EAGLE EYE

GPS BASED AUGMENTED REALITY ANDROID APPLICATION TO ASSIST THE TOURISTS IN ENJOYING AND PLANNING THEIR TRIPS

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CERTIFICATE

Certified that the contents and form of project report entitled “The Eagle Eye” submitted by Ehtesham Qazi, Aqib Mehmood and Amir Hussain have been found satisfactory for the requirement of the degree.

Supervisor: _____

Lec Mobeena Shahzad

ABSTRACT

Tourism is frequently justified on the basis of its potential contribution to economy of a country . It maintains a peaceful image throughout the world. Currently, no effective mobile application is available that provides complete guidelines for enjoying and planning their trips. With the introduction of 3G and 4G cellular networks, internet is no more a problem.

The Eagle Eye is GPS based augmented reality mobile application to assist the tourists in enjoying and planning their trips. The application offers multiple features that include Augmented Reality view, Navigation services, Search for places, maintaining Localpedia (Data to be used offnet), maintaining Wishlists, Weather updates and getting notifications of events and places.

A complete android application has been developed successfully. Coding has been done in Java language using Android Studio integrated development environment (IDE). XML is used for defining layouts and interfaces. Database is used to store the information of places, maps and information about the visits. SQL Lite database has been used to maintain database.

The Eagle Eye is a complete package for the tourists and people who have craze for travelling.

DECLARATION

No portion of this document has been presented in any qualification or awards either in this institution or anywhere else.

DEDICATION

In the name of Allah, the Most Merciful, the Most Beneficent.

To our parents and teachers, without whose unflinching support and cooperation, a work of this magnitude would not have been possible.

ACKNOWLEDGEMENTS

There is no success without the will of ALLAH. We are grateful to ALLAH, who has given us the guidance, strength and enabled us to accomplish this task. Whatever we have achieved, we owe it to Him, in totality. We are also grateful to our parents, family and well-wishers for their admirable support. We would like to thank our supervisor Lec. Mobeena Shahzad for her help and motivation throughout the course of our project. Without her help we would have not been able to accomplish anything. She provided us with the opportunity to polish our technical skills and guided us into this area of learning.

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Chapter 1

INTRODUCTION

1. Introduction:

Tourism is frequently justified on the basis of its potential contribution to economy of a country. It maintains a peaceful image throughout the world. Pakistan is struggling both in economy and terrorism now a day. No complete application is available for the tourists. So, this application will offer different features to the tourists in planning and enjoying their trips.

1.1 Purpose:

The project is aimed at developing an android application to assist the tourists in planning and enjoying their trips. The Eagle Eye is an android application of augmented reality to assist the tourists in enjoying and planning their trips. It is a multi-featured application that offers different features to the tourists including augmented reality view, navigation, weather updates, maintaining database and getting notifications.

1.2 Project Background:

Augmented Reality is direct or indirect view of real world objects. Information of buildings is shown on the live camera screen after fetching from different APIs. This makes the application easy to use and interesting.

After introducing 3G and 4G cellular networks and smart phones, it is easy to use the internet and graphical applications on the mobile phones. Google Maps provide navigation services and different other APIs provide information like weather updates and images etc. There is no such application is available which provide all these features to the users. Use of technology will increase the tourisms in a country.

1.3 Project Scope:

1.3.1 Product Scope

The intended users of the system are tourists. During their visit, they need a tour guide to make their visit memorable. Eagle Eye will provide following services to the tourists:

Show information of buildings and places in front of user's screen. It is Navigation based on GPS to find the shortest path to the destination. There will be a wishlist to make list of places to be visited in future. Notifications of events occurring nearby user during the visit will be provided to the user. Information about the places from different media (Dailymotion, Twitter) will also be shown to user. Weather updates will be given.

Localpedia (Before going to trip user will update the application with local limited information about the place (maps, famous places) so he/she can use it without internet as well).our application will give emergency numbers of places to be visited

1.3.2 Extended Scope

Application will be able to translate local sign board to user's language.

Google Translate API to communicate with the people where either user does not understand the local language or local people don't understand user's language

Database for the user to save pictures and videos so that he/she doesn't have any fear to loss the data or memory problems.

1.4 Objectives:

To learn the concepts of Android Programming.

To learn the development of Augmented Reality.

To learn the development and usage of APIs.

Using Google Maps.

Deliverables:

Deliverable Name	**Description**
Software Requirement Specification (SRS) Document	It Provides detailed description of functional and non functional requirements of the system. It also explains what the services it will provide to the user and will describe the project's target audience and its user interface, hardware and software requirements.
Design Document	Software Design Document shows how the software requirements will be implemented to develop the system. It also gives the programmer a blueprint to follow. After approval of the document, it will become baseline for limiting changes in the scope of the project. The document

	includes different diagrams that shows and depicts the system from different aspects. The document makes sure that all the requirements specified in the SRS document will be addressed during the development.
Code	Code of java of the application
The System	Complete working system

Chapter 2

LITERATURE REVIEW

2. Literature review

2.1 Introduction

As the importance of mobile devices has been increased, their usage in any aspect of life has enhanced because of new developed technologies. And because of these technologies location based services can be created easily. Mobile devices can be used to guide the user in getting locations. The devices with the internet usage facility are used widely in the world, this internet facility can be used to keep track of the users for their destinations. Mobile Devices with the camera can also be the purpose like augmented reality or virtual reality. A single product can be built by these services combined together so that user may have the services on a single click. Devices with a built in Global Positioning System (GPS) can be used to tract on a direction. Different maps can be used to have a direction on a single click with the help of the GPS.

Social Media is defined as a group of internet based applications that allow the creation and exchange of the user generated data. This media can participate in social networking. Social media is a collective of the online communication channels.

Characteristics of Different type of Social Media are following.

Web space

The application provide user to upload content in a free space

Web address

User are given a web identity in their names or web IPs. Use can share their content on this web address.

Build profiles

User are asked to make their profiles. They will be asked for their details name, address, date of birth, school college etc. This site can mine this data to connect the individuals.

Connect with friends

User are connected to their friends. They can share their data with their friends.

Upload contents in real time

User are provided to post their data like images, text in real time.

Enable conversation

Users are given rights to change their data or to comment or share to some of the friends.

Posts have time stamp

All posts are time stamped which will help in following the posts.

Our Project aims at developing standalone application (Android Application) that allow the user to get navigation for the destination. User is given the facility to look up the place near to them. They will be updated by the weather updates. Users will be given a unique platform to view the laces near to them in augmented view.

2.1.1 Features of our application are following

Show information of buildings and places in front of user's screen. It is Navigation based on GPS to find the shortest path to the destination. There will be a wishlist to make list of places to be visited in future. Notifications of events occurring nearby user during the visit will be provided to the user. Information about the places from different media (Dailymotion, Twitter) will also be shown to user. Weather updates will be given. Localpedia (Before going to trip user will update the application with local limited information about the place (maps, famous places) so he/she can use it without internet as well).our application will give emergency numbers of places to be visited.

Our application will be composed of different services provided by different Companies. Their APIs are used to get information retrieve information request information.

2.2 Background of the Location based Services

Location based services (LBS) are able to assist the people how to interact with the world. LBS is mostly used for navigation services exclusively. Navigation can be used in many aspects in which technologies allow.

2.2.1 Types of navigation

2.2.1.1 Indoor Navigation

The idea of indoor navigation is that the application can give navigation on different floors of a building. For this map of the building should be stored in the application. The user is guided inside of the building for the rooms. The path may be set to the rooms so that user can reach there with no difficulty.

2.2.1.2 Outdoor Navigation

Maps of the world are present from the thousands of years but the user of mobile devices can find their ways by using GPS devices and the digital maps provided by different service providers. In outdoor navigation users can be given the facility to set their path between the cities and make their journey.

In our application Outdoor Navigation is used with the help of Google Maps.

2.2.2 Approaches to location based Services.

2.2.2.1 Navigation through Maps:

This approach to location based service can be achieved by using Maps and GPS. In this Approach a source and destination are set by the user. The map will show the path between them. These service may use to get position of the user at any time. This service can be used to get the nearest places to user and pointing on the map

2.2.2.2 Vision based Augmented Reality

This approach to location based services can be achieved by using Camera Maps, GPS, Gyroscope, and Accelerometer. The user is given a live view to the real world through the Camera of the Device. This view will be controlled by the GPS, MAPS Gyroscope and accelerometer. In this approach the user can see the happening in the real world on the camera. With the help of the Maps and different Social Media updates. The GPS Keeps Track of the user. Bearing between the object of which information is required can be obtained.

2.3 Problem Domain

2.3.1 Android Application:

As the capabilities of mobile phones have been increased over time period. The latest mobile are supporting large processing applications. Android is the best platform to develop any application because of the world wide users as compared to other devices. Here are some statistics of the comparison between different smartphones.

Worldwide Smartphone Sales to End Users by Operating System in 1Q12 (Thousands of Units)

Operating System	1Q12 Units	1Q12 Market Share (%)	1Q11 Units	1Q11 Market Share (%)
Android	81,067.4	56.1	36,350.1	36.4
iOS	33,120.5	22.9	16,883.2	16.9
Symbian	12,466.9	8.6	27,598.5	27.7
Research In Motion	9,939.3	6.9	13,004.0	13.0
Bada	3,842.2	2.7	1,862.2	1.9
Microsoft	2,712.5	1.9	2,582.1	2.6
Others	1,242.9	0.9	1,495.0	1.5
Total	**144,391.7**	**100.0**	**99,775.0**	**100.0**

Source: Gartner (May 2012)

Figure 2-1 Statistics of the application users buying different Device

On the basis of these statistics we choose android platform.

2.3.2 GPS

From 1990 onwards GPS is used for personal trip surveys and it is very important for its accuracy. It is portable in May devices. Mostly mobiles are composed of the GPS .It provide Precise spatiotemporal information of the personal movement. GPS is used to Calculate 2d position and movement of the device. It can also be used to determine the 3D position when 4 or more satellites are used. GPS is run by United States military. But it is free for civilians, it can be used by the help of mobile company with little signals or by using internet. Mobiles without GPS cannot use this service at all.

2.3.3 Google Maps

Since from 2005 when Google maps are launched. They are widely used for geographical information. They have provided their customizable features and dynamic tools free for the users it can be used for searching of a location, view information on the maps, give direction for the users, can see objects in 3d view and different views for the users.

In android platform Google maps are free. Google maps API is free to use. Applications can be built including the features provided GOOGLE maps. The API can be used in any direction to create different applications. Google Maps can be synced with the GPS information and are used for navigations. These maps can be used offline.

2.3.4 Augmented reality

Augmented reality is the physical environment in direct or indirect virtual scene which are augmented by computer sensory inputs. Google Map APIs and Google Places API can be used to get information about the places which can be presented in a virtual view. GPS can also help in indicating the information which will be related to the nearest position.

2.3.5 Database

SQLite is a built in component to store the information in android. The information, route, images can be stored in this database.

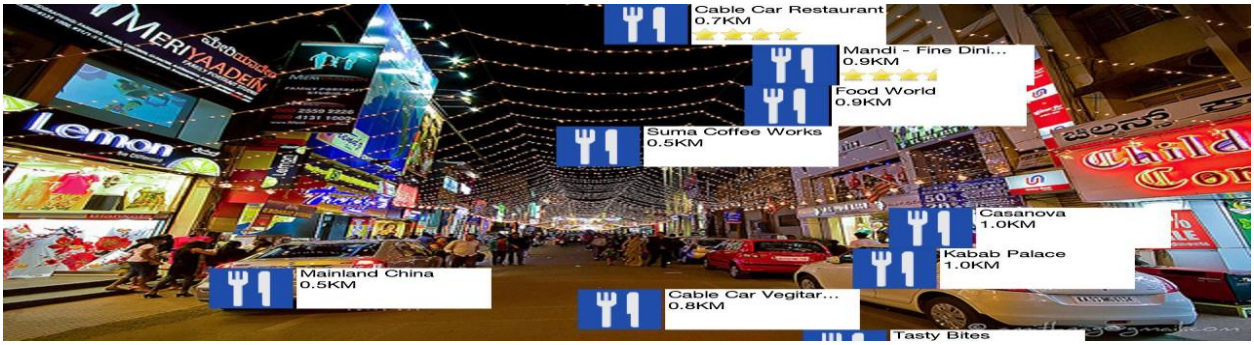


Figure 2-2 Augmented Reality

2.4 Relative Work:

2.4.1 Geo Navigations

Geo Navigation is a augmented reality Apllication Which uses the compass of the Device and GPS Tracker.

Figure 2-3 Geo Navigation

2.4.2 Sygic Maps Navigation

This Application provide the usage of Sygic Maps for navigation perpose. It uses the GPS tracker to find out the path . it also uses the accelerometer of the device to read the motion of the device.

Figure 2-4 Sygic Maps

2.4.3 Maps Factor :

This application is also android application which works to give direction and path to the user .

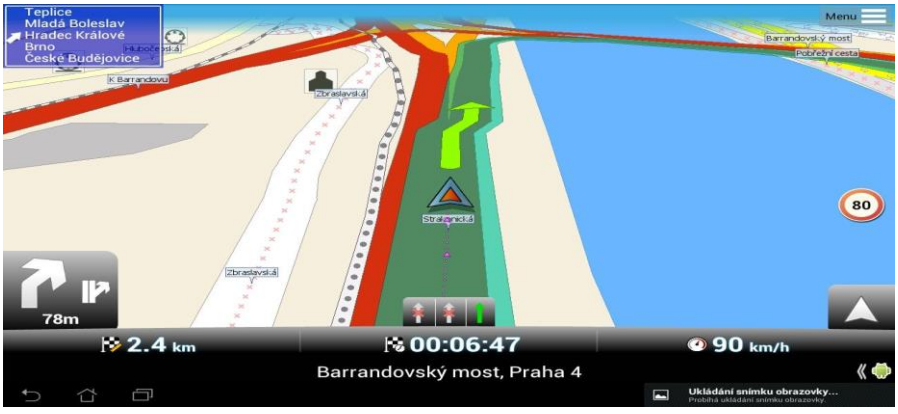


Figure 2-5 Maps Factor

2.4.4 Yelp! :

Yelp is a Location based augmented reality application in this application Virtual view is created using Camera of the device on which nearest places are indicating their direction.

Figure 2-6 Yelp!

2.5 Technological Requirements:

The software(s) required for the implementation of our project includes:

Java Development Kit 1.6
Android Studio IDE 1.2
Android-SDK version 2.2 of Level 8 API

2.6 Hardware requirements

The Hardware required for the implementation of our project includes:

Mobile Phone having Android as its OS

Built in Camera of almost 3.0 Megapixels

Data Cable for hardware and software interfacing.

Chapter 3

SOFTWARE REQUIREMENTS SPECIFICATION

3. SOFTWARE REQUIREMENTS SPECIFICATION

3.1 Introduction

System Requirement Specification contains all the functional and nonfunctional requirements asked by the stakeholder. And give convince to the developers to understand the Scope.

3.1.1 Purpose

The document will provide a detailed description of functional and non-functional requirements of the system. It will also explain what the services it will provide to the user and will describe the project's target audience and its user interface, hardware and software requirements. It will illustrate the interaction of the user with the system with the help of use cases. It will provide an agreement between the user and the development team that what services the users will get from the system to be developed. Hence, by this document the users and developers will have the same understanding about the system. This document is a contract between user and development team about the services of the system.

3.1.2 Document Conventions

Words or sentences in bold or underline descript that these are specific terms.
Words System, Application and Software are of the same meaning in the whole document. All words in above point refer to The Eagle Eye.
Words End Devices, Android Devices, Mobile Phones are of the same meaning throughout the document.
Words Document and Software Requirement Specifications are same.

3.1.3 Intended Audience and Reading Suggestions

3.1.4 Intended Audience:

Stakeholders of the system are all those who has somehow interest in the development and usage of the system. The audience/stakeholders of the document are:

3.1.4.1 Development Team:

All the members of development team will develop the system according to this document. All functionalities of the system will be developed according to requirements specified in the document.

3.1.4.2 Testing Team:

After the development of different modules, this document will help the testing team to test the system whether the developed system/module meets all the requirements specified in the document or not.

3.1.4.3 Project Supervisor:

Project Supervisor will supervise the whole development of project according to this document and he/she will make sure that the development is carried out in the right direction.

3.1.4.4 End User:

End Users will get actual functionalities of the system. He will make sure that all the requirements described in the document are of his/her needs or not.

3.1.4.5 UG Project Evaluation Team:

The document will help the UG Project Evaluation Team to evaluate the project in better and effective way. Team will check the final system according to this document.

3.1.4.6 Documentation Writers:

During the development of the system, this document will help to maintain the documentation of the system.

3.1.5 Reading Suggestions:

Section 1(Introduction) and **2(Overall Description)** of the document describes the brief overview of the system. Readers who are interested in brief functionality and introduction of the system should read these two sections.

Readers interested in a brief overview of the product should focus on the rest of Part 1 (Introduction), as well as Part 2 of the document (Overall Description).

Section 3 (External Interface Requirements) describes the technical details of the system. Readers who are interested in technical details and want to know the technicalities of the system should read this section.

Section 4 (System Features) describes the features of the system. All the features are described in this section with the help of use cases. Readers who want to explore the features of the system in detail should read this section.

Section 5 (Other Nonfunctional Requirements) describes the non function requirements such as safety, security, trust and reliability of the system. Readers who want to know about these types of non functional requirements of the system should focus on section 5.

Section 6 (Other Requirements) describes other requirements such as database requirements and legal requirements. Readers who want to know about database and legal requirements should read this section.

3.1.6 Product Scope

The intended users of the system are tourists. During their visit, they need a tour guide to make their visit memorable. Eagle Eye will provide following services to the tourists:

Show information of buildings and places in front of user's screen. It is Navigation based on GPS to find the shortest path to the destination. There will be a wishlist to make list of places to be visited in future. Notifications of events occurring nearby user during the visit will be provided to the user. Information about the places from different media (Dailymotion, Twitter) will also be shown to user. Weather updates will be given. Localpedia (Before going to trip user will update the application with local limited information about the place (maps, famous places) so he/she can use it without internet as well).our application will give emergency numbers of places to be visited.

3.1.7 Extended Scope

Application will be able to translate local sign board to user's language.
Google Translate API to communicate with the people where either user does not understand the local language or local people don't understand user's language
Database for the user to save pictures and videos so that he/she doesn't have any fear to loss the data or memory problems.

3.2 Overall Description

3.2.1 Product Perspective

Tourism is one of the key features to boost the economy of a country and maintain a peaceful image in the world. There is no complete application available at the moment to guide the tourists during their visit in affective way. Different navigation services are available on the internet, but there is no unified platform to use these services for the tourism. Eagle Eye will provide a unified platform with different services which will help the tourists to plan and enjoy their trip.

3.2.2 Modules of the project:

There are five modules in the project. All the functionalities of the project will be performed after their combined work. Following diagram shows the modules of the project.

