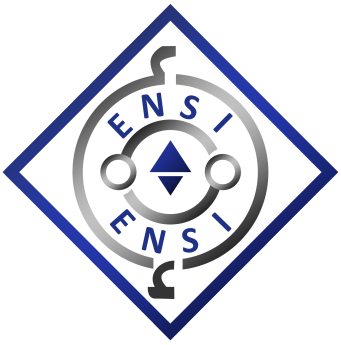
Ministry of Higher Education and Scientific Research

University of Manouba

National School of Computer Science



Stage Report of Enterprise Immersion

Augmented Reality mobile application

Directed by :

MAALEJ Yessine

Supervised by : Mr Mohamed MAHDI

Organism : Cynapsys

Adress : Elgazala BP 105 Ariana, 2088 -TUNISIE

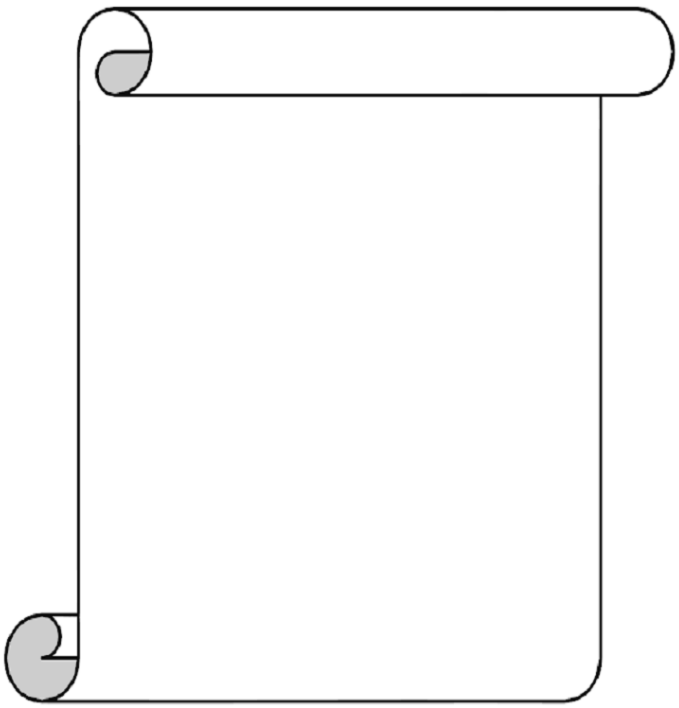
Phone : +216 71 857 899 Fax : +216 71 858 794

E-mail : info@cynapsys.de

Academic Year : 2012-2013

Supervisor's Signature

Mr. Mohamed Mahdi



ACKNOWLEDGEMENTS :

I take this opportunity to express my profound gratitude and deep regards to my supervisor Mr. Mohamed Mahdi for his exemplary guidance, monitoring and constant encouragement throughout the course of this internship.

I also wish to express my gratitude to the officials and other staff members of Cynapsys who rendered their help during the period of my project work.

I would love also to thank all the teachers of the National School of Computer Science who have enriched our jargon with knowledge to serve us in this work.

Last but not least I wish to avail myself of this opportunity to express a sense of gratitude and love to my friends and my beloved parents for their manual support, strength and help .

Abstract —— Résumé

THis report covers the development of an Augmented Reality mobile application for tourist guide to be integrated with a web server containing all Points of Interest in Tunisia .
This Document will cover the development process, the detailed design of the application, and the final produced result as well as an analysis regarding possible mistakes, problems encountered and what could be improved. The application was created by using ARchitect API which is a Javascript library based on Wikitude for mobile.
Keywords : Augmented Reality, Android, Wikitude, Points Of Interest, ARchitect, Javascript .

LE présent rapport couvre le développement d'une application mobile de réalité augmentée pour guide touristique pour être intégré avec le Web service contenant tous les points d'intérêt en Tunisie. Ce document portera sur le processus de développement, la conception détaillée de l'application et le résultat produit final ainsi que l'analyse en ce qui concerne d'éventuelles erreurs, les problèmes rencontrés et ce qui pourrait être amélioré. L'application a été développée en utilisant l'API ARchitect qui est une librairie en Javascript de Wikitude sous Android.
Mots-clés: Réalité augmentée, Android, Wikitude, points d'intérêt, ARchitect, Javascript .

Table of contents

List of Figures

GENERAL INTRODUCTION

Augmented reality has been around for decades but has hit the market just a few years back with the incredible innovations in mobile phones especially running on Android. Combining digital data with real-world imagery is being used in multiple fields like Automotive, Medicine, Advertisement, Gaming, Defense, E-learning and Tourism.
There has been a lot of research and development in each field and a number of prototypes were made for the various products and applications by making the appropriate way to add informations to reality like 3d objects , images , sound , films and even moving objects with image recognition .

Even though there are many ways to utilise AR technologies, one of the ways to use AR is for urban exploration ,based on the examples of more than 18 countries , our project consists in developing an AR application for tourist guide in Tunisia .

Importance of Augmented reality technology in the future have been predicted through many researches. The current state of the technology does not allow to exploit the full potential of what is generally known as Augmented Reality. However, each step to-wards increasing the current computing power will bring the technology on step closer to accomplish its idealistic features.

This report deals with five sections specifically the presentation of the project and the company, state of the art, specified requirements and related diagrams, the application design and the achieved work .

CHAPTER 1

OVERVIEW

Introduction

THroughout this chapter, we will try to put this project in its general context . We will focus primarily on presenting the host company. Then we will define the framework and criteria of work to do.

1.1 Context of the internship

This internship is part of the second year of the education of engineers at the National School of Computer Science (ENSI). I was led to make a six-week experience considered as an immersion course in the enterprise. We conducted this course in the IT business Cynapsys Hotspot from July 8 to August 17, 2013.

1.2 Presentation of the host organization

In this section, we describe the host company of the internship , its organization, production areas and sites, notably in Tunisia .

1.2.1 Generalities

Created in 2001, CYNAPSYS is a dynamic player in the business of consulting and computing engineering services. Their mission is to support customers and partners in the development of efficient and innovative solutions primarily for telecommunications and industry.

1.2.2 Organization

The team of Cynapsys consists of architects software, project managers, developers, testers and consultants to conduct ICT-functioning of major projects.
This expertise allows to offer clients solutions with high added value. The business organization is structured around four areas :

- Android cluster : This division, recently added, deals with the development of mobile applications supported by Android.

- J2EE cluster : This division handles the installation of systems and applications in the J2EE platform.

- Embedded Systems cluster : This division deals with the development of applications in the embedded, especially for the automotive field.

- .NET cluster : This division handles the installation of systems and applications under the. NET platform.

1.2.3 Sites

The company is of German origin, its first site was established in Munchen. Then it expanded its presence by setting up a second site in France. Through its two subsidiaries, Cynapsys has developed a deep knowledge of the European market. The site of Tunis, the environment where the internship was conducted, is the site of communication technology Elghazela and has about 115 employees working on support staff, application and design.

1.3 Project Background

In this section, we present the project, subject of this internship by putting it in its general concepts .

1.3.1 General concepts

Before describing the work to do, it would be useful to present some concepts and some technologies. This will properly introduce the detailed work .

1.3.1.1 Augmented Reality

The term "Augmented Reality" was coined in 1992 by Boeing aircraft manufacturing researcher Thomas Preston Caudell. Caudell used the phrase to describe the head-mounted-displays (HMDs) the company was using to aid in the assembly and installation of electrical wiring.

FIGURE 1.1 – A 2004 photo of a heads up display inside an FA-18 Hornet in flight

Nowadays augmented reality is much more developped by combining digital data with real-world imagery. The added data could be picture , informations , videos , sounds etc ..
It can present information about our surroundings (landmarks,points of interest) annotated onto a live camera view and not necessary for military purpose like it was created .

