Natalie Edward - X12117684

X12117684@student.ncirl.ie

BSc (Hons) in Computing

Networking and Mobile Technologies

1. Executive Summary

The purpose of this project is to present how a mobile application can contribute and be of benefit in the aid of finding a missing person in Ireland.

Ireland has seen a sharp increase in the number of persons reported missing over the last decade, this currently stands at a difference of 81%. In 2014 9,179 people were reported missing in Ireland, 7,395 of these were considered high risk, 731 were medium risk and 1.053 were low risk.

We often see information on social media regarding missing persons. However, sometimes this data is old and that case may have been resolved. Additionally, other than the ability to share this information through the platform we see it, there is no other means to contribute in the search.

This application will become an easy to use tool for users to contribute, they will become an extra resource in the search and location of a person reported missing. This will be achieved through functions such as capture an image through the device, report a sighting using the GPS functionality of a device and also receiving push notifications when that device enters a geo-location of where a person was recently reported missing.

The hope is that this will give the opportunity to efficiently gather information and distribute that information in a timely manner.

Research

There is no one reason that a person may go missing and sometimes several factors can contribute to this. Disappearances can be categorised as follows:

Intentional – An individual may be experiencing difficult situations in their lives and choose to disappear as a way to escape that situation.

Unintentional – This could include individuals who suffer from Alzheimer's or Dementia who may have become lost.

Suicide – An individual may disappear with the intention of committing suicide.

Accident – An individual may have become an accident victim

Foul Play – These disappearances may be a result of abduction, domestic violence, homicide or other criminal activities.

I focused my research on other applications which are already in the public domain. In Ireland there isn't currently an application which is specifically for missing people. There is an application which exists called Child Rescue Ireland Alert (CRI Alert), however this system is targeted at abducted minors, so a very specific group of people and there is very strict criteria to meet when using this system for alerts. Applications similar in nature were assessed and evaluated and were sourced through Google Play Store and Apple Store. The findings of this evaluation are documented in Table 1.1

Additional research was conducted through meetings with representatives from An Garda Siochana. The initial meeting took place with Mr. Liam Kidd, Director of ICT at An Garda Siochana. The idea was presented to Liam. He felt there was value in the application as they didn't have anything like this currently in operation, the only other application is the CRI Alert and this is only targets minors who have been kidnapped or abducted, a strict criteria is applied to the usage of that particular application. Liam advised that the next best action would be to have a meeting with a representative from the Missing Persons Bureau as they would be able to give better feedback as to whether the application would be of worth to the organisation. This meeting is currently scheduled to take place in the coming weeks.

Application	Features	Feedback Reviews	General Observations from Reviews
CRI Alert	Upload informtion regarding missing child Show Active Alerts Sends Notification of active alerts to all registered users	Great idea but the developer needs to get the finger out and sort the problems with this app. It's never worked since I downloaded it. Tried to reinstall but it's still the same. Won't allow adding my children. Crashes when I try to enter the child's name The app is a fantastic idea but it crashes when I try to add my child. App has been active how long and the 1st time It was used it crashed. Now I can't post it to facebook or share anywhere else. Get it sorted Poor app. The concept behind the app is an great idea, but the app is poor product. Unreliable app Extremely buggy. Got 10-15 notifications this evening for one child that had already been found by the time the alert had been sent. On top of that the app force closes vast majority of the time. Given the simplicity of the app, reliability shouldn't be hard to achieve. :/	Application crashes Multiple notifications about active alerts evenafter an alert becomes inactive.
Alert Missing	Missing Journal Follow Missing Create a Missing Person Share/Geolocation Make Donation User Registration User Log In	A lot of information/options in app - overload? Cant use any of the above until you have created a full profile - The questions in profile seem to be as if you are the missing person yourself, quite personal.	Some good functionality ideas however not to easy to use if you simply want to browse the app or report a sighting
Missing Kids	State Selection Person Details Creates PDF Poster Creates Online Poster Case Information	Seems good Doesn't have newest missing person Chelsea Bruck from monroe, mi yet, but there's a lot of missing persons in the archive. Information (text) on the individual cases is positioned over the image of the missing person making it difficult to read. This app is a great service to the public. Thank you to the developer(s) for this contribution to humanity. If at all possible (and I know it will be a headache) adding a john doe/jane doe section would be nice feature. Great app! Very nice interface This application is very easy to use and very necessary. I found myself looking at missing children posters more and more now and this app put it all right in front of me all the time just in case. App takes a while to load and then crashes	Unable to self review as app keeps crashing

Table 1.1 – Applications similar in nature currently on the market

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Application	Features	Feedback Reviews	General Observations from Reviews
Missing Person	Easy To Navigate Social Share Capability Report A Sighting Sightings Map News and Messages (relating to a case) GPS Location Capture	Perfect Idea - Well Executed Easy to Navigate No notification feature	This application lacked reviews to make and accurate observation
FBI Child ID	Stores Information on Child for easy upload to local authority if child goes missing. Add photos for identifying characteristics (birthmarks, scars etc.) Set and send your phones location as your childs last known location	No Reviews	Unable to download. General observations from online research - basic application, primary function is for parents of missing children to quickly send information to authorities.
Child Rescue Alert UK	Same Criteria as CRI Alert for alert to be activiated.	Not kept up to date Watching news about a 10 year old child missing with medical conditions but no alert on here? Should already be on the phone. Would of downloaded the app sooner had I known about it. Fantastic idea more people need to know about it.Spare with family & friends. Not sure how this works but last week a young teenager was missing for days in my area & nothing came up about it. Did look on the app straight away & no information on her. Should be preloaded as app on all phone no matter which country Simple but effective. Please sort it out Iv downloaded the app, it keep saying error and wont let me look at anything, please sort it! Great idea although in the few months I've had it on my phone not one alert has been issued. im sure somewhere in the uk a child has just gone missing Is this app working? Have had this on my phone for ages and have never had an alert. A little 10 year old boy from my area went missing last night and it was on sky news this morning which is how I knew about him. IS this app still active? Had this app since GMTV told us it a vital part of out app choice not once has it alerted me or tells you how to operate it very confusing needs perhaps to tell us if, why's & buts of this app x poor little boy just been found perhaps if this app was working the alert might have saved him	Performance seems to be an issue. Integrity of data also in question

Table 1.1 *cont.* – Applications similar in nature currently on the market

Missing Persons Facts and Figures

This section aims to give some idea of the current situation with regards to missing people in Ireland.

In 2013 there were a total of 9,179 missing reports in Ireland, surpassing the total of 7,753 reported missing in 2012 and an 81% increase from a decade earlier. The increasing numbers are bound to put a strain on the existing resources allocated to dealing with these cases.

Table 1.2 shows figures provided by An Garda Siochana of the number of reported persons missing and those still outstanding from 2003 to 2014.

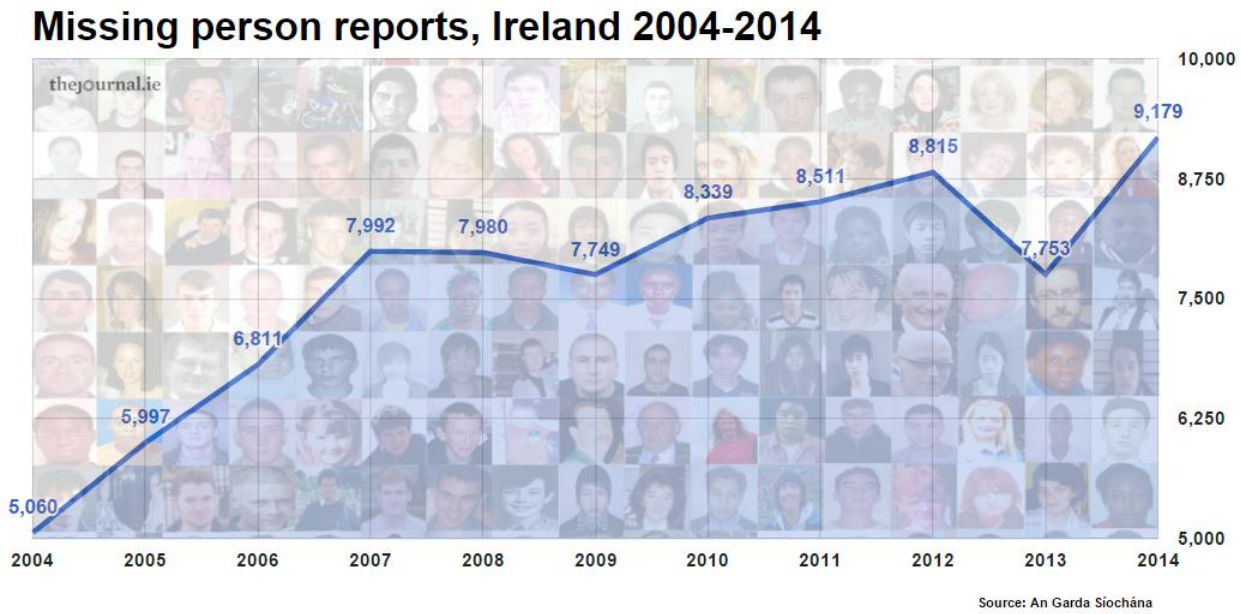


Table 1.2

**For almost every missing person case, the critical time period for the start of investigation is "immediately". Especially when the subject is a missing child, the first 24 hours after disappearance, (not from discovery), can make the difference in finding a living subject or a dead subject. * Acmeinvestigations.com, (2015)*

2. System

2.1 Technical Approach

The application will be developed as a hybrid app using Ionic framework. Ionic uses technologies such as HTML5, CSS and Sass.

The framework is built on top of AngularJS and Apache Cordova. AngularJS utilises HTML as the template language and allows for extension of HTML's syntax to express the application's components.

Backand is a backend-as-a-service which is tailored for AngularJS and the Ionic framework. This will be used to provide the database which will be hosted on the Cloud. It gives access to server side JavaScript code execution, allowing for functionality which depends on a secure execution environment.

2.2 Requirements Specification

The requirements are an integral part of this project. They give a clear understanding of what the intended result of the application should be.

The system should accomplish the following requirements, both functional and non-functional, in order to be deemed to successful.

2.2.1 Functional Requirements

FR 1: Launch Application - The application should be successfully launched from the home screen.

FR 2: Save Information to a Database - The application shall save uploaded information from a user to a database.

FR 3: Geo Location Push Notifications - The application shall send push notifications to an enabled device which has permission to receive such notifications, located in a specified geographic location.

FR 4: Social Sharing – A user shall be able to share information on listed missing person through social media platforms.

FR 5: Report A Sighting – A user shall be able to report a sighting of a listed missing person

FR6: Capture Image – A user shall be able to capture an image of a sighting

Functional Requirement 1: Launch Application

Description

Launching the application is the most important function of the application. Without this being carried out successfully the application will not be able to perform any of the other functions and so will be deemed useless.

Priority – P1: High

Use Case

ID:	UC-1
Title:	Launch the application
Scope:	The scope of this use case is to describe the steps take to launch the application.
Description:	This use case describes the interaction between the user and the system.
Primary Actor:	User
Preconditions:	The device is powered on
Post conditions:	The application is launched
Termination:	The use case is terminated when the application launches
Main Success Scenario:	1. User selects application icon from device home screen 2. System loads application (See E1)
Alternative Flow:	No alternative flows are associated with this use case.
Exceptional Flow:	E1. Application crashes and fails to open
Status:	Pending Review

Functional Requirement 2: Save Information to Database

Description

The application shall save uploaded information from a user to the database.

Priority – P1: High

ID:	UC-2
Title:	Save information to database.
Scope:	The scope of this use case is to describe the steps taken when information is collected to be saved to the database.
Description:	This use case describes the interaction between the user and the system.
Primary Actor:	User
Preconditions:	The system is in initialisation mode.
Post conditions:	The system goes into a wait state
Termination:	The system returns to originating state
Main Success Scenario:	1. User submits information (see A1) 2. System receives information (see E1) 3. System saves information to appropriate table
Alternative Flow:	A1: 1. User cancels submission 2. System terminates use case
Exceptional Flow:	E1. System fails to make connection with database
Status:	Pending Review

Functional Requirement 3: Geo-Location Push Notifications

Description

The system will push notifications to a device once that devices enters a specified radius.

Priority - P2: Medium

ID:	UC-3
Title:	Geo-Location Push Notifications
Scope:	The scope of this use case is to describe the steps taken when a push notification is sent to a device.
Description:	This use case describes the interaction between the user and the system.
Primary Actor:	User
Preconditions:	The system is in initialisation mode. The device must have push notification feature enabled The device must have GPS enabled
Post conditions:	The system goes into a wait state
Termination:	The system goes back to originating state
Main Success Scenario:	1. System identifies the device in the specified geo location 2. System sends push notification to the device 3. User selects "view more information" (see E1) 4. System initialises individual case screen (see A1) 5. User selects "Report a Sighting" 6. System activates use case 4
Alternative Flow:	A1: 1. User selects social sharing 2. System activates UC-4
Exceptional Flow:	E1. 1. User selects "Close" 2. User selects option to close push notification 3. System goes into termination state
Status:	Pending Review

Functional Requirement 4: Social Sharing

Description

The system will share information through social media platform.

Priority – P2: Medium

ID:	UC-4
Title:	Social Sharing
Scope:	The scope of this use case is to describe the steps taken when a user shares information through a social media platform.
Description:	This use case describes the interaction between the user and the system.
Primary Actor:	User
Preconditions:	The system is in initialisation mode.
Post conditions:	The system goes into a wait state
Termination:	The system goes back to originating state
Main Success Scenario:	1.User selects social sharing option 2. System initialises social sharing options 3. User selects social media platform to send information 4. System verifies user details for selected social media platforms 5. User confirms selection 6. System performs sharing action
Alternative Flow:	A1:
Exceptional Flow:	E1.
Status:	Pending Review

Functional Requirement 5: Report a Sighting

Description

The system will provide a platform for a user to be able to report a sighting of a missing person.