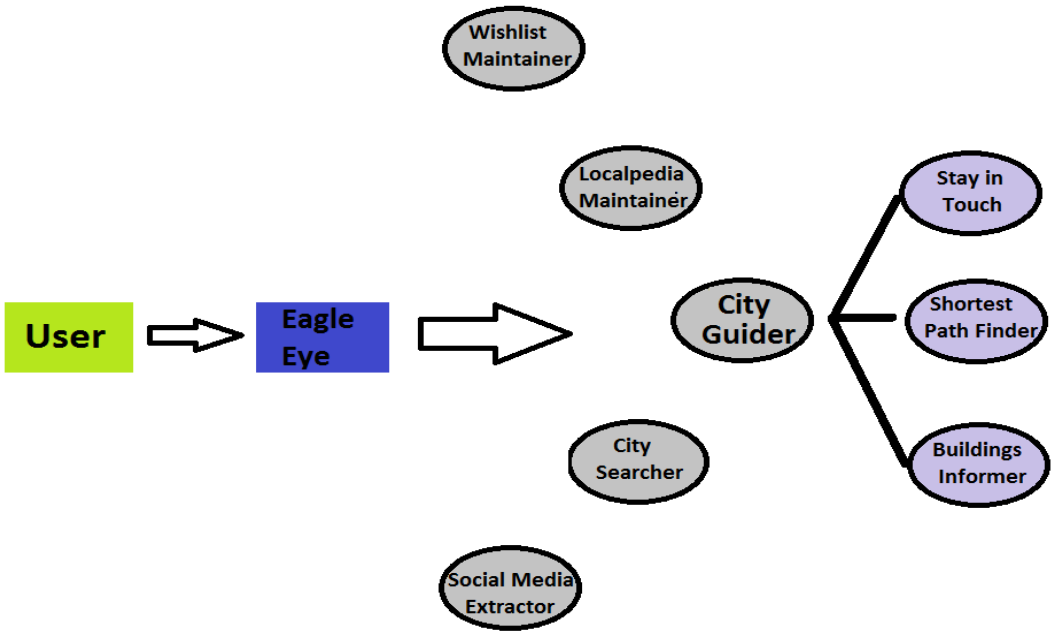


Figure 3-1 Moduler Diagram

3.2.2.1 City Guider:

This module will guide the user throughout his visit. This will find shortest path to the destination by sending the current coordinates and destination to Google Maps. Google Maps will send back the shortest path to the user. This will also make sure that user is on the right path throughout his/her journey. Also, the information of famous buildings and places will be displayed by this module.

3.2.2.2 Social Media Extractor:

This module will take the information from different modules and search for that information from different social media websites. The extracted information will be shown back to user.

3.2.2.3 Wishlist Maintainer:

This module will maintain the places to be visited in future. All the information of the places will be stored on web server using this module.

3.2.2.4 City Searcher:

This module will search for different recommended places during visit. Also nearest ATMs and restaurants will be searched for the user.

3.2.2.5 Localpedia Maintainer:

This module will maintain the information of the places before going to the visit. This will store the necessary information of the place so that the application can be used without internet as well. This information includes maps, emergency call numbers, world clock and some recommended places.

3.2.3 Product Functions

- **Building Allocations:** It will allow user to get information of important buildings and places in front of user's screen.
- **Shortest Path:** It will allow user to get shortest Distance to the selected destination.
- **Stay in Touch:** It will make sure that user will be on the same path as prescribed by shortest path finder.
- **Wish list Maintaining:** It will allow user to make list of places to be visited in future.
- **Notification Generation:** It will allow user to get the notifications of events occurring nearby user during the visit.
- **Recommend Places:** It will allow user to get recommend places to be visited during the current visit.
- **View Place Information**: It will allow user to get Information about the places from different media (Dailymotion and Twitter)
- **Weather Search:** It will allow user to get weather of different places.
- **ATM Search:** It will allow user to get location of Near ATMs.
- **Localpedia Maintaining:** It will allow user to store the information about the place, maps so that he/she can use it without internet as well.
- **World clock:** It will allow user to get the world clock.
- **Emergency numbers:** It will allow user to get emergency numbers of the places to be visited

3.2.4 User Classes and Characteristics

Users of the system are not specific. Anyone who has enthusiasm for the tourism and wants to make the trip memorable can use the system. Users are not required to have much technical background of computer technology. Our system expects only some knowhow of the English language and technology that includes android applications and using internet in affective way. Users can be from any cultural background, knowledge background and age regardless of gender.

3.2.5 Design and Implementation Constraints

Source of Information:
In this system information will be retrieved from Google Maps and social media. This information can be maps, current coordinates, events, images and links.

Information Storage:

SQL server will be used to store the database in web server.

Operating Environment:

The system will be able to run in Android environment. The system will not be able to run in the systems which run iOS or Symbian.

Security Considerations:

The system will provide a complete security to all the users. It will make sure that all the data either on mobile phone or database server will kept in secret.

Language Requirements:

The system will be developed in Eclipse using java. The database server will be developed in ASP.Net MVC4.

Cost:

Android mobile devices are generally expensive. So, the initial testing will be done on one mobile phone only.

3.2.6 User Documentation

Users will be provided with a user manual describing all the functionalities of the system. Using images all the functions of the system will be elaborated with steps.

There will be a video as well uploaded on the website to tell the user how to use system effectively and efficiently. A tutorial will also be uploaded on the website describing the functionalities of the system with proper steps.

3.2.6.1 Assumptions and Dependencies

Assumptions:

It is assumed while starting the development of the system that:

Project started on Sep 8th, 2014.
Development team is developer and user of the system at the same time. The requirements of the system are gathered from the development team.
During all the visits, different events occur.

Dependencies:

The system will be dependent on the Google Maps API. The system will keep on working properly if Google Maps API is working properly.
Information will be extracted from different social media websites and the working of this functionality is dependent upon the proper working of those social media APIs.
System is dependent on SQL database to store the data properly.
Most of the functionalities of the system will work if a fast internet connection is available.

3.3 External Interface Requirements

3.3.1 User Interfaces

User will interact to the system by mobile phone and Personal Computers (PCs). Mobile interface will allow the user to perform main operations described in section 2.2. PCs interface will allow the user to modify Wishlist and history of tours. Following are assumed screen shots of the system.

3.3.2 Android Phones Interface:

When the user opens application from his/her android device, following interface will be displayed.

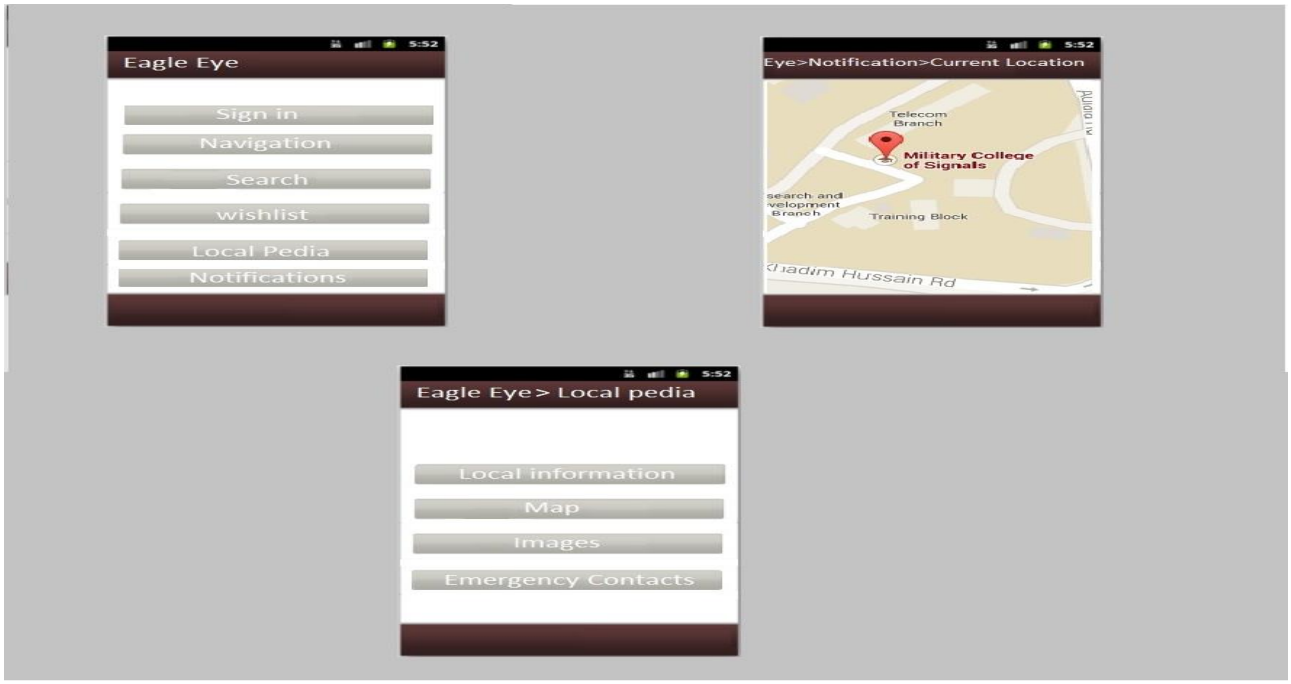


Figure 3-2 Initial interface

3.3.3 Hardware Interfaces

In terms of hardware interfaces, the system can be divided into 3 categories.

Android Smartphones

Shall have Global Positioning System (GPS) for location attributes

Shall have a network adaptor to establish a internet connection to communicate with server

Personal Computers

Shall have a monitor to display the interface

Shall have a keyboard input

Shall have a mouse input

Shall have proper internet hardware in working condition to communicate with server

Database Server

24/7 on server to maintain database to make the system accessible.

3.3.4 Software Interfaces

The smartphones shall have android operating system.

The smartphones shall have wireless internet with an internet browser.

The database shall have installed latest version of SQL server.

The personal computers shall have installed Windows XP/7/8.

The system will interact to database server, Google APIs, Twitter API and DailyMotionAPI through smartphones.

Information will be two ways i.e. it will be coming from the system and into the system.

User will enter the destination, the information along with his/her current position will be sent to Google Map APIs.

Information that includes shortest path to destination, data from social media and DailyMotion will be retrieved and received in the system.

3.3.5 Communications Interfaces

System shall be connected to Google Map APIs and other social media websites with following services:

To access those services, SOAP (Simple Object Access Protocol) can be used.

Those services can be discovered using UDDI (Universal Description, Discovery and Integration) protocol.

Finally to describe those services WSDL (Web Services Description Language) protocol will be used.

Normal communication between the client and the server will be through HTTP over a web browser.

Web Services will be used by the android devices.

3.4 System Features

Login
Navigation to find shortest path and events.
Search places their weather, ATMs and Restaurants.
Localpedia
Wishlist
Notifications

3.4.1 Navigate:

Description and Priority

This use case will describe how user finds his/her location and shortest path to the destination. The system shall takes the coordinates from android device through GPS and send it to Google Map APIs. Then device will get required information about the places from Google Maps and social media.

Priority: High

3.4.1.1 Stimulus/Response Sequences

Stimulus: The user enters the destination.
Response: The system finds the shortest path to the destination.

Stimulus: The user asks the system to stay in touch.
Response: The system keeps on checking the position of user according to shortest path.

3.4.1.2 Functional Requirements

REQ-1: The system shall get the source.
REQ-2: The system shall get the destination.
REQ-3: The system shall find the shortest path between source and destination.
REQ-4: The system shall show the information about the famous buildings in front of user.
REQ-5: The system shall stay keep in touch with user for complete guidelines throughout his/her journey.

3.4.1.3 Use Case Description

USE CASE NAME	Navigate
ACTOR	User , APIs, GPS
NORMAL COURSE	The user enters the source and destination. The system finds the shortest path. The system keeps the user in touch and guide throughout the journey. The user gets the information about the building from Google Map APIs and social media.
ALTERNATE COURSE	1) If no information can be get from Google APIs and social media, No information retrieved message pops up. 2) If user goes to other than shortest path, user is notified with a beep.
PRE CONDITION	User should be logged in. Internet should be available.
POST CONDITION	Shortest path and information is displayed on the user's screen.
ASSUMPTIONS	Users have know how of technology and have android smartphones.

4.2.5. Use Case Diagram

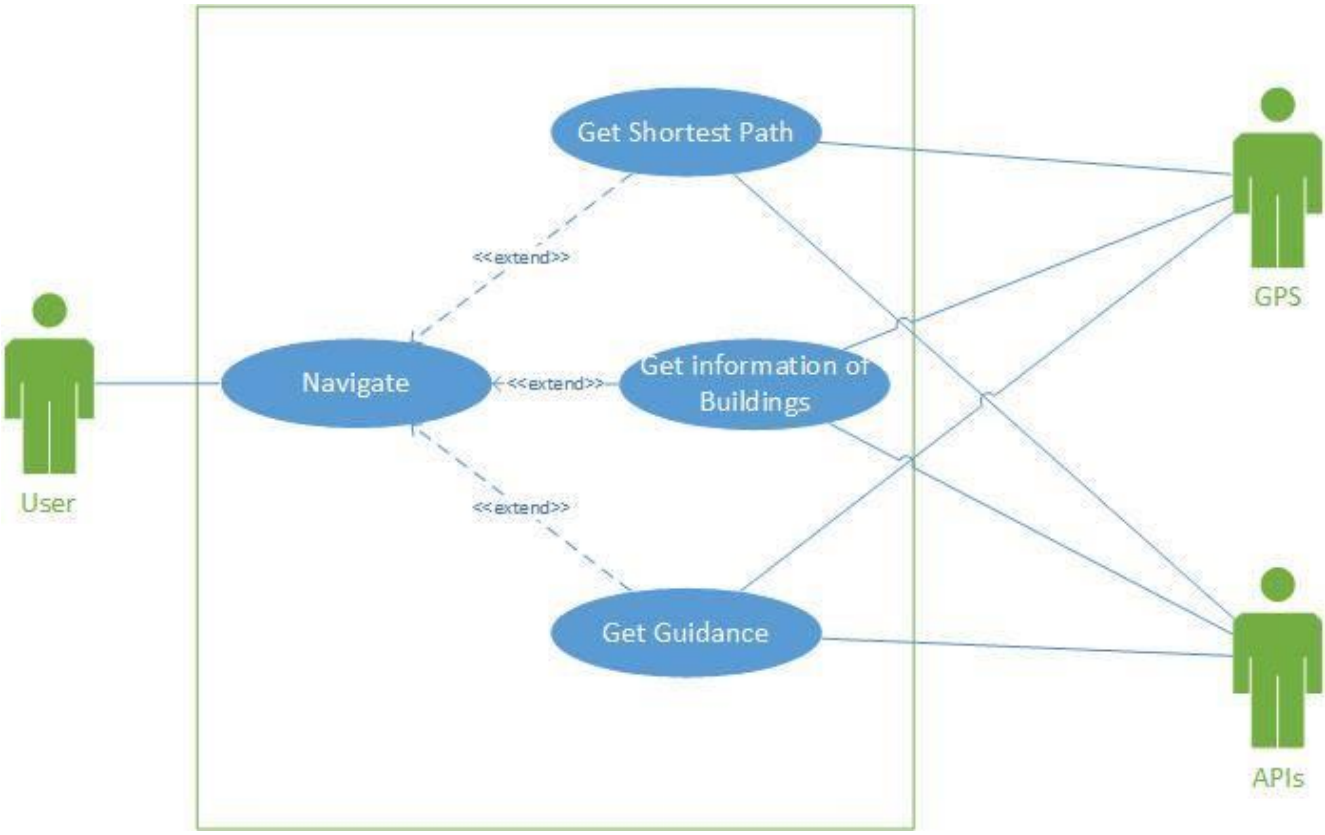


Figure 3-3Use case Diagram Navigation

3.4.2 Search:

3.4.2.1 Description and Priority

This use case will describe the search feature of this application. In this feature the authorized client will search any place. This application will show the results. The user will select the suitable place from search results. This application will give him/her the information from social media about the place. User can save the results in the Localpedia.

Priority: High

3.4.2.2 Stimulus/Response Sequences

Stimulus: The user will type in search bar.
Response: The system will give results by searching the place from Google Maps.

Stimulus: The user selects the best search.

Response: The system will show the place on the map with information gathered from social media. And will give option to select different categorized nearby places like ATM, Mosques, and Restaurants etc.

Stimulus: The user selects the desired category.
Response: The system will show the information about the selected option on the map.

3.4.2.3 Functional Requirements

REQ-1: The system shall get the input.
REQ-2: The system shall give search results.
REQ-3: The system shall point the selected result on the map.
REQ-4: The system shall show the information of the area on the map from social media.
REQ-5: The system shall give option to select different categorized nearby places like ATM, Mosques, and Restaurants etc.
REQ-6: The system shall point the selected categorized places on the map with information from social media.

3.4.2.4 Use Case Description

USE CASE NAME	Search.
ACTOR	User, APIs
NORMAL COURSE	The user enters the source and destination. The system finds the shortest path. The system keeps the user in touch and guide throughout the journey. The user gets the information about the building from Google Map APIs and social media.

ALTERNATE COURSE	1) If no information can be get from Google APIs and social media, No information retrieved message pops up. 2) If user goes to other than shortest path, user is notified with a beep.
PRE CONDITION	User should be logged in. Internet should be available.
POST CONDITION	Shortest path and information is displayed on the user's screen.
ASSUMPTIONS	Users have know how of technology and have android smartphones.

3.4.2.5 Use Case Diagram

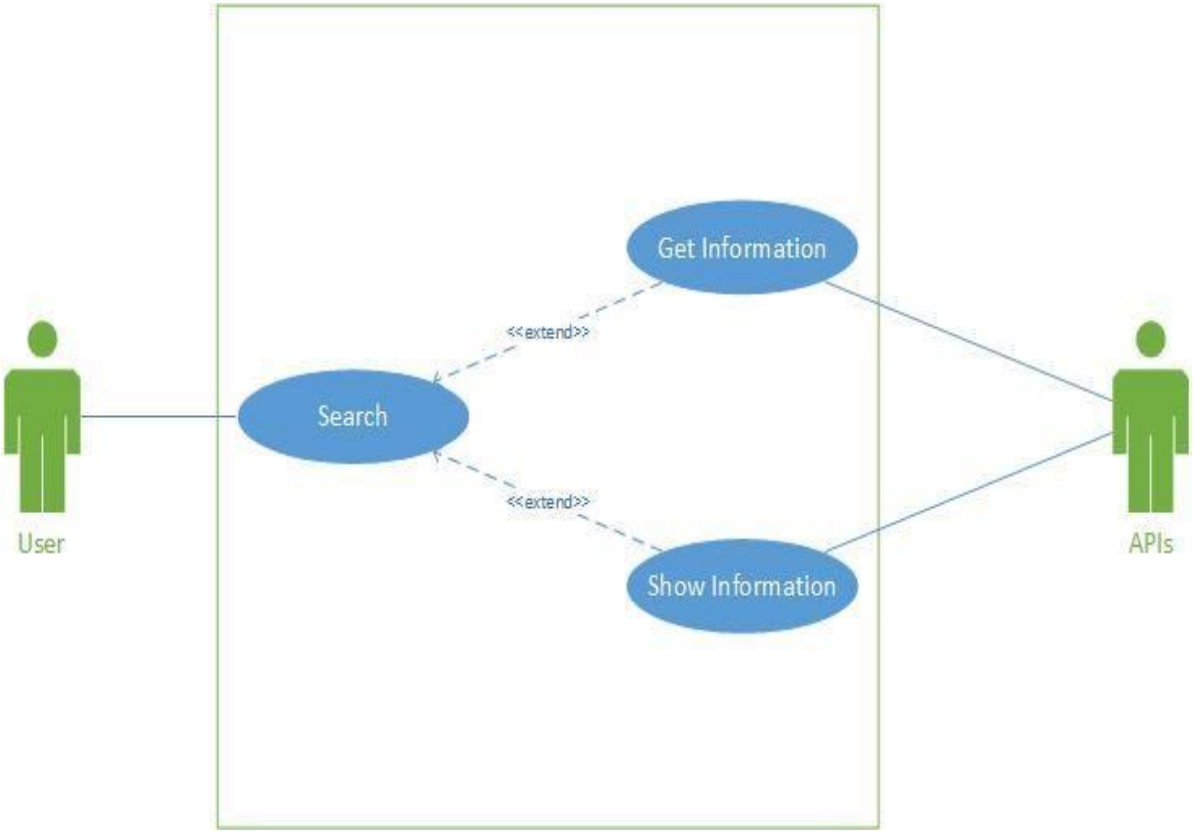


Figure 3-4 Use Case Diagram Search

3.4.3 Maintain Wish list:

3.4.3.1 Description and Priority

This use case will describe the functionality of the system in which user will maintain the list to make future plans and the system will store this list in the database. This list will contain the information about the place. The information will be shown on request.

Priority: High

3.4.3.2 Stimulus/Response Sequences

Stimulus: The user enters the place he/she wishes to visit in future.
Response: The system will store the information in database.

Stimulus: The user opens the wish list and selects a place.
Response: The system will show the requested information from database.

3.4.3.3 Functional Requirements

REQ-1: The system shall get the input.
REQ-2: The system shall store the information it the database.
REQ-3: The system shall retrieve the information from social media.
REQ-4: The system shall save the information modified by user.
REQ-5: The system shall show the information to the user when requested.