1.3.1.2 Developped mobile systems

Much innovation in the mobile AR space has been happening on Android, as the necessary hardware and API has been available since launch.
Being a fresh technology for smartphones, augmented reality for Android-based applications are likely to become the new standard on our smartphones in just a few years, as adaptation of this technology has been incredibly fast.
This is certainly due to Google which has been relentless in making Android the dominant smartphone OS into AR technology due to their current operations in the Google Glass, these pair of user-worn, casual-looking glasses use AR technology and its OS is Android based too.

1.3.1.3 Developped mobile hardwares

Mobile telephony developed in leaps and bounds over the next decade, particularly with the arrival of 3g connection which allowed each one to be connected at any time and in any place.
In that lots of technologies appeared in smart phones to give more performance like :

- Triple-axis Accelerometer/Magnetometer : The triple-axis accelerometer/magnetometer compass module. Inside are two sensors, one is a classic 3-axis accelerometer, which can tell us which direction is down towards the Earth by measuring gravity. The other is a magnetometer that can sense where the strongest magnetic force is coming from, generally used to detect magnetic north. By combining this data we can detect any specific orientation caused by moving the mobile phone .

- Global Positioning System (GPS) : is a radio navigation system that allows land, sea, and airborne users to determine their exact location, velocity, and time 24 hours a day, in all weather conditions, anywhere in the world.

- Graphics Processing Unit (GPU) : is a co-processor that takes on graphical calculations and transformations so that the main CPU does not have to be burdened by them. The use of a GPU can greatly increase the performance of a device, especially when used for tasks such as developed image treatment ,for example adding markers and 3D objects.

1.3.2 Project presentation

This internship aimed to develop an Augmented Reality mobile Application for Touristic guide which will allow the tourist to have complementary information of what he is watching in the reality view. In fact , the project consists in conceiving an innovative application that embodies the concepts of mobile AR in a special way . It is destined to guide the tourist through his journeys in Tunisia by offering points of interest in a location-based services. As the application is going to be built on a mobile platform, we will use general concepts related to the notions of mobility.

Conclusion

In this chapter we have tried to put this project in its general context with presenting and describing the host company and with exposing work goals theme. In the next chapter, we will give an insight of what mobile AR has got to offer today, through our background analysis commonly known as State of the Art.

CHAPTER 2

STATE OF ART

Introduction

To achieve the goals of our project, the study of existing solutions and different means put at our disposal is an inevitable step. In fact, we will conduct a detailed study of the existent similar AR applications. Then we will propose a suitable solution that can cope with problems related to existing products in order to satisfy the needs of tourists.

2.1 Existing products survey

Through the extensive research we have found out that multiple AR applications built in many countries for tourist guide do actually exist on the market.

- LAYAR : official name SPRXmobile in Netherlands .

Layar is multi purpose AR browser, and although it's got many of the same functions as Wikitude World Browser,that we will treat after , it does them all with a different style . In addition to giving the user detailed informations on his surroundings, it can also be used to create 'interactive print' on pages that would otherwise be static.

- Junaio : official name metaio GmbH in Germany .

The data that is transferred using the Unifeye software can be encrypted. However, it must be set up manually before the data is sent and received unlike other software platforms that automatically encrypt informations. The software also lacks support for facial tracking and Maya models, two features metaio says are in the product's roadmap for the future.

FIGURE 2.1 – Layar application

FIGURE 2.2 – Junaio application

- WIKITUDE : official name Mobilizy GmbH in Austria

Wikitude World Browser is widely regarded as the king of all augmented reality browsers.

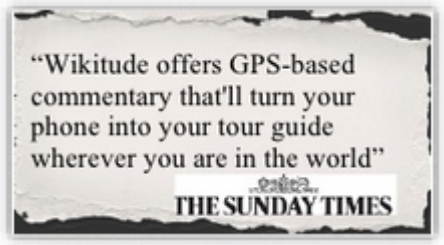


FIGURE 2.3 – Wikitude international well reputation

As we travel around any given area, Wikitude will provide us with just about any geographically-relevant information we need Wikipedia articles for landmarks, ATM locations, Youtube videos, Tweets, Foursquare locations, and whole lot more like is presented in the following figure

.

FIGURE 2.4 – Wikitude

2.2 Critic of the existent

There is a huge similarity between all the application with AR which is lake of functionalities of maps ,help and combining events with POI.
Another big problem is the long time for uploading all POI because there isn't any filter to simply have particular types of POI.

2.3 Proposed solutions

We decided to develop a special new application of tourist guide , the first one in Tunisia , offering a lot of extra modules to insure a better performance and to guarantee the satisfaction of the tourist by using multi advanced technologies such as Wikitude and Google maps to face the lack existing in other applications in the international market.

Conclusion

Throughout this chapter, we presented a study of the existing in the area AR and we pulled the key problems that currently exist. Our project TunisiaTouristicGuide is a new idea based on advanced concept and offering new features that we will study its requirements in the next part of this report.

CHAPTER 3

REQUIREMENTS ASSESSMENT

Introduction

THrough this chapter, we are going to specify the requirements of our project. Starting from the functional requirements till getting to the non-functional ones, we are then going to show our project's principal scenarios.

3.1 Requirements specification

we will detail the functional as well as nonfunctional requirements of our proposed solution.

3.1.1 Functional requirements :

Our application must provide the features which are going to be specified in this section. The processes to be implemented are :

- The application must be designed to offer a live events calendar which presents the events per types (cultural , artistic etc ..).
- A user needs to be able to refer back to all the events on map around him and also to locate his self at any moment.
- The application must allow optimal research and show of all the POI in AR around the user and must guide him to selected location.
- The application must offer features of each selected POI depending to the chosen topic.

3.1.2 Non-functional requirements

This application must satisfy a series of non-functional requirements such as :

- Usability : The user should not have to spend more than 20 seconds to be able to see POI loaded and displayed in the screen while the cam is opened.
- Reliability : The application should, under normal conditions, perform the required functions successfully.
- The application must allow an easy choice of POI categories .
- Performance :The application must offer maximum characteristic of each selected POI without being very slow.

3.2 Requirements Modeling

To specify in a formal way the required needs by the application, we opted for the realization of some use cases and sequence diagrams to have a better understanding of the needs but before that we will deal with principle actors of our application .

3.2.1 Actor's identification and Classification

An actor is an external element that can be a man, a machine or another system which interacts with the system to get a result. He/It makes decisions and initiatives. In the case of our project,actors are :

- Users : includes all those who will use our application "TunisiaTouristicGuide" in order to have access to all the functions of the application including maps , AR and event's calendar.
- Administrator : handles the web-services of the application in the sense that he can add or delete POI events .The dynamic part concerning Web service isn't held in the application and it's implemented outside.

3.2.2 Use case diagram

The following use case diagram represents the application major relationship with the users(tourists). The application allows the user to perform several activities like taking notes , calling fast help and navigating whether by using map or by filming or by following events from the live calendar .

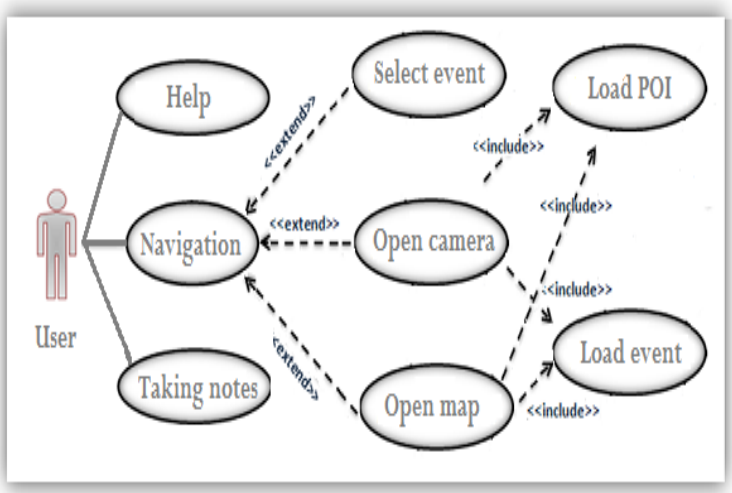


FIGURE 3.1 – Use case diagram

3.2.3 Sequence diagrams

We give a simplified but precise idea about how our program processes. For this issue, we make use of 3 sequence diagrams , the first one is general describing the hole communication with server and the others deal with the two frequent use cases selecting POI and events.