Priority - P2: Medium

ID:	UC-5
Title:	Report a Sighting
Scope:	The scope of this use case is to describe the steps taken when a user reports a sighting.
Description:	The use case describes the interaction between the user and device when the report a sighting feature is activated.
Primary Actor:	User
Preconditions:	The case must be active
Post conditions:	The system goes into a wait state
Activation:	When the user selects "Report a Sighting"
Termination:	The system goes back to originating state
Main Success Scenario:	1. User selects "Report a Sighting" 2. System initialises and loads information on selected case 3. User selects "use current location" (see A1) 4. System initialises map indicating current location 3. User confirms selection (see A2) 4. System saves information to database
Alternative Flow:	A1: 1. User selects manual location input 2. System loads input form 3. User confirms 4. System saves information to database A2: 1. User selects cancel 2. System goes into a wait state
Status:	Pending Review

Functional Requirement 6: Capture Image

Description

The system will provide functionality for a user to take an image of a potential sighting.

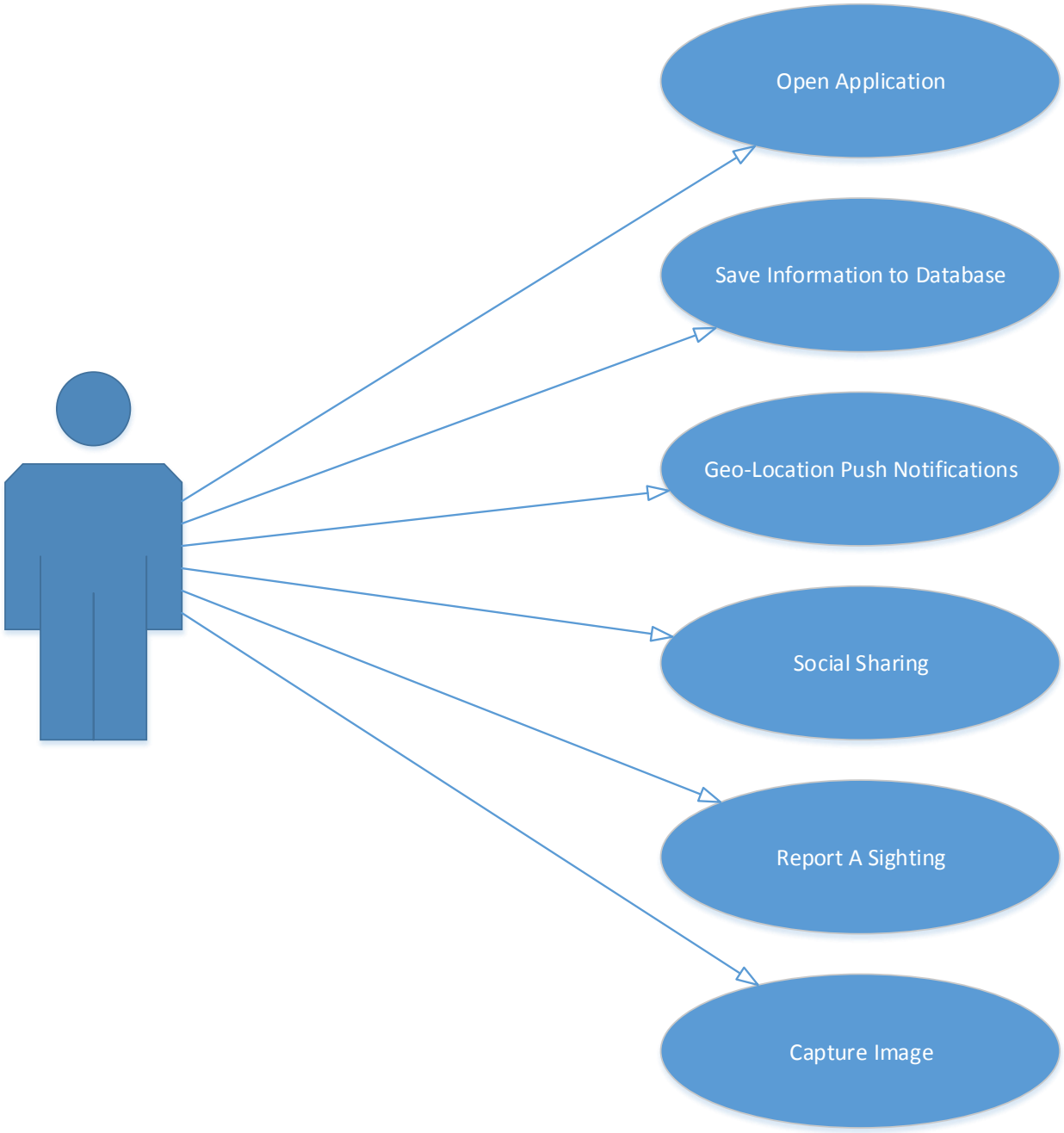
Priority – P2: Medium

Use Case

ID:	UC-6
Title:	Capture Image
Scope:	The scope of this use case is to describe the steps take to capture an image from the application using the device hardware.
Description:	This use case describes the interaction between the user and the system.
Primary Actor:	User
Preconditions:	The device is powered on
Post conditions:	The application is launched
Termination:	The use case is terminated when the application launches
Main Success Scenario:	1. User selects "Capture an Image" 2. System initialises device camera 3. User captures snap shot 4. System takes picture 5. User confirms the image (see A1) 6. UC-2 is activated
Alternative Flow:	1. User rejects image
Exceptional Flow:	2a. Application crashes and fails to open
Status:	Pending Review

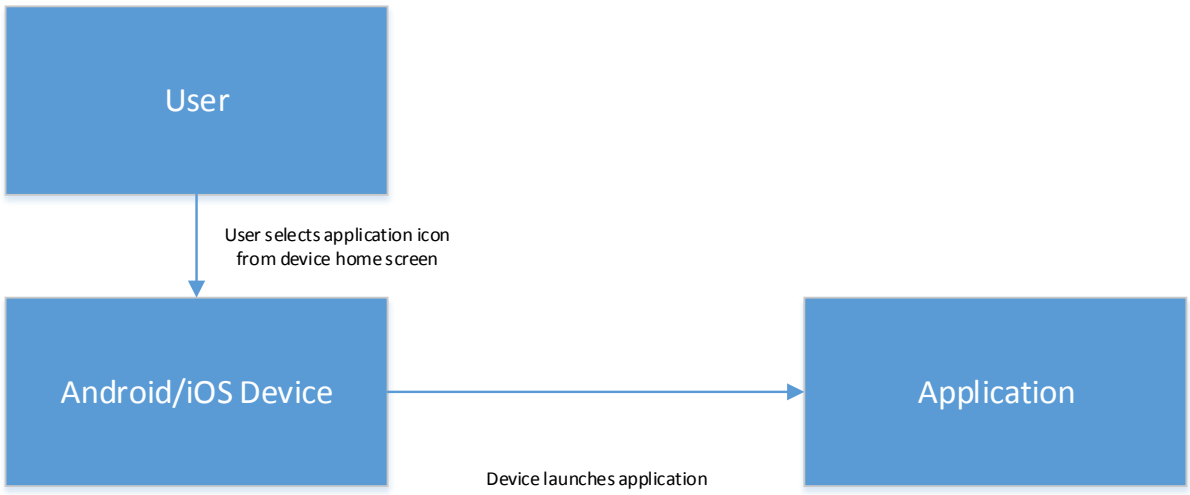
Use Case Diagram

The following Use Case Diagram provides an overview of all use cases previously declared.