3.4.3.4 Use Case Description

USE CASE NAME	Maintain Wishlist
ACTOR	User, APIs, Database
NORMAL COURSE	The user enters the place to be visited in future.) The system stores the information in database.) The user selects any one place from wishlist.) The system show the information retrieved from database and social media.) The user edits the information stored in database.) The system updates the modified information.
ALTERNATE COURSE	1) If no information can be get from Google APIs and social media, No information retrieved message pops up.

	2) If user goes to other than shortest path, user is notified with a beep.
PRE CONDITION	User should be logged in. Internet should be available.
POST CONDITION	Shortest path and information is displayed on the user's screen.
ASSUMPTIONS	Users have know how of technology and have android smartphones.

3.4.3.5 Use Case Diagram

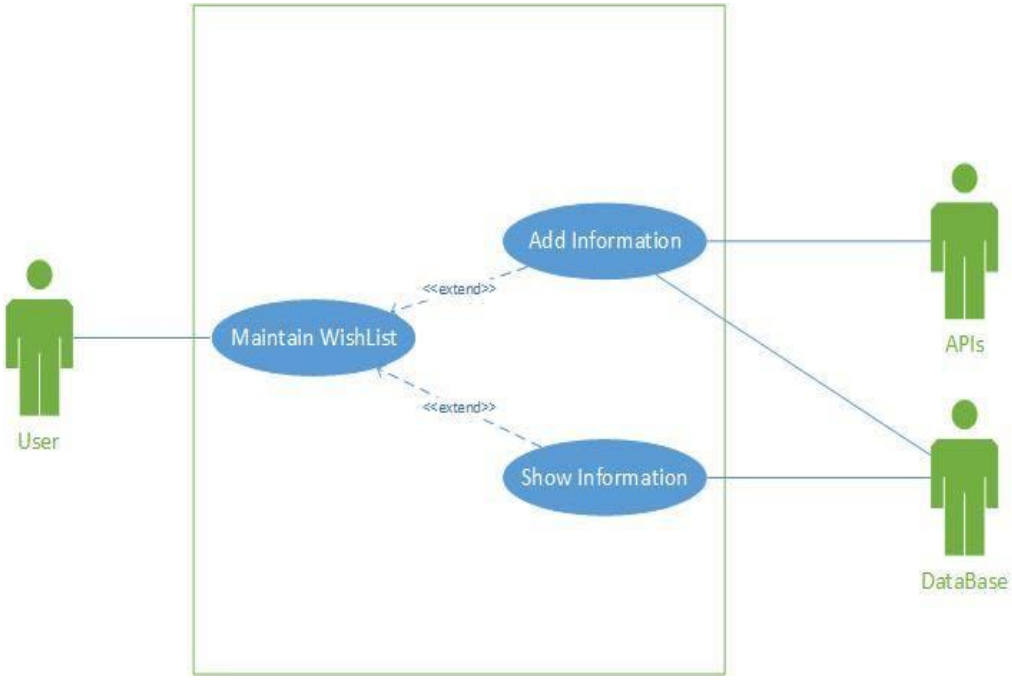


Figure 3-5 Use Case Wishlist

3.4.4 Maintain Localpedia

3.4.4.1 Description and Priority

This will facilitate the user to use the application during visit without internet with limited functionalities. Before going to a trip the user will update the application Localpedia with the information that includes maps, emergency numbers and recommended places to be visited.

Priority: High

3.4.4.2 Stimulus/Response Sequences

Stimulus: The user requests the system to update Localpedia about a place.
Response: The system will update the Localpedia about the requested place.

3.4.4.3 Functional Requirements

REQ-1: The system shall get the input.
REQ-2: The system shall retrieve information from different media.
REQ-3: The system shall store the information retrieved
REQ-4: The system shall show the information to the user when requested. .

3.4.4.4 Use Case Description

USE CASE NAME	Maintain Localpedia
ACTOR	User, APIs
NORMAL COURSE	) The user request the system to update the localpedia about the place/) The system retrieves information from different media.) The system shows the information to the user when requested.
ALTERNATE COURSE	If no information can be get from Google APIs and social media, No information retrieved message pops up.

PRE CONDITION	User should be logged in. Internet should be available while updating.
POST CONDITION	Localpedia is updated and shown to the user when requested.
ASSUMPTIONS	The place being visited doesn't have internet facility.

3.4.4.5 Use Case Diagram

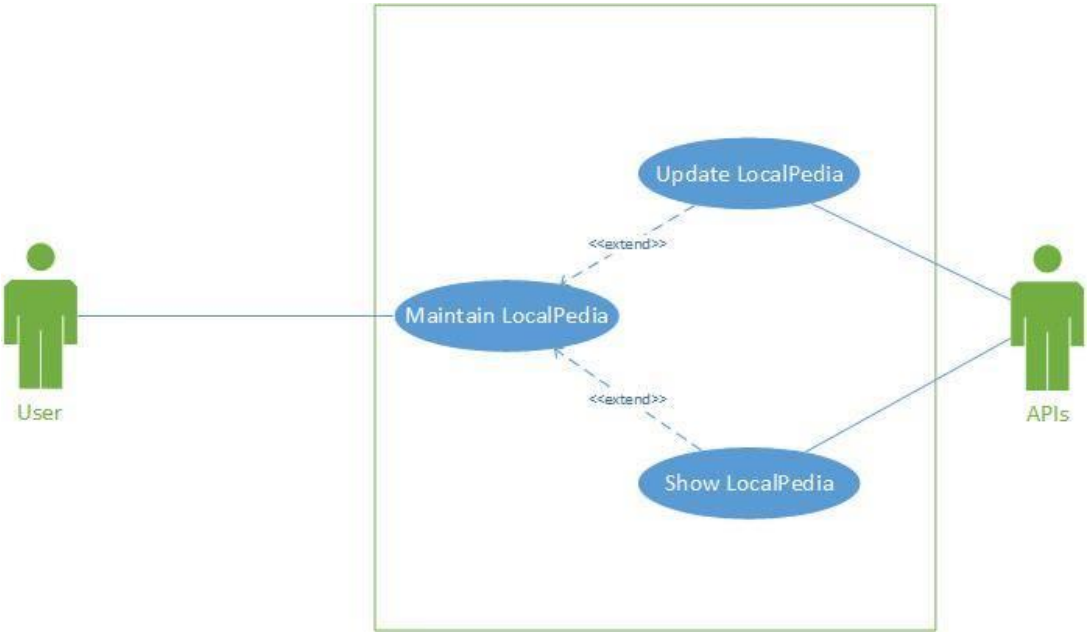


Figure 3-6Use Case Diagram Localpedia

3.4.5 Get Notification

3.4.5.1 4.6.1 Description and Priority

This will allow the user to be stay in touch with events occurring nearby the user during visit.

Priority: High

3.4.5.2 Stimulus/Response Sequences

Stimulus: The user is on visit.

Response: The system will retrieve the information about events and show them to user's screen.

3.4.5.3 Functional Requirements

REQ-1: The system shall retrieve the information about events from different media.
REQ-2: The system shall notify the user by showing that information to the user. .

3.4.5.4 Use Case Description

USE CASE NAME	Get Notifications
ACTOR	User, APIs
NORMAL COURSE	The system retrieves the information about events occurring nearby user. The system notifies the user by showing that information.
ALTERNATE COURSE	If no event is occurring nearby user, no notification will be shown.
PRE CONDITION	User should be logged in. User should be on visit.
POST CONDITION	User gets notified about the events.
ASSUMPTIONS	Different events are occurring nearby user.

3.4.5.5 Use Case Diagram

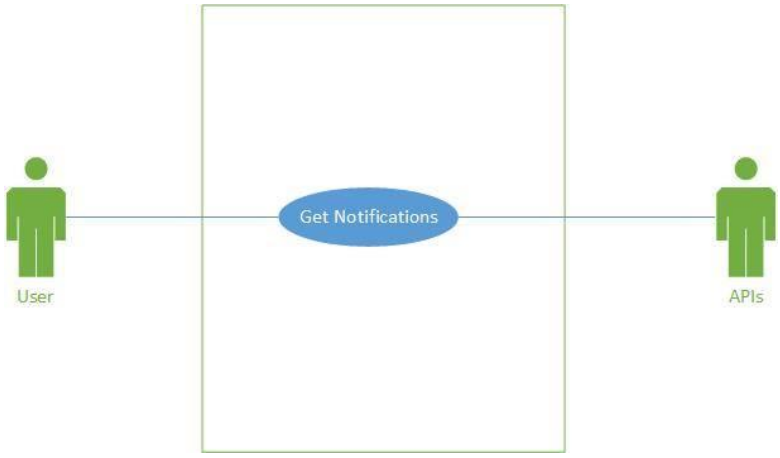


Figure 3-7 Use Case Diagram Notification

3.4.6 Complete Use Case Diagram

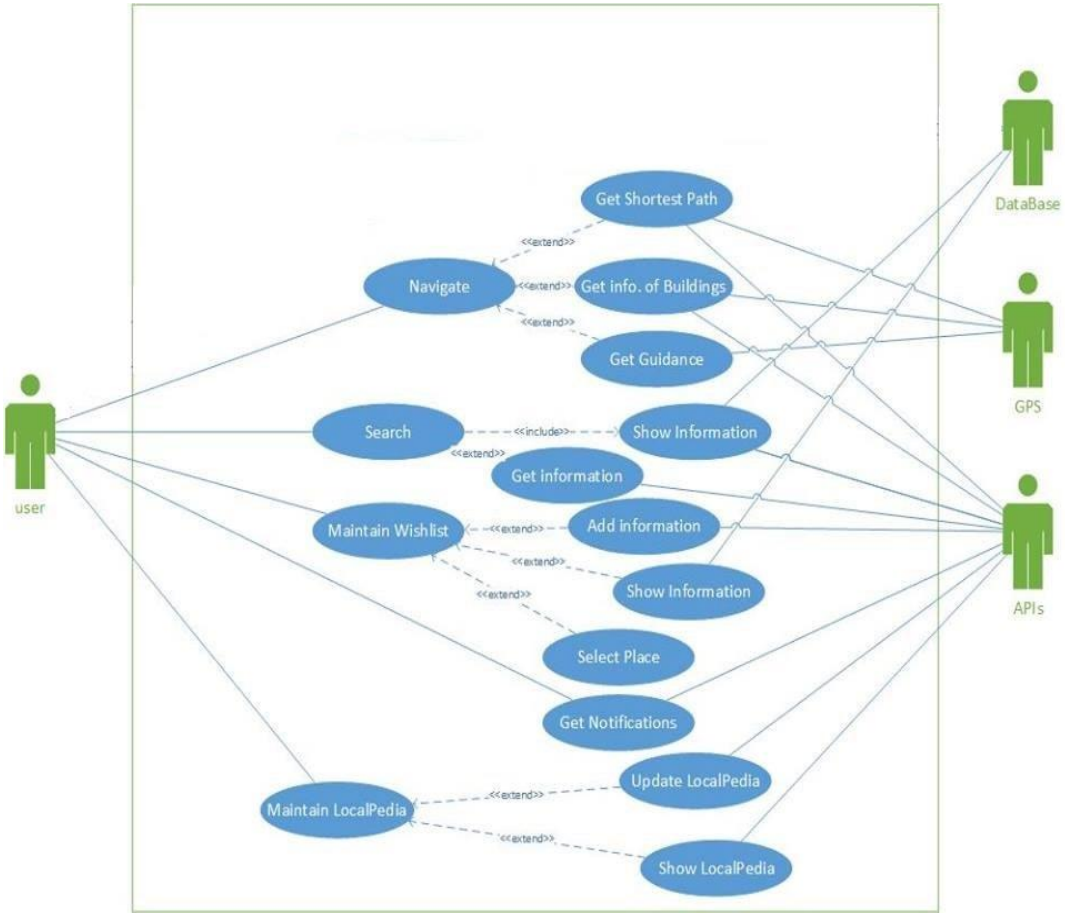


Figure 3-8 System Use Case Diagram

3.5 Other Nonfunctional Requirements

3.5.1 Performance Requirements

Access to Localpedia information will be mainly based on device performance and access to Google maps, Social Media will be heavily dependent on both internet service and device performance. After introducing 3G technologies in Pakistan, users will be able to use the application more effectively and efficiently. Application will use minimum possible memory to perform operations efficiently so that users that have low memory issues in their devices may get full advantage from the application.

3.5.2 Safety Requirements

3.5.2.1 Security Requirements

The database must be accessed by authorized users.
Manipulation of database must be authorized according to user roles.
The application running on the mobile devices must give full functional ties after login.

3.5.3 Software Quality Attributes

3.5.3.1 Reliability:

The whole application should be reliable enough to show the user accurate results. The information of database, information retrieved from Google APIs and different social media must be free of errors. The data should be according to user's needs.

3.5.3.2 Usage Easiness:

The interface and overall functionality of the system should be efficient that every user having some background of information technology should be able to use the system. The terminologies, language, interface and placement should be appropriate.

3.5.3.3 Compatibility:

The system should be compatible to all android devices having GPS system.

3.5.3.4 Trust:

The privacy of user about their visits in past, present and futures must be kept in secret so that no one can know about his/her plans. This will help to build up a sense of trust in our product.

3.5.3.5 Learning:

Any user without strong computer skills should access the website database easily. Also, any user having little know how of the android systems should be able to use the system effectively.

3.5.3.6 Maintenance:

The system should be able to adopt changes needed in future versions.

3.5.3.7 Adaptability Requirements:

The application should be able to be run on all android versions higher than 2.1 and all the web browsers.

3.5.4 Other Requirements

3.5.4.1 Database Requirements:

Database will be used to store the information of places user wants to visit in future. The respective data of user can be added, modified and deleted by user anytime. Admin will be allowed to check and modify all the data. Database will have access from mobile device and computer's web browsers.

3.5.4.2 Legal Requirements:

System will allow all the functionalities by fulfilling legal constraints. All the data will be kept in secret. It will be made sure that secrecy of any user will not be breached.

Chapter 4

DESIGN AND DEVELOPMENT

4. SYSTEM DESIGN AND DEVELOPMENT

4.1 SYSTEM REQUIREMENT SPECIFICATIONS

4.1.1 Introduction

4.1.1.1 Purpose

After making the Software Requirement Specifications, next phase in the development is to make a design document. Software Design Document shows how the software requirements will be implemented to develop the system. It also gives the programmer a blueprint to follow. After approval of the document, it will become baseline for limiting changes in the scope of the project. The document includes different diagrams that shows and depicts the system from different aspects. The document makes sure that all the requirements specified in the SRS document will be addressed during the development. After the completion of the document, architecture will be finalized and any flaws in the system will be removed. When the revision is required to the system, it also provides a platform to understand the system by other developers.

4.1.1.2 Project Background

Tourism is frequently justified on the basis of its potential contribution to economy of a country. Increase the tourism implies increase in the economy of a country. Technology is very helpful in increasing the tourism. There is not a complete application available to facilitate the tourists in planning and enjoying the trip. The project labeled as "The Eagle Eye" is GPS based android application to assist the tourists in making and enjoying their plan. The project provides a unified platform to get the advantage from different web services. The project will use different techniques to achieve the above mentioned task. The information will be getting from different websites and sent to the user. To make the information accessible easily and efficiently, augmented reality is used. Augmented reality maps the information on the real world objects through camera screen.

After introducing 3G and 4G cellular networks, mobile internet speed is increased rapidly. To take full advantage from the 3G and 4G, application will use different websites APIs to make the system work precisely and efficiently.

The application will get the information from different media, navigate, maintain database and notify the user about the events. The core task is to get the exact location of the user and information in user's camera screen and get the precise information

4.1.1.3 Project Scope

The intended users of the system are tourists. During their visit, they need a tour guide to make their visit memorable. Eagle Eye will provide following services to the tourists:

Show information of buildings and places in front of user's screen. It is Navigation based on GPS to find the shortest path to the destination. There will be a wishlist to make list of places to be visited in future. Notifications of events occurring nearby user during the visit will be provided to the user. Information about the places from different media (Dailymotion, Twitter) will also be shown to user. Weather updates will be given. Localpedia (Before going to trip user will update the application with local limited information about the place (maps, famous places) so he/she can use it without internet as well).our application will give emergency numbers of places to be visited

4.1.1.3.1 Extended Scope

Application will be able to translate local sign board to user's language.

Google Translate API to communicate with the people where either user does not understand the local language or local people don't understand user's language

Database for the user to save pictures and videos so that he/she doesn't have any fear to loss the data or memory problems.

4.1.1.4 Overview of Document

This document is about the design of the system to be developed. After the SRS document, next phase is to make the design document. Document shows how the requirements gathered in the SRS document will be converted into a working system.

Document has seven sections. Each section addresses the way of development of system from different perspective. Section 1 describes the introduction and overview of the product. Readers who are interested in just introduction of the system should read this section. Section 2 describes the System Architecture Description. This section includes System Block Diagram, System Components, System Modules, The way of interaction among the modules and architectural style to be followed for the development of the system. Indeed this section describes purely technical details of the development of the system. This section is for those who are interested to know how the system will be developed and what steps and styles would be followed to reach the destination.

Section 3 also describes the technical details of the system to be developed. This describes that how the user will interact with the system and what would be the course of action. This purpose is achieved by the

ER diagram, Use Case diagrams, Sequence diagrams, Collaboration Diagram, Data Flow Diagrams, State Transition Diagrams and Interface Diagrams. These diagrams collectively show that how the user will interact with the system and what would be the sequence to achieve the functionality. Also, this section describes the boundaries of the system and

sequence of data flowing though different modules. This section is also for the technical readers and developers of the system.
Section 4 describes the details of the previous system with which help it is developed. It shows the analogical details of the system.
Section 5 is about the design pattern to be followed while developing the system. This section is for those who are in development. Also, who wants to know what design pattern will be followed for the development.
Section 6 describes how the main components of the system will work and how user will achieve the required functionality. This section is interesting for the development team.

4.1.1.5 System Architecture Design

4.1.1.6 System Block Diagram

Principal parts of the system are represented by the blocks and the lines show the relationship between those parts. This diagram is high level and less detailed description.

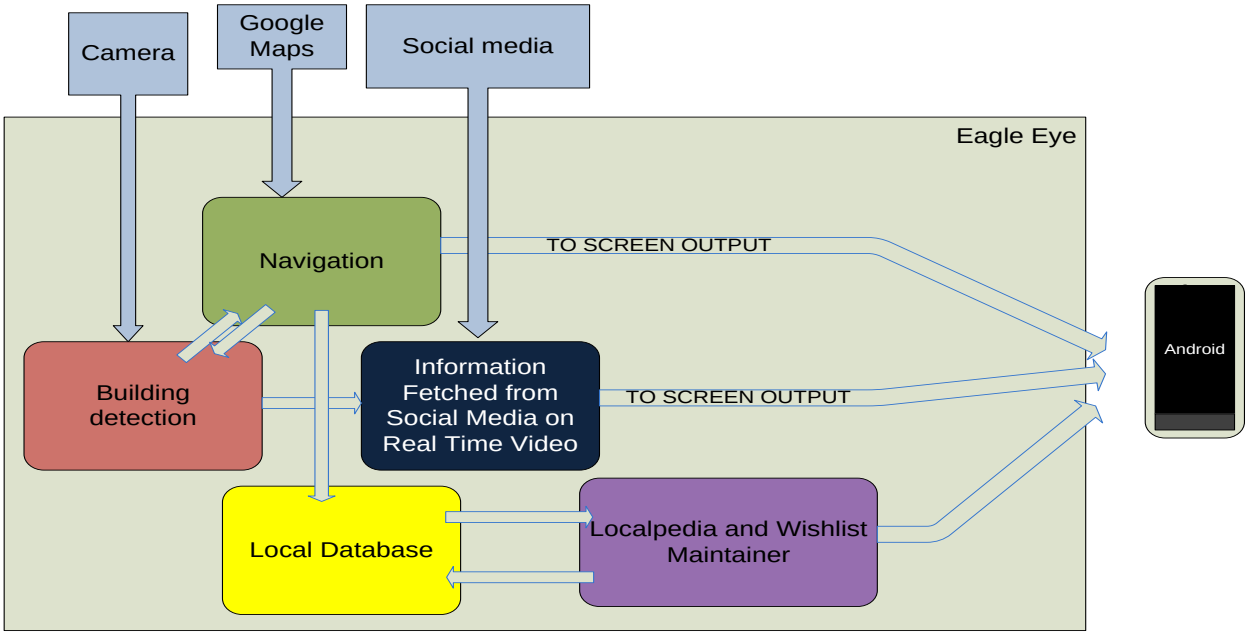


Figure 4-1 System Block Diagram

4.1.1.7 System Components

Following are the system components used in development of the system.