3.2.3.1 General sequence diagram

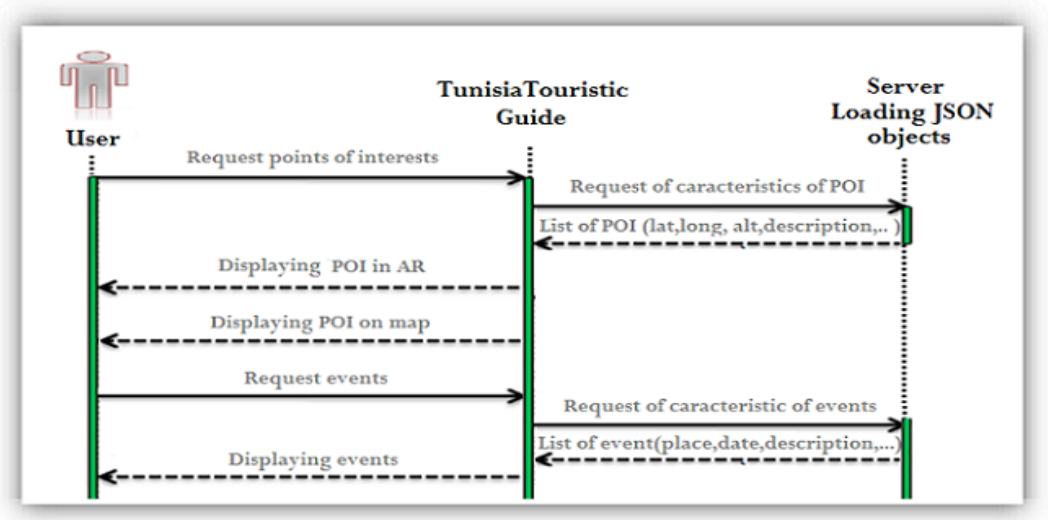


FIGURE 3.2 – General sequence diagram

The previous diagram illustrates the operation of uploading POI for AR and map navigation from a distant server , which offers simple informations regarding POI like name , longitude , latitude , altitude , description and then being treated , in a geo based augmented reality concept , and displayed in the phone's screen while the user is filming.

3.2.3.2 Selecting POI sequence diagram

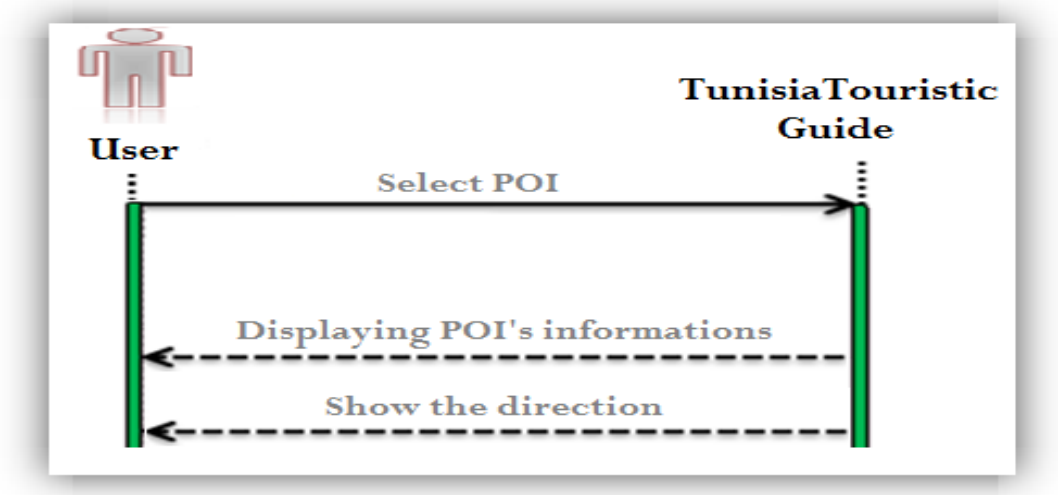


FIGURE 3.3 – Selecting POI sequence diagrams

The previous scenario sum up in the selecting of one POI then the application will show in a separate view the details of the activity and whenever the user turns back to AR view filming the application will guide him to the direction of the selected POI with a remarkable difference in the marker.

3.2.3.3 Selecting event sequence diagram

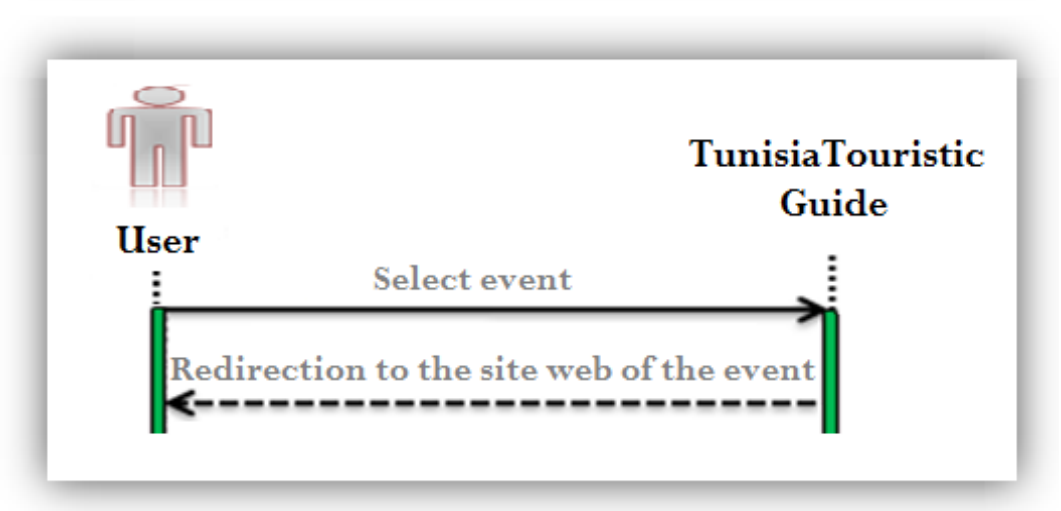


FIGURE 3.4 – Selecting event sequence diagrams

In this scenario, the user will choose one theme that will expand into related events , then he is supposed to select an event after that the application will open its related web site .

Conclusion

In this chapter we specified functional and non-functional requirements of our application. After having identified the actors , we attempted to write and describe the main functions through a use case diagram .Finally, we unrolled three sequence diagrams demonstrating the most principle interactions between the user and the application .

CHAPTER 4

DESIGN

Introduction

In this chapter, after specifying the various requirements to be met by our application, we present the design of our tool. This chapter focuses on 4 parts. The first one will address the overall design of our work and the two next parts will be devoted to packages diagram and dependencies between packages and the final part for the detailed architecture. In this chapter we will discuss the structure of the architecture of our application . Also after having finished and analyzed the use cases of our project in the previous chapter will identify the packages, classes and components of the application and we will focus on designing a suitable structure for the application. This step is crucial in the course of the project and aims to undertake and prepare the ground for the implementation phase.

4.1 Overall design

The smart phone detects the current position GPS and the orientation due to compass and accelerometer , then requests the data from the server. The data containing JSON objects lists of POI with appropriate characteristic .
After uploading data from the server , the application calculates positions of POIs on the screen depending of the location and user's sight direction which is the filming camera in order to display the drawable of each POI =Geo-Object + Location + Drawable. The application makes the calcul thanks to the class ARchitectObject which is the base class for objects created in ARchitect API in Wikitude.