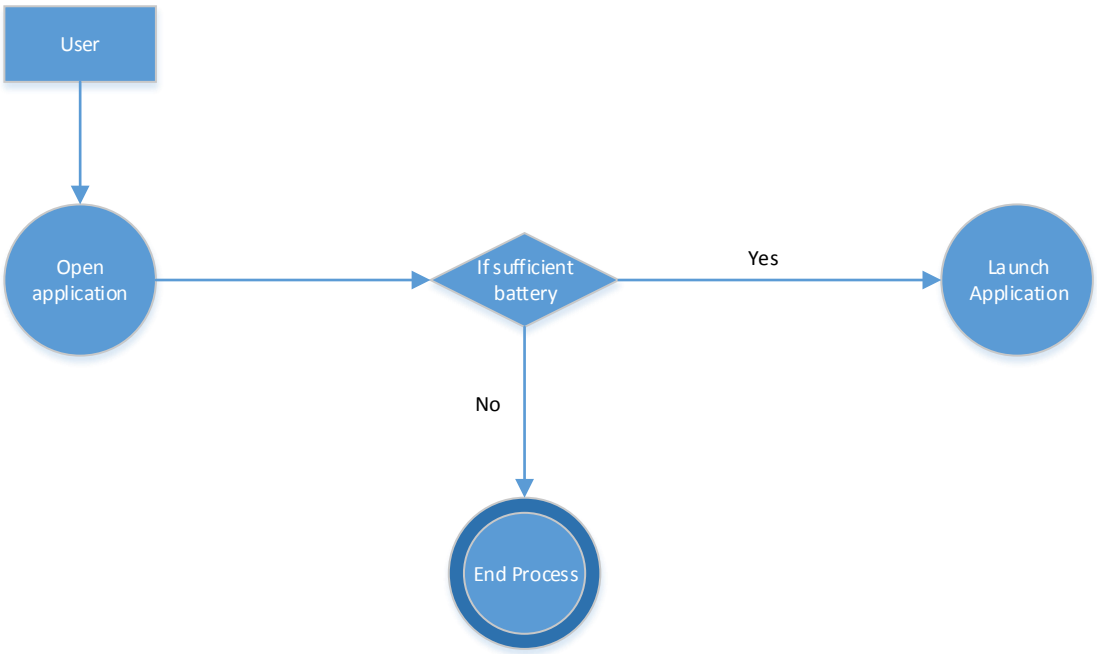


Open Application

Level 0 DFD

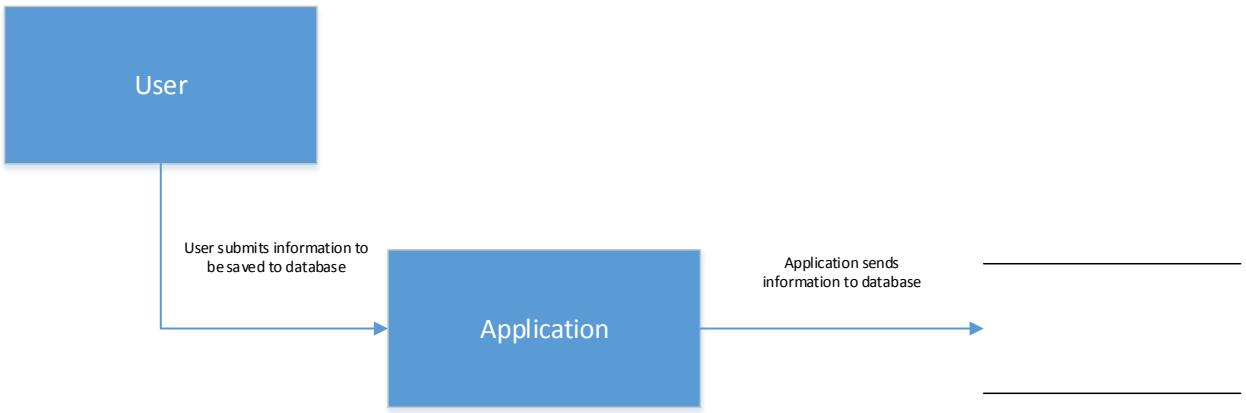


Level 1 DFD

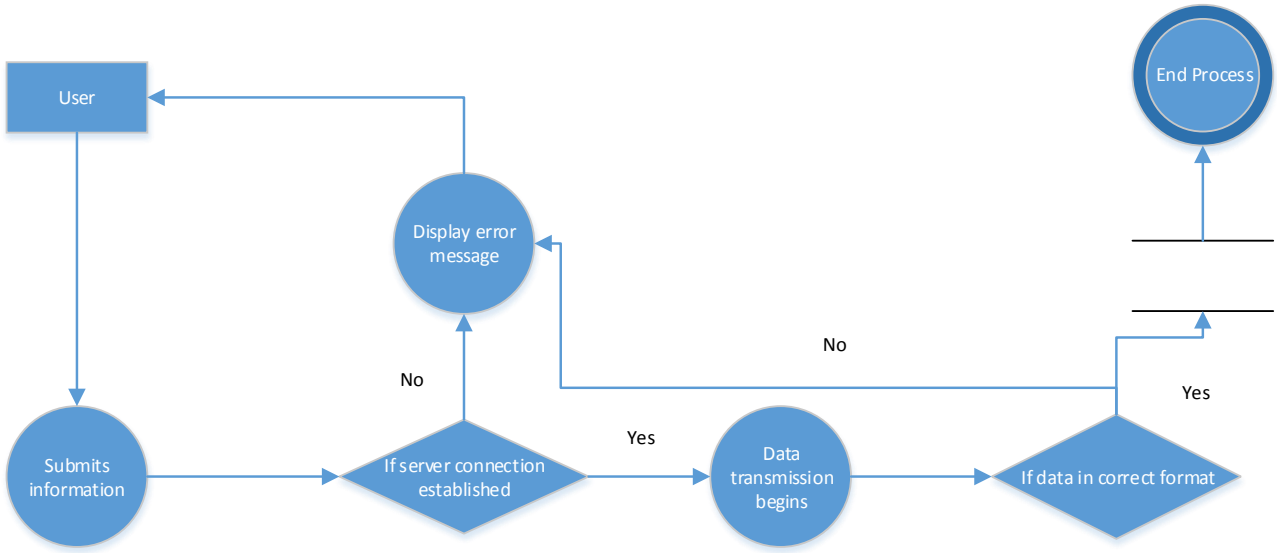


Save Information to Database

Level 0 DFD

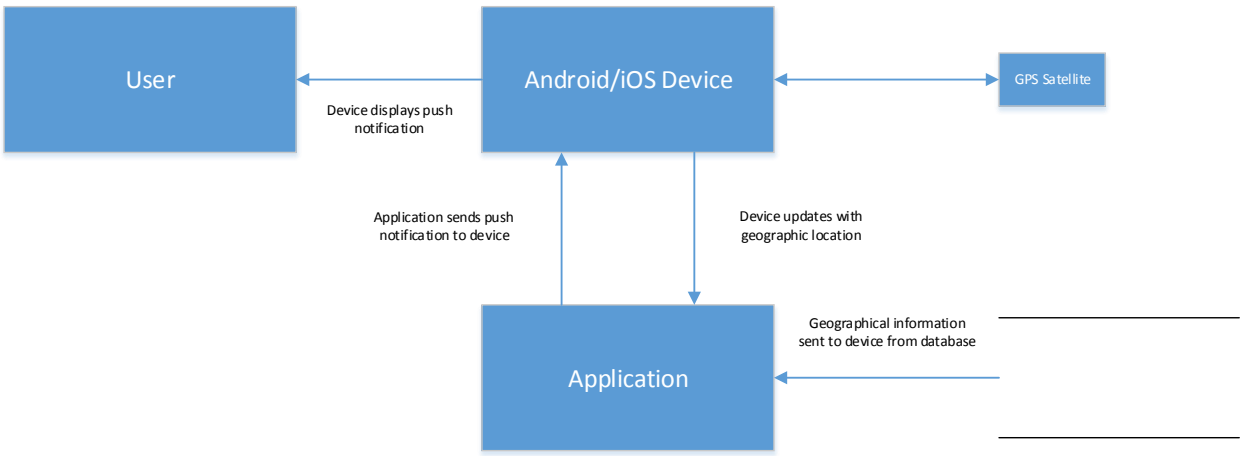


Level 1 DFD

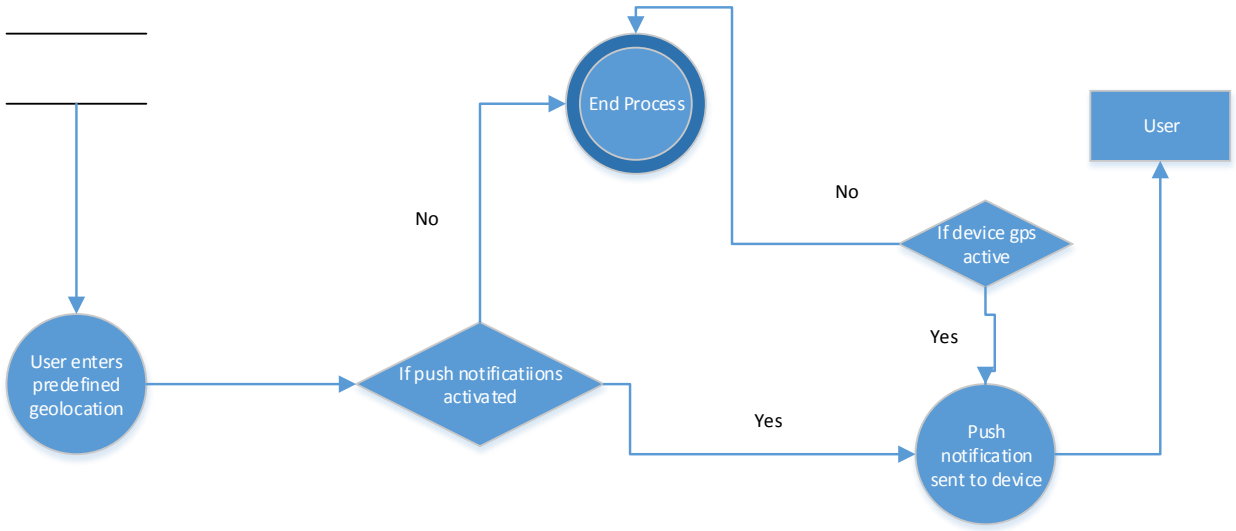


Geo-Location Push Notifications

Level 0 DFD



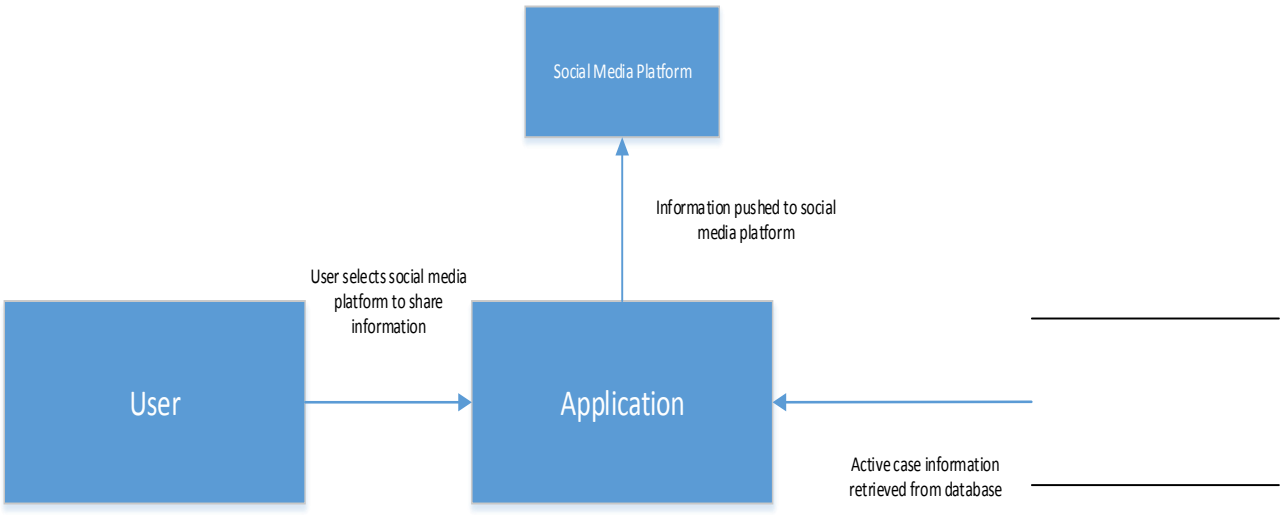
Level 1 DFD



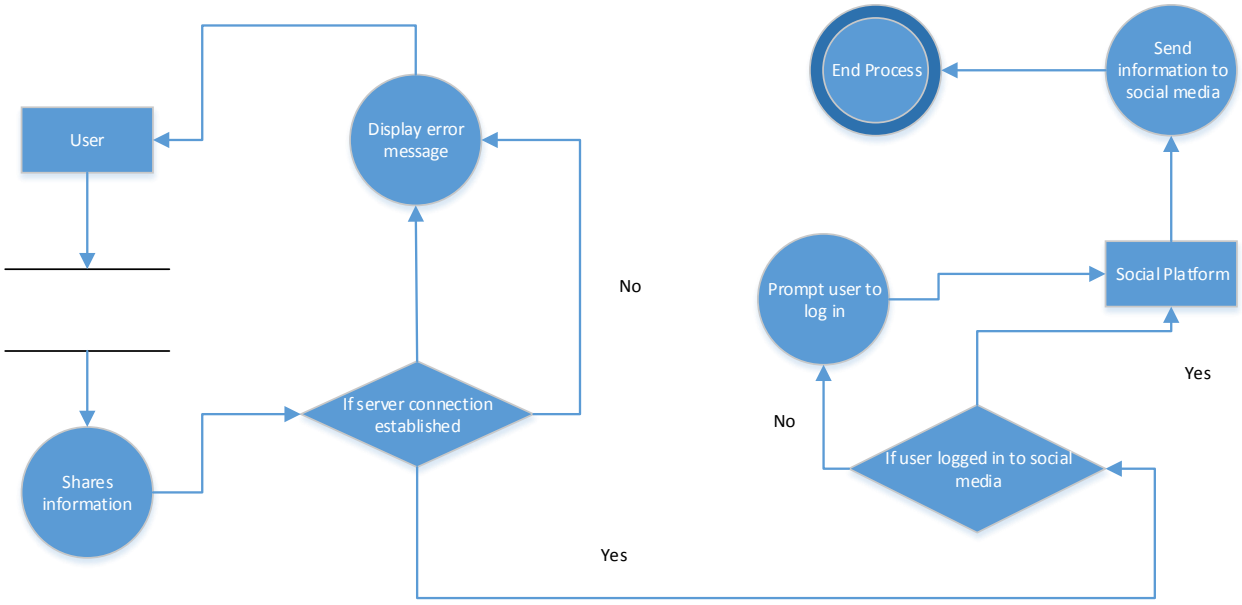
Natalie Edward, x12117684
BSc. (Hons) Computing
Supervisor: Pramod Pathak