4.1.1.7.1 Operating System

Windows 8

Android OS

4.1.1.7.2 Software Packages

Android Software Development Kit

Eclipse Integrated Development Environment (IDE)

Java SDK

4.1.1.7.3 System Context Diagram

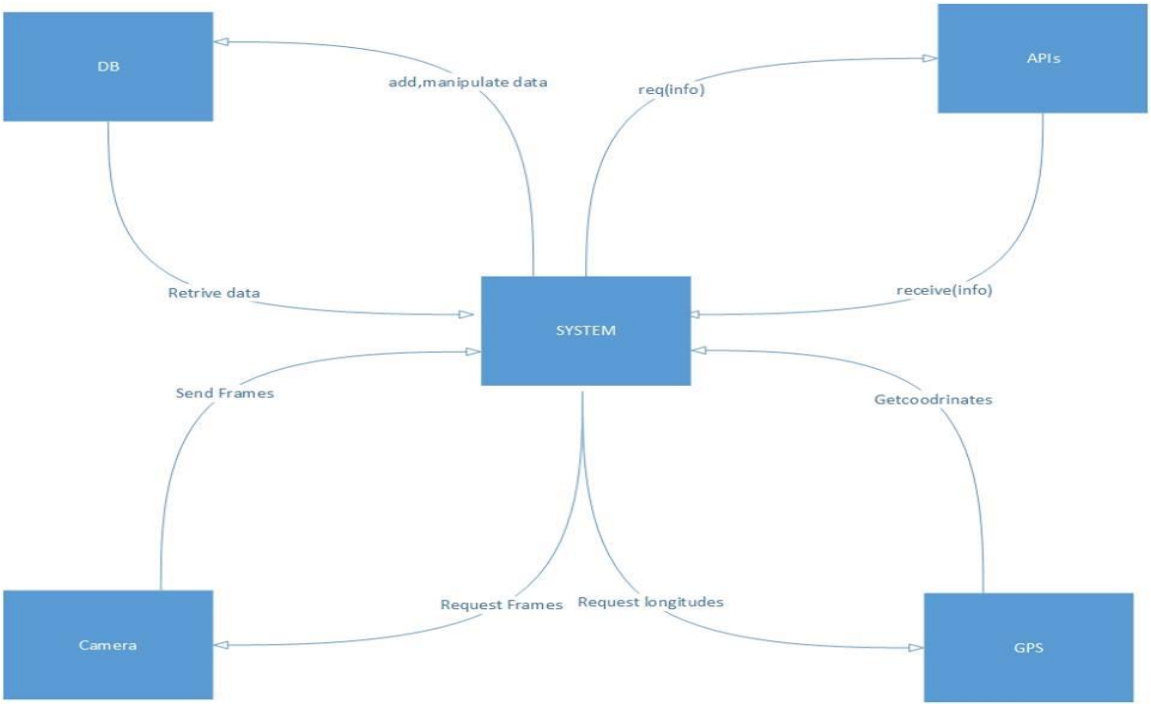


Figure 4-2 System Context Diagram

4.1.1.8 Hardware Components

Laptops

Android Devices

GPS

Internet

4.1.1.9 High Level Design Diagram (Modules Identification)

This diagram shows all the modules of the system that will work together to perform a specific task. User interacts with the main module "Eagle Eye" and this main module interacts with the core modules of the system.

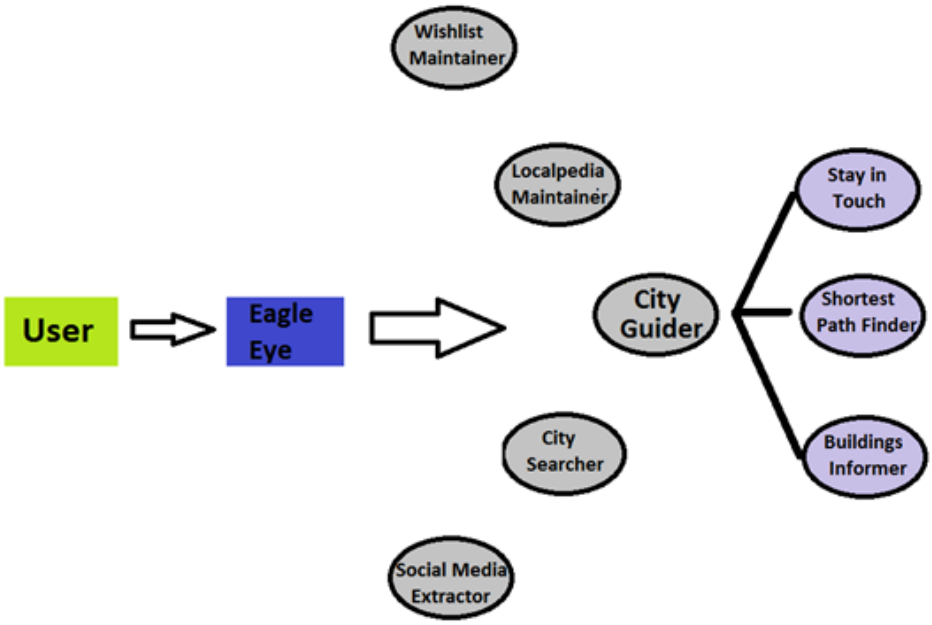
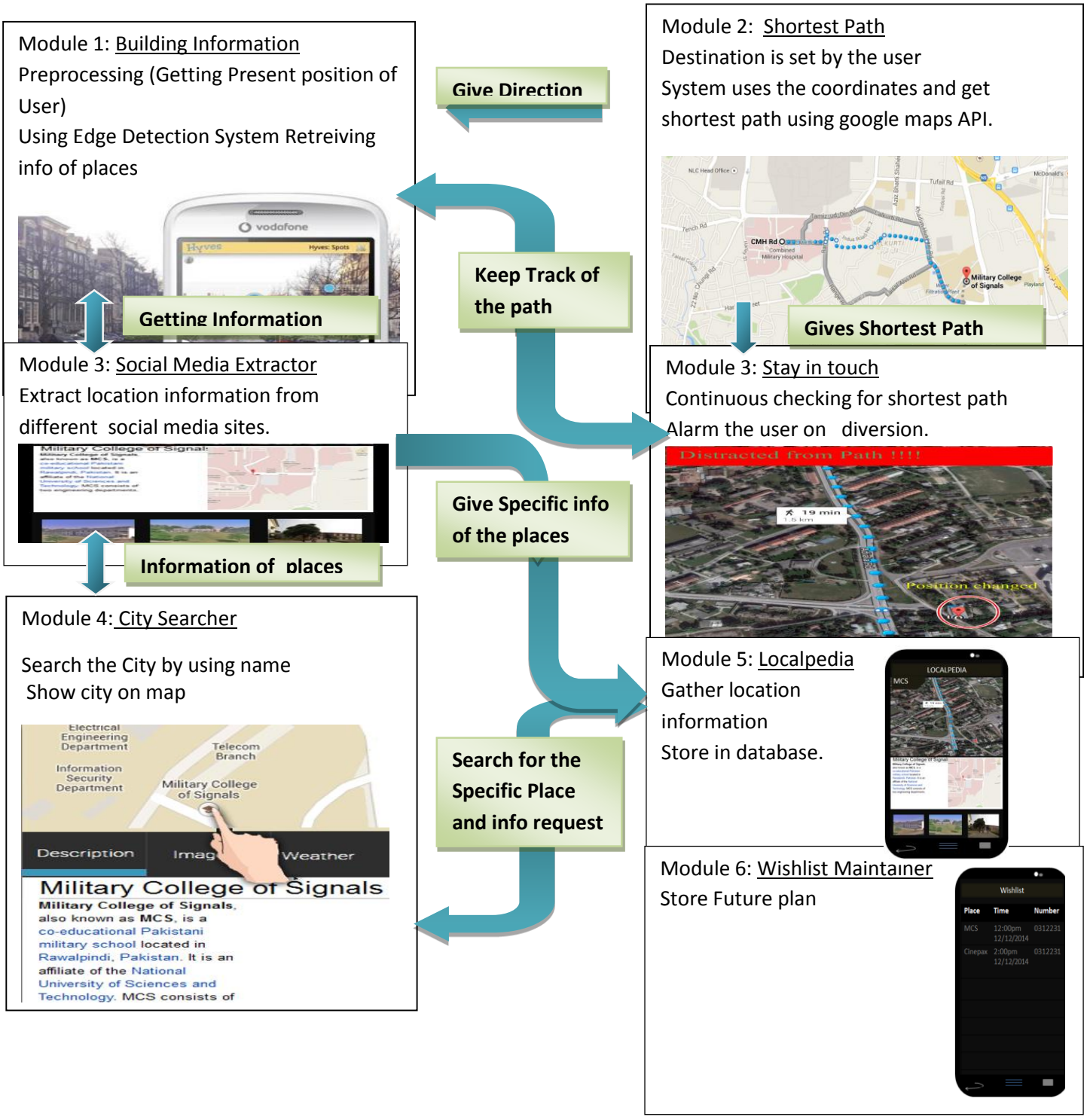


Figure 4-3 High level Design

4.1.1.10 Interaction among the Modules (Abstract View)



4.1.2 Architectural Style:

Eagle Eye is using the multilayered and component base architecture. First two layers being the part of Eagle Eye App using the MVC design pattern. Third layer uses the java API to access the camera and get the video stream. The images received are then send to the AR Toolkit Library. Fourth layer here uses different computer vision and Graphic libraries. Android OS at the bottom layer of software part which is above the hardware (kernel).

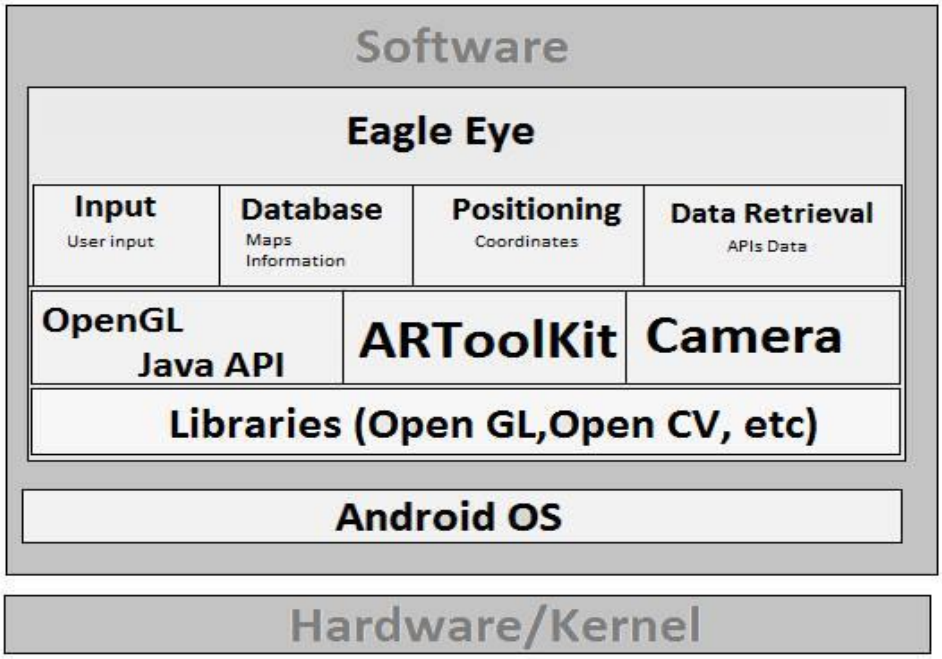


Figure 4-4 Layered Architecture

The Purpose of using this architecture is because our application need low level calls to camera, AR toolkit and other libraries like OpenCV and OpenGL etc. First two layer following the Model-View-Controller design pattern. In MVC, View is the presentational aspect of the App that the user view and interacts with called as graphical user interface.

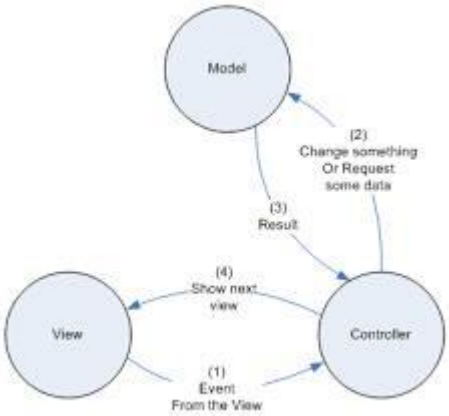


Figure 4-5 Model View Controller

Controller get the data manipulates it and control how it is displayed in the layout. It controls how view operates in view and how data is added, change and deleted. It covers the main logic or BI of the Application.

Controller is used for formatting the model for displaying and handling events like user input and updates the view.

Model deals with data sources, manages the data, logic and rules for the application. The App layer modules like database and APIs data comes under this model.

4.1.3 Detailed Design

4.1.3.1 Database Diagram

4.1.3.1.1 Entity Relationship Diagram

This diagram shows all the entities of the system and relationship between those entities. It is data model for describing the data or information aspects of the business domain in abstract way.

ERD of the Eagle Eye contains the following entities and attributes:

User

ID, Name, Photo

System

Location

Name, Maps, Lat, Long

Wishlist

ID, Name, Date

APIs

ID, Name, Address

Localpedia

ID, Maps, Name, Photos, Emergency Nos

Navigation

ID, lat, long, Places

GPS

Lat, Long

Camera

Frame, Size

Recommended Places

ID, Name, Long, Lat

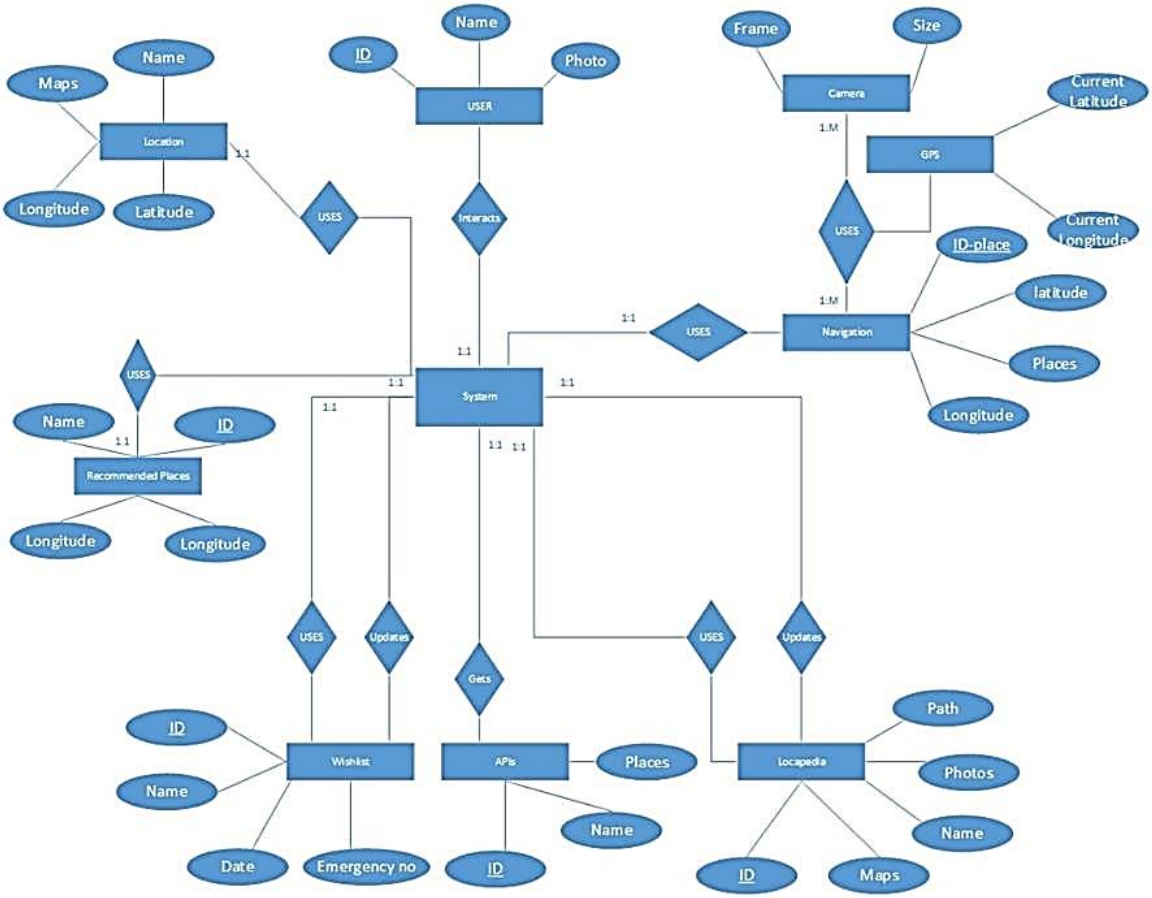


Figure 4-6 ER Diagram

4.1.3.2 UML Diagrams

Unified Modeling Language (UML) diagrams provide a standard way to visualize the design of the system.

4.1.3.2.1 Use Case Diagram

Use case diagrams show how the user will interact with the system. It is the simplest way of showing the interaction of the user with the system.

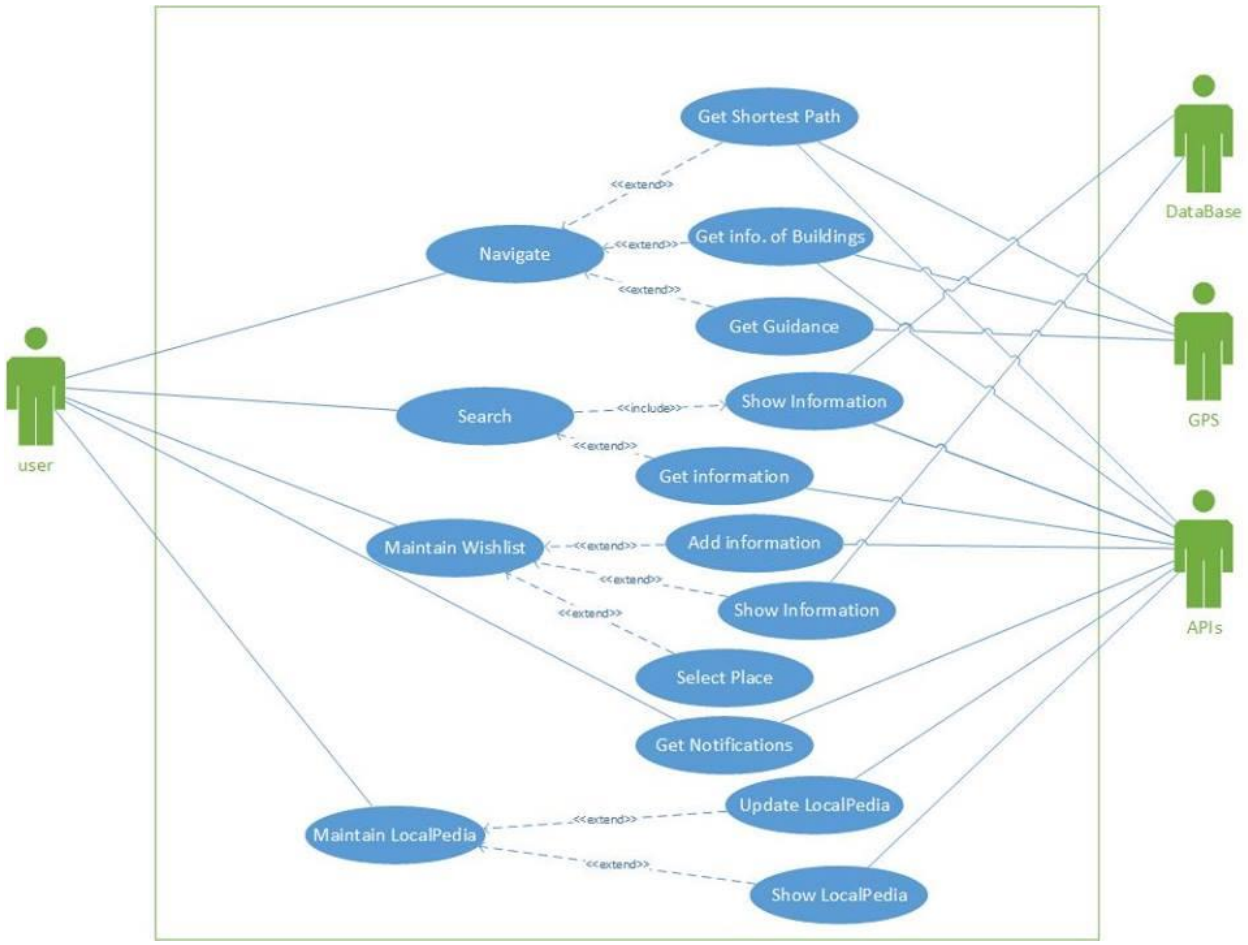


Figure 4-7 Use Case Diagram

4.1.3.2.2 Use Case Specifications:

Actors:

User, GPS, APIs, Database

Use Cases:

Navigate

Search

Maintain Wishlist

Maintain Localpedia

4.1.3.2.2.1 Navigate:

USE CASE NAME	Navigate
ACTOR	User , APIs, GPS
NORMAL COURSE	) The user enters the source and destination.) The system finds the shortest path.) The system keeps the user in touch and guide throughout the journey.) The user gets the information about the building from Google Map APIs and social media.
ALTERNATE COURSE	1) If no information can be get from Google APIs and social media, No information retrieved message pops up. 2) If user goes to other than shortest path, user is notified with a beep.
PRE CONDITION	User should be logged in. Internet should be available.
POST CONDITION	Shortest path and information is displayed on the user's screen.

