
Performance Livestock Analytics

Project Plan

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1. INTRODUCTION

1.1 Project Statement

We will create an intuitive iOS application for tracking veterinary medical information for cattle farmers. This application will help our clients record and monitor medical treatment and recovery information for their animals and facilitate data-driven analysis and decision making to help our users make more informed economic and medical decisions.

1.2 Project Purpose

This project would benefit our clients by giving them better metrics of profitability and animal care analysis for their livestock. This in turn helps make our clients more profitable and reduces operational costs resulting in cheaper prices for the rest of society.

1.3 Project Goals

For this project we are striving to create a veterinary medicine companion app to help our clients manage the health of cattle as well as make data driven decision about medical treatment. Our application would help cattle farmers track the recovery or non-recovery of their animals and would provide support for the monitoring of various health indicators, medical treatment data, and cost analysis. The application will include systems for secure access to the Performance Beef database for information tracking, a method of data entry for more efficient and effective application of medical treatment, and monitoring tools that allow our clients to quickly see how their animals are recovering as well as make informed decision about continuing treatment. To achieve this project we have identified the following project goals:

- Create a simple and intuitive user interface and data entry model that is easy to learn and painless to use in the field
- Develop methods of communication with the existing Performance Beef database systems in order to use and improve the information made available to our clients
- Build a information review system from synthesized data that allows our clients to make more effective and informed decisions about their animal health

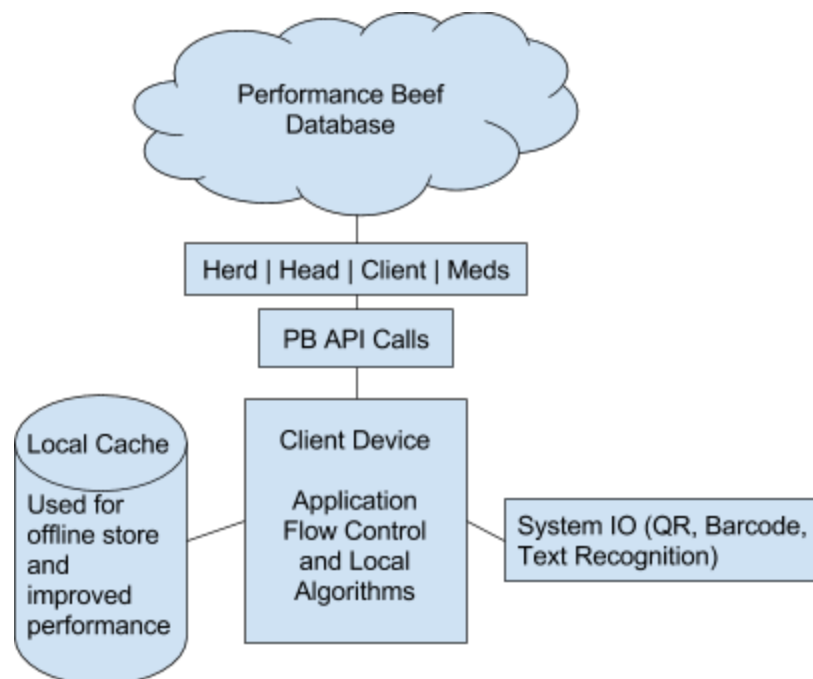
2. DELIVERABLES

In order to accomplish the project goals described above we will create a fully featured iOS application which will be compliant with all Apple development standards and publishable to the Apple App Store. This application will include:

- An easy to use data entry system that allows our clients to retrieve data for each head of cattle as well as add additional health and treatment information for later analysis
- Systems of connected access to Performance Beef for data retrieval and updates as well as methods of offline caching
- A home for synthesized and meaningful data that that allows our clients to see and learn from their treatment and health records

3. DESIGN

This project will be built upon a cloud based mobile development paradigm. Each application installation will operate on a single iOS device (iPhone or iPad) and will both cache information locally as well as sync client data against the existing Performance Beef database. iOS provides methods of easily caching information locally but communication with an external databases is more complicated. To solve this problem we will be using a set of API calls specifically developed for this project which will allow our application to retrieve and update the data stored for those individual heads of cattle which have received medical attention. We will use a smart identification system to allow our clients to quickly access the data associated with an animal while in the field administering treatment. We will also retrieve drug information from external resources to track the types of medications used and improve profitability analysis within the larger performance beef system. The algorithms associated with this analysis may run locally for smaller operations and analysis while macro-level data analysis will remain in the performance beef system.



