eRhODIS™

Design Specification
Overall System and Interface Design

RhODIS® Android Development : eRhODIS™ Application

Version 1.3

This document contains the design specification of the eRhODIS™ application and a detailed description of the system interface and design of the model, views and controls.

Change History

Date	Version	Description	Updated By
05 August	1.0	Created Document	Gideon
05 August	1.0	Added main sections as discussed.	Gideon
28 October	1.1	Added Amazon EC2 services.	Gideon
30 October	1.1	Added Design mock-ups of ui	Gideon
18 November	1.2	Updated Database Design	Gideon
20 November	1.2	Updated Device Database Design	Gideon
7 February	1.3	Added Protection to databse for public documentation viewing.	Gideon

Changes will be displayed in red throughout the document.

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Introduction

RhODIS® (Rhino DNA Index System) is a project that was initiated by the Veterinary Genetics Laboratory of the University of Pretoria in order to help with the plight of the rhinos. The Veterinary Genetics Laboratory is collecting DNA samples of rhinos across the country to create a database using the unique DNA profile of individual rhinos.
The goal is for all rhinos to be on the system. This will deter poachers and assist in forensic prosecutions.

RhODIS® was first used in a rhino poaching case in 2010 and resulted in a Vietnamese citizen being sentenced to 10 years imprisonment for having rhinoceros horns from poached rhinos in his baggage when he was apprehended at OR Thambo International Airport. South African National Parks (SANParks) have partnered with RhODIS since 2010 and in association with the Forensics Science Laboratory of the South African Police Services have played a key role in the development and implementation of the RhODIS Kit for sample collection.

The South African Department of Environmental Affairs introduced amendments to the norms and standards for sample collection and identification of live and poached rhinos under the National Environmental Management: Biodiversity Act 10 of 2004 which requires that samples are collected from all poached rhinos and other rhinos that are immobilized or die using RhODIS® kits which then have to be submitted to the Veterinary Genetics Laboratory for inclusion on the RhODIS® database. A number of other bodies including the South African National Parks Honorary Rangers, the World Wildlife Fund, corporates and individuals have donated funds to support the development and implementation of RhODIS®. eRhODIS™ has been developed as an adjunct for RhODIS® to aid in the collection of samples and information relevant to the RhODIS® project and Samsung is the exclusive technology partner associated with this development.

Purpose

The purpose of this document is to provide a comprehensive overview of the eRhODIS™ application that the Veterinary Genetics Laboratory of the University of Pretoria together with RhODIS® will be developing.

This document will serve as a tool to cater for the end-user, who may use the eRhODIS™ android application. This document will further provide a view from a design perspective, not only in terms of the user interface, but also the inner architecture of the system. This document uses a detailed approach to show how each part of the system as well as the system in its entirety will be implemented.

The intended audience of this document would be any person interested in the design principles behind the eRhODIS™ android application.

Document Conventions

Conventions used in this document:

   Use-Case notation using the Unified Modelling Language (UML).

Project Scope

The main idea of the application is that it ensures that all information needed to ensure that DNA samples are collected from poached and live rhinos are collected in a standard way and that all the necessary information to provide details of the chain of custody for these samples are automatically collected and uploaded to a secure database for future use should the need arise. All information, including GPS coordinates, photos, sample information is uploaded and stored on the cloud server.

It also ensures that key required data is always collected and uploaded. Use of the application also enhances data accuracy and does away with the need to manually enter any of the data after receipt of the samples in the Laboratory.

The application also uses the S-Pen to capture the authorised person's signature which therefore provides further integrity for the chain of custody features incorporated into the application.

References

Android developer guidelines http://developer.android.com/design/index.html

Related Documents

eRhODIS™ Requirements Specification.
eRhODIS™ Architectural Specification.

System Description

The eRhODIS™ application will serve as a utility tool for end-users to collect samples and relevant data in the field in the event of a rhino poaching or related incident, where after the data will be stored and uploaded to a secure cloud server.

The application ensures that all information needed to ensure that DNA samples are collected from poached and live rhinos are collected in a standard way and that all the necessary information to provide details of the chain of custody for these samples are automatically collected and uploaded to a secure database for future use should the need arise. All information, including GPS coordinates, photos, sample information is uploaded and stored on the cloud server.

It also ensures that key required data is always collected and uploaded. Use of the application also enhances data accuracy and does away with the need to manually enter any of the data after receipt of the samples in the Laboratory.

The application also uses the S-Pen to capture the authorised person's signature which therefore provides further integrity for the chain of custody features incorporated into the application.

User account information are automatically set to a demo account upon the first installation of the application on the device. The specific user's account details are provided and preconfigured by RhODIS® officials and administrators before the device is used by the end user. These account details will also be used by the user to log into the erhodis backed to view their submissions.