Social Sharing

Level 0 DFD



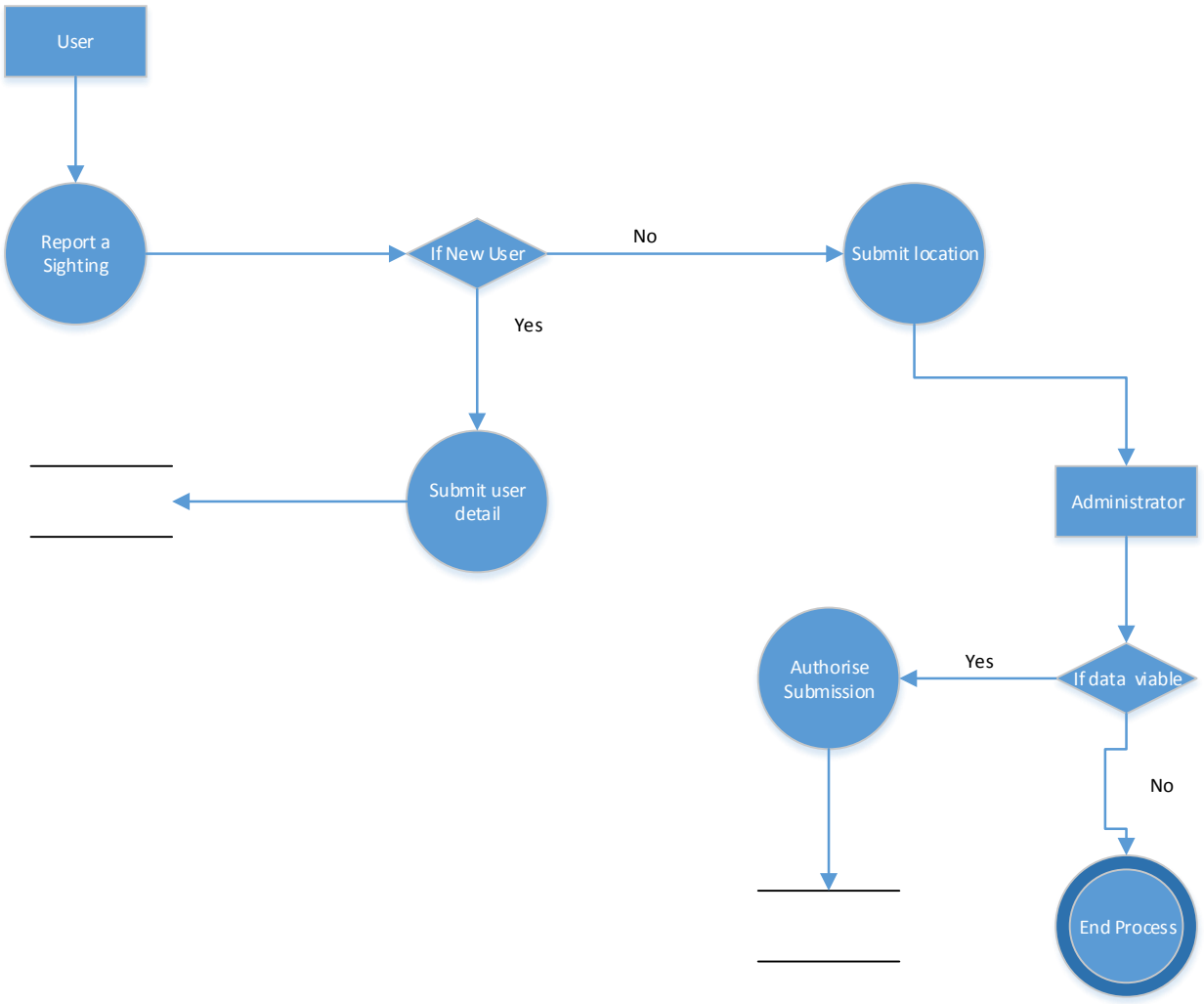
Level 1 DFD



Report Sighting

Level 0 DFD

Level 1 DFD



Natalie Edward, x12117684
BSc. (Hons) Computing
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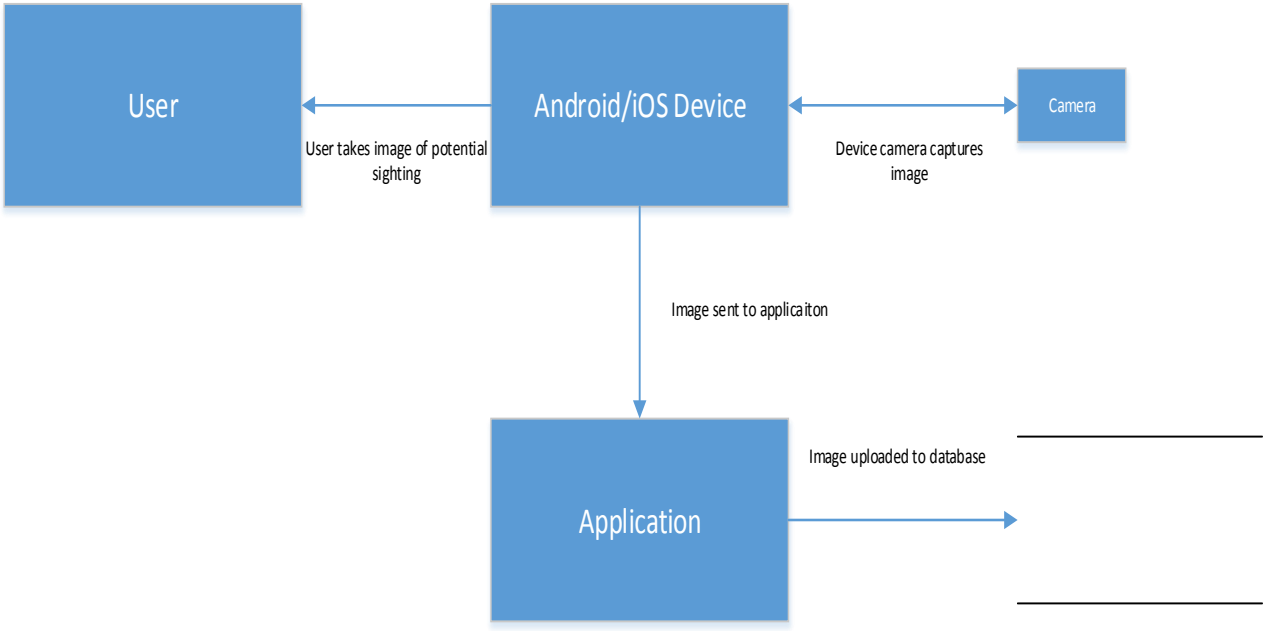
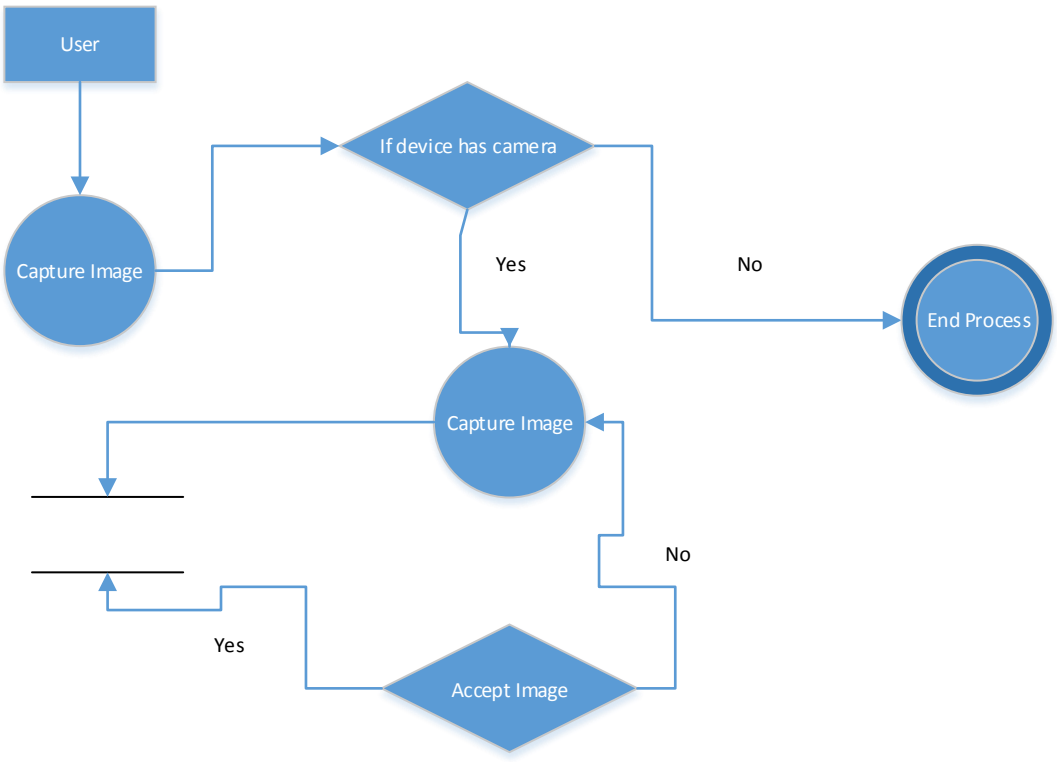
Level 0 DFD



Level 1 DFD



2.2.2 Non Functional Requirements

Performance/Response time

The application should respond to users input within a satisfactory timeframe (circa 3 seconds).

Availability

The application should be available 24 hours a day, 7 days a week 365 days a year.

Database

The database should be well structured with the stored data being accurate and efficient.

Security

All data uploaded and stored to the database should be secure and comply with the data protection act.

Reliability

The application should be reliable with data being current and up to date.

Maintainability

The application should be maintainable in a timely and reliable manner to keep the integrity of the data

Portability

The application should function in all environments and be available in other geographical locations.

Installation

The installation process should be easy with users simply clicking download from Apple App Store or Play Store.

2.2.3. System Requirements

Android or iOS Operating System – The device must run on Android or iOS as a minimum requirement.

Sufficient Storage Capacity – The device must have a minimum of 30mb storage to download the application as a minimum requirement.

Internet Capabilities – The device should have internet capabilities in order to receive new cases of missing people, to upload information relating to a case and received push notifications

GPS Functionality – The device should have GPS functionality in order to use push notification and report a sighting functions.

2.2.4. Data Requirements

DR 1: Recovery

DR 2: Back up

DR 3: Data integrity

DR 4: Reliability

2.2.5. Usability Requirements

USR 1: The application should be icon driven

USR 2: Input boxes and radio buttons should be provided where information input is required from the user.

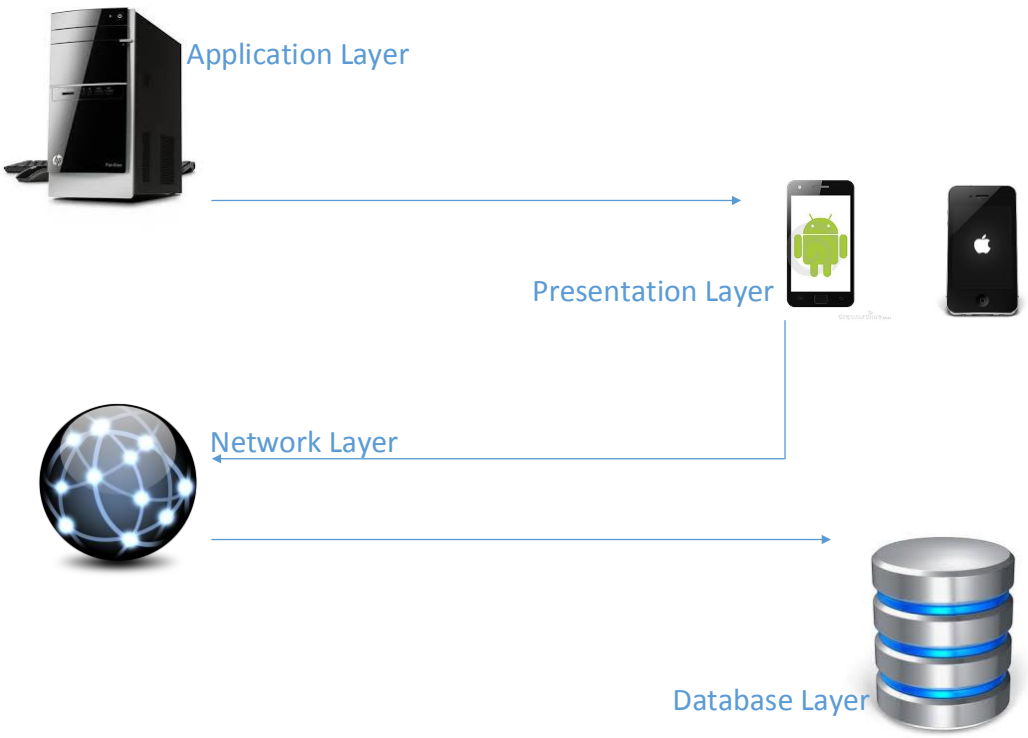
USR 3: The application should be easy for a user to navigate

USR 4: The application should require little or no training to use.

2.3 Design and Architecture

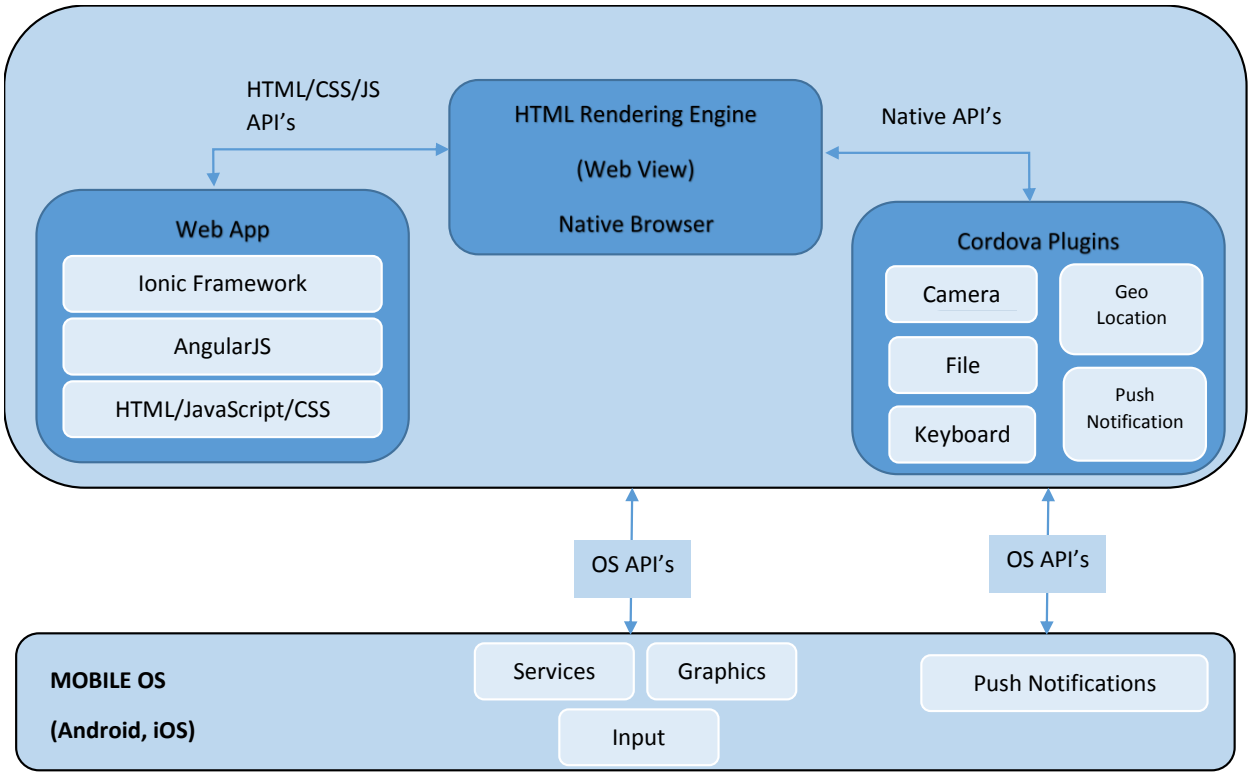
System Structure

The following diagram shows a high level architecture diagram outlining the structure of the system architecture.



Mobile Application Architecture

This diagram outlines the structure of the mobile application architecture. It shows the frameworks and plugins required and how the API's interact between them and the GUI.



Structure of Ionic Framework

An Ionic application can be split into a number of different elements. Views, Controllers, App Configuration and Directives.

Views, also referred to as Templates, and each view is stored in a html file. This is where the mark up for the state or page of the application lives.

The Missing application will have the following views:

Home.html activeCases.html individualCase.html reportSighting.html menu.html

Controllers, do as the name implies. They are the brains behind the application and where the flow of logic and data is controlled. The controller uses a view as a template for the mark-up it shows to the user and make calls to the data elements to get the actual data to bind to the view. The data is assigned to $scope by the controller and then bound to the view.

The following controllers will be implemented in the Missing application:

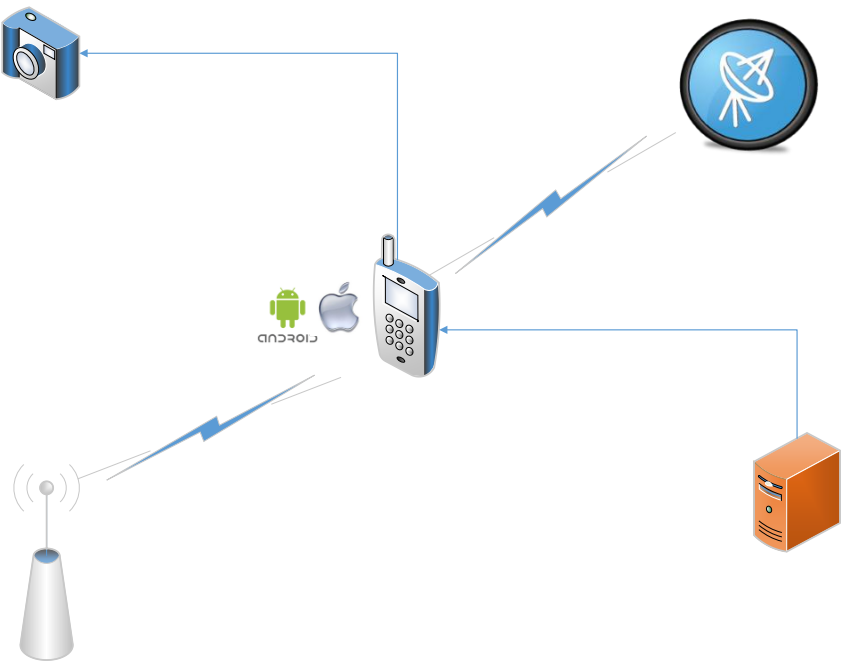
homeCtrl.js activeCaseCtrl.js individualCaseCtrl.js MapCtrl.js getSightingDetailsCtrl.js

App configuration is where the configuration for the states and routing is declared.

Directives are markers on a DOM element which tells AngularJS's html compiler to attach a specified behaviour to that DOM element.