4.1.3.2.2.2 Search

ASSUMPTIONS	Users have know how of technology and have android smartphones.
USE CASE NAME	Search.
ACTOR	User, APIs
NORMAL COURSE	) The user enters the source and destination.) The system finds the shortest path.) The system keeps the user in touch and guide throughout the journey.) The user gets the information about the building from Google Map APIs and social media.
ALTERNATE COURSE	1) If no information can be get from Google APIs and social media, No information retrieved message pops up. 2) If user goes to other than shortest path, user is notified with a beep.
PRE CONDITION	User should be logged in. Internet should be available.
POST CONDITION	Shortest path and information is displayed on the user's screen.
ASSUMPTIONS	Users have know how of technology and have android smartphones.

4.1.3.2.2.3 Maintain Wishlist

USE CASE NAME	Maintain Wishlist
ACTOR	User, APIs, Database
NORMAL COURSE	) The user enters the place to be visited in future.) The system stores the information in database.) The user selects any one place from wishlist.

	) The system show the information retrieved from database and social media.) The user edits the information stored in database.) The system updates the modified information.
ALTERNATE COURSE	1) If no information can be get from Google APIs and social media, No information retrieved message pops up. 2) If user goes to other than shortest path, user is notified with a beep.
PRE CONDITION	User should be logged in. Internet should be available.
POST CONDITION	Shortest path and information is displayed on the user's screen.
ASSUMPTIONS	Users have know how of technology and have android smartphones.

4.1.3.2.2.4 Maintain LocalPedia

USE CASE NAME	Maintain Localpedia
ACTOR	User, APIs
NORMAL COURSE	) The user request the system to update the localpedia about the place/) The system retrieves information from different media.) The system shows the information to the user when requested.
ALTERNATE COURSE	If no information can be get from Google APIs and social media, No information retrieved message pops up.
PRE CONDITION	User should be logged in. Internet should be available while updating.
POST CONDITION	Localpedia is updated and shown to the user when requested.
ASSUMPTIONS	The place being visited doesn't have internet facility.

4.1.3.2.2.5 Get Notifications

USE CASE NAME	Get Notifications
ACTOR	User, APIs
NORMAL COURSE	The system retrieves the information about events occurring nearby user. The system notifies the user by showing that information.
ALTERNATE COURSE	If no event is occurring nearby user, no notification will be shown.
PRE CONDITION	User should be logged in. User should be on visit.
POST CONDITION	User gets notified about the events.
ASSUMPTIONS	Different events are occurring nearby user.

4.1.3.2.1 Sequence Diagram

4.1.3.2.1.1 Navigate

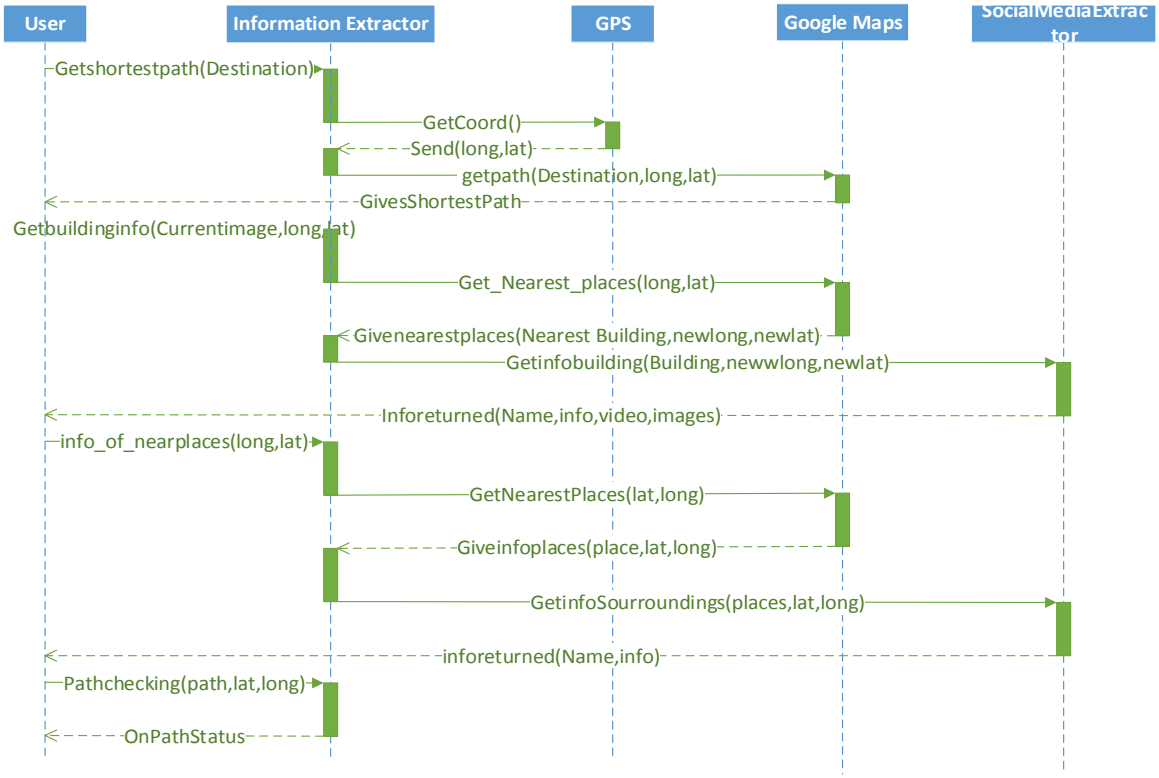


Figure 4-8 Sequence Diagram Navigate

4.1.3.2.1.2 Search

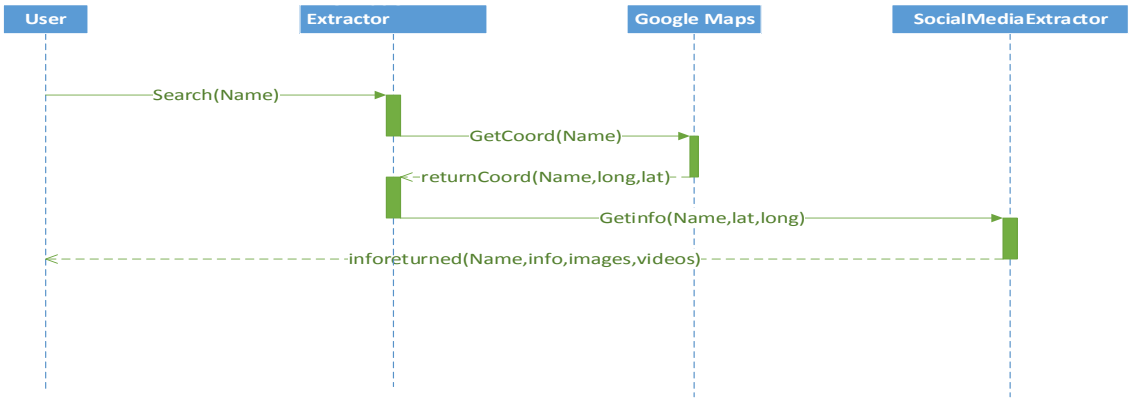


Figure 4-9 Sequence Diagram Search

4.1.3.2.1.3 Maintain Wishlist:

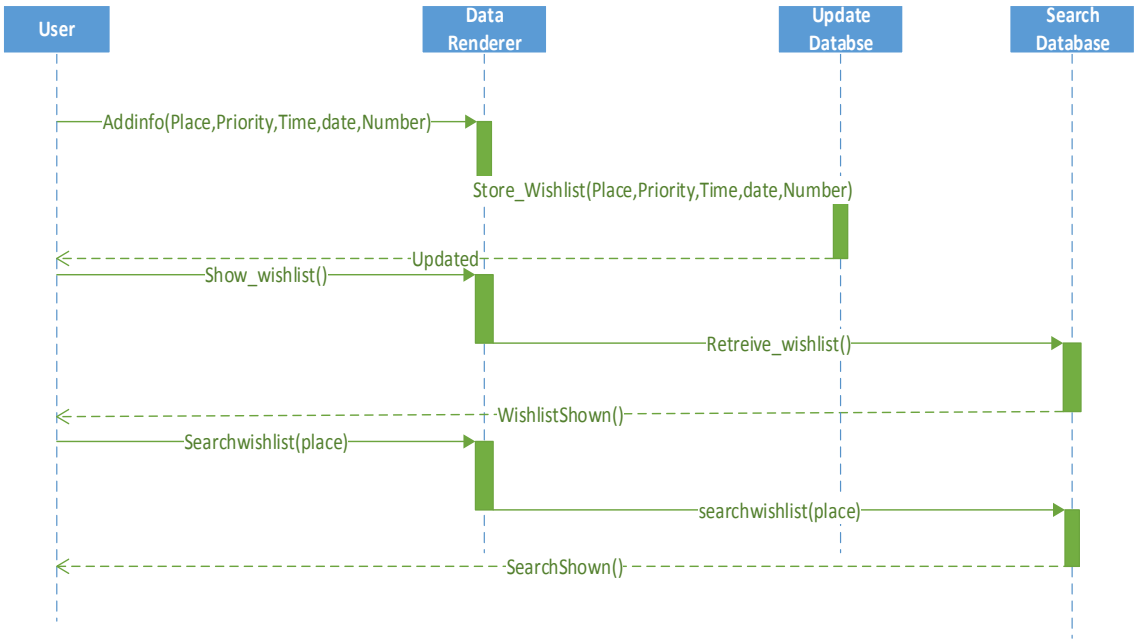


Figure 4-10 Sequence Diagram Maintain Wishlist

4.1.3.2.1.4 Maintain LocalPedia

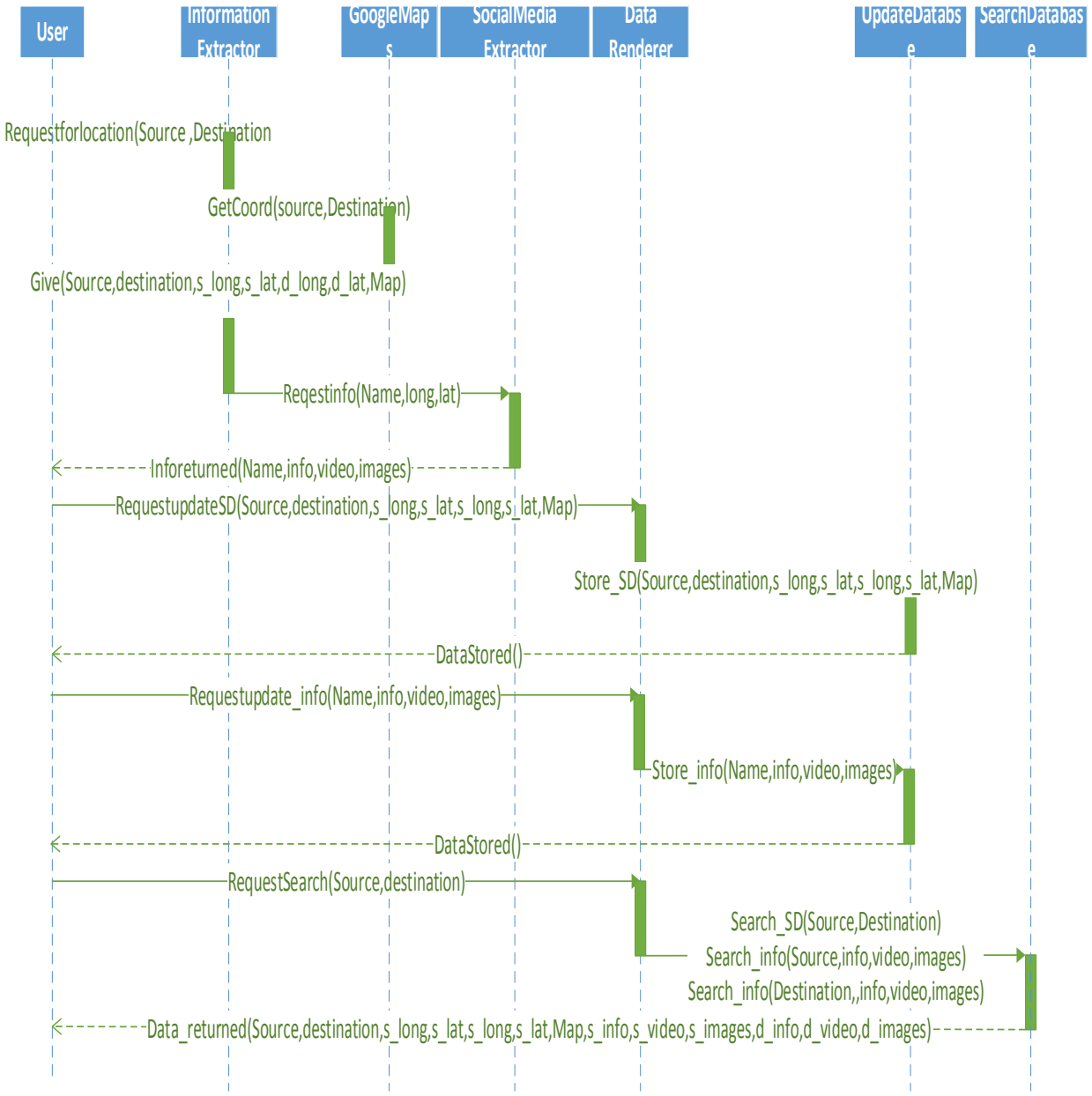


Figure 4-11 Sequence Diagram Miantain localpedia

4.1.3.2.1.5 Get Notifications

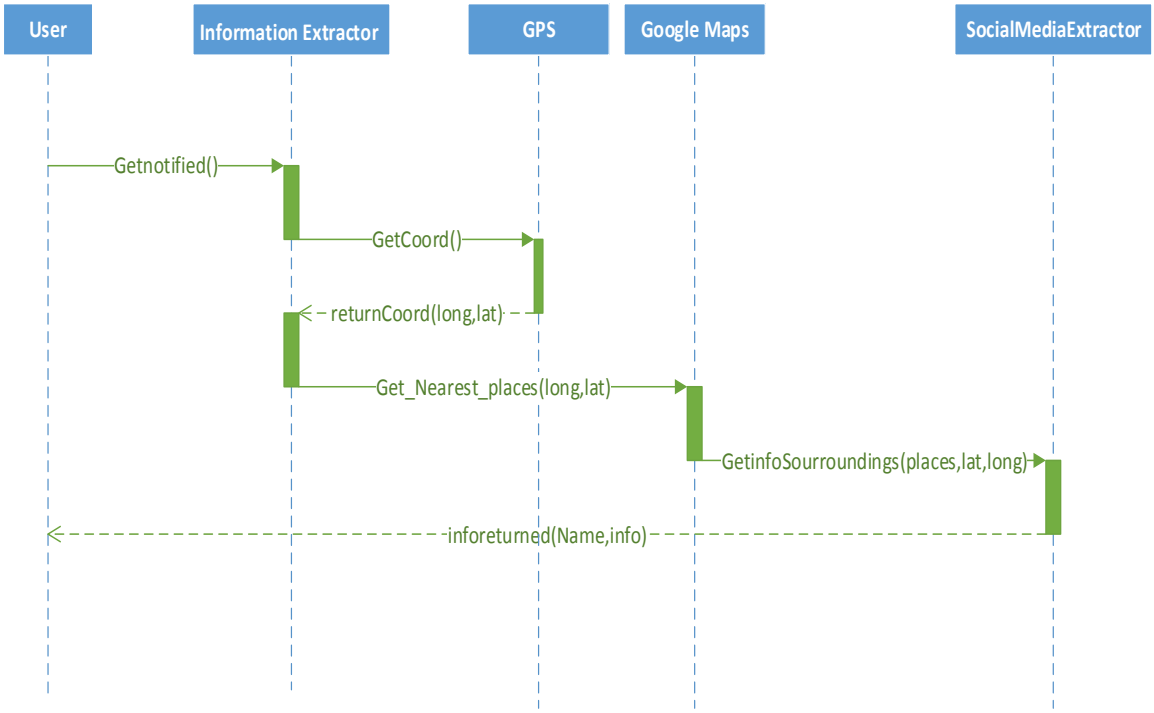


Figure 4-12 Sequence Diagram Get Notifications

4.1.3.2.2 Collaboration Diagrams

Collaboration Diagrams are illustration of the relationships and intersections among software objects in the UML.

