CS Capstone Requirements Document

APRIL 19, 2019

App to Support Field Diagnostics in Veterinary Medicine

PREPARED FOR

Oregon Veterinary Diagnostic Laboratory

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Abstract

Currently, there are many difficulties for veterinary pathologists trying to perform remote diagnostics. There are not any effective ways for people out in the field collecting samples to communicate with specialized experts located in laboratories. As a result, this project will involve creating an Android mobile application that will be used as a bridge to connect the field personnel with the veterinary pathologists in laboratories. With this mobile application, the field personnel will be able to take pictures of the individual that is being analyzed and then send the pictures along with other data such as the patient, location, and time to a pathologist. The pathologist will then be able to use the provided information to perform a necropsy and send feedback to the field personnel. This project is intended to support remote field diagnostics in veterinary medicine.

CONTENTS

1 CHANGE LOG

Section	Original	New
System Functions	- Can create field reports that can contain pictures and text information such as date, location, and patient - When viewing a report, a user can write messages that will be sent to the other users involved in the report - Take pictures using Android device's camera - Can write additional text details using drop-down menus in the application - When connected to the internet, the user who created the report can send it to another user - When not connected to the internet, the application will send the report as soon as a connection is established - Sending a report automatically updates the MySQL database - The MySQL database will have a web API Interface - A SQLite database for native storage on the phone - Both databases will be expandable and searchable - Only users with the proper credentials can use the application - Only the users who created and received the report can view the report - Stretch Goal: Provide instant feedback on image quality for each picture taken	- Now uses the word "submission" instead of "report". - Now any user can use the application, but only users with proper credentials can send a submission through the application.
Functional Requirements	When field personnel need to send reports to the lab, they can fill out a form on the app which will have menus and prompts as well as a quota for images and text entry. The app needs to receive messages and feedback about reports from people in the lab. They might need to request more information or give instructions regarding next steps in the diagnostic process. The app will need to ensure all needed information has been included in each report to minimize requests for additional or forgotten information. Users will need to log in to the app to access stored information and to attach their credentials to any reports they send. This will give them permission to see previous reports and messages sent to them from the lab. They should be able to log out though the menu or settings screen. Users in the lab will be able to log into the database and search its contents for past reports. They will be doing this using a web interface to allow multiple user to access the database without having to search using SQL. Through this web interface, users will be add comments to reports and then send them back to the user. The app needs to receive messages and feedback about reports from people in the lab.	- Now uses the word "submission" instead of "report". - Clarified that the website is a stretch goal.

Section	Original	New
User Characteristics	This Android application will be used by staff members and clients of the Oregon Veterinary Diagnostics Laboratory. There will be people out in the field who are using the application to create and share reports. In addition, there will be users in the laboratory who will use the application to view reports and send feedback to the field personnel.	• Now uses the word "submission" instead of "report".
User Interface	Users will need to log in to the app to access stored information and to attach their credentials to any reports they send. This will give them permission to see previous reports and messages sent to them from the lab. They should be able to log out though the menu or settings screen. When field personnel need to send reports to the lab they can fill out a form on the app which will have menus and prompts as well as a quota for images and text entry.	• Now uses the word "submission" instead of "report".
Software Interfaces	Each report will be assigned a case number so it can be easily found again by querying the database from the app or the interface in the lab. The lab interface is yet to be determined. The app could send the field reports and the lab could review the reports using a web interface, but that might be out of the scope of the project and is a stretch goal.	• Now uses the word "submission" instead of "report". • Clarified that the web interface is a stretch goal.
Information Management	Users will need to log in to the app to access stored information and to attach their credentials to any reports they send. This will give them permission to see previous reports and messages sent to them from the lab.	• Now uses the word "submission" instead of "report". • Clarified that the web interface is a stretch goal.

2 INTRODUCTION

2.1 System Purpose

This mobile application is intended to serve as a means of communication between personnel in the field and pathologists in the laboratory. Its purpose is to improve a team's ability to perform remote diagnostics by providing a convenient way for teams to communicate information.

2.2 System Overview

2.2.1 System Context

The Oregon Veterinary Diagnostic Laboratory (OVDL) wants to create an efficient way for field personnel and lab staff to communicate for remote diagnostics. A lack of communication can make remote diagnostics difficult because the pathologists in the laboratories can't analyze the sample and make decisions about sample processing until the sample is back in the laboratory. This can prove problematic if the pathologist decides that further action is needed. For example, they may decide that they require additional samples and data, but the field personnel may not still be in the field or the original specimen may no longer be available when this decision is made.