The application provides online and off-line capabilities for areas where users have no internet connectivity i.e. cell phone reception or wi-fi coverage.

Physical View

Physically, the system the this android application uses is a N-Tier system between the android application and the MySQL server (hosted on AWS) hosting the database content and providing a means for the android application to communicate with it.
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On the android device itself, the android library naturally makes use of the MVC design pattern and provides libraries and built in classes for user code to interact with device facilities such as the GPS or and the camera intent. This is generally referred to as the android service manager.

The models that control the views will be used to interact with device functions and to interact with a MySQL database which stores user data and any data that the user submits.

The model also interacts with other API's and web services that are needed to connect securly to amazon's web services.

In essence, this is the DRY principle and MVC pattern working together.

Database Design: MySQL Server
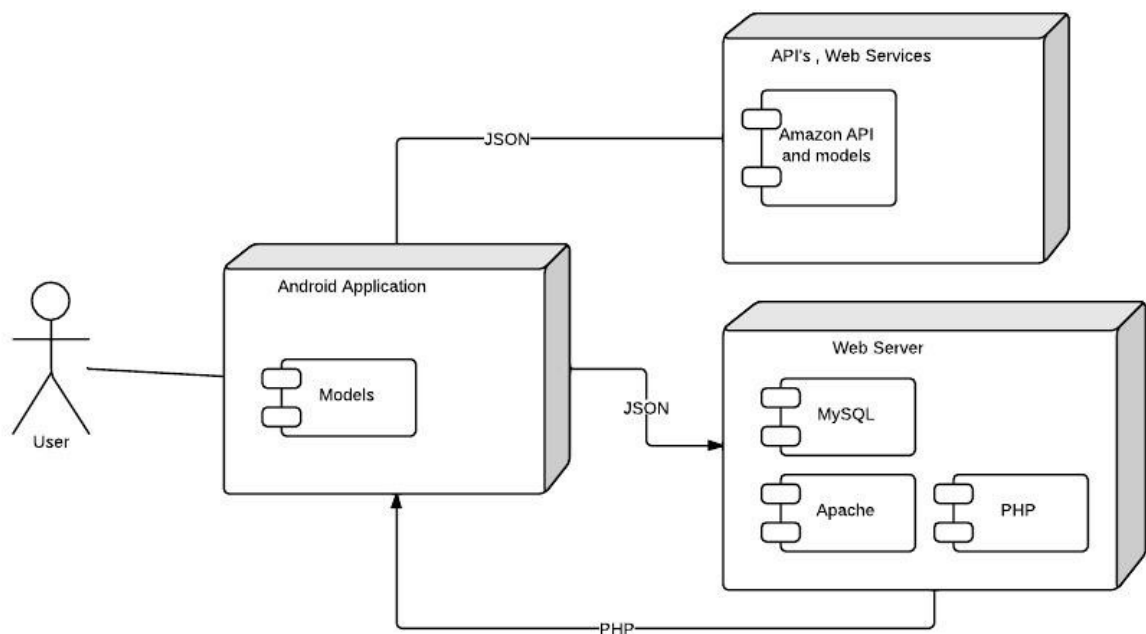
This is a brief overview of the MySQL database design on the eRhODIS server in the form of an ERD (Entity Relational Diagram).

Database Design: Android Device

This is a brief overview of the SQLite Database Design on the device in the form of an ERD (Entity Relational Diagram).

User Interface

Example Storyboard Mock-ups

Splash Screen
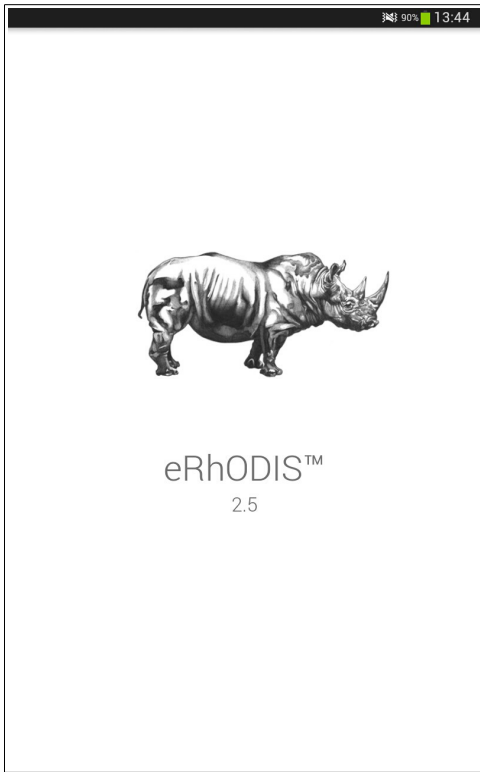
Main Screen
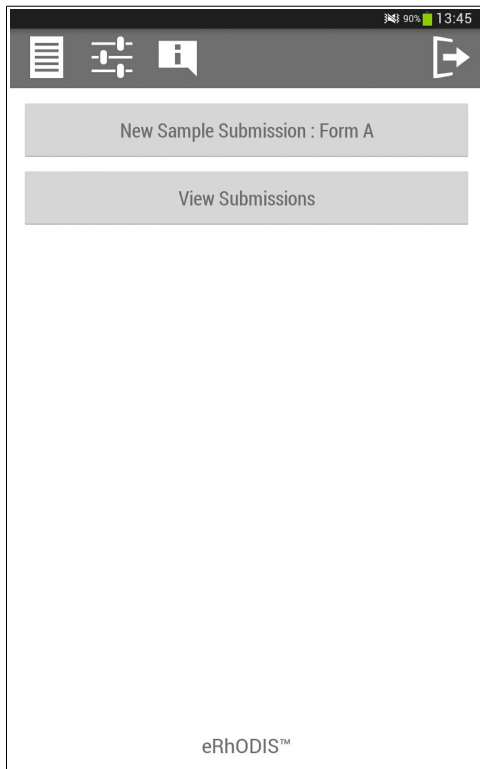
View Submission Screen

