

MOBILE GUIDE


By:

Iyad Jamal
(Mohammad Ali) Al-Hudhud

Supervised by:

Dr. Samer Arandi

OUTLINE

- ❑ Motivation
 - ❑ What is Mobile Guide application
 - ❑ Tools and technologies
 - ❑ System diagram
 - ❑ Web side
 - ❑ Mobile application module and its functionality
 - ❑ Augmented reality implantation
 - ❑ Demo
 - ❑ Future work
- 
- Several white lines of varying lengths and slopes are positioned on the right side of the slide, extending from the middle towards the bottom right corner.

MOTIVATION

Why we built this application ?

- People don't know too much about archaeological places in the city.
- The tourists cant reach and get historical information about those places without a guide.

MOBILE GUIDE APPLICATION

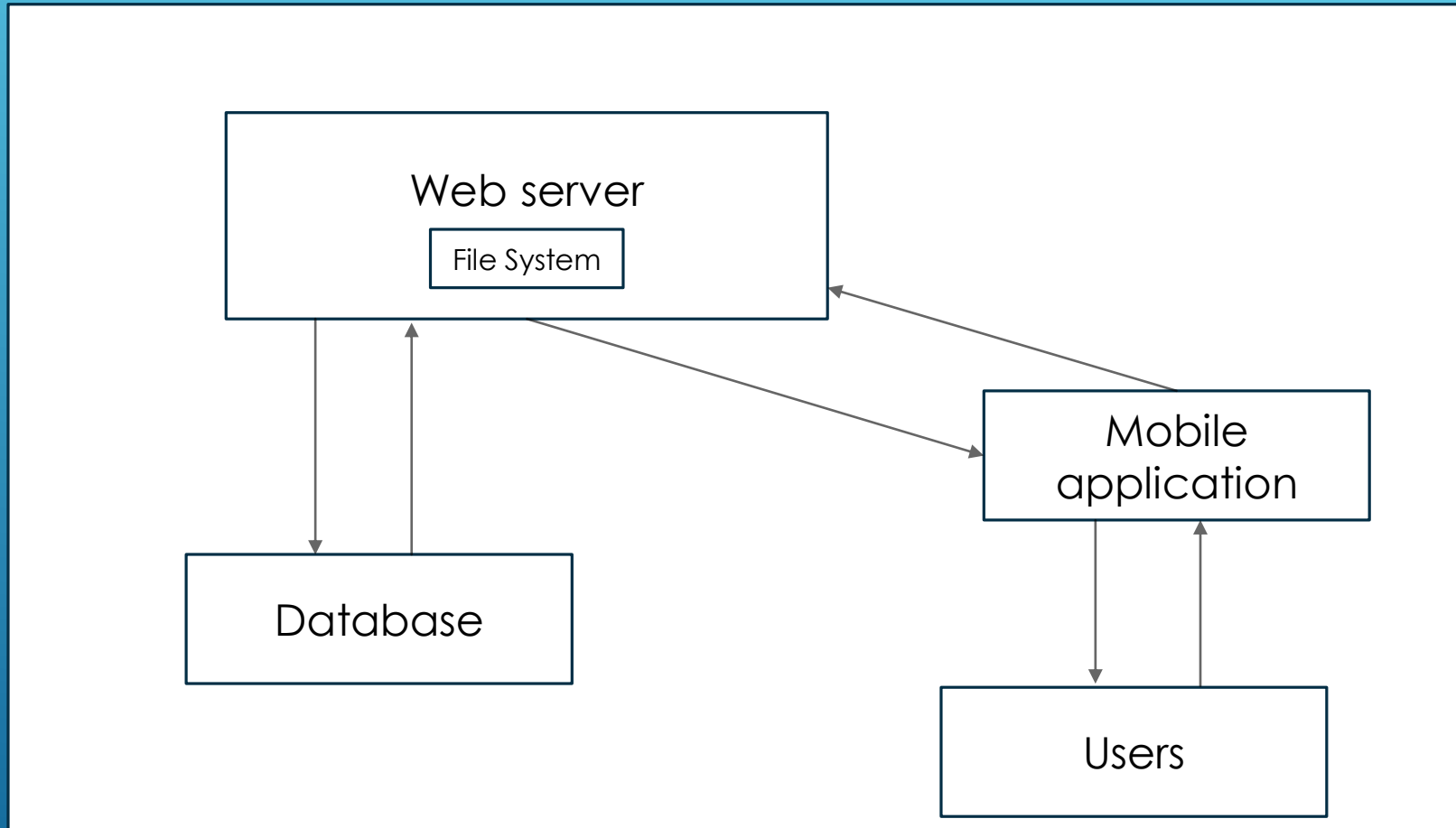
It's an application that allow user to:

- To access historical data about the places in the city that he wants to visit.
- Access an offline map to city.
- Using new Navigation system that provides augmented reality Technology.

TOOLS AND TECHNOLOGIES

- Cordova
 - Leaflet maps Library
 - Three.js
 - PHP
 - Maparative
 - MYSQL DATABASE
 - jQuery & JS.
 - HTML
 - BOOT STRAP
- 
- Several white lines of varying lengths and orientations are positioned in the bottom right corner of the slide, creating a modern, abstract graphic element.