Since it was created for inheritance purposes, it cannot be used directly. ARchtitectObject has a property to destroy objects. This property is used to free the memory space occupied by the object during the creation of new objects.
Subclasses of ARchitectObject include ActionArea , Location , Drawable , ARObject and many others.We will discuss briefly these subclasses which are mainly used to be runned on the ARchitect engine on Wikitude .

ActionArea is used to define a geographical area where actions are executed and triggered up on entrance or exit of the area. The location class refers to a description of a general location of POI in the augmented view.
ARObject represents a geographical coordinate in the real world using geoobjects or trackable 2DObjects for image recognition.
In our application ARObjects are represented in the AR application by drawables which are attached to them .
Drawable is used to represent ARObjects on the reality view. It serves as a building block for all geographical representation of GeoObjects. It should not be instantiated directly as it has subclasses. Right-handed coordinate system which is a local coordinate system used by drawable is characterised as :

- The origin of the coordinate system is in the location of the object the drawable is attached to and to be between the user sight and the object.
- The x axis is pointing right.
- The y axis is pointing up.
- The z axis is pointing out of the screen.

The following figure describe the hole system of adjusting the position of a drawable related to point of interest (1) depending on the user view point and the position of the phone .

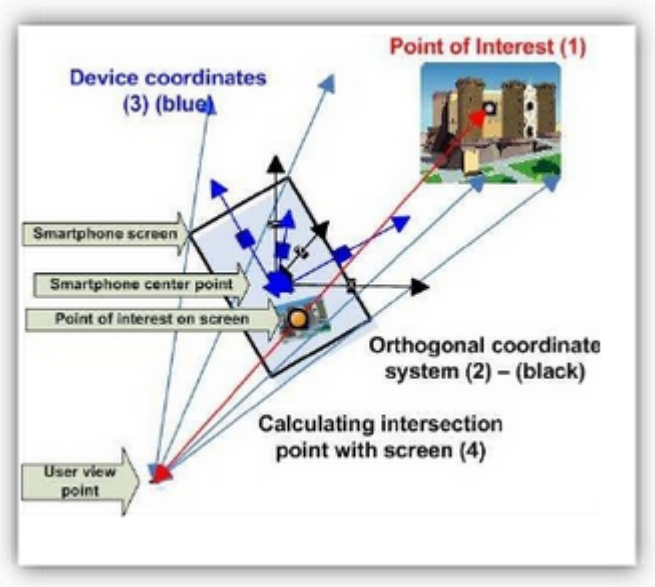


FIGURE 4.1 – Concept of displaying drawables in AR view

4.2 Package diagram

An important component of the application design is the division into modules or packages. A package is used to group logically related classes. The organization of all the modules forming an application or system is its software architecture. The principle packages of the application are presented in the following diagram.

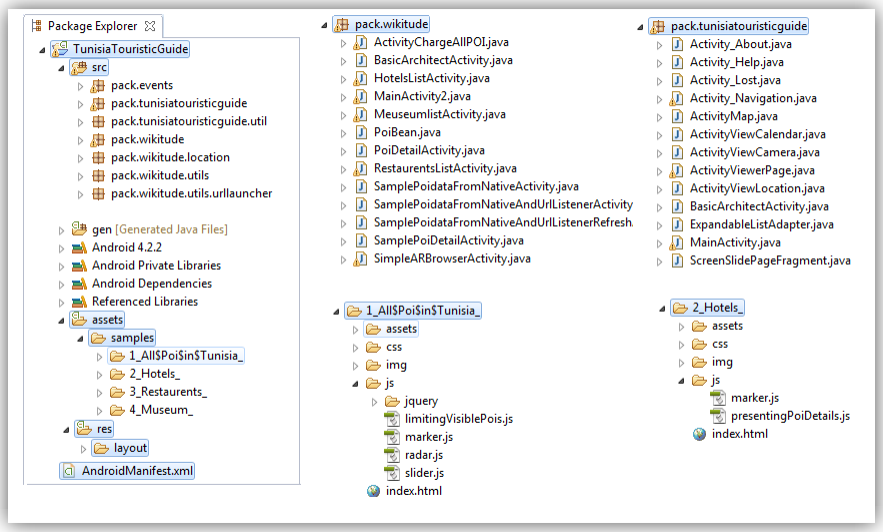


FIGURE 4.2 – Diagram of the application packages

4.3 Dependencies between packages

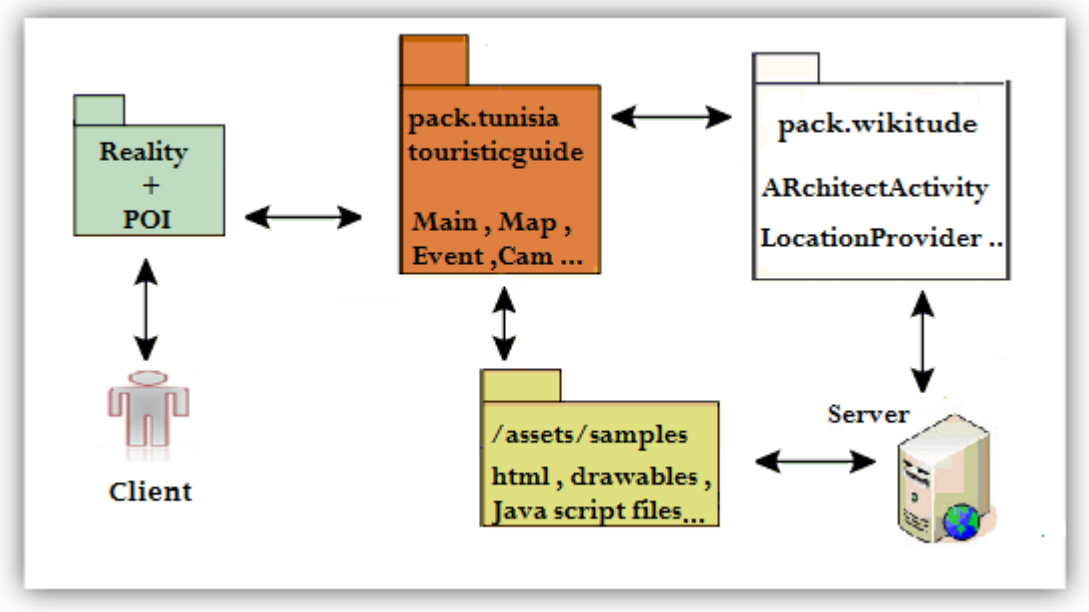


FIGURE 4.3 – Schema dependencies between packages of website

The figure above describes the dependencies between packages. In fact, the user reacts with the Activitie which simply receives data from server and manage it by calculating the POIs positions in addition to prepare the html file to be displayed to the reality view.This requires configuring JavaScript files then we will have the information to pass to the activitie that shows the result on the value of the requested treatment .

- pack.tunisiatouristicguide : This package contains the MainActivity which is the first loaded . It contains also the Activity_navigation ,like a view pager activity , that contains in the first fragment the activity containing events , the second one contains the map and the third fragment contains the list representing all the choices of AR view like All POIs, restaurants,hotels etc.. obtained after parsing the folder /assests/samples/ and extract all the names of contained folders.

  This package contains also the different classes related to the expandable list view and the view pager activity.
- pack.wikitude : This package contains BasicArchitecActivity which the activity called from one AR choice to charge the index.html corresponding in the appropriate folder after being instanciated from RestaurentsListActivity , HotelListActivity or ActivityChargeAllPOI. The SimpleARBowserActivity is that one responsible of displaying the 3D ob-

jects whenever the user click on Museum . This package contains also the different classes related to the Wikitude API .

- the folders in /assets/samples : each one contains the java scripts for uploading data from the server ,constructing and contains also the index.html in which we will call these functions to be displayed in AR view with all the characteristic .