GPS Screen

Example of image taken
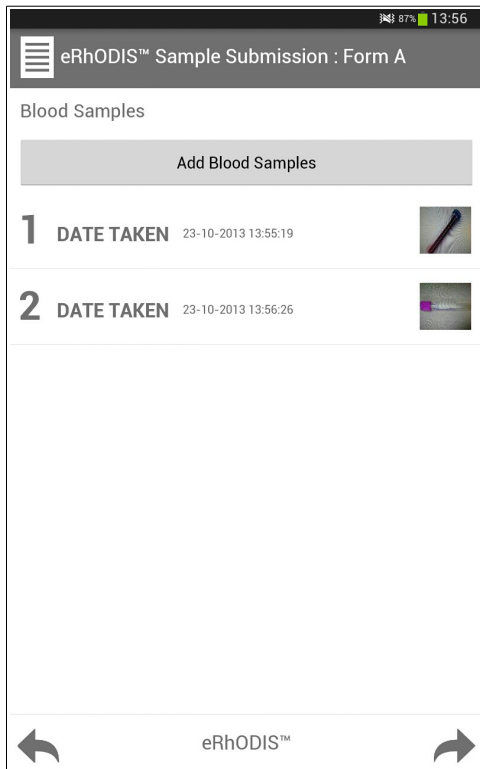
Submission of blood samples

Animal Horn Details

Area Details

Signature

Confirmation email with PDF

Examples of the web server back end
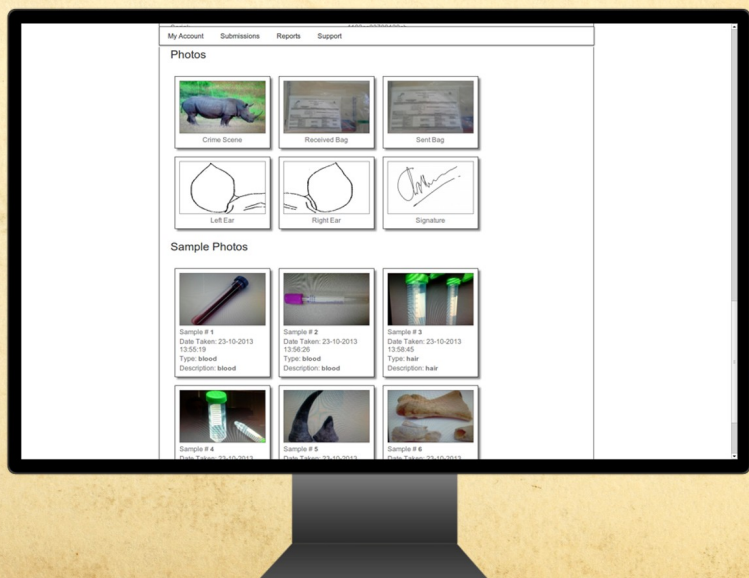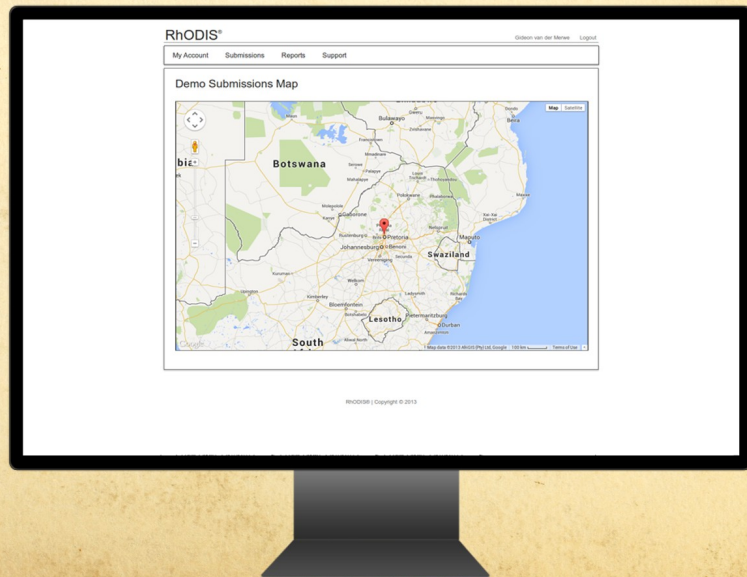