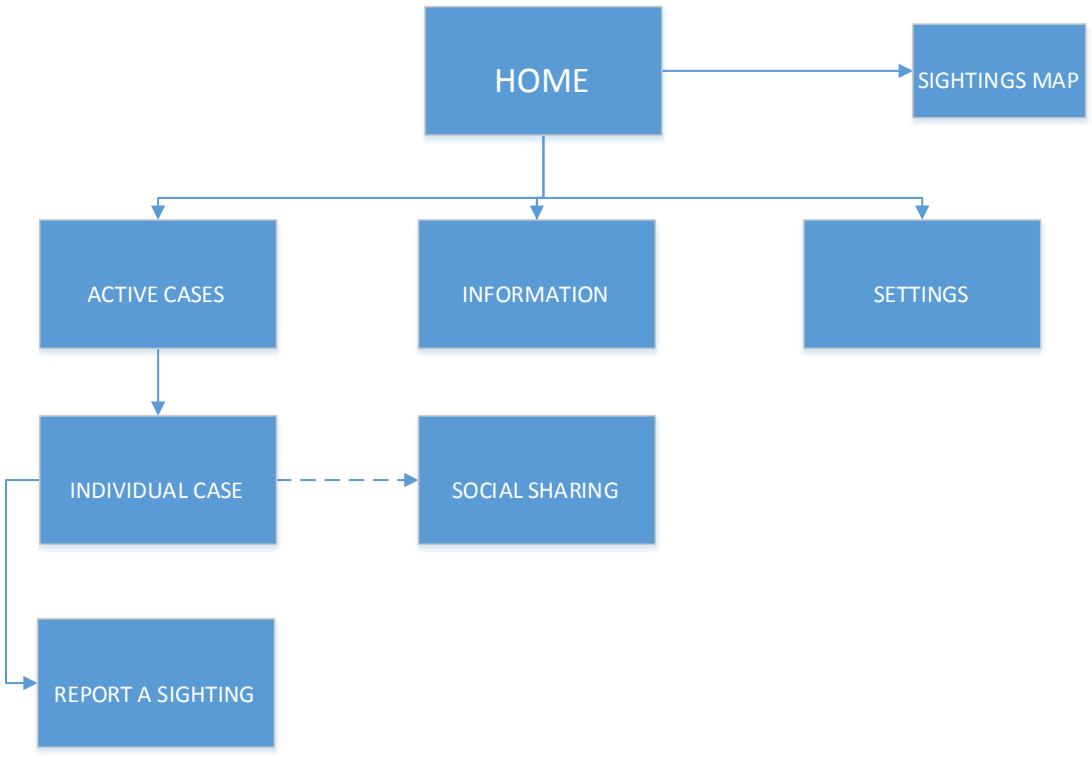
Hardware Architecture

This diagram outlines the hardware required for this application



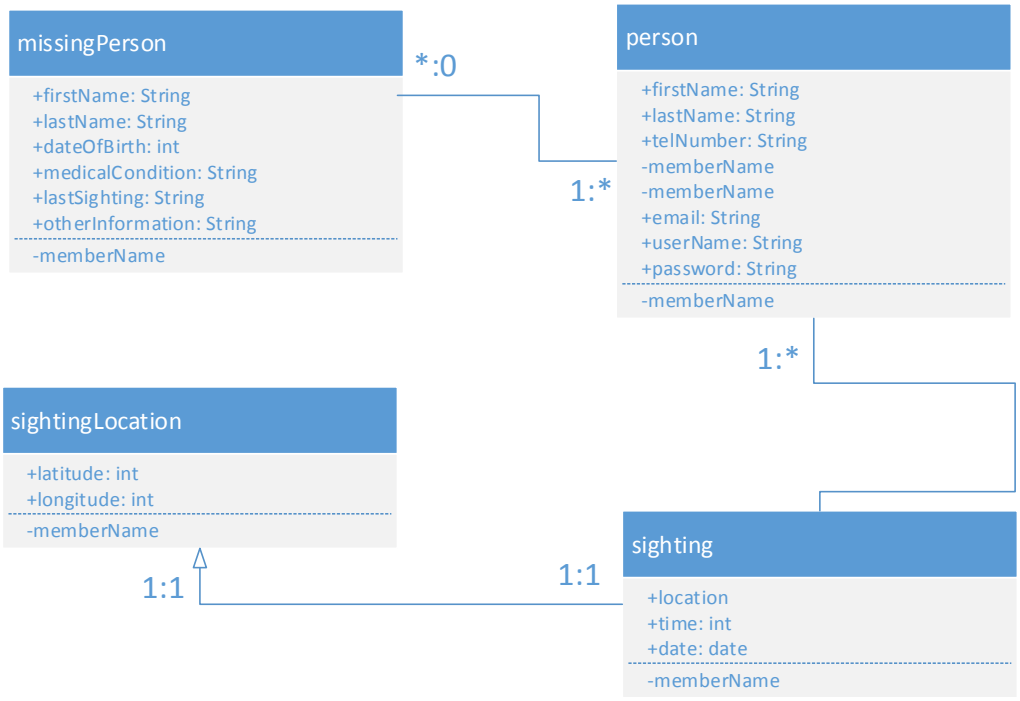
Navigation Structure

The following shows a high level class diagram outlining the structure of the application screens



Class Diagram

The class diagram outlines the relationship between the different classes required for Missing.

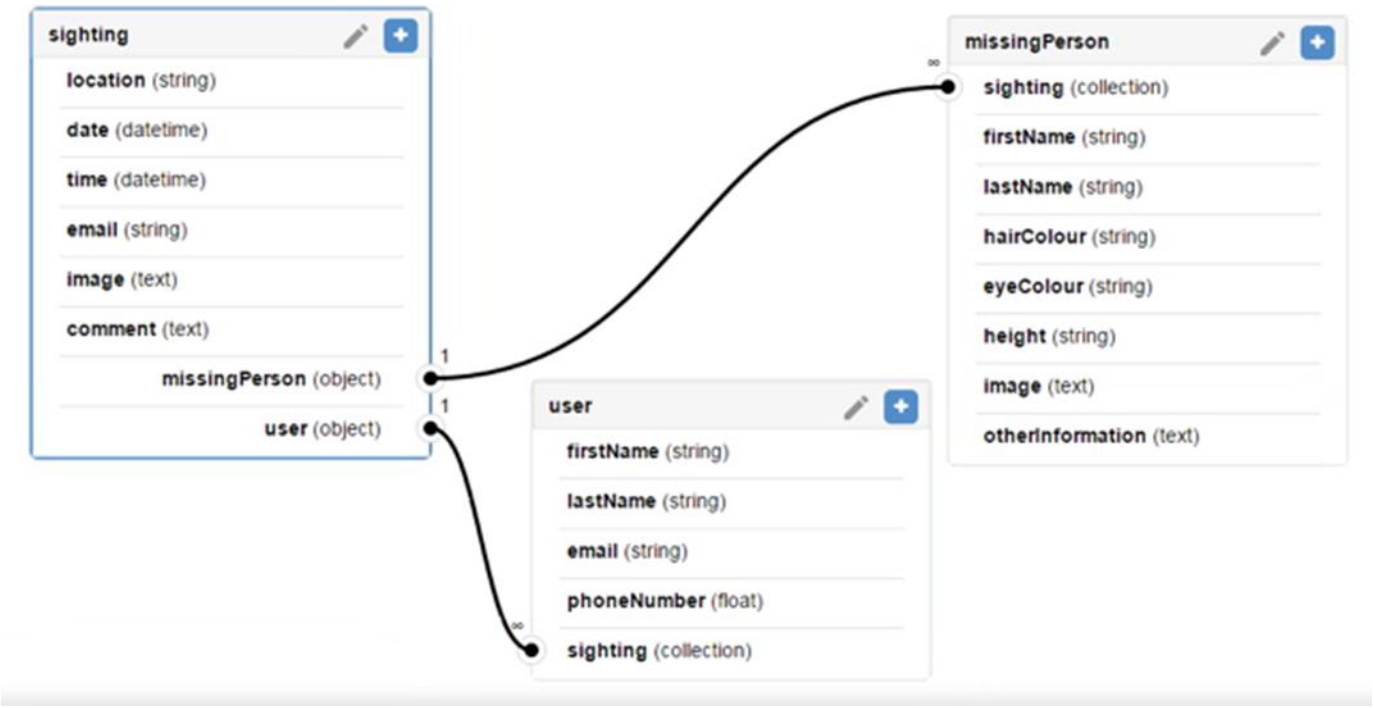


Natalie Edward, x12117684
BSc. (Hons) Computing
Supervisor: Pramod Pathak

2.4 Data Model

Database Diagram

The following illustrates the tables required for the database and their relationships between each other.



JSON Objects

missingPerson

```
{
  "name": "missingPerson",
  "fields": {
    "firstName": {
      "type": "string"
    },
    "lastName": {
      "type": "string"
    },
    "hairColour": {
      "type": "string"
    },
    "eyeColour": {
      "type": "string"
    },
    "height": {
      "type": "string"
    },
    "image": {
      "type": "text"
    },
    "otherInformation": {
      "type": "text"
    },
    "sighting": {
      "collection": "sighting",
      "via": "missingPerson"
    }
  }
},
```

sighting

```
{
  "name": "sighting",
  "fields": {
    "location": {
      "type": "string"
    },
    "date": {
      "type": "datetime"
    },
    "time": {
      "type": "datetime"
    },
    "email": {
      "type": "string"
    },
    "image": {
      "type": "text"
    },
    "comment": {
      "type": "text"
    },
    "missingPerson": {
      "object": "missingPerson"
    },
    "user": {
      "object": "user"
    }
  }
},
```

user

```
{
  "name": "user",
  "fields": {
    "firstName": {
      "type": "string"
    },
    "lastName": {
      "type": "string"
    },
    "email": {
      "type": "string",
      "required": true,
      "unique": true
    },
    "phoneNumber": {
      "type": "float"
    },
    "sighting": {
      "collection": "sighting",
      "via": "user"
    }
  }
}
```

3. Implementation

3.1 Technology Overview

The application utilises a number of technologies which work seamlessly with each other to develop reliable hybrid mobile applications. Ionic and Backand

The application is built using model view controller process with each view bound to a particular model and controller.

3.1.1. Ionic

Ionic is an open-source SDK for mobile application development. It is built on top of AngularJS and Apache Cordova

Setup

Initially Node.js needed to be installed. Node.js is a JavaScript runtime using an event-driven non-blocking I/O model.

The setup of the environment is done through the command line prompts.

Install Ionic

```
$ npm install -g cordova ionic
```

Start Project

```
$ ionic start missing blank
```

Creates a new blank ionic project called missing.

Add Platforms

```
$ cd missing
$ ionic platform add ios
$ ionic platform add android
```

3.1.2. Backand

Backand is a hosted backend service for AngularJS. This takes care of the database functionality of the application.

Integrating Backand with the ionic application is done in 4 steps.

1. Add Backand Scripts to index.html

```
<!-- Backand SDK for Angular -->
 <script src="//cdn.backand.net/backand/dist/1.8.2/backand.min.js"></script>
<script src="lib/angularbknd-sdk/dist/backand.min.js"></script>
```

2. Add Script dependencies

```
angular.module('missing', ['ionic',  'ngCordova', 'backand', 'angular-cache'])
```

3. Configure secure calls to Backand REST API

```
.config(function($stateProvider, $urlRouterProvider, BackandProvider) {
            BackandProvider.setAppName('missing');
            BackandProvider.setSignUpToken('08379351-99d5-4832-9faf-3fa4cc2b5d95');
            BackandProvider.setAnonymousToken('4b162583-40b6-45f8-9984-064d5dc47d80');
```

4. Read data from database

```
function activeCaseCtrl(missingPeople, $state, $scope) {
        missingPeople.getallPersons()
            .then(function(data) {
                $scope.activePerson = data
            });
```

3.1.3. HTML5 & CSS

HTML & CSS were utilised for the development and styling of the User Interface. Existing knowledge of these languages allowed for quick development thus allowing more time to be allocated to the more complex aspects of the application.

3.1.4. JavaScript

Working alongside HTML & CSS, JavaScript allows to define the behaviour of the application activities. Again, existing knowledge was advantageous in development however, some extra learning was required in order to use it effectively in the application.

3.1.5. SQL

SQL was used to execute custom queries on the tables in the Backand database. Below shows an example of a query used to get information on a missing person case.

The query will display First Name, ID, Last Name, Missing Since and Last Sighting. This information is pulled from both the **missingPerson** and **missingPersonCase** tables.

```
select a.firstName
,a.id
,a.lastName
, missingSince
, lastSighting
from
missingPerson a
join missingPersonCase b
on a.id = b.missingPerson
```

3.2 Procedures

The application is structured in a way that each screen has its own html page. In addition each screen is also controlled by its own JavaScript file which includes any controllers required to enable functionality related to it.

3.2.1 Page Navigation

Ionic uses the AngularJS UI Router for page navigation. This is configured in the app.js file.

Each page is declared as a state. Below is a snippet of code which configures routing for the **activeCases** state.

The **$stateProvider** is an AngularJS directive which is responsible for transitioning a user through the different application pages, it does this through url's which defines a page view and content. It provides an interface to declare the states to the app.

Using this directive as opposed to a normal route allows for child nesting of pages.

The **$stateProvider** service is injected into the config file, this then scans for the activeCases url. Once located the activeCases file is then loaded.

```
4
5   $stateProvider
6       .state('app.activeCases', {
7           url: '/activeCases',
8           views: {
9               'menuContent': {
10                  templateUrl: 'activeCase/activeCases.html'
11              }
12          },
13      });
14
```

3.2.2. Retrieve Information from Database

Active Cases

The application has been developed so that a user can view current active cases. The page can be accessed by clicking the "View All Active Cases" button on the home screen.

Clicking the button triggers an event which makes a call to the Backand database. This then returns all active cases.

The information is returned in the form of an array of objects. A mapping function is then used to iterate through each object and strip out the Meta data and retrieve the object data alone. This info is retrieved through a REST call where it consumes the promise which is returned by the call. The action is complete once the information has been returned.

activeCases.html

```
<ion-view view-title="Active Cases">
    <ion-content class="background" ng-controller="activeCaseCtrl">
        <div class="card" ng-repeat="x in activePerson">
            <div class="item item-thumbnail-left">
                <img src="img/image.png">
                <h2>{{x.firstName + ' ' + x.lastName}}</h2>
                <p>Missing Since: {{x.missingSince}}</p>
                <p>Last Seen: {{x.lastSighting}}</p>
            </div>
        </div>
    </ion-content>
</ion-view>
```

activeCaseCtrl.js

```
(function() {
angular.module('missing')
    .controller("activeCaseCtrl", ['missingPeople', '$state', '$scope',
        function activeCaseCtrl(missingPeople, $state, $scope) {
            missingPeople.getallPersons()
                .then(function(data) {
                    $scope.activePerson = data;
                });
        }
    ]);
})()
```

Report Sighting

Once a missing person case has been entered into the system a user can report sightings against each individual missing person's case. This functionality is assessed by the report a sighting function.