2.2.2 System Functions

- Can create field submissions that can contain pictures and text information such as date, location, and patient
- When viewing a report, a user can write messages that will be sent to the other users involved in the report
- Take pictures using Android device's camera
- Can write additional text details using drop-down menus in the application
- When connected to the internet, the user who created the report can send it to another user
- When not connected to the internet, the application will send the report as soon as a connection is established
- Sending a report automatically updates the MySQL database
- The MySQL database will be able to use a web API
- A SQLite database for native storage on the phone
- Both databases will be expandable and searchable
- Only users with the proper credentials can send submissions through the application
- Only the users who created and received the report can view the report
- Stretch Goal: Provide instant feedback on image quality for each picture taken

2.2.3 User Characteristics

This Android application will be used by staff members and clients of the Oregon Veterinary Diagnostics Laboratory. There will be people out in the field who are using the application to create and share submissions. In addition, there will be users in the laboratory who will use the application to view submissions and send feedback to the field personnel.

2.3 Definitions

TABLE 1
Definitions

Term	Definition
Necropsy	Autopsies of non-human species
Pathology	The study of the causes and effects of diseases, especially the branch of medicine that deals with the laboratory examination of samples of body tissue for diagnostic or forensic purposes

3 REQUIREMENTS

3.1 Functional Requirements

The OVDL wants a native Android mobile application that collects field data and images, stores the information on a native SQLite database, sends them to the lab's MySQL database, and gets real time feedback from the lab. When field personnel need to send reports to the lab, they can fill out a form on the app which will have menus and prompts as well as a quota for images and text entry.

The app needs to receive messages and feedback about submissions from people in the lab. They might need to request more information or give instructions regarding next steps in the diagnostic process. The app will

need to ensure all needed information has been included in each report to minimize requests for additional or forgotten information.

Users will need to log in to the app to access stored information and to attach their credentials to any submissions they send. This will give them permission to see previous submissions and messages sent to them from the lab. They should be able to log out though the menu or settings screen.

Users in the lab will be able to log into the database and search its contents for past submissions. They will be doing this using a web interface (stretch goal) to allow multiple user to access the database without having to search using SQL. Through this web interface, users will be add comments to submissions and then send them back to the user.

3.2   Usability Requirements

A stretch goal for the app is having a feature that analyzes the images taken using the phone's built-in camera and gives the user feedback on image quality. It should only send images that are well lit, dont have shadows or reflections, and clearly show the subject. If there is time we will try to implement it because it would be beneficial for the client.

3.3   Performance Requirements

Some of the remote locations might not have a stable internet or cellular connection so the data will need to be stored until a connection can be established. Otherwise the data is stored locally on the app

3.4   Interfaces

3.4.1   User Interface

The User Interface will be the Android app which should be easy to navigate for a user with only a basic knowledge of the app's functions.

Users will need to log in to the app to access stored information and to attach their credentials to any submission they send. This will give them permission to see previous submissions and messages sent to them from the lab. They should be able to log out though the menu or settings screen. When field personnel need to send submissions to the lab, they can fill out a form on the app which will have menus and prompts as well as a quota for images and text entry.

3.4.2   Software Interfaces

A SQLite database must be able to store data and images from field users. The lab will review these images be using API which is connected to a MySQL Server. Each report will be assigned a case number so it can be easily found again by querying the database from the app or the interface in the lab. The lab interface is yet to be determined. The app could send the field reports and the lab could review the reports using a web interface, but that is a stretch goal.

3.5   System Modes and States

3.5.1   Network Connection

Some of the remote locations might not have a stable internet or cellular connection so the data will need to be stored until a connection can be established. Once the connection is made the data should be uploaded and the lab personnel should be alerted.

3.5.2   Database Synchronization

The app must work with and without an internet connection and be able to store data until an internet connection is made so the data can be sent to the database. An optional feature is allowing the user to decide if they want the data sent automatically when the phone connects to the internet or if they want to manually send the data once they find an internet connection.

3.6   System Security

The application must adhere to the OVDL's information security needs and keep track of users account permissions.

3.6.1   Information Management

The field personnel should only be able to access the data they gathered and the information sent to them by the lab, not data gathered by other field personnel. There is a hierarchy of permissions for people working in the lab as well and they must only have access to the data they are allowed to see. Users will need to log in to the app to access stored information and to attach their credentials to any submissions they send. This will give them permission to see previous submissions and messages sent to them from the lab. They should be able to log out though the menu or settings screen.

3.6.2   Policies and Regulations

We must get permission before using any of OSU's logos or images.

4   VERIFICATION

4.1   Debugging

The app's code will be consistently debugged by Android Studio's debugger.

4.2   Field Tests

The delivered app should be able to collect the data and images, send them to the lab through a database, and receive messages from the lab. It will need to pass a field test to prove it works and all the features are correctly implemented.

5   APPENDICES

5.1   Assumptions and Dependencies

- We are assuming users will be English speakers and have some experience using Android phones.