4.4 Detailed design

In this section , we will be presenting the data server that we'v been working with, we will also describe the activity diagram which shows the possible transition between the application's interfaces .

4.4.1 Data server

We'v worked with a server which offers simple informations and then depending of the user's position the AR view will be generated and the POIs are shown by adding the latitude and the longitude of the user to those given in the JSON objects.
Each POI is characterized by a unique ID , latitude , longitude , name and description.
The following figure represents the unreal POIs that we have been working with .

FIGURE 4.4 – Data offered by the server

4.4.2 Activity Diagram

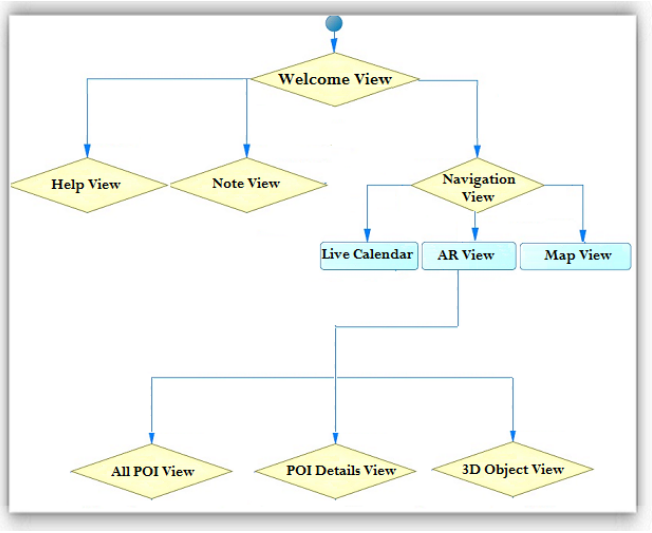


FIGURE 4.5 – Activity Diagram

The Figure 4.5 above represents the Activity Diagram of the application. The starting point is the moment that the user accesses the application , he will choose between calling help , taking notes or navigating into the view pager for accessing to live calendar , google maps showing POI's and events or the AR navigation. The AR view offers between showing all the POIs or specifying wether he is looking for hotels , restaurants or museums .

Conclusion

In this chapter, we presented the design of our project. We all first presented the general architecture of our application. Next, we studied the detailed design of the modules through the UML. This study facilitates the transition to the next stage of implementation. The next chapter is about to highlight the different results of development of the tool required.

CHAPTER 5

ACHIEVEMENTS

Introduction

The latter part of the report is devoted to the operation of the project once the work is completed. We will begin this part by exposure of the hardware and software environment used to develop the application. Then we will present the achieved work through some screenshots of the application .

5.1 Workspace Environment

We will present in this part the hardware and software environments we used to set up our solution.

5.1.1 Hardware environement

For the implementation of our project, we worked on a personal computer, the configuration of which is as following :

- Processor : Intel(R) Core(TM)2 Duo CPU P7350 @ 2.00GHz 2.00 GHz .
- Operating system : Windows 7 Integral Edition .
- RAM : 4.00 Go.
- Hard disk : 300 Go.

For debugging the application we used a Samsung Galaxy S3 , not just in an AVD , with the following configuration :

- Processor : CPU Quad-core 1.4 GHz Cortex-A9 .
- Sensors : Accelerometer, gyro, proximity, compass, barometer .
- GPU : Mali-400MP supports OpenGL 2.0 .
- Android : 4.1.2 .

5.1.2 Developpement environment

In this section we will present briefly the utilities which we have used to develop and maintain our project.

- Eclipse Platform Android Developer Tools v22.
- Wikitude API 3.0 release date 18/6/13.
- Android sdk 4.1.2 .

5.2 Technical solution survey

In this section , we will be presenting and justifying the different programming languages used during this internship.

5.2.1 JavaScript

JavaScript is a scripting language object oriented mainly used web browsers (HTML pages) to add interactivity. In contrast to languages Servers (running on the site), JavaScript code is usually embedded directly into these pages since JS is an interpreted language meaning that scripts are executed without preliminary compilation.

5.2.2 JSON

JSON is designed to be a data exchange language which is human readable and easy for computers to parse and use. As we used JavaScript for creation AR world , we have loaded data from a server JSON because it is directly supported inside JavaScript and is best suited for JS applications. The next line describes an example where JSON is used to encode a characteristics of one POI :
"id" :"10","longitude" :"0.007","latitude" :"-0.028","description" :" description","name" :"POI#10".

5.2.3 Wikitude 3.0

The very first AR browser to be launched in the world was Wikitude. It's ARchitect API provides location based tracking, image recognition and 3-dimensional object recognition services.
ARchitect enables developers to utilise simple web technologies such as HTML, CSS , JavaScript and jQuery mobile to create AR application .
In ARchitect geo-objects are defined to be displayed at a specific location in AR view, but they are not represented by info bubbles, rather they are represented by shapes also known as drawables.
Manipulation of geo-objects are done using JavaScript and they can be manipulated to trigger events as well.
Behind this great technology there are many advanced concepts like SDU (Scaled Distance Unit) and DBS (Distance Based Scaling).

- SDU : The size of an object in AR applications cannot be defined neither by pixels nor by anyother measurements used in 2-dimensional applications . The size of an object depends on the distance from the viewer to the object.
- DBS : Depending on the motion of the user , whether he is getting closer or moving away from the geo object location , the size of the drawable will get smaller and smaller or will be scaled to a bigger size

Voted "Best Augmented Reality browser" four years : 2009, 2010, 2011 and 2012. Wikitude is the "third eye" that allows us to see things we wouldn't normally see.
In a world with the existence of the Wikitude SDk , it would be impossible to work with any other technology .

5.2.4 Google maps V2

With the Google Google Maps Android API v2, we can add maps based on Google Maps data to the application. The API automatically handles access to Google Maps servers, data downloading, map display, and response to map gestures.

5.3 Overview of the achieved work

In this section we will present the achieved work through some screenshots of the application, starting with the Welcome view :

FIGURE 5.1 – Welcome view

This interface appears once the application is launched.This dynamic view contains 4 circular buttons for passing to notes view , calling help and about the app and about us.
The previous interface contains also the cam navigation button , on the foot of the view , which will lead the user to the second important interface like a view pager that contains three fragment CALENDAR , MAPS and CAMERA .