eRhODIS™
- *List of Submissions.*

eRhODIS™
- *View / Edit Submission.*

- *View GPS & location info.*

- *View Photos.*

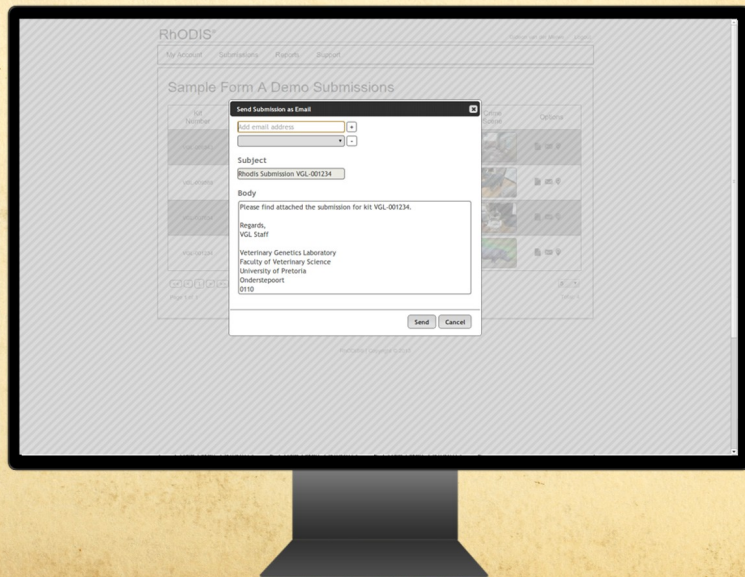# eRhODIS™

*- Interactive
GPS
functionality.*
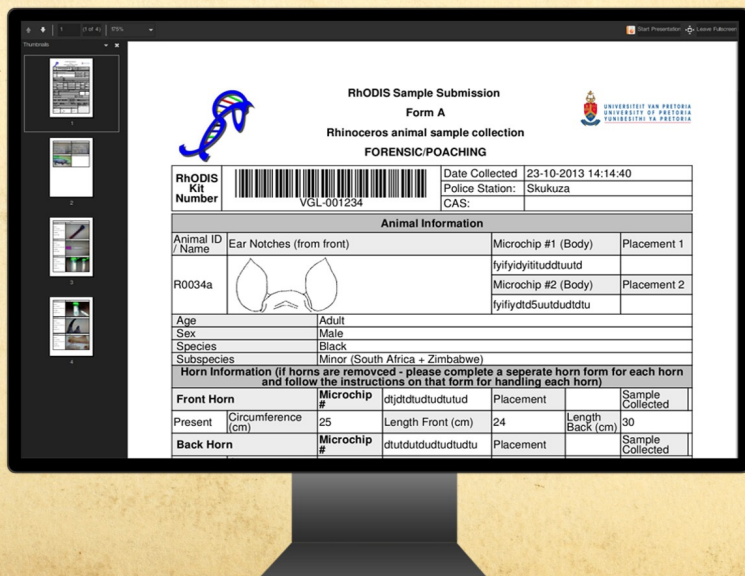

eRhODIS™

*- Interactive
GPS
functionality.*

eRhODIS™
- E-mail a submission.

eRhODIS™
- Export to PDF.

Glossary

Term	Meaning
AWS	Amazon Web Services
Cloud Server	A Server that is maintained within a cloud computing infrastructure.
Cloud Computing	Computing concepts that involve a large number of computers connected through a real-time communication networks such as the Internet.
Database	A database is an organized collection of data.
DBMS	Database Management System
eRhODIS™	Electronic RhODIS®
GPS	Global Positioning System
MVS	Model View Control
RhODIS®	Rhino DNA Indexing System
PDF	Portable Document Format
Server	A computer system that runs one or multiple servers to provide services over a network and deliver content on demand.
Web Server	A Server providing web services such as retrieving web pages and/or data from a database.
UML	Unified Modelling Language