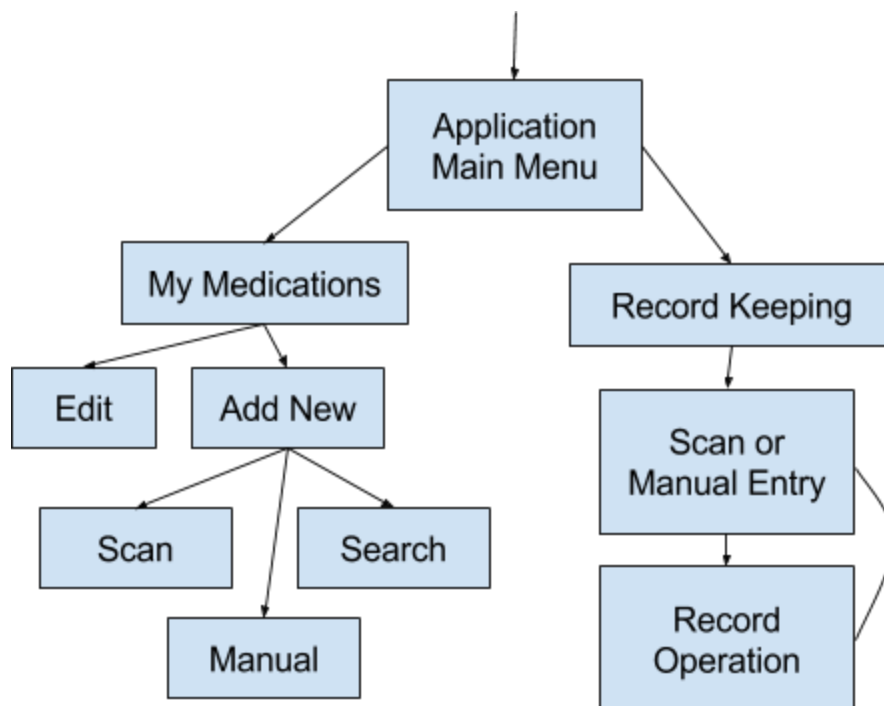
(Figure 1)

3.1 Previous Work / Literature

While there are a number of existing products available to iOS users that serve different veterinary purposes, there are no existing products which accomplish what we are proposing. A number of existing apps available list existing FDA approved medications^(1,2), however, these products do not provide tracking for individual animals and medications or doses of the drugs administered. In the market of web-based applications, there does appear to be an application, CattleMax⁽⁴⁾, which accomplishes very similar health data tracking systems as proposed in our application. The primary difference is that the CattleMax application appears to be exclusively web-based, and does not have an associated mobile application and the quality of their platform is disputed.

3.2 Proposed System Block Diagram

When a user opens our application they will be greeted with two primary methods of use. In the first use case the client will likely be in the field administering treatment to different animals and so our application will present them with an iterative data entry system which allows the user to quickly identify the animal being treated and then record additional health and treatment information during that specific encounter. In the second use case the client will analyze the data they have entered and make decisions from that information. This could include analysis of animal health and the individual head level, etc.



(Figure 2)

3.3 Assessment of Proposed Methods

Because we are developing a mobile application, there are limited approaches for development and deployment. We plan to create an iOS exclusive application which means we will have to comply with the Apple development standards and AppStore guidelines.