A user reporting a sighting has the option of manually entering an address or using their current location.

getSightingDetailsCtrl.js

```
function getLocationlatlong(){
      var address = $scope.address.street +" " + $scope.address.city + " " + $scope.address.county + " " + $scope.address.country;
      var geocoder = new google.maps.Geocoder();
        geocoder.geocode( { 'address': address}, function(results, status) {
        if (status == google.maps.GeocoderStatus.OK) {
          if(results[0].geometry.location.lat() != ''){
            $scope.address.lat = results[0].geometry.location.lat();
            $scope.address.lon = results[0].geometry.location.lng();
              missingPeople.postSighting($scope.address)
            } else
            {alert("waiting for data");
            $scope.address.lat = results[0].geometry.location.lat();
            $scope.address.lon = results[0].geometry.location.lng();
          }
        }
        else {alert("You need Internet connection")};
        });
    };
```

The code snippet above demonstrates when a manual address is entered a call is made by the application to Google Geolocation API, passing in the address as strings and then consuming the return longitude and latitude which is then saved to the database.

ReportSighting.html

```
<div   class="button-bar background" ng-click="setManualLocation()">
    <a id ="toggle" class="button icon-right button-outline button-stable ion-chevron-down">Manually Input Location</a>
</div>
```

The code above shows the setManualLocation() being called when the button is clicked.

For a user opting to use the current location feature, a call is made using the device built in gps locator to get the longitude and latitude of the devices current location. This is then passed by to the Google Geolocation API to retrieve the actual address components relating to the longitude latitude (street, city, country etc.) which is then saved back into the database. This is demonstrated in the code snippet below.

getSightingDetailsCtrl.js

```
function getCurrentLoc(){
 var x=[];
 var maps;
   var options = {timeout:10000, enableHighAccuracy:true};
    $cordovaGeolocation.getCurrentPosition(options)
     .then(function(position){
       x=['me', position.coords.latitude, position.coords.longitude] ;
      $scope.lat = x[1];
      $scope.long=x[2];
   var mapOptions = {
     center:new google.maps.LatLng(x[1],x[2]),
     zoom: 9,
     mapTypeId: google.maps.MapTypeId.ROADMAP
   };
       missingPeople.getAddressFromMap($scope.lat,$scope.long)
       .then(function(data){
         $scope.address.street = data.results[0].address_components[0].long_name + " " + data.results[0].address_components[1].long_name;
         $scope.address.city = data.results[0].address_components[3].long_name;
         $scope.address.county = data.results[0].address_components[5].long_name;
         $scope.address.country = data.results[0].address_components[6].long_name;
         $scope.address.lat = $scope.lat;
         $scope.address.lon = $scope.long;
         missingPeople.postSighting($scope.address)
    });
```

New Case

The application gives a user the ability to create a new missing persons case. The user fills out a form and is also given the option of uploading an image which is saved via a http call to the Backand server and retrieves a url path to the saved picture. This is then saved when the user submits the form back into missingPerson table in Backand.

addNewCaseCtrl.js

The following code demonstrates the functionality for adding a new person.

```
function addNewCaseCtrl (missingPeople, $state, $scope, $http){

        $scope.person={
        firstname:"",
        lastname:"",
        eyecolour:"",
        haircolour:"",
        URL:"",
        otherinformation: "information",
  }

  $scope.initCtrl =  function(){initUpload();
  };

$scope.addPerson = function createPerson(){

     $scope.person.URL =  $scope.imageUrl,

    console.log($scope.imageUrl);
console.log($scope.person);
    missingPeople.createNewMissingPerson($scope.person);

    };
```

The following snippet of code demonstrates the function for adding an image.

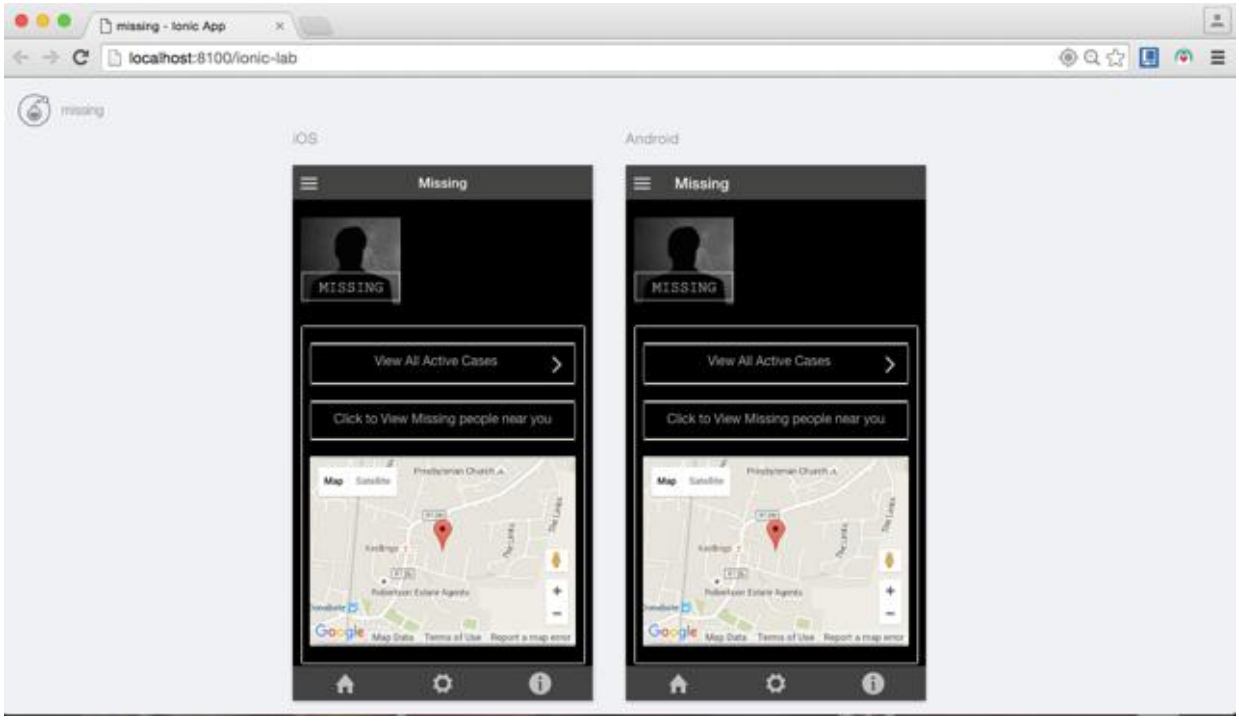
```
    reader.onload = function(e) {
      upload(file.name, e.currentTarget.result).then(function(res) {
       $scope.imageUrl = res.data.url;

      }, function(err){
        alert(err.data);
      });
  };
    reader.readAsDataURL(file);
  };

  // register to change event on input file
  function initUpload() {
    var fileInput = document.getElementById('fileInput');
      imageChanged(fileInput);
  }

   // call to Backand action with the file name and file data
  function upload(filename, filedata) {
    return $http({
      method: 'POST',
      url : 'https://api.backand.com'+ baseActionUrl + objectName,
      params:{
        "name": filesActionName
      },
      headers: {
        'Content-Type': 'application/json'
      },
      // you need to provide the file name and the file data
      data: {
        "filename": filename,
        "filedata": filedata.substr(filedata.indexOf(',') + 1, filedata.length) //need to remove the file prefix type
      }
    });
  };
```

4. Testing

Testing is an integral part of any I.T. project allowing for evaluation of the system with the intention of finding errors or defects.

Testing was carried out on an ongoing basis through the Ionic LiveReload function. LiveReload watches for changes in the file system. As changes are made and saved, the browser refreshes the page automatically to reflect this. In addition, Ionic Lab was also used, this displays the application in both and android and iOS frame as indicated in the image below.

As each function was developed and integrated, the LiveReload/Ionic Lab provided the ability to monitor the performance through the console enabling for the Identification and rectification of errors immediately



Unit Testing

Unit testing was carried out using both the Karma and Jasmine frameworks.

Karma is a JavaScript test runner developed by AngularJS. It loads the source code through the web server and then executes the intended tests along with the Jasmine framework which is a behaviour driven development framework.

A suite of unit tests were developed and continuously executed through the continuous integration process to validate not just each component but also the overall application features.

Functional Integration Testing

Functional integration testing of the overall system application was carried out by deploying the application to selected android device and an iOS emulator.

Each functionality part was exercised during these tests to confirm the requirements specifications were met. For external system calls to third party API's, stubbing was used to mimic these calls.

System Integration Testing

The system integration tests were carried out to validate that all external components, API's and plugins functioned with the system as expected.

Actual calls were made to external third parties such as the Backand Database Server for both saving and retrieval of information, Google Geolocation for device geo positioning and user location during this phase of test.

User Acceptance Testing

As the application is targeted to a wide range of users it was important to target user acceptance testers to reflect this.

Each user was instructed to navigate the application without any direction or script. The idea was to gain honest feedback on the user interface and their thoughts in general on the application and its intended purpose.

User 1

Name:	Anonymous
Occupation:	Not Specified
Age Group:	36-45
Operating System:	Android
Comments:	None

User 2

Name:	Kellie
Occupation:	Student
Age Group:	19-25
Operating System:	Android
Comments:	Wouldn't make changes to the application. "Something that is needed in the community"

User 3

Name:	Ralph Sanyaolu
Occupation:	QA Lead
Age Group:	36-45
Operating System:	Android
Comments:	"There is a case for an application like this due to the large number of missing in Ireland. The developer should looked to integrate more analytics and possible government interest to use in projecting help for vulnerable persons."

User 4

Name:	Ben O'Connor
Occupation:	Shop Assistant
Age Group:	<18
Operating System:	iOS
Comments:	"The application is a good idea."

Overall scoring in the survey indicates that application was well received with the majority of scoring being at 4 and 5. The surveys are available to view in the appendices.

5. Interface

The application will be button driven with a side menu which will be available across all views for ease of use along with the aestheticness of the application.

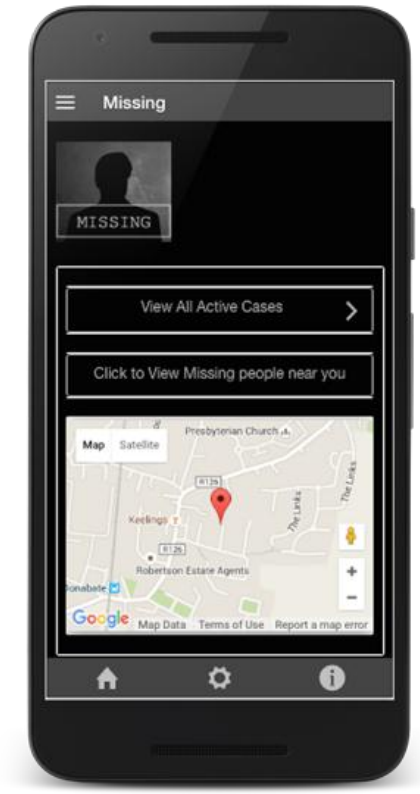
GUI

The Graphical User Interface has been designed and developed for ease of use. The interface was designed with both the seasoned mobile user along with the less experienced user. In other words it's an application which can be used with little or no training.

The look and feel of application is uniformed throughout. This has been achieved through use of the ionic <ion-view></ion-view> directive. This is a container for view content and has been used throughout the application.

The application is primarily button driven. Should a user want to navigate back then the in the case of android use the user can use the back button built within the device hardware.

Below are screenshots outling how the application looks at each stage.



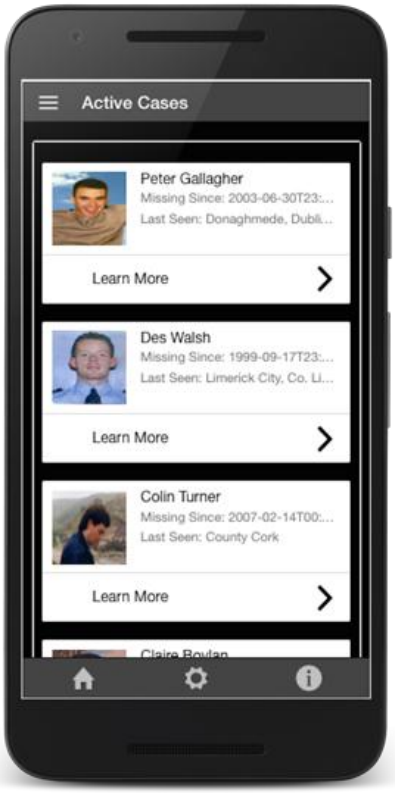
HOME SCREEN

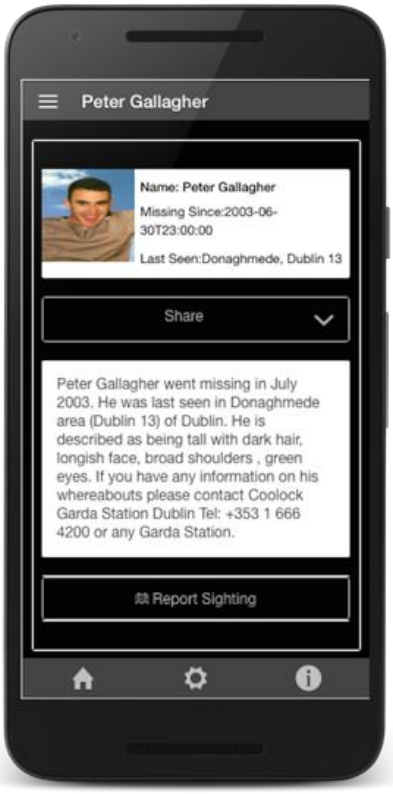
The home screen will be a simple screen which shows the users current location as a marker on themap. Pins will then drop on the map, these will be indicators of missing people in that area.

The page will also have a "View All" button. This will direct the user to the "Active Cases".

ACTIVE CASES

The active cases screen shows all the cases which are currently open. The information on each case is minimal in this view, showing just the name, missing since, last seen and an image. If a user wants to see more information on a particular case then they would navigate to the "Individual Case" screen by clicking the "Learn More" button directly below the case in which they are interested.





