout the day. This is later finalized on a new paper copy and reported back to the office to be entered into the system. The supervisor or even a dedicated employee oversees entering the data into the system.

- *a brief paragraph about your specific project; what is special about your proposed system and what are its goals; why is it needed and by whom?*

The Field Management System (FMS) is a mobile application that will be used by supervisors to clock in employees. It will also record data that relates to the farmer's duties for that day. All data entry will be done onsite through a networked mobile device. An example would be how many crates of fruit were completed by employee X. The Field Management System will be composed of three parts. The first part is an Android application that will allow the user to check in employees using NFC. The employee will carry a NFC enabled key tag that the mobile application will pick up using Near-Field Communication technology on the mobile device. The second part will be a bridge that will allow the Android application to write to and read from its database server. The last part will be the database server which will house the data collected. The goal is to export the collected data to an excel file to eliminate the need for a dedicated person to enter the data.

2. Requirements of the Proposed System

Figure 1. Block diagram of the proposed system



The system consists of three parts. First, the block diagram in Figure 1 shows how the employees key tag, which is NFC enabled, is scanned by the supervisor using their mobile device. The mobile device uses the Field Management System application to detect the employees key tag using the built in NFC technology in the mobile device.

The next part takes place when the key tag is picked up by the application, the supervisor then has a list of options on what to do next. The first option is they can clock in or clock out an employee. The second option would be a search function that would query the database for an employee, date, or product. The final choice is the ability to add data to an existing employee or product. Depending on which option is selected, the data will either be written to, or read from the database as shown in the figure below.

The last part takes place back in the office where an employee will be able to export an XML file of the data collected on the field. It will show employees hours, product that was picked, tasks that were completed.

2.1 Functional Requirements

Add

The option to add data to the Purlieus database to existing employees, products, or tasks.

Search

The supervisor will be able to search the Purlieus database for employees, product, or tasks. This can be done with the employee's key tag or by simply using the search function on the Field Management System application.

Export

The ability to export the collected data to an XML file. This will reduce the need for having paper copies and the need for someone to do data entry for the paper copy.

2.2 Performance Requirements

Internet Connection

An internet connection will be required to push data to the database when out in the field. If there is no internet connection available, the FMS application will ping the sever in the background until a connection can be established. A fast internet speed is recommended if the user of the application will be reading and writing from the database. This will improve the wait time when adding data or querying the database for a specific entry.

Privacy

The application will require a login to access the features of the FMS application. Only a handful of employees, such as supervisors and upper management, will have the credentials to access the application. This is to reduce the risk of data manipulation and to increase the integrity of the data collected.

Platform Considerations

The goal is to have the FMS application on both Android and iOS. Testing will be done on the Android platform and if successful, an iOS port will be considered.

2.3 Cost

Components

NFC Key Tag: $ 1.61 10pcs
Android Phone: $499.00 1pcs
Database server: $ Free

Total: $500.61

3. Implementation

The first couple weeks will be dedicated to meeting with Chuy & Sons Labor located in Oxnard and analyzing the current system in place. They are a great example of company that would benefit of a system such as this. I'm also meeting with acquaintances that work in field to get a better understanding what happens on the front and backend. One thing to note is that this capstone is not being made for this company. Once the analysis is complete, the following weeks consists of designing the database, software, and interface. Once the design is complete, development of the system will take place and testing will commence. Testing will continue to ensure all issues are fixed and the application works as designed. The implementation will take place over five months, starting from late December and ending mid-May.