4.1.3.2.2.1 Navigate:

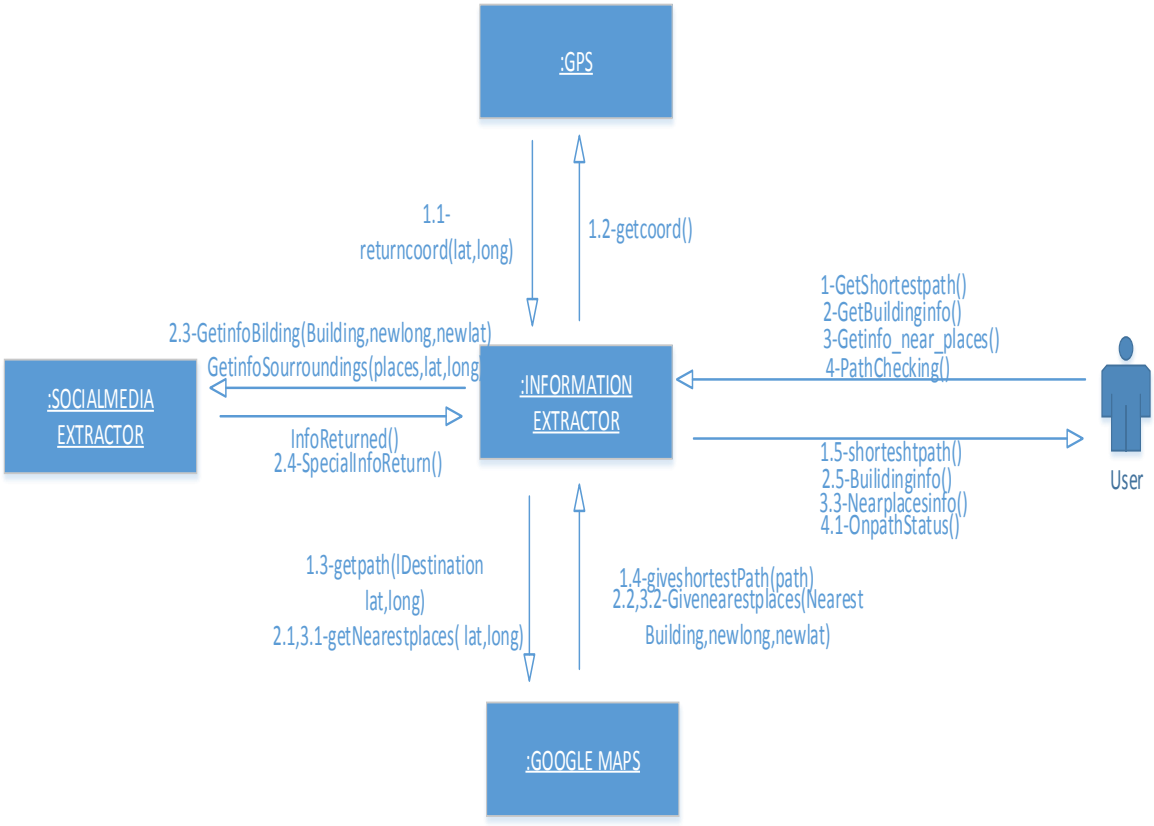


Figure 4-13 Collaboration Diagram Navigate

4.1.3.2.2.2 Search

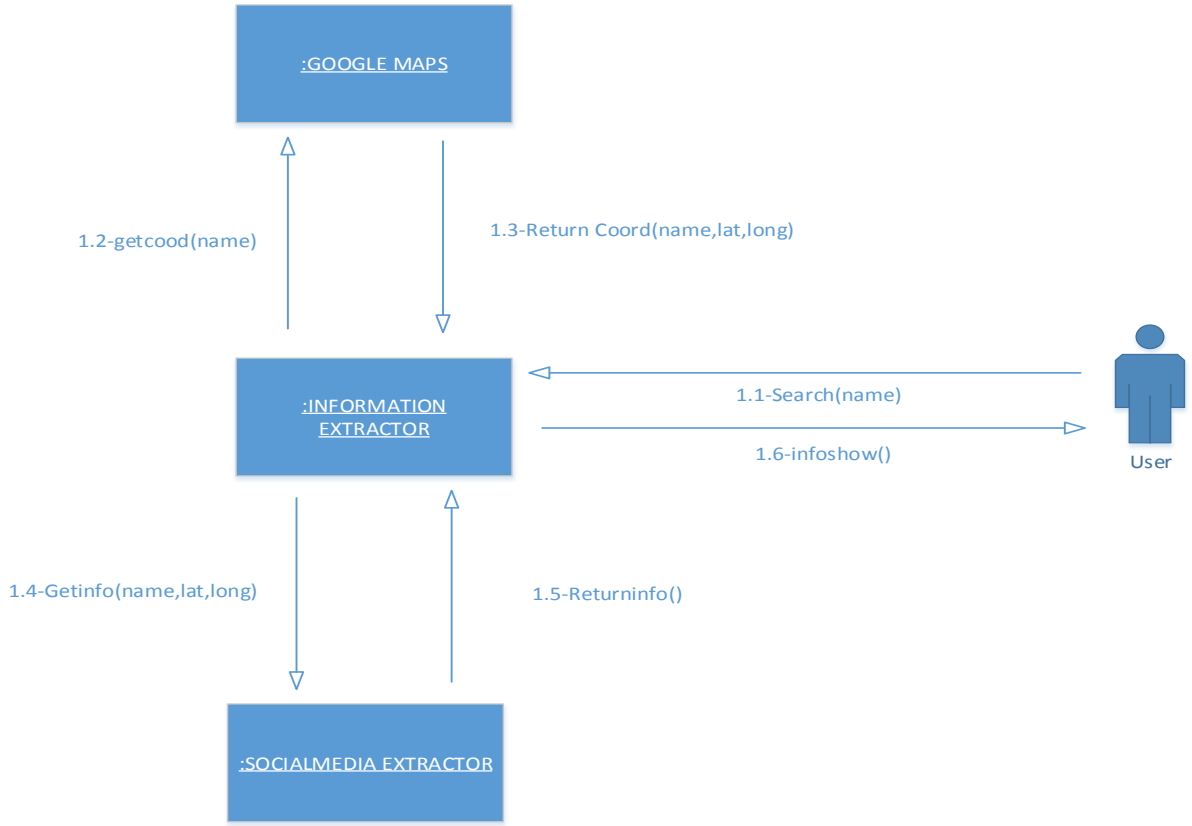


Figure 4-14 Collaborative Diagram Search

4.1.3.2.2.3 Maintain Wishlist

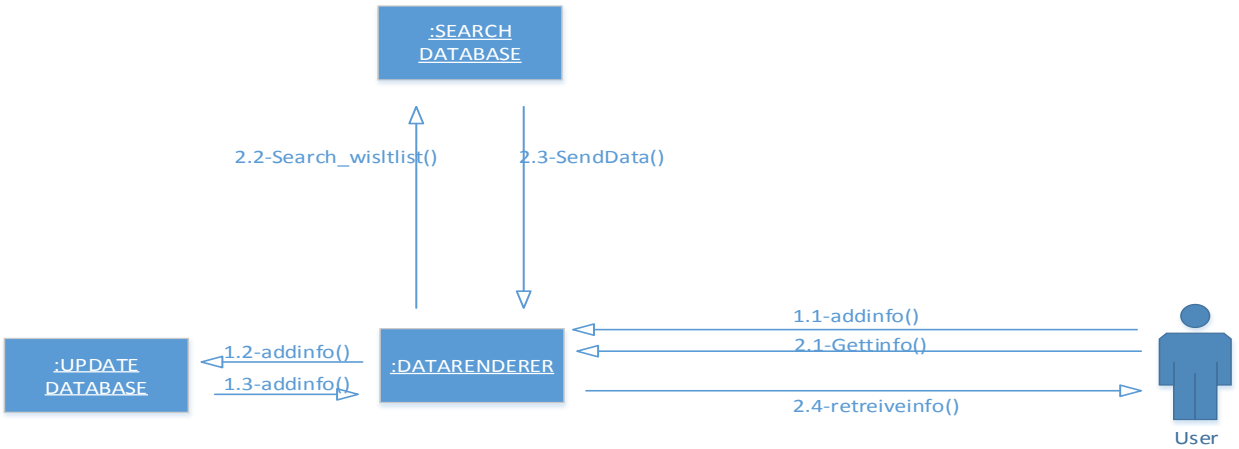


Figure 4-15 Collaborative Diagram Maintain Wishlist

4.1.3.2.2.4 Maintain LocalPedia

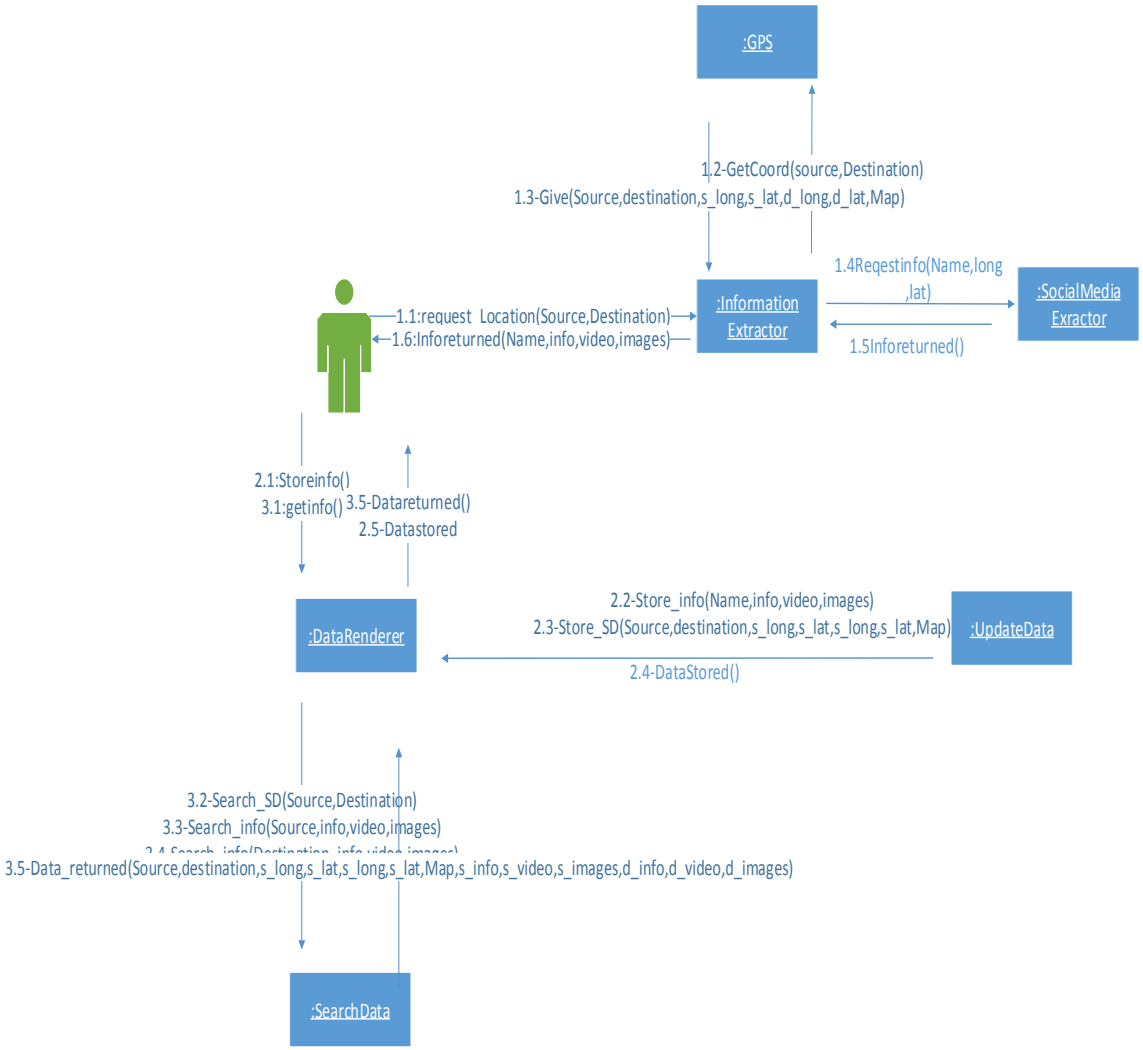


Figure 4-16 Collaborative Diagram Maintain Localpedia

4.1.3.2.2.5 Get Notifications

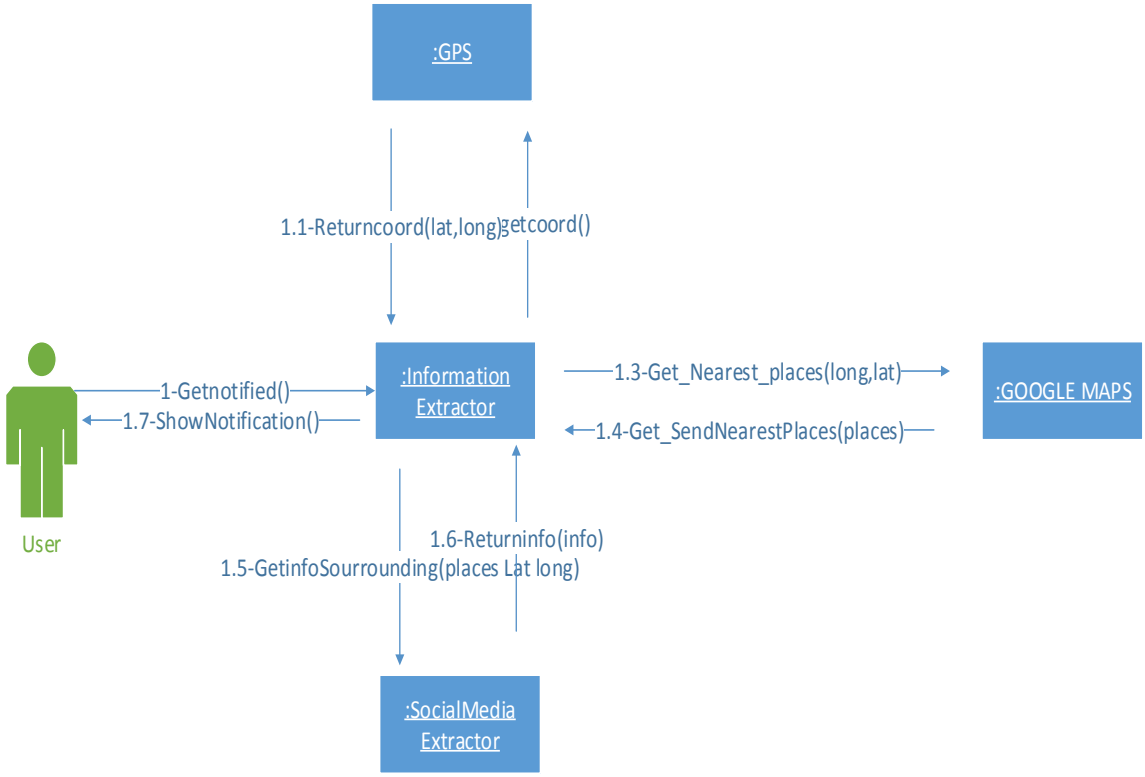


Figure 4-17 Collaboraton diagram Notifications

4.1.3.2.3 Logical View

4.1.3.2.3.1 State Transition Diagram

4.1.3.2.3.1.1 Navigation

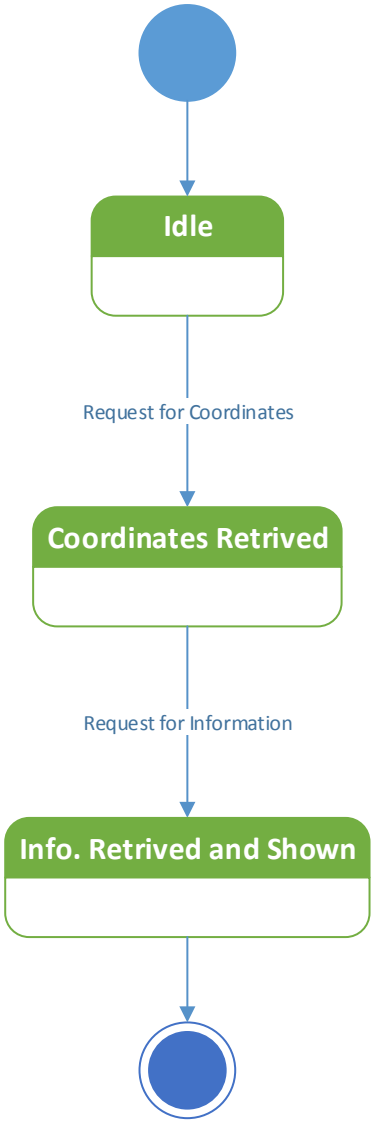


Figure 4-18 State Transition Diagram Navigation

4.1.3.2.3.1.2 Search

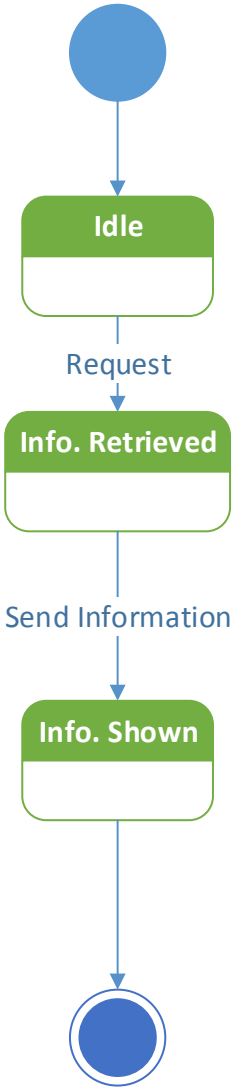


Figure 4-19 State Transition Diagram Search

4.1.3.2.3.1.3 Maintain Wishlist

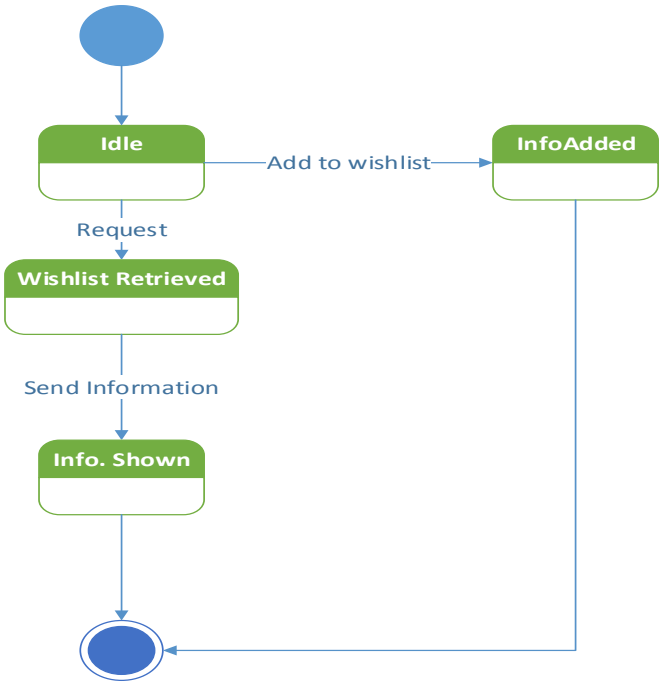


Figure 4-20 State Transition Diagram Maintain Wishlist

4.1.3.2.3.1.4 Maintain Localpedia

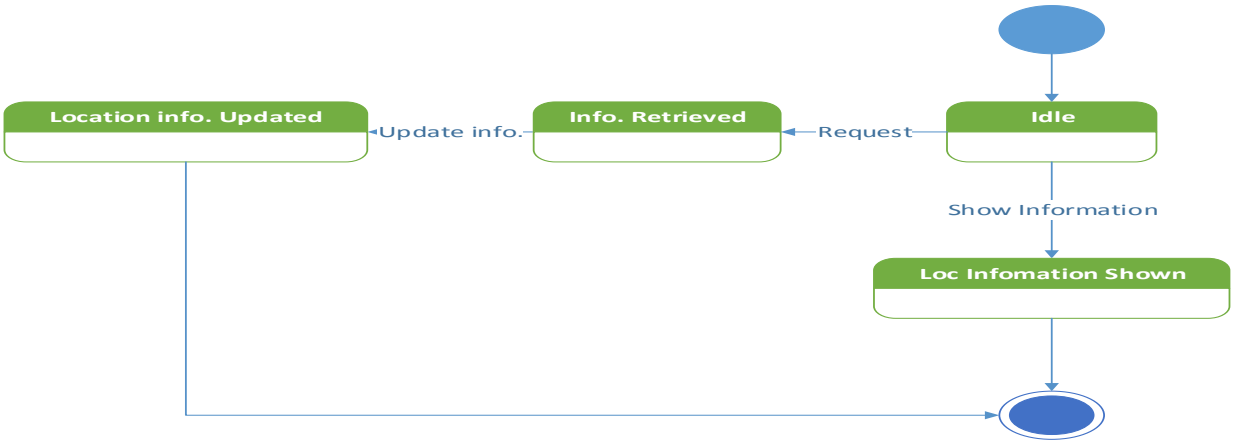


Figure 4-21 State Transition Diagram Maintain localpedia

4.1.3.2.3.1.5 Get Notifications:

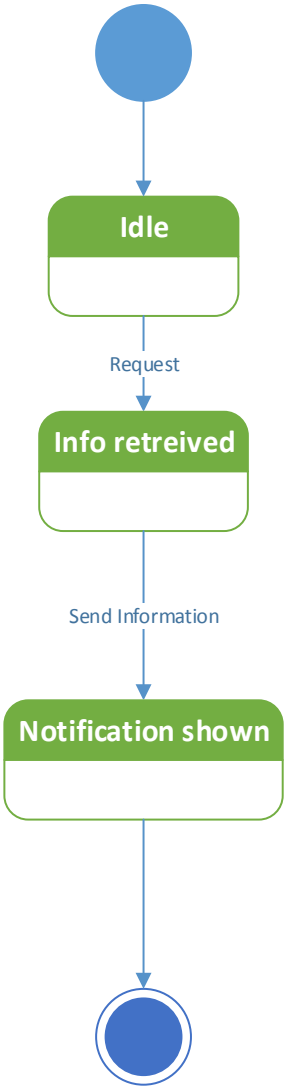


Figure 4-22 State Transition Diagram Get notifications

4.1.3.3 Dynamic View

4.1.3.3.1 Activity Diagram

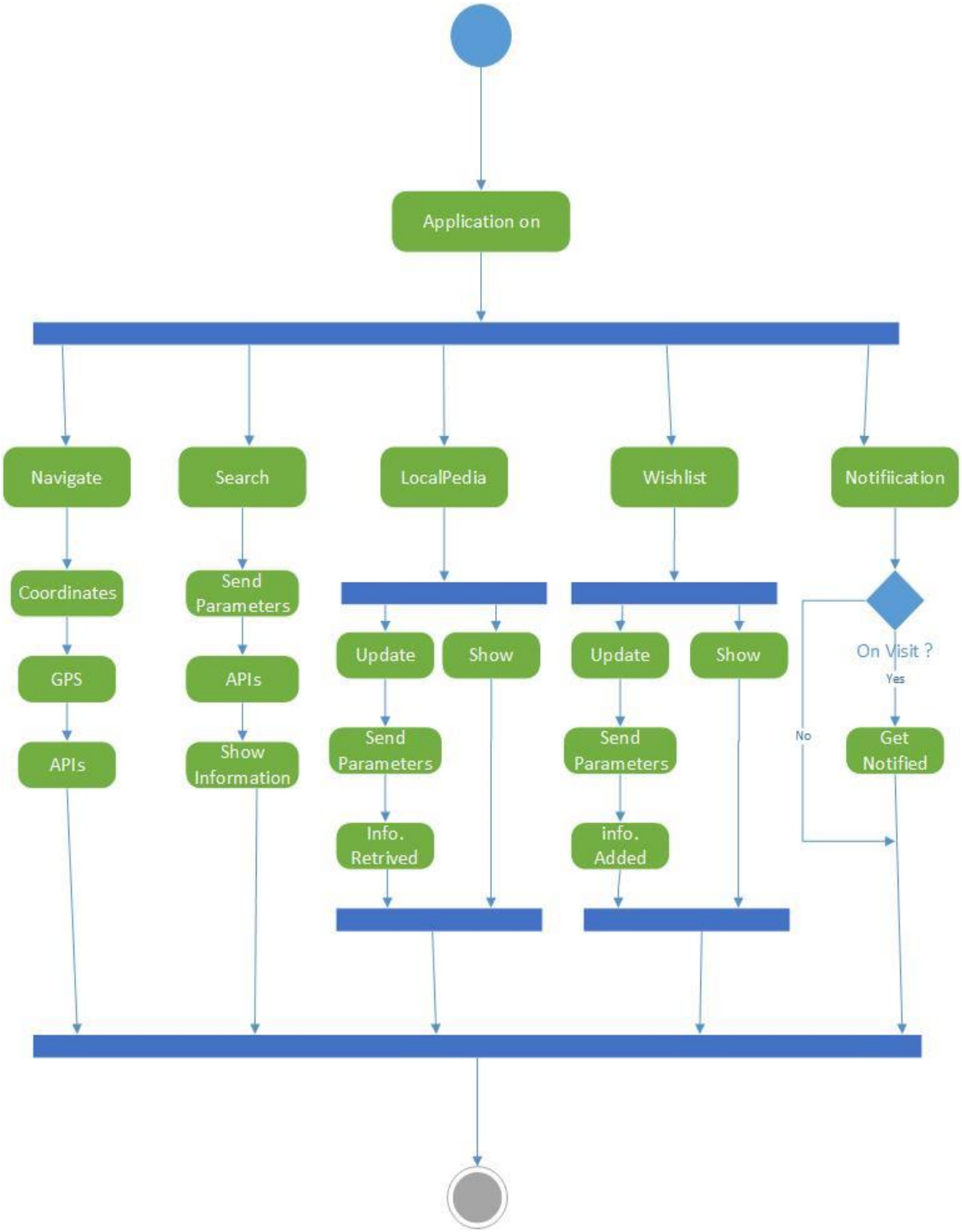


Figure 4-23 Activity Diagram

4.1.3.4 Data Flow Diagram

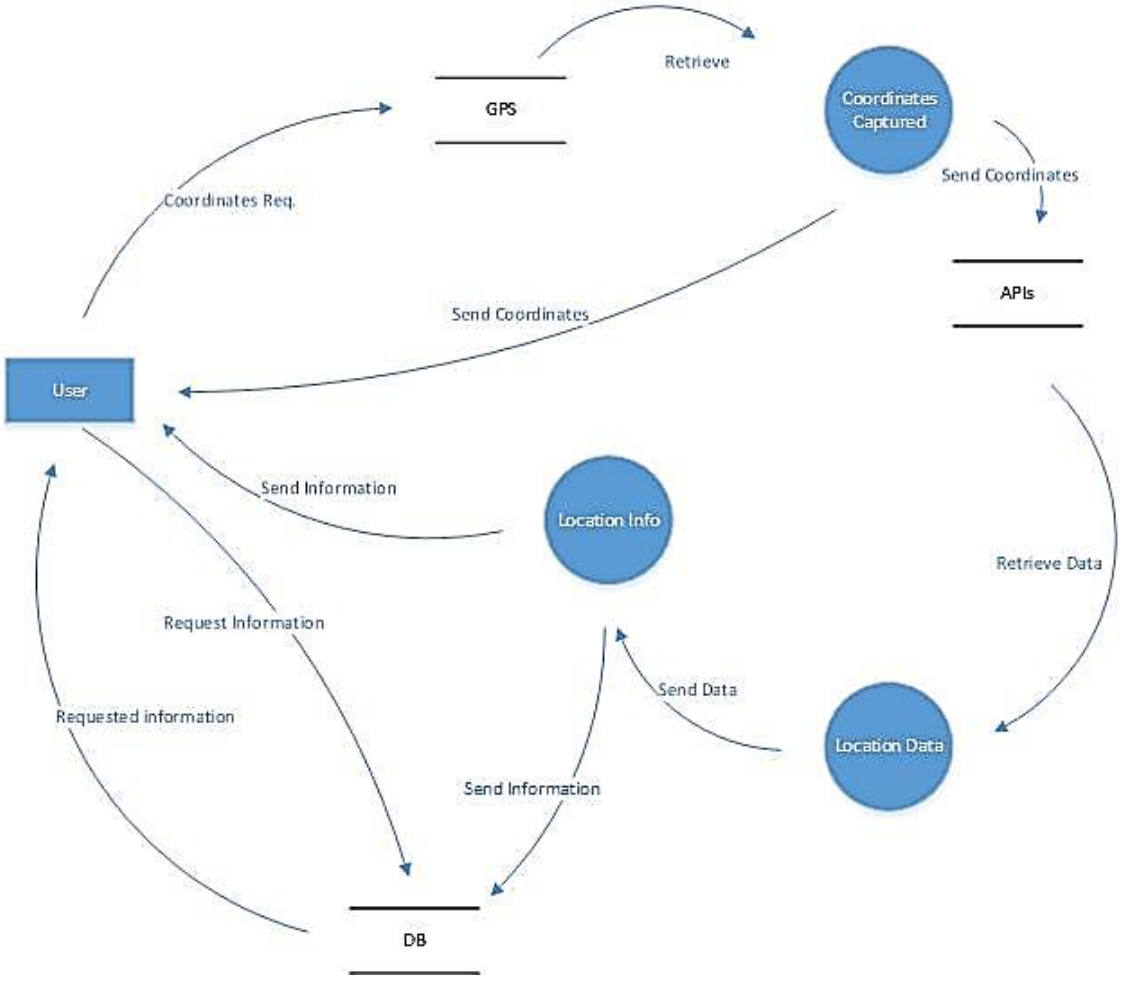


Figure 4-24 Data Flow Diagram

4.1.3.5 Implementation View

4.1.3.5.1 System Class Diagram

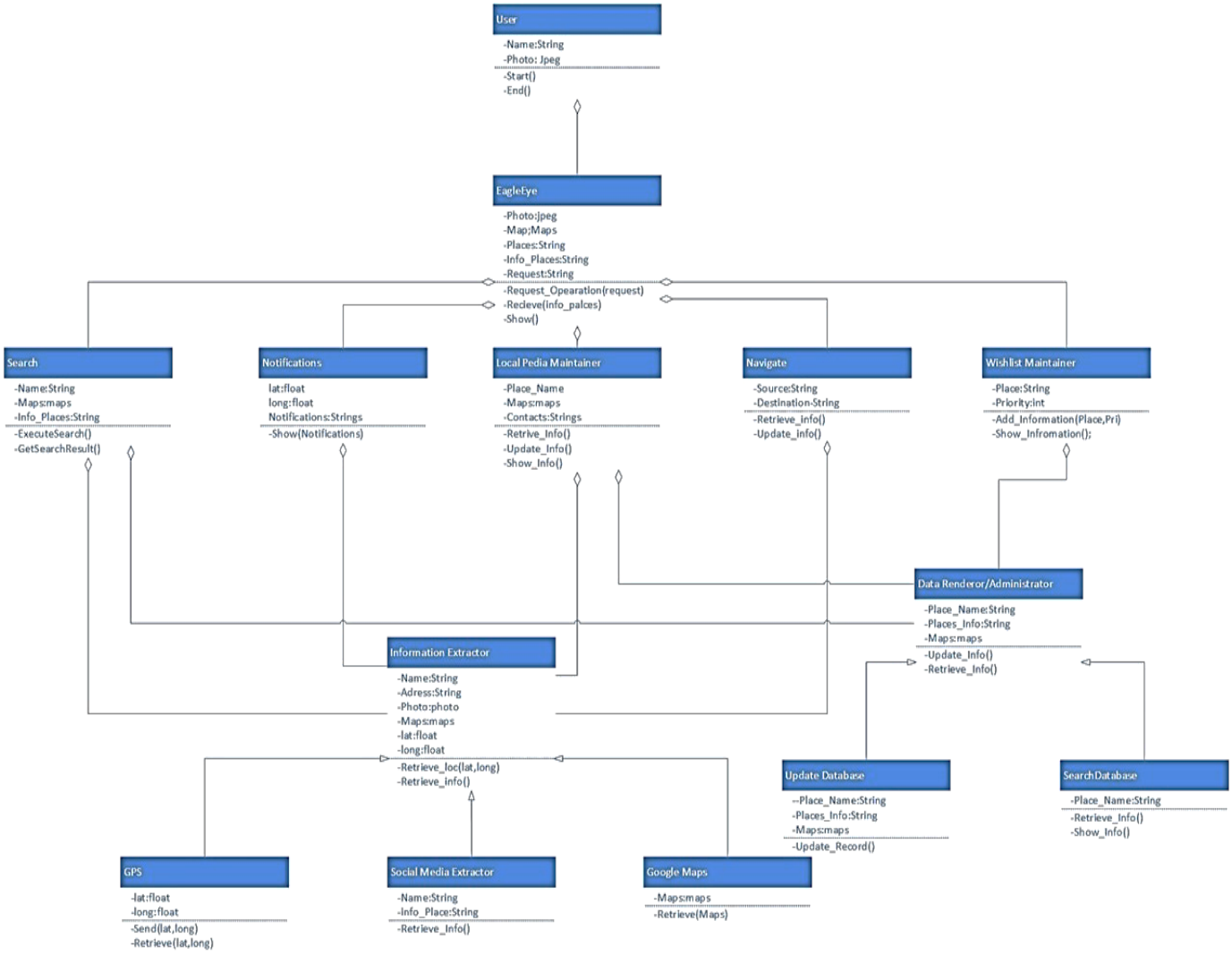


Figure 4-25 Class Diagram

4.1.3.6 System Class Description

User	This is the class to describe the user. User will have name and photo to make his/her profile. User will be able to start, end and use the application. User will only interact with the class "Eagle Eye" which is the main class.
Eagle Eye	This is the main class of the system. User interacts with this class and gets the required functionality done. This class has all the possible variables to show and retrieve the possible operation of the system. Variables are maps, photos and numbers. This class receives the request from user and interacts with the respective classes to get the required functionality for the user class. There are three member functions in this class. 1) Request_Operation(request) which receives the request from the user and calls the respective classes to get the functionality. 2) Receive(info_places) to receive the required information from different classes against the user's request. 3)Show_info() to show the information to the user after receiving the information from different classes.
Navigate	This also one of the main classes of the system. This performs navigate related functionalities of the system. This class receives requests from the EagleEye class and further interacts with InformationExtractor to get the required information. It has source, destination and request as variables and retrieve_info(), send_info and update_info() as member functions. 1) Retrieve_info() to retrieve the information from different classes against a specific request. 2) send_info() to send the requested information to main class. 3) Update_info() to update the information in the database.
Localpeia_Maintainer	This class manages the localpedia module of the system. Localpedia is necessary information of the visit stored in the database so that application can also be used without internet as well. This interacts with Information_Extractor and Data_Renderer to retrieve and update the information respectively. It takes place as input and updates the information using variables images, maps, emergency_nos and places_info. It has three member functions. 1) Retrieve_info() to retrieve the information from different media regarding a place or visit. 2) Update_info() to update the information regarding place or visit in the database. 3) Show_info() to show the information stored in the localpedia.
Search	This class enables the user to search different places and information of that place. This also further interacts with Information_Extractor and Data_Renderer to search the information and save the search results

	respectively. Its variables are place, maps, images and weather_status. It has two member functions. 1) Search() to search the information 2) Save_results() to save the search results in the database.