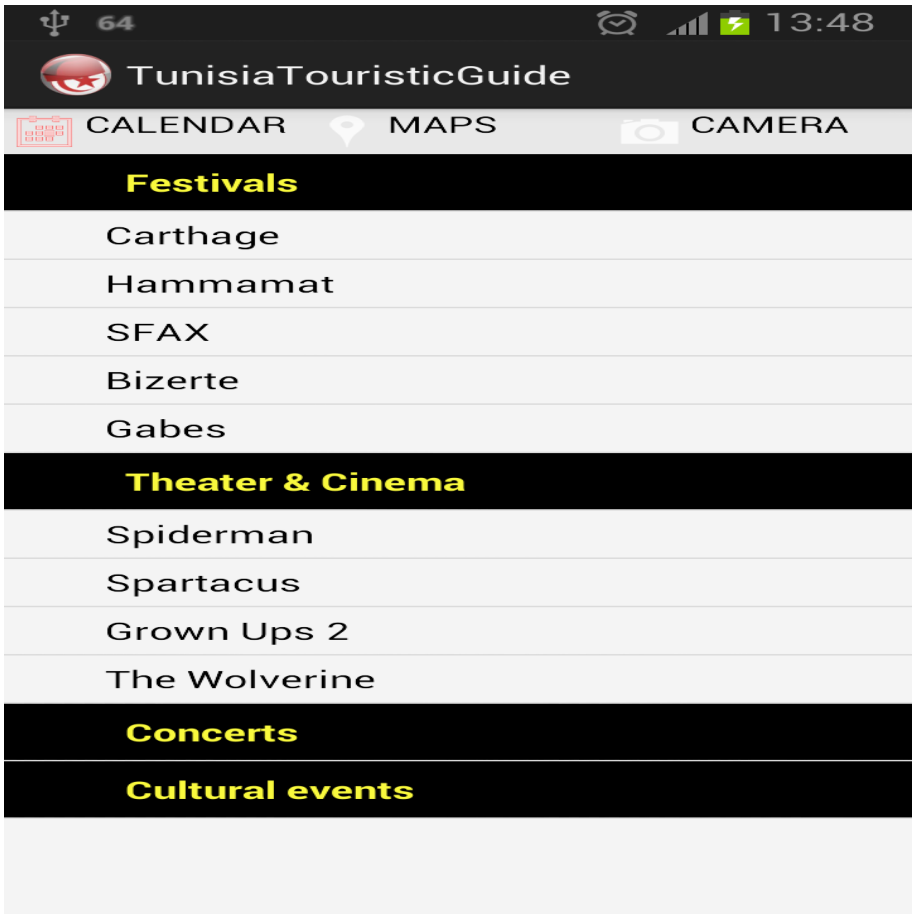


FIGURE 5.2 – Live calendar view

The first interface is the live calendar composed of an expandable list view containing 4 theme for Festivals , Theater&Cinema , Concerts and cultural events and once chosen the user will be offered to select an item and to be redirected to the appropriate site web .
When the user scroll the screen to the left , the second fragment will appear like attached to the first one .

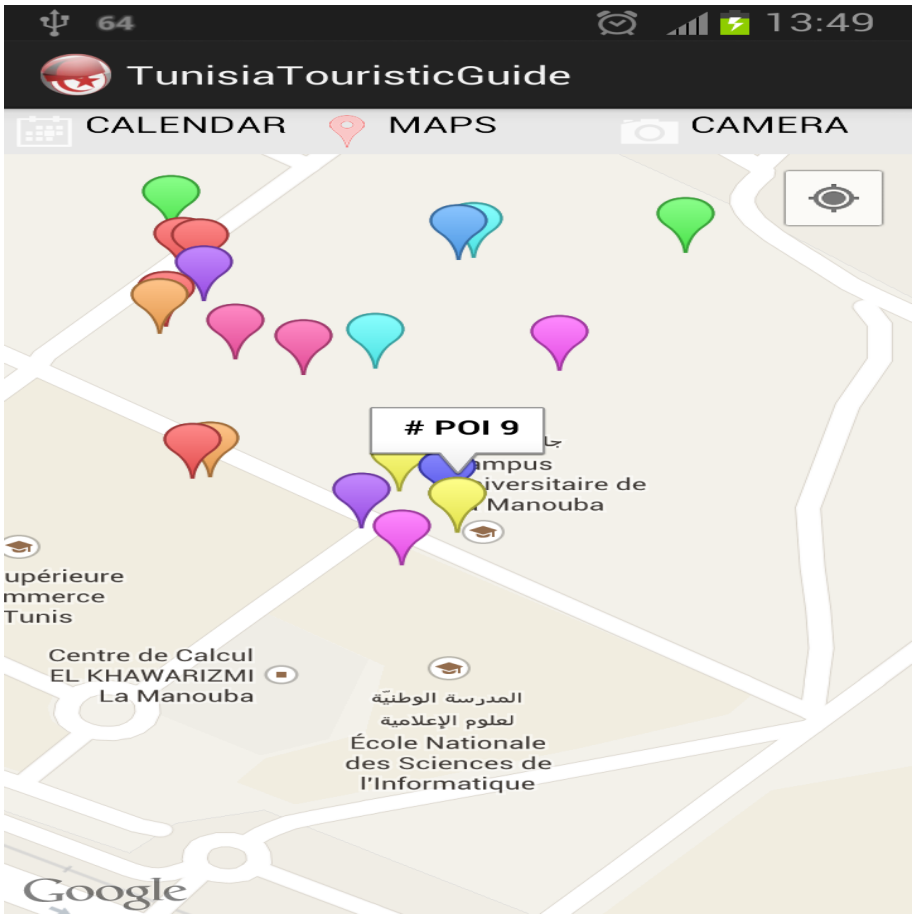


FIGURE 5.3 – maps view with selected POI

After choosing to change the view , the user will be able to visualize on the map his current position together with the different POI around him .

Clicking on one POI will plot the marker over the map indicating its name .

Now coming the most important part of our project which is augmented reality .

By choosing the next fragment the user will be asked to open his GPS and wifi for internet connection like is showed in the next interface of our application .

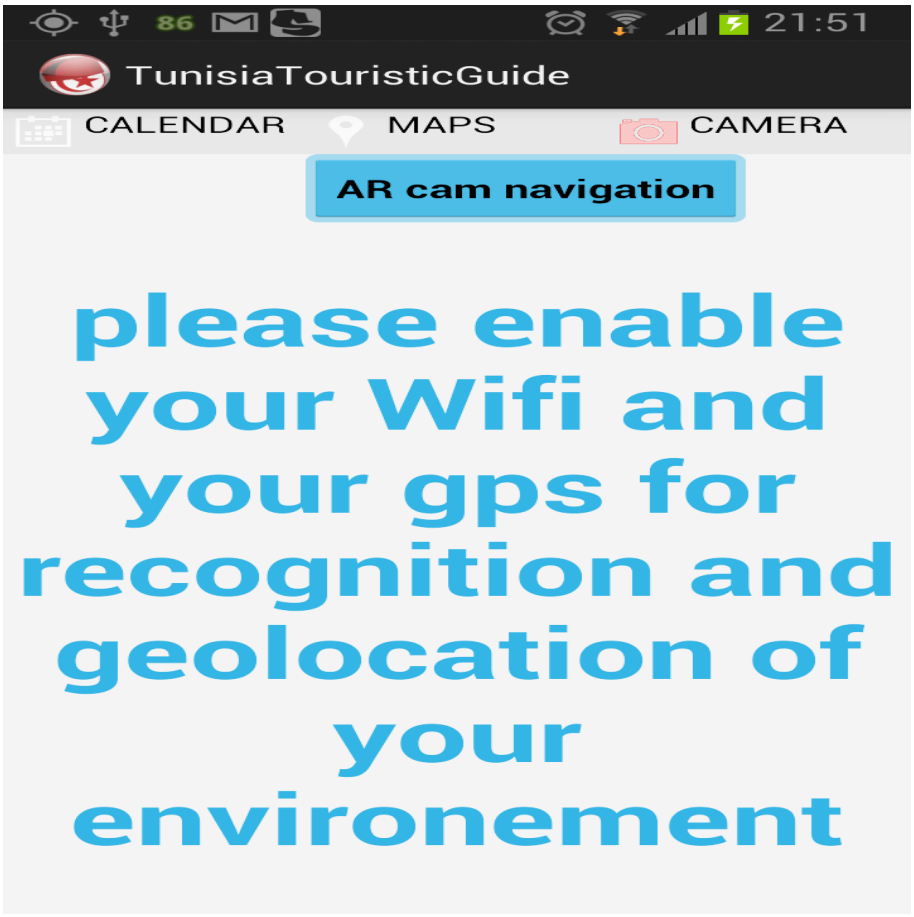


FIGURE 5.4 – View for passing to AR

By clicking the button AR cam navigation the user will be asked to choose between four types of AR view .

Thus he is supposed to select either having all the POI in one view or simply displaying only hotels or restaurants or museum .

The appropriate interface to the scenario described above is presented in the figure 5.5 .