3.4 Validation

Our application's primary function will be to track and add data to the existing Performance Beef database, most analysis of that data will be handled server-side and primarily viewed via the existing web application. This means that our solution's functionality will be confirmed by data validity and the usability of our platform. Because the product is being used by farmers it needs to be intuitive, stable, and fast for use in the field.

4. PROJECT REQUIREMENTS / SPECIFICATIONS

To complete this project we have identified the following functional and nonfunctional requirements.

4.1 Functional

1. Compile livestock drug database information
2. Setup communication with Performance Beef database
 - a. Retrieve cattle head data from database for edits and additions
 - b. Configure user medications list and develop client control systems
3. Systems for scanning heads of cattle and medical information
4. Create a simple and intuitive user interface
5. Systems of data analysis for analytics views and decision making aids

4.2 Non-Functional

1. Keep offline connectivity and usability by caching specific data
2. Be able to recover after an application failure
3. The application will be able to function on all scales, small to large
4. All screens should be easy to use with a logical workflow
5. The application will be easily maintained and expanded
6. The application will be written for, and must be effectively tested for iOS

4.3 Standards

While developing this product we will operate within the Agile process and adhere to the Apple development and release guidelines associated with releasing to the AppStore. This policy is particularly strict when dealing with medication information even for non-human use so we will have to be careful when interpreting these guidelines. To avoid mistakes here we will avoid recommending any specific medications or any dosage information. There are a few other release guidelines we will need to follow mostly in the area of data security and communication protocols⁽³⁾. The complete development guidelines are included for as the third reference link in this document.

5. CHALLENGES

Our team is starting on this project with limited to no experience with iOS and Swift development. Learning the OS and language will likely be the first hurdle for the project but we feel the learning curve for these technologies will be very manageable as we have already begun the process of orientation and the community response to Swift as well as iOS development is overwhelmingly positive so we are trusting the opinions of those developers who have more experience than us. The second major hurdle we predict is system interactions with the existing Performance Beef database. We won't have access to this database directly so it will be very important that we are clear in our API needs and consistent in how we are storing, using, and updating user data.

6. TIMELINE

Our development cycle for this project will be divided between two semesters. We have separated our development timeline accordingly.

6.1 First Semester

First Semester Development Timeline

TASKS	START DATE	END DATE	% COMPLETE
Design Application Architecture	02/17/2017	03/01/2017	100%
Create Initial Project and Test Environments	03/01/2017	03/07/2017	100%

Implement Client and Medications Databases	03/08/2017	03/14/2017	100%
Develop Client UI for Editing/Viewing Data	03/15/2017	03/21/2017	100%
Develop Login and Authentication Systems	03/22/2017	4/01/2017	100%
Polish, Test, and Improve UI	04/01/2017	04/20/2017	75%

6.2 Second Semester

The second semester of the project will be dedicated toward improvements product design and feature expansion. Some of the additional features we hope to implement during this second phase are listed below:

- Barcode scanning for medication identification
- Analytics for tracking and data-driven decision making
- Medical diagnostics through RFID or other external devices
- Extended or highly polished user interface

7. CONCLUSIONS

Our goal for this project is to create an iOS application from start to finish which will be released to the Apple AppStore. Our application will allow farmers to track the health of their cattle by tracking of medication use and sickness. With this data our clients can analyze their herds in real time. Our plan begins with creating and designing a pull/fetch communication system with support for cross-communication between different databases. Once we are able to use the different databases simultaneously we will then implement technical/graphical features. These features will improve client interaction with their data by creating an easy-to-use one-step solution and systems like barcode scanning, analytics, etc. will allow management and use from the field.

8. REFERENCES

1. UPenn Veterinary Apps Library:
<http://guides.library.upenn.edu/mobilehealth/vetapps>
2. Veterinary Practice News App Article:
<http://www.veterinarypracticenews.com/Embrace-the-World-of-Veterinary-Apps/>
3. Apple's App Store Review Guidelines:

<https://developer.apple.com/app-store/review/guidelines/>

4. CattleMax website:

<http://www.cattlemax.com/>

9. APPENDICES

Not applicable at this time.