Wishlist_Maintainer	This class maintains the wishlist of the application. Wishlist is list of places stored in the local database of the system which user wants to visit in near future. This interacts further only with data_renderer class to store and retrieve the stored information. Variables include place, recommended_weather, images. There are two member functions of this class. 1) Update_info() to update the wishlist. 2) Get_info() to get the stored information.
Notifications	This class notifies the user with events occurring nearby user during a vist. Data members of the system are lat, long, name and distance. There are member functions of the system. 1) Retrieve_info() to retrieve the information about events. 2) Notify() to notify the user about that event.
Information_Extractor	This class extract the information from different APIs and GPS, transform that information and sends back to the main class. This class further interacts with GPS, SocialMedia_Extractor and Google_Maps classes to retrieve the information. It further transforms the data into information and sends back to main class. Data members of the class are name, photo, place, emergency_nos, lat, long and description. There are member function of the class. 1) Retrieve_info() to retrieve the information. 2) Transform_info() to transform the information to user's requirements. 3) Send_infoI() to send back the information to the main class.
Data_Renderor	This class saves and retrieve the information for the user from the database. This further interacts with Update_database and Search_database to update and search the information from database respectively. Data members of the class are name, image, maps, emergency_nos and description. There are 2 member functions of the class. 1) Retrive_info() which allows to retrieve the information against specific query. 2) Update_info() to update the information in the database.
GPS	This is the database handler class that perform transactions related to the database. It has methods to add and get the history and favorite places by calling the four methods i.e. addHistory,addFavourites,GetAllHistory and getAllFavourites. This class performs the CRUD (Create, retrieve, update, delete) operations to the local database.

Google_Maps	This class enables the user to get the location and maps from Google Maps APIs. This class receives requests from Information_Extractor class and returns information results against requests. Data members are maps, images, lat, long and isOnPath. There are three member functions of this class. 1) getShortestPath() to get the shortest path to destination. 2) IsOnRoute() to ensure that user is on the same route as prescribed by shortest path finder function. 3) GetInformation() to extract different information from Google Maps APIs.
Update_Database	This class enables the user to manipulate the database. User can delete, add and modify existing record. Data members are maps, photos, description, numbers and weather_info. There are member functions of this class. 1) Add() to add the new record. 2) Modify() to modify the existing record. 3) Delete() to delete the record from database.
Show_Database	This class enables the user to access the database. User can only view the records. Data members of this class are maps, photos, description, numbers and weather_info. There is only one member function of this class. 1) Show() to show the records against some request.

4.1.4 Human Interface Design

4.1.5 User Interface

Figure 4.1.1:Welcome Screen

Figure 4.1.2:Menu + Search

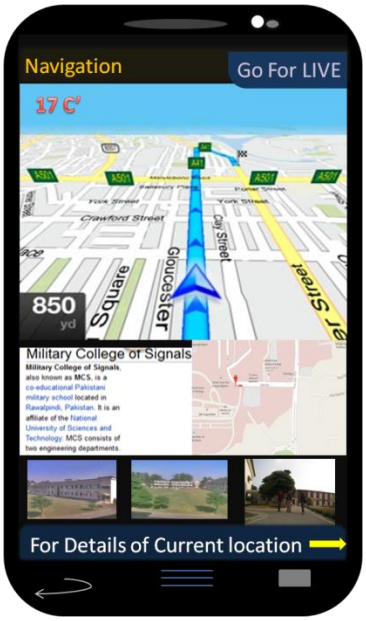


Figure 4.1.3:Navigation

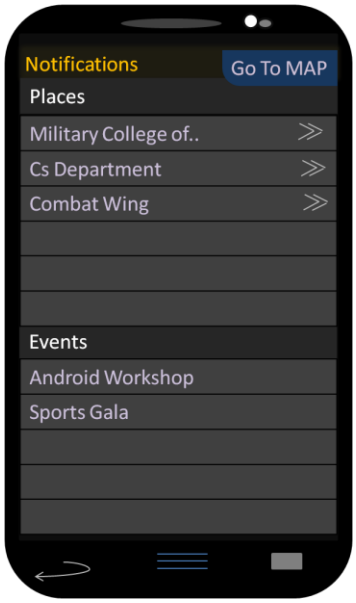


Figure 4.1.4:Notifications

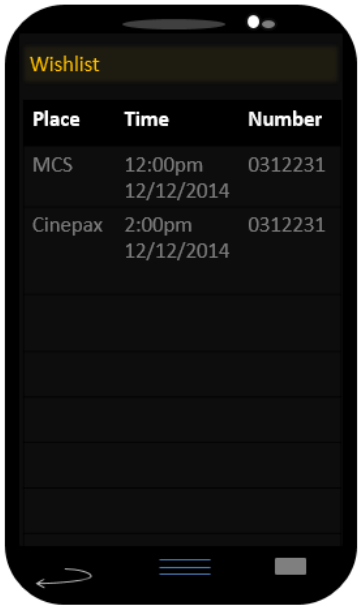


Figure 4.1.5:Wishlist

4.1.6 Design Patterns

4.1.7 Pattern Name: Controller Pattern

Problem: What first object beyond the UI layer receives and coordinates ("controls") a system operation (Navigate)?

Solution:

Whenever an event is triggered to turn on the camera preview, the request for the event is forward for processing to Information_Extractor which is Controller. Event is triggered in the View and then forwarded to the controller class through Navigate class. In this case, Navigate is Model and data members and member functions are defined and initialized in this class.

Processing in the Model includes opening of the camera feature of mobile, adjusting the image if required and then capturing it at last.
By using this Controller pattern interface logic will be separated from the business logic .It will increase the potential for reuse and pluggable interfaces. It also provides an opportunity to reason about the state of the use case which is done by the controller. It provides low coupling, high cohesion and high reusability.