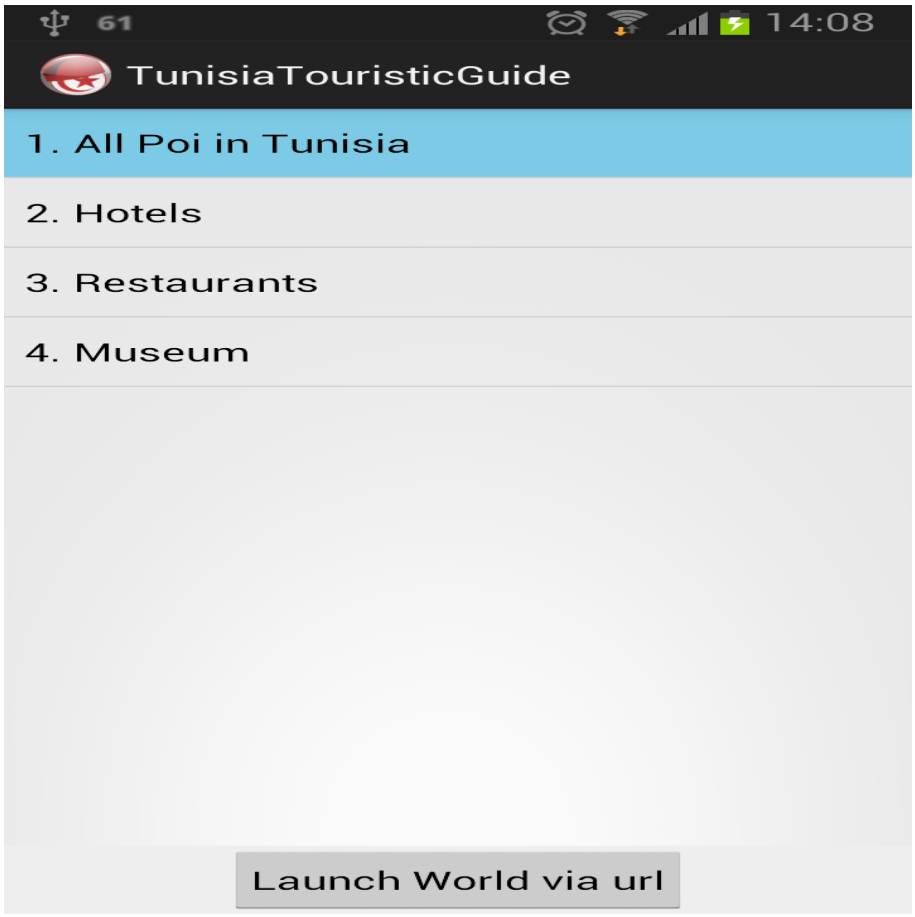


FIGURE 5.5 – Cam list choices view

When selecting All POI in Tunisia like is showed in the figure , the user will be filming in AR after uploading all the POI and displaying them on the screen.

For the button Launch world via url will lead the user to enter an Wikitude world discribing POI that he can add manually , this is a predefined function in wikitude describe our own world .

This is quite discernible in the next figure 5.6 where is added to the real view a radar showing AR points and also the slider for limiting the number of appearing markers of POI .

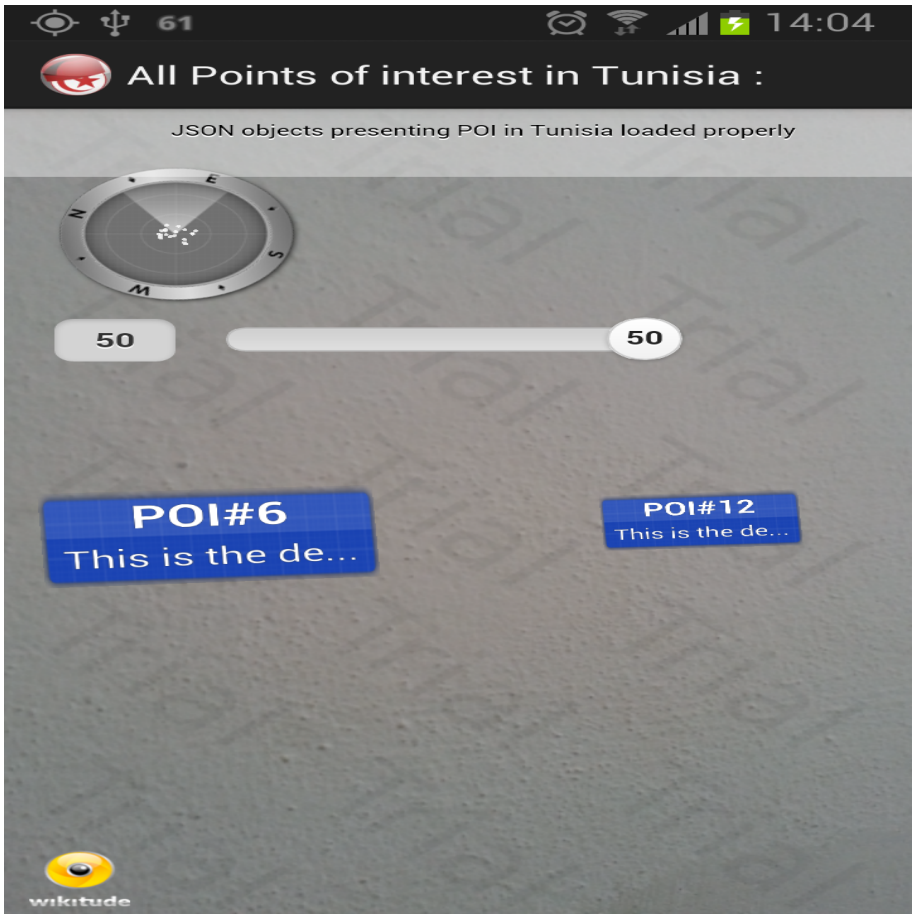


FIGURE 5.6 – All POI view in AR with radar and number counter

The previous figure shows fictiv points of interest like POI6 and POI12 are used to guide the tourist of what is important around him .

The added POI could be in the same concept be an event or a theme of interest that contains longitude , latitude and altitude and could be displayed in different manners like 3D object like in the example of museum.

So by selecting one POI , for example number 12 that we gonna to treat in the figure 5.7 , an arrow will appear to indicate to the user of the direction to the selected POI .

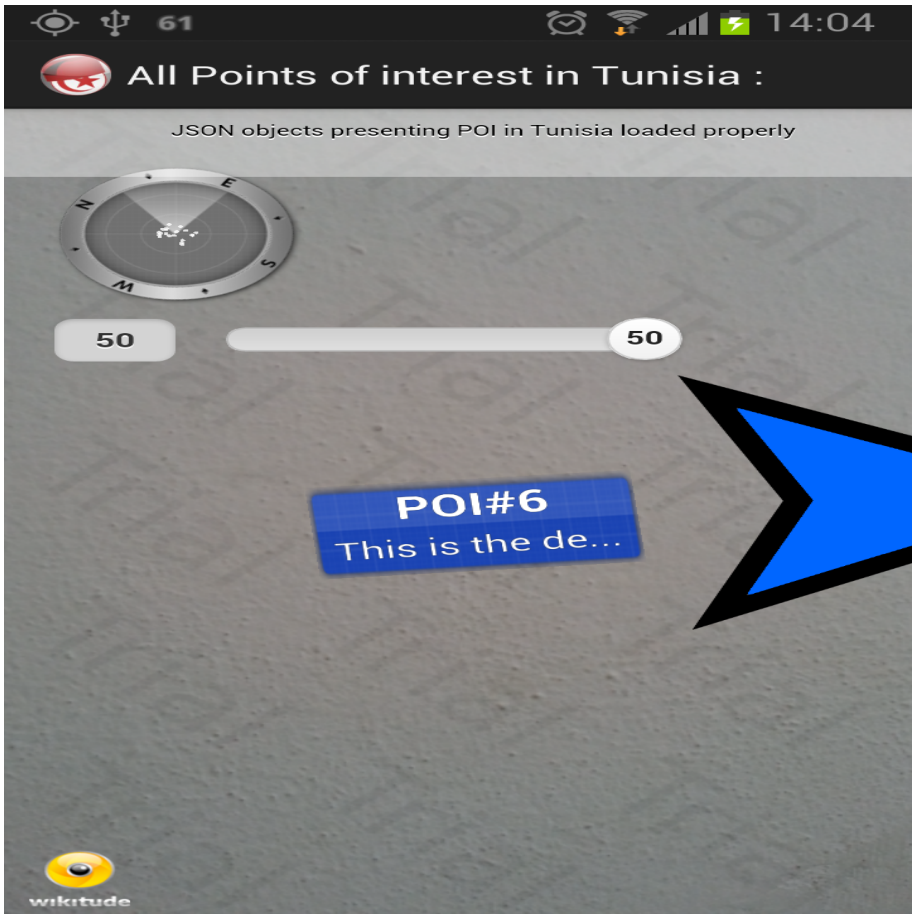


FIGURE 5.7 – AR view with selected POI

The selected POI in this case is number 12 so the blue arrow will always point to that one whenever the user switches over the direction of his phones.
While the user is getting closer to one POI , the marker , if not selected , will get bigger and bigger and will distribute over the entire screen .