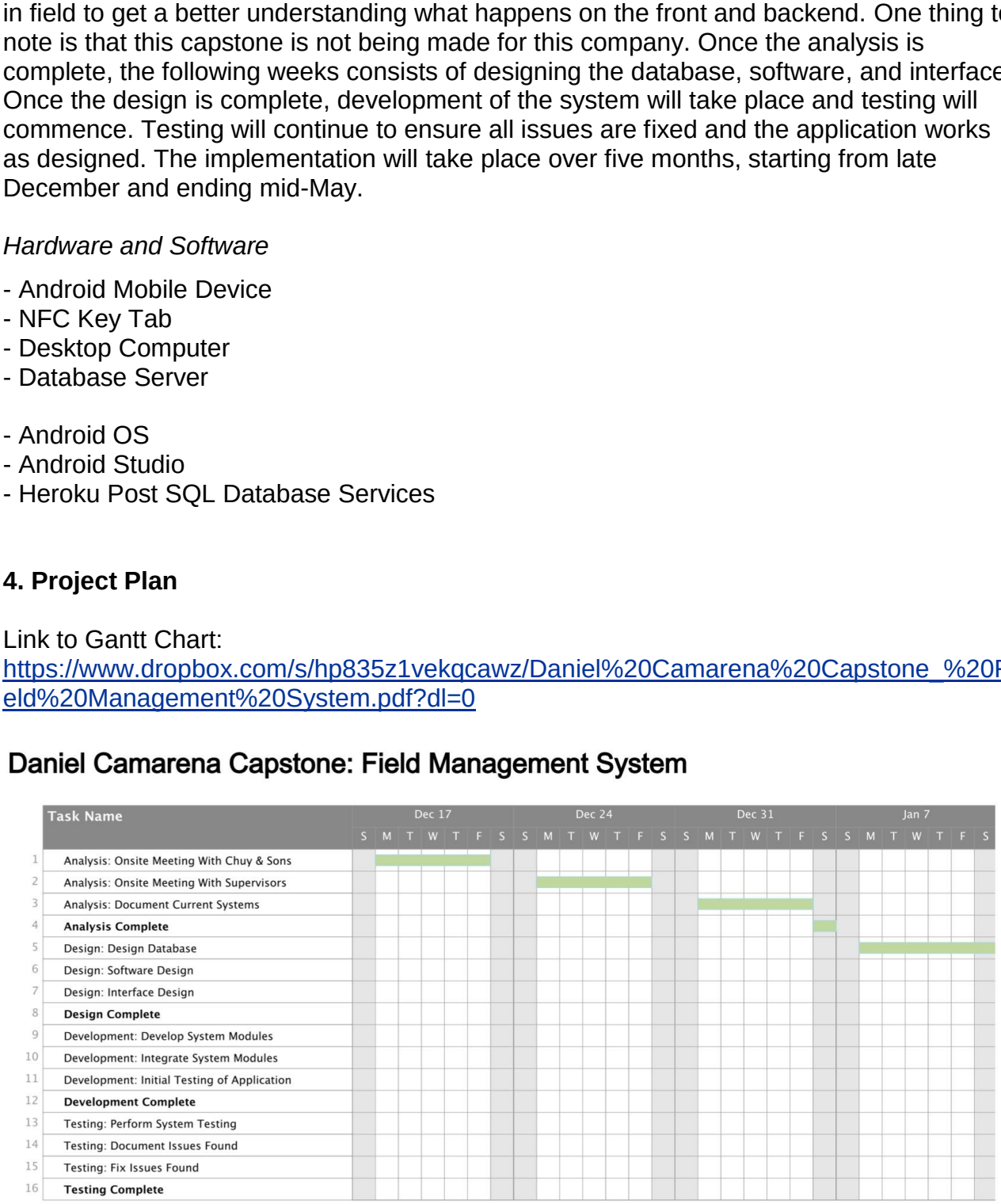
Hardware and Software

- Android Mobile Device
- NFC Key Tab
- Desktop Computer
- Database Server

- Android OS
- Android Studio
- Heroku Post SQL Database Services

4. Project Plan

Link to Gantt Chart:
https://www.dropbox.com/s/hp835z1vekqcawz/Daniel%20Camarena%20Capstone_%20Field%20Management%20System.pdf?dl=0



5. Conclusion

The goal of Field Management System (FMS) is to create an efficient way for farm workers to record data when out in the field. If the FMS mobile application is successful, it will eliminate the need for paper copies and trips to the office to submit data. If an internet connection is available on the mobile device, then the data collected would be instantly available to staff at the office. The staff at the office would be able to view the data on the mobile application or export the data as an XML file. This will also eliminate the need for repeated data entry. Usually the data is recorded at the site on paper, then it is finalized for submission, and finally it is entered to the company's system when brought to the office. The FMS application can potentially save money for companies, by reducing time spent for data collection and eliminating the need for a data entry employee.

6. References

[1] Chuy & Sons Labor Inc. 214 Bellafonte Ct. Camarillo, CA 93012