5.2 Acronyms and Abbreviations

- OVDL - Oregon Veterinary Diagnostic Laboratory
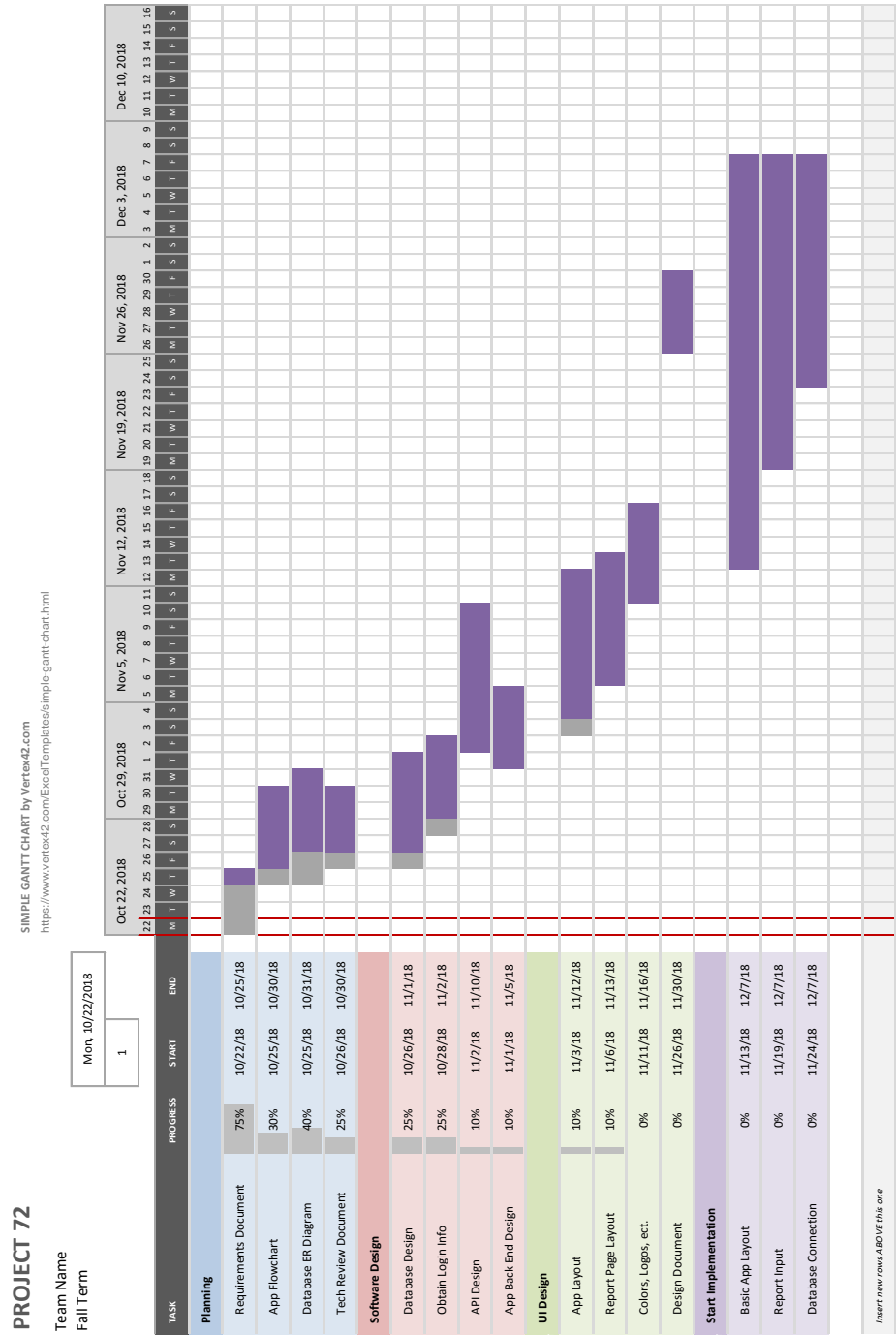- OSU - Oregon State University

6   GANTT CHART

PROJECT 72

Team Name
Fall Term

Mon, 10/22/2018

1

TASK	PROGRESS	START	END
Planning			
Requirements Document	75%	10/22/18	10/25/18
App Flowchart	30%	10/25/18	10/30/18
Database ER Diagram	40%	10/25/18	10/31/18
Tech Review Document	25%	10/26/18	10/30/18
Software Design			
Database Design	25%	10/26/18	11/1/18
Obtain Login Info	25%	10/28/18	11/2/18
API Design	10%	11/2/18	11/10/18
App Back End Design	10%	11/1/18	11/5/18
UI Design			
App Layout	10%	11/3/18	11/12/18
Report Page Layout	10%	11/6/18	11/13/18
Colors, Logos, ect.	0%	11/11/18	11/16/18
Design Document	0%	11/26/18	11/30/18
Start Implementation			
Basic App Layout	0%	11/13/18	12/7/18
Report Input	0%	11/19/18	12/7/18
Database Connection	0%	11/24/18	12/7/18
Insert new rows ABOVE this one			

Fig. 1. Fall Term 2018