FIGURE 5.8 – Selecting type of POI

For now the major function is to select whether restaurants or hotels as the only types of POI to be displayed in AR.

As the figure 5.8 shows we will treat the case that the user select restaurants from the list view but it is almost the same thing will happen if he chooses hotels with a little difference in the selected marker and the indication written on.

The two coming figures show the selected restaurant being marked with a different picture and the related description and characteristic for only that which is selected.

FIGURE 5.9 – The selected restaurant marker changed

It is quite clear that all the displayed POIs are only restaurant and that one who is selected is having a different marker that the others .
In addition to that the user will be guided throw the arrow like it is well described above until he will get to that selected POI.

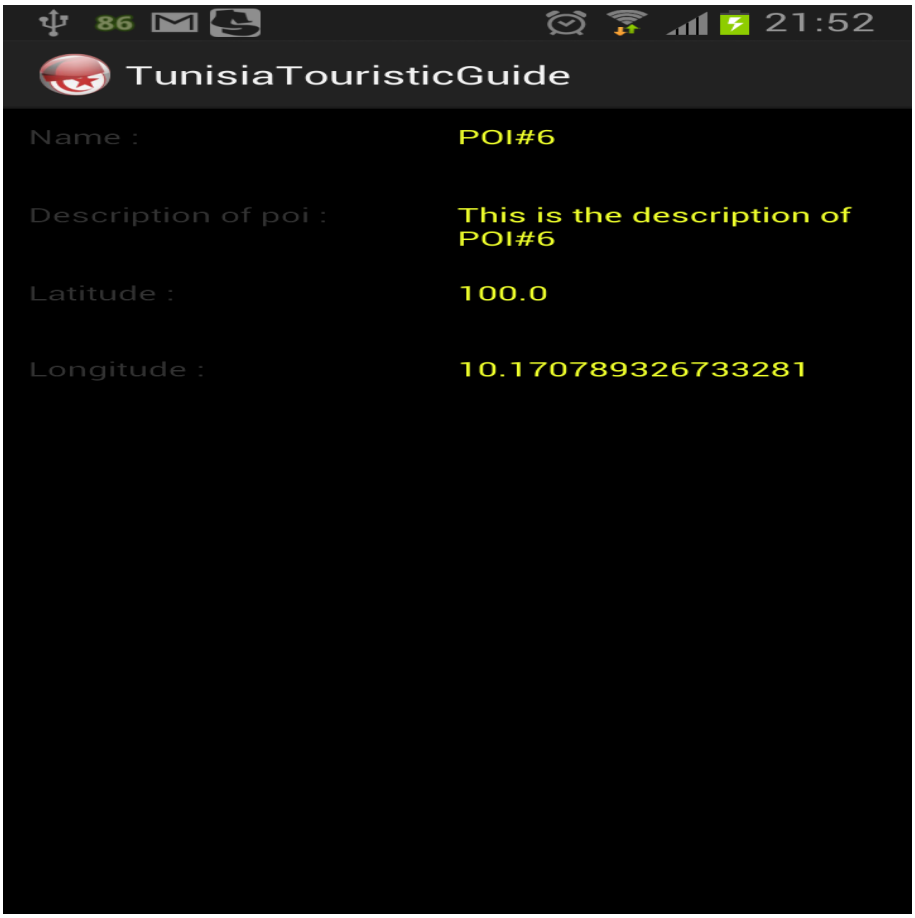


FIGURE 5.10 – Presenting selected POI's details

This is the part where the application shows all the details of the POI.
These details are not really advanced in our case because the lack of real data of POI in Tunisia but it can be developed and ameliorated using this work .

FIGURE 5.11 – 3D object

If the user chooses to display only Museum , as we mentioned above, we will present a 3d object to cover the reality view .

Conclusion

In this chapter, we presented the hole environment in which we created our application especially used languages and API. We subsequently presented the most significant interface of our application and explained its deployment in mode AR and the different actions happening on the screen.

CONCLUSION AND PROSPECTS

Although augmented reality sounds a lot like a wild futuristic concept, the technology has actually been around for quite some time now, and software developers have come up with all kinds of creative uses for it.As a result our application was developed around this concept and it was capable of interacting with a dynamic data from a server showing POIs around the user. TunisiaTouristicGuide could be improved with all the locations of interesting places around the country in addition to the principle events that will , or still happening while the tourist is having a tour .

Importance of Augmented reality technology in the future have been predicted through many researches. The current state of the technology does not allow to exploit the full potential of what is generally known as Augmented Reality. However, each step to-wards increasing the current computing power will bring the technology on step closer to accomplish its idealistic features. Also the competitiveness nature of the commercial use the technology is an additional ingredient to speed up its development stages.

Glossary of Acronyms

A

AR : Augmented reality.

API : Application programming interface, a particular set of rules 'code' and specifications that software programs can follow to communicate with each other.

D

DBS : Distance Based Scaling .

G

GBAR : Geo Based Augmented Reality is a particular concept of AR based on locations.

J

JSON : JavaScript Object Notation, is a lightweight text-based open standard designed for human-readable data interchange.

JS : Java Script is a dynamic prototype-based scripting language , used in the form of client-side in order to give enhanced user interfaces and dynamic websites.

JQuery : is a multi-browser (cf. cross-browser) JavaScript library designed to simplify the client-side scripting of HTML.

S

SDU : Scaled Distance Unit.

Netography

[N1] **:http :**//www.androidauthority.com/best-augmented-reality-android-apps-93950 // final consult July, 28th 2013.

[N2] **:http :**//www.developer.wikitude.com// final consult July, 30th 2013.

[N3] **:http :**//www.fr.slideshare.net/momonorway/the-future-is-agumented // final consult August, 6th 2013.

[N4] **:http :**//www.vogella.com/articles/AndroidGoogleMaps/article.html // final consult August, 8th 2013.

[N5] **:http :**//www.developer.wikitude.com/developer-forum // final consult August, 11th 2013.

[N6] **:http :**//www.jquery.com/// final consult August, 11th 2013.

[N7] **:http :**//www.tutos-android.com/parsing-json-jackson-android// final consult August, 15th 2013.

[N8] **:http :**//www.android-er.blogspot.com/2012/06/communication-between-fragments-in.html// final consult August, 15th 2013.

[N9] **:http :**//www.androidhive.info// final consult August, 15th 2013.

Bibliographie

[B1] Lester madden - Professional Augmented Reality Browsers for Smartphones : Programming for Junaio, Layar and Wikitude,2012 .

[B2] Hephaestus Books , Articles on Augmented Reality, Including : Artoolkit, Atomic Authoring Tool, Atomic Web Authoring Tool, Wikitude, Augmented Geotravel, Augmented Realit .

[B2] Greg Kipper ,Augmented Reality : An Emerging Technologies Guide to AR , 2012 .