INDIVIDUAL CASE

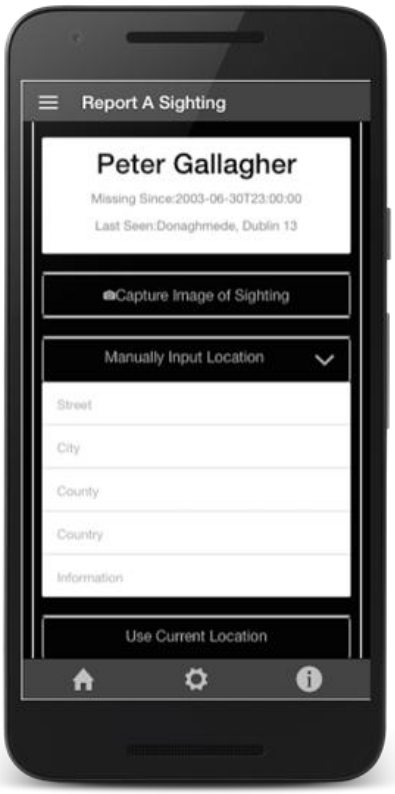
The "Individual Case" view populates the information on a particular missing person. Details include name, missing since, last seen and any other information related to the case.

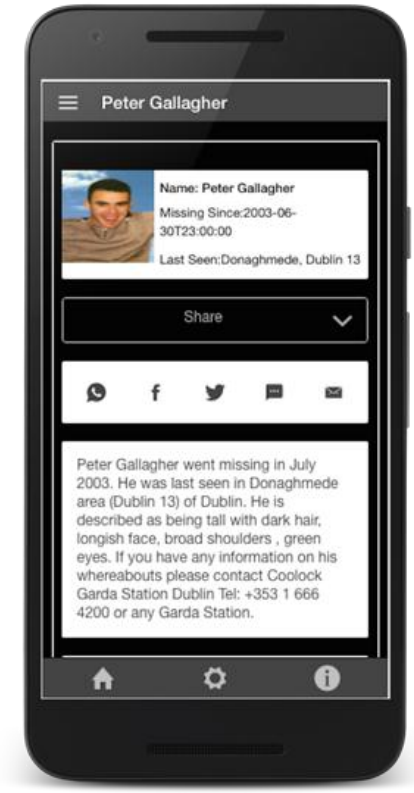
The user will also have the ability to report a sighting, share information on social platforms and also capture an image of a potential sighting.

REPORT SIGHTING

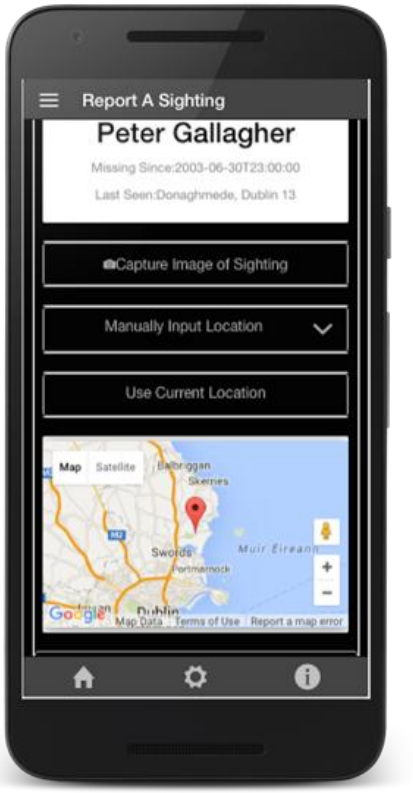
The “Report Sighting” screen will again populate the name, missing since and last seen information of a missing person.

This feature will require the user to submit some contact information in order to report a sighting. Once this action is completed they will be given the option to use their current location as the sighting position or manually enter a location. Once this has been selected then a hidden div will appear with either a map with current location or a form to manually input, dependent on their choice.





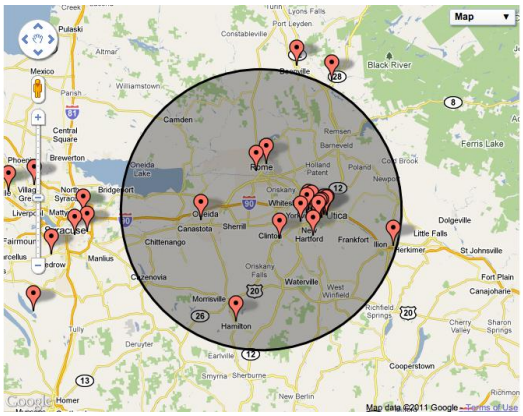
The above view shows the individual case with the social sharing features



The above view shows report sighting when the user selects “Use Current Location”

Application Programming Interfaces (API)

Google Maps



The application will utilise the GoogleMap API.

This will service both the geo location push notification and sightings map features of the application.

The API will specify the interaction between the application and the ngCordova geolocation plugin.

OneSignal

OneSignal is a high volume and reliable push notification system for mobile and web applications.

The OneSignal API was utilised for the push notification functionality of the application. It allows for groups of users to be identified through filtering of longitude and latitude which enabled for the targeted push notifications when a person is reported missing in a specific area.

6. Conclusion

Upon reflection I am confident that Missing can be a viable application and has plenty of scope to evolve.

In the given time, the application has been developed to a satisfactory standard where it can be deployed and made available to the public market and even marketed to specific establishments and organisations to be utilised for their benefit.

In terms of self-development and learning throughout this project I am of the opinion that I have a better understanding of the software development lifecycle and more importantly the obstacles and hurdles which can and do occur during development. However the accomplishments far outweigh these obstacles and hurdles.

Overall I am pleased with the final result. On initial planning the idea of developing this was quite overwhelming and I was unsure whether I would be able to achieve the end goal.

6.1 Evolution

There are a number of additional features which could be added to this application.

- Cognitive and Predictive Analysis
- Data Analytics
- Facial Recognition

Ideally IBM Watson would be utilised to address the above listed feature and give recommendations based on the information given to the system. For example, when a user submits a new missing person case, the system would read this data in such a way that it would be able to predict whether that person was at risk or not and then make a recommendation for the next best action.

The system would become a valuable tool in making decisions.

Appendices

User Acceptance Testing Survey Results

Submitted with the hard copies.

Proposal

Introduction

The purpose of this document is to provide a detailed description of the mobile application Missing. It will provide an insight into the requirements both function and non-functional along with the structure and design of the application.

The following will be covered in the document:

- System Requirements
- Functional Requirements
- Non-Functional Requirements
- Usability Requirements
- Interface Requirements
- Technical Approach
- Design & Analysis

It will outline how the users will interact with the software and who should have permissions to update and change the information.

Additionally, this document defines terminology (technical terms, abbreviations, acronyms, etc.) and outlines factors that affect software performance and reliability.

Goals & Objectives

The purpose of Missing is to facilitate in the search and location of a missing person through public interaction and contribution.

The goal will be that all data in the application is current and up to date and core functions will be integrated to allow the desired interaction of the general public.

Such functions are:

- View active missing person cases
- Map view of missing persons
- Report sighting
- Capture an image
- Push notifications
- Social Sharing

The mobile application will be available for download to anyone who has an android or iOS mobile device.

Project Overview and Scope

The application functions will be split into two groups, the functional requirements of the application, these will be essential to the function of the application, and non-functional requirements, these will add to the performance and usability of the application but are not essential.

Users will have the ability to take pictures of potential sightings and upload this information along with reporting that location right from their mobile device. Additionally there will be the added feature of the user receiving push notifications to an enabled device when that device is within a specified geo-location of a missing person.

Users will have the ability to view both open and closed cases of missing persons, report a sighting and view last known sightings on a map. However, the main feature of this application will be push notifications based on a user's geo-location. If a user is within a distance specified geo-location of somebody who has recently gone missing then they will be sent a push notification to the device informing them of this and to encourage that they look out for that person.

The application will deliver critical information regarding missing persons within a time frame which would aid in speeding up an investigation into locating a missing person.

Motivation

I first took an interest in this subject when I started to notice an increase in missing person posts on social media. A number of posts were being shared when in fact the person had been found, so the data was not inaccurate.

As the research figures indicate this is an ongoing problem which seems to be on the increase. My opinion is that this is an area where technology isn't being used to its full potential and a mobile application could be of great value. Although this application certainly won't eradicate the problem I do envisage that it will make a difference and give those who may not have had the encouragement or reason to be aware of missing people in their locality to now do so.

Constraints

The biggest constraint for this project is time and knowledge. Although a considerable amount of time has been allocated for completion there are a number of factors which slow the development process. The most prominent being the use of new technologies. A significant portion of time will be allocated to learning the new technologies and becoming familiar with them.

System Evolution

There are a number of possibilities for the future of his application. The initial phase will focus primarily on persons missing in Ireland and giving users the ability to contribute information and resources to aid in the search.

The functionality described in this document could be further expanded to include data analysis on varying levels. A future release would include data analysis tools which would advise the next best action in relation to a missing person based on the information collated in relation to their lifestyle. The system would be able to evaluation if that person thought to be in immediate danger or not.

Definitions, Acronyms, and Abbreviations

Activity	Term used to describe each screen in the application
Case	A record of an individual missing person.
Cross-platform solution	A software application that runs on multiple platforms with minimal dependencies on the platform
DFD	Data Flow Diagram
SRS	Software Requirement Specification – a document which outlines the requirements for a software application.
GUI	Graphical User Interface - the primary output device for displaying the animations, images, diagrams, and textual descriptions of concepts
GPS	Global Positioning System
SQL	Structured Query Language – a standard language for accessing and manipulating databases.
DBMS	Database Management System - Specially designed applications that interact with the user, other applications, and the database itself to capture and analyse data.
Case	Refers to the case created by the emergency services when a person is reported missing.
UR	User Requirement
FR	Functional Requirement
NFR	Non Functional Requirement
SR	System Requirement
UR	Usability Requirement

Reflective Journals

September 2015

Student name: Natalie Edward
Student Number: x12117684
Programme: BSc. in Computing
Month: September

So this month I managed to complete the initial planning stages of the project. This included the project proposal which I managed to complete and upload early. I was a bit unsure of how much detail I was to put in this document. I covered the basic concept of the project and any further detail needed will be covered in the Requirements document.

I had a quick meeting with Eamon to discuss my idea. I was initially concerned that I was taking on something that may turn out to be too difficult and my fear was that I will be unable to complete it. Eamon felt my idea was good and advised that I shouldn't be worrying about whether I can complete it or not at this stage. It's still early days.

I made a start on my project plan, this was actually more challenging than I thought. It's quite hard to determine how long tasks will take and assigning deadline dates. I started the Gantt chart with the milestones of which I am already aware, i.e. upload dates, presentations, showcase etc. This gave a basis for me to start working on. As the project progresses, there is no doubt that I will be adding more tasks to the chart.

My Achievements

Xamarin on Visual Studio and also on Mac, is the platform I will use to develop. The free version had some limitations which would have made it difficult for me to do this. Fortunately, they offer a version to students which has more features. It took a few weeks to get the link sent across from Xamarin as they had to verify my student status. This is now installed and ready to go for when I start coding.

I have found a few videos on Pluralsight which will look like they will be very useful for those, like myself, that have never used Xamarin before. Now I have the software installed I can start following these and hopefully become familiar with the tool.

My Reflection

This month I have felt in control of everything in terms of this project, I fell that this is for two reasons:

1) It is still early in the development lifecycle
2) I am making a conscious effort to not fall behind. Keeping ahead of the game is going to be key in the coming months. It's very easy to let tasks build up and before I know it I will be hit with milestones and the pressure of doing things last minute. This is where the Gantt chart is going to be useful.

Supervisor Meetings

I haven't had a supervisor assigned as of yet so nothing to report on this.

October 2015

Student name: Natalie Edward
Student Number: x12117684
Programme: BSc. in Computing
Month: October

This month I spent the majority of my time carrying out research in preparation for putting together my SRS document.

I looked at similar applications and actually found that there was a big gap in the search for missing adults. The majority of applications in the market at the moment focus primarily on missing children (U 18's).

My Achievements

I have secured a meeting with the Executive Director of ICT at An Garda Siochana. This will be a valuable meeting in terms of my requirements gathering.

My Reflection

October I feel that I didn't achieve as much as I had hoped. I put this down to workload from other modules. I think its key at this stage to manage my time wisely whilst it is still fairly early in the development lifecycle.

Supervisor Meetings

Notes take from supervisor meetings will follow later in this document.

November 2015

Student name: Natalie Edward
Student Number: x12117684
Programme: BSc. in Computing
Month: November 2015

November proved to be quite challenging in terms of the project.

I encountered problems with Xamarin which was the tool I proposed to use to develop the application cross platform. I was trying to set up this tool on the mac through Visual Studio, however because Visual Studio runs on Windows I was running a virtual machine. This, however presented problems with the emulators I was trying to set up. Although this in theory should have been a small problem that could have been easily rectified, it actually turned out to be quite time consuming and so I had to make a decision of whether to continue and try to resolve the problem or look for an alternative tool. I chose the latter.

Android Studio was recommended to me and so I set this up on my system and watched a number of tutorial videos on YouTube and Pluralsight, it was very user friendly and I had a basic application up and running on the virtual emulator and my own device in a surprisingly short space of time. The only negative of using this was I could only develop for Android and so iOS development would have been sacrificed.
I consulted with Pramod about this is and he recommended that I first look to see if other tools were available for cross platform development before making the decision to develop for Android only. PhoneGap looked like a good alternative to Xamarin and so I am currently researching this and hoping that this will be my option and I can begin work on my prototype.

Other activities this month included my meeting with Liam Kidd from An Garda Siochana. The meeting was very helpful and Liam has put me in touch with a representative from the Missing Person Unit. I will be setting up a meeting in the second week of December with the unit which I hope will be useful in going forward with the project.

Finally, I was able to put together my Design & Analysis document for submission. I still feel there is some work which needs to be done on this document. Again, as the project progresses so will the documents.

My Reflection

Upon reflection I felt somewhat deflated with my progress in November and did hope to much further along that what I am. This is down to the issues I encountered with the development tools. Now I have the design & analysis submitted I can turn my focus solely onto developing the prototype and get back myself back on track.

Supervisor Meetings

Notes take from supervisor meetings will follow later in this document.

December 2015

Student name: Natalie Edward
Student Number: x12117684
Programme: BSc. in Computing
Month: December 2015

This month I focused on starting to code the application in preparation for having a working prototype for February's presentation.

