Problem Statement

CS 461 Senior Software Engineering Project 72 Fall 2018

Katherine Jeffrey

October 16, 2018

Abstract

The Oregon Veterinary Diagnostic Laboratory (OVDL) wants to create an efficient way for field personnel and lab staff to communicate for remote diagnostics of animal diseases. The pathologists in the lab can not go to all the remote locations and receiving physical samples takes time, but they need to make quick preliminary diagnoses. An Android app for field personnel that can send reports directly to the OVDL would make this possible. The final product of the project will be a fully functioning android application that can send data and high quality images to a database that can be accessed at the lab and through the mobile application as well as receive messages from the OVDL.

1 Definition and Description

The Oregon Veterinary Diagnostic Laboratory (OVDL) sends field personnel to conduct remote diagnostics for animal diseases and perform autopsies. The veterinary pathologists in the laboratories need to view the data and images collected at remote locations so they can make a preliminary diagnosis and decide if further action is needed. They need the data to be stored in a way that is accessible to both remote and lab personnel so they can easily find and refer to it. The veterinarians in the lab need to be able to send messages to field personnel about the diagnostics and give feedback on data collected. They might need to request more information or give instructions regarding next steps in the diagnostic process. 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.
When images are taken in the field they need to be high quality so the veterinarians in the lab can clearly see the important information they contain. Discoloration, shadows or reflections could distort the image and lead to a misdiagnosis or other problems. When a person in a remote location takes a picture of an autopsy they need to know right away if the image is clear enough to be sent to the lab.
The data collected can be sensitive and needs to be protected so users will be required to give their credentials to access it. 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.
The OVDL wants to test how effective remote diagnostics can be, to do this the data sent from the field must be accurate and precise. Also, the method of sending data should not require much training to use in the field. If the tests are successful it could lead to an international spread of remote diagnostic work.

2 Proposed Solution

The OVDL wants a native Android mobile app that collects field data and images, sends them to the 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.
Ideally the app will have 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. This part of the project is not a core requirement, but if there is time we will try to implement it because it would be very beneficial for the client.
Once the data is collected it will be sent to a database as soon as an internet connection is established. The data will be stored in the phone until it can be transmitted. Ideally there will be a setting where users can decide to sync automatically when connected or send the data manually when they know they are connected.
The database must be able to store data and images from field uses and be accessible through an API on the app and at the lab. 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 as emails or there could be a web interface, but that might be out of the scope of the project.
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.
The app will need to ensure all needed information has been included in each report to minimize requests for additional or forgotten information. The app should streamline the remote diagnostics process, be a useful tool for veterinarians, and make filling out paper report forms unnecessary.

3 Performance Metrics

The goal of this project is to develop from a prototype a fully functioning android application while testing the feasibility of remote support of post mortem diagnostics. 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.
The application must adhere to the OVDLs information security needs and keep track of users account permissions. 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.
The clients would also like the app to test the image quality of the pictures users take and give them feedback so the images they send to the lab are clear and well lit. This feature might be out of the scope of this project but if possible we want to implement it because the pictures are important for diagnosing many diseases.
The app will need to be easily distributable, most likely through Google Play so field personnel in remote locations can install it. It will need to pass a field test to prove it works and all the features are correctly implemented.