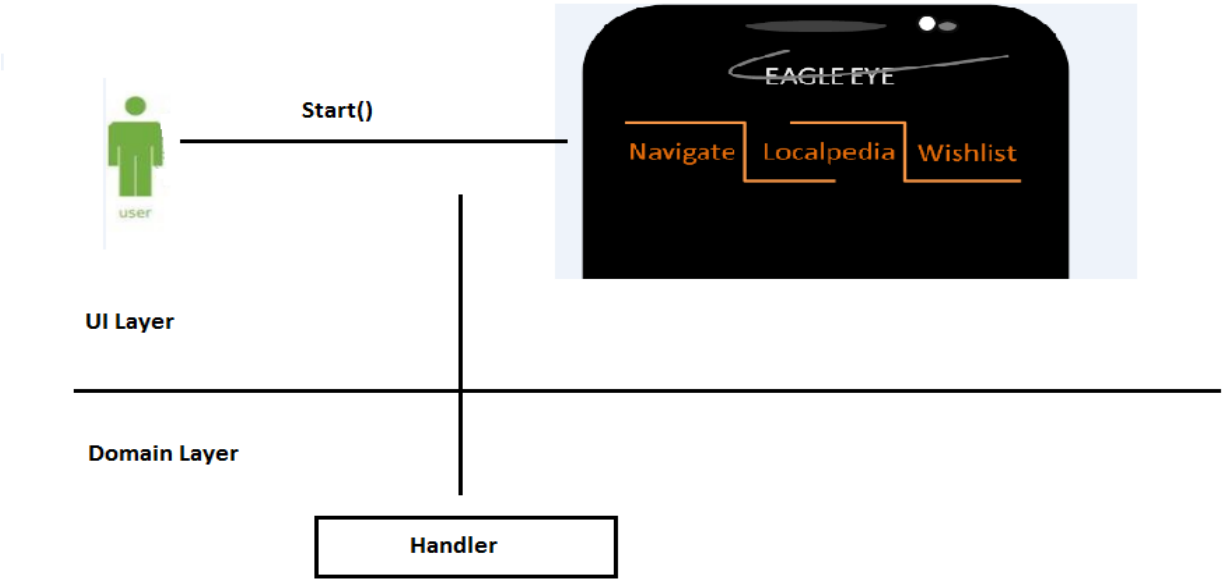


Figure 4-26 Controller Pattern

4.1.8 Pseudo Code for Components

4.1.8.1 Wishlist Maintainer

Show Wishlist Menu

If user selects show option

Begin

Show Wishlist

End

If user selects Add option

Begin

Show form to add new wishlist

Print 'Record added'

End

If user selects delete option

Begin

Show Wishlist

Delete selected record

End

4.1.8.2 LocalPedia Maintainer

Show LocalPedia menu

If user selects update option

Begin

User enters the destination

Information from APIs is retrieved

Information is added in the database

Print 'LocalPedia updated'

End

If user selects show option

Begin

List of records is shown

User selects an item

Information is shown

End

4.1.8.3 City Searcher

User selects the Search option from the menu

User enters the name of place in text box

Information is retrieved from the APIs

If user wants to add information to wishlist

Begin

User clicks the Add to wishlist option

Print 'Information added to wishlist'

End

4.1.8.4 Social Media Extractor

If system request to extract information from social media

Begin

Extract information from desired social media website

Print 'Information'

End

4.1.8.5 City Guider

System receives navigation request

If Stay in Touch request is made

Begin

Get the destination

Get the current position

Get the shortest path from Google Maps

Continuously checks the current location

If Current location is not on the shortest path

Begin

System beeps

End

End

If user selects the Building Information option

Begin

Turn on the camera

Get the current location from GPS

Take the picture

Sends current location and picture to Google API

Get the name of building

Extract information of building from social media APIs

Print 'Information of building'

End

4.2 Implementation:

4.2.1 Technologies Used:

4.2.1.1 Programming Languages:

Application is developed in Java language. All the programming is done through Java and interface part is done using XML.

4.2.1.2 Development Tools

Android Studio is used to develop the system.

4.2.1.2.1 Database

Databases were developed, managed and maintained in MySQL.

4.2.2 Implementation Work Flow:

The system is developed using:-

Java Programming

XML

API Programming

Database

4.2.2.1 Java Programming

In the project, first activity is **MainActivity.java.** All other activities are called using this activity. MainActivity.java displays the main interface and all other activities are linked with this activity.

For search, **Google_Search.java** is called. Mostly APIs operations are done in this class. It has furthermore **Weather, PlacesInfo, JSONParser and DownloadTwitterTask** activities. These activities work asynchronously with the main thread. These activities are used to extract weather information, places information, images from Flickr and tweets.

Get_Longs.java receives the place name and returns its latitudes and longitudes using APIs. **LocalPedia.java** is used to manage the Localpedia module of the system. This module interacts with database and web APIs.

Wishlist.java is used to maintain the wishlist module of the system. This activity interacts with database and show the wishlist to the users.

4.2.2.2 XML

XML is used to define the layout and interfaces. In the system the main layout file is **activity_main.xml** which shows the main menu to the user. **Activity_google_search.xml** is used to show the interface of Google_search.java class. **Get_Longs.xml** is used to show the longitudes and latitudes of the places. **LocalPedia.xml** is used to show the localpedia information to the user. And similarly, Wishlist.xml shows the wishltists saved by the user. It also enables the user to add new entry to the wishlist.

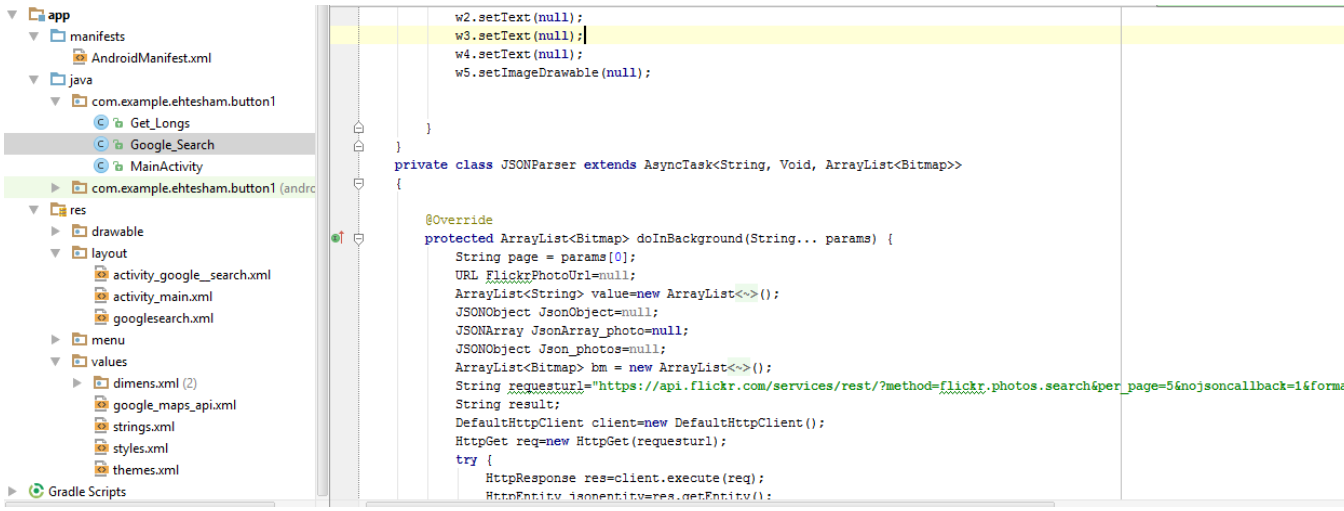


Figure 4-27MainActivity.XML

4.2.2.3 API Programming

Data from the APIs is fetched in the form of JSON (JavaScript Object Notation). Furthermore, this JSON is parsed using JSON.java class.

4.2.2.4 Database

We are using SQLite database as SQLite is an Open Source database and it supports standard relational database features like SQL syntax, transactions and prepared statements. The reason of using this is that the database requires limited memory at runtime (approx. 250 KByte) so a good candidate to embed into it at runtimes.

SQLite isa part of every Android device and SQLite database in Android does not require a setup procedure or administration of the database.

In the picture below you can see that **updateDB.java** class is containing all the necessary information of the table also we are using **DatabaseOperation.java** class that is controlling all the function of creating database and creation of table. To create the database we are using the above class which extends **SQLiteOpenHelper c**lass. In the constructor of your subclass you call the super() method of SQLiteOpenHelper, specifying the database name and the current database version.

UpdateActivity.java class containing all the functions that are necessary to update the database.

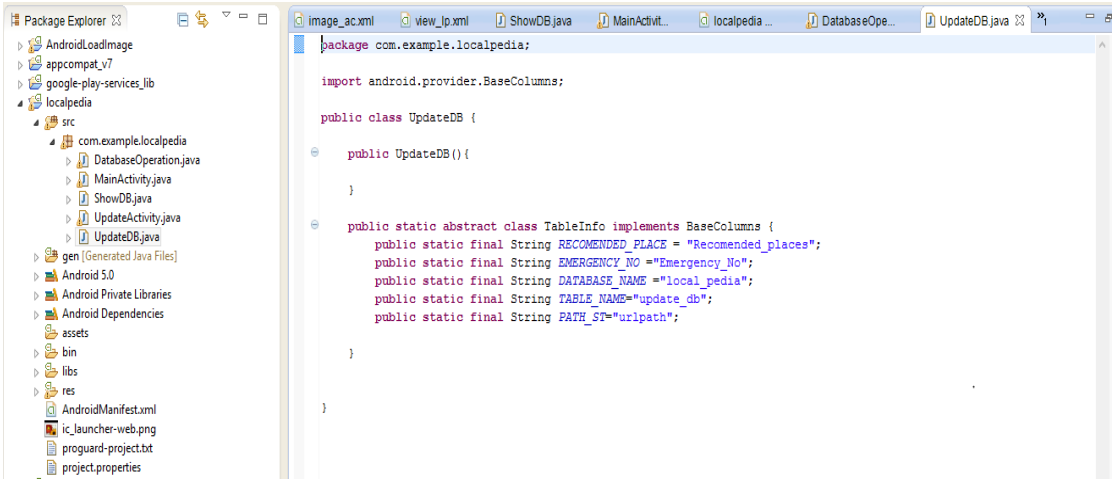


Figure 4-28 ShowDB.java

ShowDB.java class is used to show the database in user interfaceclass **view_lp.xml**. Other user interface classes which we are using to interact with java class are **activity_main.xml**,**update_lp.xml**, **view_lp.xml**.

Chapter 5

ANALYSIS AND EVALUATION

5. ANALYSIS AND EVALUATION

5.1 Overview:

This section involves different testing techniques to make sure that system is working correctly. It involves different stages of testing to check that system is fault and error free. There are different modules of the system. After the development of these modules, these modules were integrated to perform a combined functionality. So, after development of each module, it was checked and tested independently. After these successful tests, all the modules were integrated. So, integrated test was made at this stage. After complete integrations, whole system was tested and checked against the requirements.

The details of all the stages are given here:

5.1.1 Unit Testing:

The system has different modules which were developed independently and these modules have to work together to give the desired functionality. After development of each module, it was tested independently. Unit testing of all the modules is given here by:

5.1.1.1 Navigate Testing:

Test Case Name	Navigate
Test Case No	1
Description	This module provides different navigation services including shortest path, building information, nearest places and data from other APIs. The user asks for the navigation service and requested information is fetched from APIs and shown to the user screen.
Testing Technique Used	Black Box Testing
Preconditions	System is running and internet is available
Input Values	Source Destination
Valid Inputs	Source and destination names can be of any city, country or place
Steps	Open the navigation Enter the source Enter the destination Ask for desired navigation task
Expected Output	If the valid source and destination is entered, user gets the valid information fetched from different APIs.

Actual Output	As expected
Status	PASS

5.1.1.2 Maintain Wishlist Testing:

Test Case Name	Maintain Wishlist
Test Case No	2
Description	This module enables the user to add the places which he/she wishes to visit in future. User adds the places in wishlist and can modify this list.
Testing Technique Used	Black Box Testing
Preconditions	System is running
Input Values	Place id Place Name Place Description
Valid Inputs	Place is added in the list when retrieving. Place is not there when adding new place.
Steps	Open the wishlist Select the place Information is shown Enter the place Place is added
Expected Output	If place is present in the list, information is shown. If new place is added, information is added.
Actual Output	As expected
Status	PASS

5.1.1.3 Maintain Localpedia Testing:

Test Case Name	Maintain Localpedia
Test Case No	3
Description	The basic purpose of this module is to enable the user to use the application effectively and efficiently when internet is not available. This modules stores the necessary information about the place in the database and shows when asked.
Testing Technique Used	Black Box Testing
Preconditions	System is running and internet is available
Input Values	Source

	Destination Shortest Path Place information Weather
Valid Inputs	Source and destination names can be of any city, country or place
Steps	Open the Localpedia Enter the source Enter the destination Ask for the update Information is updated Ask for information retrieval Information is shown
Expected Output	If the valid source and destination is entered, user gets the valid information fetched from different APIs. If the information is stored in the database, information is shown to the user screen
Actual Output	As expected
Status	PASS

5.1.1.4 Search Testing:

Test Case Name	Search
Test Case No	4
Description	This module searches the information about places, cities and countries. The information includes weather updates, images and places to visit.
Testing Technique Used	Black Box Testing
Preconditions	System is running and internet is available
Input Values	Source, Destination
Valid Inputs	Source and destination names can be of any city, country or place
Steps	Open the navigation Enter the source Enter the destination Search
Expected Output	If the valid source and destination is entered, user gets the valid information fetched from different APIs.
Actual Output	As expected

Status	PASS

5.1.1.5 Get Notifications Testing:

Test Case Name	Get Notifications
Test Case No	5
Description	This module enables the user to get notifications from twitter account of the company. The company updates tweets about events and tourist places after regular intervals and these tweets are shown in form of notifications to the user screen.
Testing Technique Used	Black Box Testing
Preconditions	System is running and internet is available
Input Values	Twitter account
Valid Inputs	Valid twitter account
Steps	Open the twitter Post a tweet User click the get notifications Notifications about the places and events are shown.
Expected Output	Tweet is posted and user gets the notification when he/she clicks the get notifications
Actual Output	As expected
Status	PASS

5.1.2 Integration Testing:

Whole system was divided into 5 modules before starting development. These modules were developed independently and separately. After passing unit testing of all the modules, system was integrated and integrated testing was done to check whether these modules were working fine or not. All the interdependencies were checked. The details of integration testing are given here below:

Test Case Name	Http Request Handler
Test Case No	1
Description	This feature allows the user to ask for the data from APIs through mobile devices. This test case is aimed to check that whether data is perfectly moving from APIs to mobile devices or not.

Testing Technique Used	Black Box Testing
Preconditions	System is running Internet is available Http handler is requesting for data and receiving data from APIs.
Input Values	Source Destination Longitude Latitude
Valid Inputs	Valid source Valid destination Valid longitude Valid latitude
Steps	Enter source Enter destination Request for information Press Enter to get the requested information
Expected Output	Information from APIs is retrieved. This information includes:- Maps Shortest path Weather updates Photos Tweets
Actual Output	As expected
Status	PASS

5.1.3 System Testing:

System testing is done when whole system is developed and integrated. And unit testing and integration testing has been passed. The complete system is tested against different inputs and checked the output against the requirements.

When the system testing was done according to the above criteria, there was no difference found between expected and actual output.

Chapter 6

CONCLUSION

6. Conclusion

In Consumer market Location based augmented services on android devices had great success. Which provides very useful functionality of finding nearby point of interest. Next generation Location based augment reality promises more to deliver for the smartphone users and create a huge knowledgebase of location-tagged information. The new devices are integrated with many options like drivers like notifications, integration of advanced sensors such as accelerometer, digital compass and still/video cameras and Gyroscope. As a result this application has used all these aspects of features of android devices and provided uniform platform for the android users to be navigated in true sense.

Eagle Eye is a complete system that provide complete guidance to user during their trips and planning their trips. User is guided by providing complete route to destination and is provided with complete information of any city query. Only thing that they need to do now is to get this system on their devices and feel carefree from any kind of data loss regarding the memories they have made being at a particular place at a particular time.

“Eagle Eye “helped to achieve these objectives of learning

Android Software Development process/cycle.

Android Phone Programing.

Android Phone Architecture.

Interaction of Database with android.

Chapter 7

FUTURE WORK

7. Future work

Eagle Eye is the augmented reality android based tourist guide app which enjoy and guide the tourist in planning and during the visit. It has following features like augmented view, showing the tags of building on camera while lifting the mobile up. Notification, which shows the notification from the flicker and twitter. Search, which can be used to search about any place and save the result in the local podia. Navigate, which gives the user its current location and nearby pales information and gives shortest path. Wish-list, which maintain the list of your future plans and store in the database. Furthermore our project can be enhanced in some of the features like Analyzing sense, translating local sign board, interpreter, and user profile.

This app is showing only tags of building on camera but analyzing scene can give finer details of building and tells what is inside building. For example you are walking down the street and you see the hotel this feature will identify the objects in the hotels from room availability to the room booking options. So how many rooms are available and what is the cost of living there will be shown on the user screen and some of the pictures of the room will be shown and booking will be done.

In translating local sign board to user's language is one the best thing that can be implemented in this product, in this using image processing techniques like character recognizing and converted local sign boards into the user language which can easily be understood by the user.

It is some time very difficult for the tourist to communicate with the local people so overcome this and to make the communication easy the feature which can be called as the interpreter, which will translate local language using Google Translate API into another form and then it can be used to communicate with the people where either user does not understand the local language or local people don't understand user's language.

To save the data on multiple place user profile can be created which will save your data in to database on the web. User view the data either for the mobile device or from the web using this the user will able to save pictures and videos on the server so that he/she doesn't have any fear to loss the data or memory problems.

7.1 Overview

The eagle eye which is android base tourist guide app. That helps the tourists to guide and help to enjoy their trips it also help in planning their trips.

It has five main features and we have implemented all of them. But a lot work can be added in the future to make it wonderful app as desired in future work.

We have successfully completed this and using this in our android devise. We are currently using this to view the tags of nearby buildings getting guides about nearby places and saved our future trips in wishlist and saving some emergency number and picture in loalpedia.

System is showing the notification from the flicker and twitter and helping us to find the shortest path.

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APPENDIX A: USER MANUAL

TABLE OF CONTENTS

1. Reading Instructions

This user manual is a guide to the application “Eagle Eye”.

It is technical assistance document for installing and performing major operations of the system.

For first use of the system, the manual should be read in the given sequence. For subsequent use, it can be consulted as per the requirement.

2. Conditions for installation

Application will run over Android version 2.2.

3. Installing Instructions

The .apk file will be used to install this application. Download the file in the SD card memory and run it. After selecting install option the application will be installed.

4. Using the Application

Using of this application is very simple. First make sure that device is connected with internet.

4.1 Turn on application

Click the application “Augmented Maps” to run it. The application will take less than 2 seconds to launch and camera view will be opened by the application.

4.2 How to use the system

Run the application then select any of the option you want to use the facility.

For navigation of give the destination the path will be shown.

For nearest places the device will show you the nearest place as a augmented reality.

For wishlist option user may use this option to create update or modify his wishlists.

For localpedia user can user to see the information stored for the next trip.

4.3 Turn Off Application

Click the back button on the device. This will safely close the application.

If the application is making some trouble due to any reason, it can be closed from the application manager.

FAQS

In this section some of the frequently asked questions about this application will be answered.

Q1: Which android versions are supported by this application?

A1: Android 2.2 and above.

Q2: Is there any special hardware architecture needed to run the application?

A2: There is no special hardware architecture needed except for the arm v7 binaries. The application can be run on any android device v2.2 with arm v7 binaries.

Q3: Will I be charged for the application data downloaded from the internet?

A3:No this application is totally free to use except charges for internet facilty.

Q4: Why the Information related to map/document is not rendered on the screen despite the correct detection of the target visual code?

A4: Check your internet connection, your device may not be connected to the internet and hence the application may be unable to download the location information. We hope you have an awesome experience with our application.

Appendix B: Glossary

Definitions:

Augmented Reality Augmented Reality is a digital layer over the real world that you can't see with the naked eye but you can see with the camera on your smart phone or computer.

Constraint A limitation or restriction imposed on a function.

Android device An Android device is a mobile phone built on a mobile computing platform, with more advanced computing ability and connectivity than a feature phone.

Abbreviations and Acronyms:

AR	Augmented Reality
FAQ	Frequently Asked Question
GUI	Graphical User Interface
SDK v2.2	Software Development Kit version 2.2
IDE	Integrated development Environment
SRS	Software Requirements Specification
Wi-Fi	Wireless fidelity
GPS	Global Positioning System
API	Application Programming Interface
Google Maps	Service provided by Google for navigation and searching
Social Media	Websites that let the people to connect and share their information
Long and Lat	Values of coordinates to find the location on the Earth.