After the setbacks encountered in November with regards to the development tools I was going to use, I have now identified which software I am going to utilise for development going forward and feel like I am somewhat back on track.

Ionic Framework was recommended to me by a fellow student. After some research on this, it seemed like a good option for me to take in terms of development of my application. It is an open source SDK which is built on top of AngularJS and Apache Cordova. More importantly it allows for me to develop cross platform extremely easily which enables me to return to my original plan of developing for Android and iOS. It also uses some of the languages I am already familiar with which will allow me to focus more time on other areas of the application which will prove to be more challenging.

With that said, to date I have 50% of the views in the application created with navigation. Surprisingly, this took me very little time. The navigation element believe it or not took the longest to figure out. The views were created in less than a day. All that is left to do now is the remaining views and then I will move on to the core functionality and connecting the application to a database.

My Reflection

December so far has been quite productive, however I do feel that I really need to manage my time well over the coming weeks with the Christmas break and upcoming exams.

Supervisor Meetings

Notes take from supervisor meetings will follow later in this document.

January 2016

Student name: Natalie Edward
Student Number: x12117684
Programme: BSc. in Computing
Month: January 2016

January saw slow progress for me on the project. This was mainly due to the exams taking place and shifting some of my focus on to those.

For the remainder of the month I worked on the database and returning the data back to the application views. I came across a couple of obstacles with this. These have now been resolved and I have the application returning data back. This a big step for me in terms of the functionality and I now hope to gain momentum in getting the other features integrated.

I also met with Brenda Fields from the Missing Persons Bureau at An Garda Siochana.
I presented the idea to Brenda, whilst she thought that it was good, she did have some concerns about whether this would be something the organisation would take on. Her concern was the fact that their systems are quite dated and they wouldn't have the resources to maintain the application. I still feel there is a big gap in the market for this application and if presented to An Garda Siochana later in the development stages that they would see its value.

My Reflection
As mentioned earlier, January saw my time on the project limited due to the exams. However I do feel like I have made good progress on the application all things considered.

Supervisor Meetings
I met with my supervisor once this month. The summary of that meeting follows.

February 2016

Student name: Natalie Edward
Student Number: x12117684
Programme: BSc. in Computing
Month: February 2016

The beginning of this month saw me focus primarily on the midpoint presentation. This went much better than I had expected and the results and feedback that came from it were positive.

I have reached a couple of milestones in the project this month, most notably is the geolocation functionality. I now have the map functioning with the current location of the device, additionally the user can now populate that map with last sightings of missing people in the database. This now allows for me to start work on the geo-fencing functions of the application.

Setbacks – For some reason the performance of the application seems to have fallen back somewhat. There are a number of intermittent issues with navigation, in particular the back button. The fact that these issues are intermittent makes it much more difficult to find the root of the problem. My feeling is that it is something in relation to the plugins being used and the order in which they are being called. This is an issue which I continue to try and resolve.

My Reflection

Upon reflection, February was a good month in terms of productivity. My fear was that once the midpoint presentation had taken place that I would lose the momentum picked up, however this was the opposite and I feel that it was the most productive month so far.

March 2016

Student name: Natalie Edward
Student Number: x12117684
Programme: BSc. in Computing
Month: March 2016

March turned out to be less productive than previous months in terms of development of the application itself. My focus diminished somewhat, mainly due to me focusing all of my efforts on the end of semester and trying to get other projects completed and out of the way.

I did however manage to put aside some of my time to work on the final technical document and making a start on my test plan.
My Reflection
Upon reflection, even though this month turned out to be less productive I do feel a weight has been lifted with the completion of my other modules and now I can put all of my efforts on what remains to be done for the project.

Supervisor Meetings

October 12 2015 - Meeting Minutes

October 12, 2015

Present: Pramod Pathak, Natalie Edward
Next meeting: October 23, 2015, 10:00am – 11:00am, Room 3.22

Discussion

Today was a general discussion about the application and my proposal. We discussed other missing person's applications in the market. We also talked about applications which were similar in concept.

What other concepts would compare?

- Looking for an item in a shop
- Game
- Companies such as O2 who would send push notifications to a customer who was close to a location of which they could avail of an offer/deal

Actions

Look at high scoring project from last year which would be similar to mine. Make notes on the proposal/SRS and also why it was the highest scoring project.

Download CRI Alert application. Navigate through it and take not of its features. Make comparison to my application and why it is going to stand out from CRI Alert.

Look at and download other similar missing person's apps from other countries. Make the same comparison as in item 3.

Look at apps which have the same concept as mine, not necessarily a missing persons app but those that have the same idea of finding an object. I.e. O2 sending push notifications if a user is near a shop which has discounts. Look at the architecture of these applications, the SRS document if available and what technologies were used.

October 23 2015 - Meeting Minutes

October 23, 2015

Present:	Pramod Pathak, Natalie Edward
Next meeting:	October 30, 2015, 11:30am – 12:00pm, Room 3.22

Discussion

Initial discussion was a follow up on the actions from our last meeting. We also discussed other missing person's applications in the market, what their features are and how my idea will be different and innovative.

Actions

Create an excel spreadsheet with the following columns:

- Similar Applications
- Features of those Applications
- Usage
- Feedback/Reviews from these applications

List companies who may be interested in my application.

Contact organizations affiliated with missing persons.

October 30 2015 - Meeting Minutes

October 30, 2015

Present: Pramod Pathak, Natalie Edward
Next meeting: November 6 2015, 3:00pm – 3:30pm, Room 3.22

Discussion

Initial discussion was a follow up on the actions from our last meeting.

We briefly talked about how my application could evolve. A few ideas were using it in the search for criminals or even missing items. The architecture of the app is the same however the missing item/person would differ.

Pramod put me in touch with Liam Kidd who is Executive Director of ICT at An Garda Siochana to set up a meeting to discuss the application. This will aid in me pulling together the requirements.

Actions

Contact Liam Kidd from An Garda Siochana asap to set up a meeting.

Continue working on SRS

November 6 2015 - Meeting Minutes

November 6, 2015

Present: Pramod Pathak, Natalie Edward
Next meeting: November 13, 2015, 10:00am – 10:30am, Room 3.22

Discussion

Discussion today centered on the software requirements document which was due for submission.

We went through each section and discussed how they could be improved, focus was primarily on the functional requirements.

This elicited ideas for the application such as integrating data analytics to do the work. For example when a case is uploaded and analytical api could be integrated to analyze that data and make recommendations.

I also gave Pramod feedback on my meeting with Liam Kidd from An Garda Siochana. The meeting with Liam was a general discussion around the application idea. He felt it was a good idea but was concerned that the users would only consist of those with a vested interest in the missing person, i.e. friends, family. Liam is going to put me in touch with the missing person's bureau so I can work more closely with them on the application.

Actions

Complete and submit SRS document.

Research IBM Watson for analytical use in application. Is this feasible?

November 13 2015 - Meeting Minutes

November 13, 2015

Present:	Pramod Pathak, Natalie Edward
Next meeting:	December 7, 2015, 10:00am – 11:00am, Room 3.22

Discussion

Today's meeting was a general discussion on where I was with the project as the action from the last meeting was to complete and upload the SRS document.

There was some discussion on IBM Watson/Bluemix and utilizing this tool in my application for data analysis.

We finally discussed the upcoming deliverables for the project. In particular the Design & Analysis document which is due to be submitted in December and the Prototype which should be presented in February. Pramod advised that I make a start working on these in the next week.

Actions

Start working on Design & Analysis document

PP advised to start working on the prototype

Research IBM Watson/Bluemix

PP to look at obtaining licenses for IBM Bluemix

December 7 2015 - Meeting Minutes

December 7, 2015

Present: Pramod Pathak, Natalie Edward
Next meeting: December 11, 2015, 10:00am – 11:00am, Room 3.22

Discussion

Today's meeting was a general discussion on where I was with the project.

Emphasis was on where I need to be for the prototype in February. It was agreed that all basic functionality of the application would be developed and with as much of the more difficult elements as possible.

Consideration should be given to the completeness and innovation of the project.

We also talked about what should be discussed at the meeting I have with a representative from the missing person's bureau. Look for what features of an application they are missing at the moment on the CRI Alert App. Is my application something they would be interested in utilizing.

Actions

Look at grading rubric and replace with my own measurable.

Meet with representative from missing person's bureau.

Look at deploying the application to the cloud for customers to utilize.

December 11 2015 - Meeting Minutes

December 11, 2015

Present: Pramod Pathak, Natalie Edward
Next meeting: January 15, 2016, 10:00am – 11:00am, Room 3.22

Discussion

Today was a general discussion about the progress of the project.

Some discussion centered on which technology I would use for the database. IBM Bluemix was a suggestion and so I will research this further to see if it will be compatible with Ionic.

I have some concerns about the progression of my project and the approach I am taking. My current approach is to develop the front end and then add functionality, I may choose to take each functionality and develop the project in increments.

Actions

Look into the use of IBM Bluemix for the database element of the project. Speak to Cristina Hava Muntean regarding licenses.

Meet with Missing Persons Bureau on Monday 14th December

Continue application development ready for midpoint presentation.

Have basic functionality

- All pages created
- User Registration
- Login
- Get Current Location

January 15 2016 - Meeting Minutes

January 15, 2016

Present: Pramod Pathak, Natalie Edward
Next meeting: TBC

Discussion

Discussion today centered around current standing and preparation for mid-point presentation, focusing on the grading rubric and what needs to be done to achieve h1 marks.

Actions

Continue mid-point preparation

Meeting with missing person bureau

ID	Task Mode	Task Name	Work	Duration	Start	Finish	Details	T	F
1		**Project Planning**	**0 hrs**	**57 days**	**Thu 17/09/15**	**Fri 04/12/15**	Work		
2	✓	Project Proposal Document	0 hrs	12 days	Thu 17/09/15	Fri 02/10/15	Work		
3		**Requirement Specification Document**	**0 hrs**	**31 days**	**Mon 28/09/15**	**Mon 09/11/15**	Work		
4	✓	Project Scope	0 hrs	1 day	Tue 29/09/15	Tue 29/09/15	Work		
5	✓	**Functional Requirements**	**0 hrs**	**2 days**	**Wed 30/09/15**	**Thu 01/10/15**	Work		
6	✓	Use Case Diagram	0 hrs	1 day	Wed 30/09/15	Wed 30/09/15	Work		
7	✓	Non Functional Requirements	0 hrs	2 days	Wed 30/09/15	Thu 01/10/15	Work		
8	✓	GUI	0 hrs	7 days	Fri 02/10/15	Sat 10/10/15	Work		
9	✓	System Architecture	0 hrs	7 days	Sun 11/10/15	Sun 18/10/15	Work		
10	✓	System Evolution	0 hrs	2 days	Mon 19/10/15	Tue 20/10/15	Work		
11		Submit Requirements Specification Document	0 hrs	14 days	Tue 20/10/15	Fri 06/11/15	Work		
12	✓	Project Research	0 hrs	11 days	Mon 28/09/15	Mon 12/10/15	Work		
13		Software Research and Self Learning (Xamarin)	0 hrs	31 days	Mon 28/09/15	Mon 09/11/15	Work		
14		Project Analaysis and Design	0 hrs	1 day	Fri 04/12/15	Fri 04/12/15	Work		
15		**Development**	**0 hrs**	**110 days**	**Mon 09/11/15**	**Fri 08/04/16**	Work		
16		Application Coding	0 hrs	110 days	Mon 09/11/15	Fri 08/04/16	Work		
17		Midpoint & Prototype Presentation	0 hrs	0 days	Thu 04/02/16	Thu 04/02/16	Work		
18		Project Beta Version	0 hrs				Work		
19		Submit Final Documentation & Code	0 hrs	0 days	Wed 11/05/16	Wed 11/05/16	Work		
20		Project Presentation	0 hrs	0 days	Wed 18/05/16	Wed 18/05/16	Work		
21		Project Showcase	0 hrs	0 days	Wed 25/05/16	Wed 25/05/16	Work		
22		**Testing**	**0 hrs**	**17 days**	**Sat 09/04/16**	**Sun 01/05/16**	Work		
23		Functionality Testing	0 hrs	7 days	Sat 09/04/16	Sat 16/04/16	Work		
24		Usability Testing	0 hrs	6 days	Sun 17/04/16	Fri 22/04/16	Work		
25		Performance Testing	0 hrs	6 days	Mon 25/04/16	Sun 01/05/16	Work		
26		Deployment	0 hrs	7 days	Mon 02/05/16	Tue 10/05/16	Work		

Bibliography & Resources

References

- Acmeinvestigations.com. (2016). Missing Persons. [online] Available at: http://www.acmeinvestigations.com/MissingPersons.htm [Accessed 15 September 2015].

- The Polyglot Developer. (2014). *Use The Android And iOS Camera With Ionic Framework*. [online] Available at:https://www.thepolyglotdeveloper.com/2014/09/use-android-ios-camera-ionic-framework/ [Accessed 21 January 2016].

- Technotip.com. (2016). *Social Sharing Plugin: Ionic App*. [online] Available at: http://technotip.com/4809/social-sharing-plugin-ionic-app/ [Accessed 8 March 2016].

- OneSignal Push Notification Service Documentation. (2016). *Getting Started with OneSignal · OneSignal Push Notification Service Documentation*. [online] Available at: https://documentation.onesignal.com/ [Accessed 8 May 2016].

Resources

The following resources were used throughout the development process of this application:

Documentation:

Ionic Documentation - http://ionicframework.com/docs/

Developer Guide - https://docs.angularjs.org/guide

Backand Documentation - http://docs.backand.com/en/latest/index.html

Google Maps API Documentation - https://developers.google.com/maps/documentation/android-api/

Google Geolocation API Documentation - https://developers.google.com/maps/documentation/geolocation/intro#requests

Tutorials:

Getting Started with Karma for AngularJS Testing - http://www.bradoncode.com/blog/2015/05/19/karma-angularjs-testing/

Building Mobile Apps with Ionic Framewok & AngularJS By Steve Michelotti – Pluralsight - https://www.pluralsight.com/courses/building-mobile-apps-ionic-framework-angularjs

Angular: The Big Picture By Joe Eames – Pluralsight - https://www.pluralsight.com/courses/angular-big-picture