SYSTEM DIAGRAM



WEB SIDE

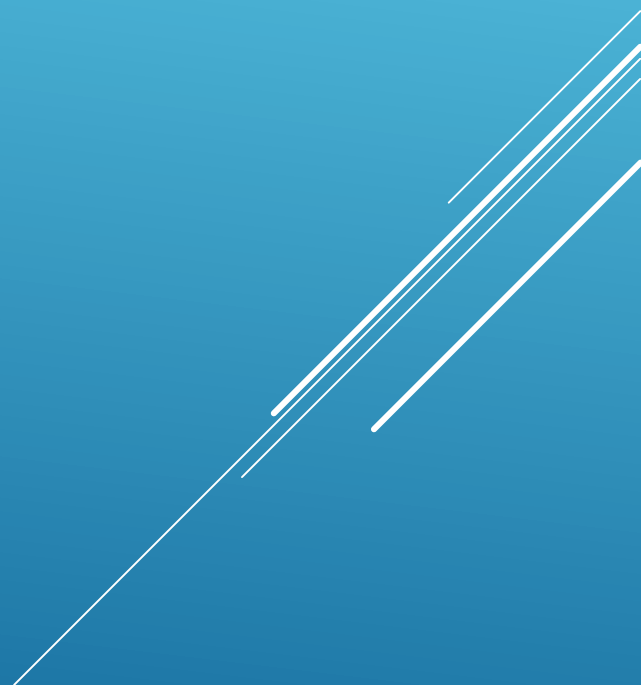
It contains :

- Web server module
- Database module

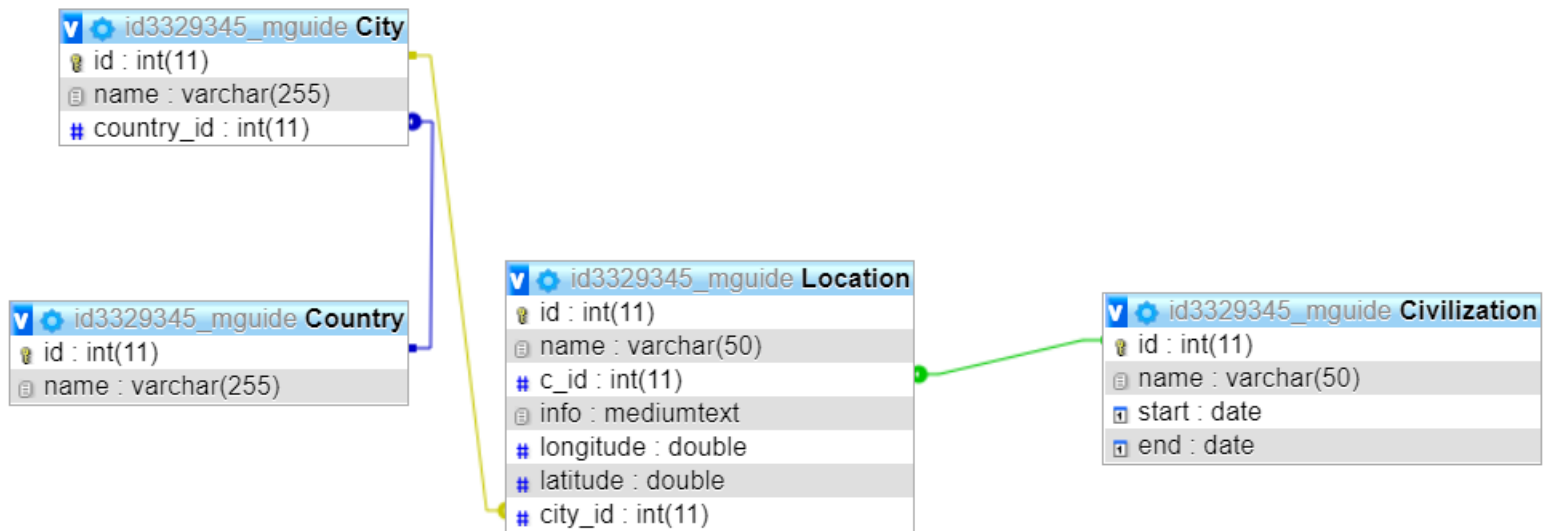
WEB SERVER MODULE

- It contains client view and admin view.
- It handel the update operation.

QUICK VIDEO FOR WEB



DATABASE MODULE

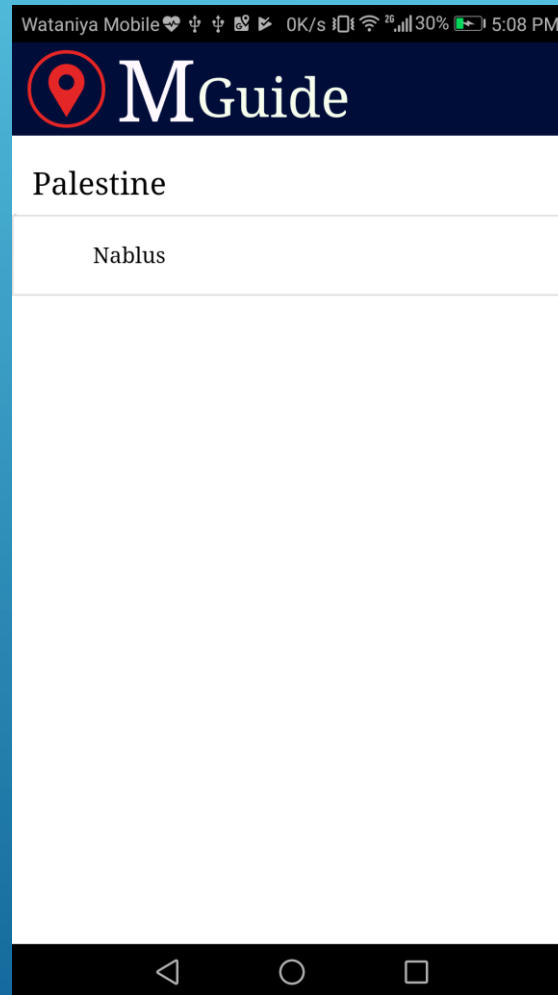


MOBILE APPLICATION MODULE

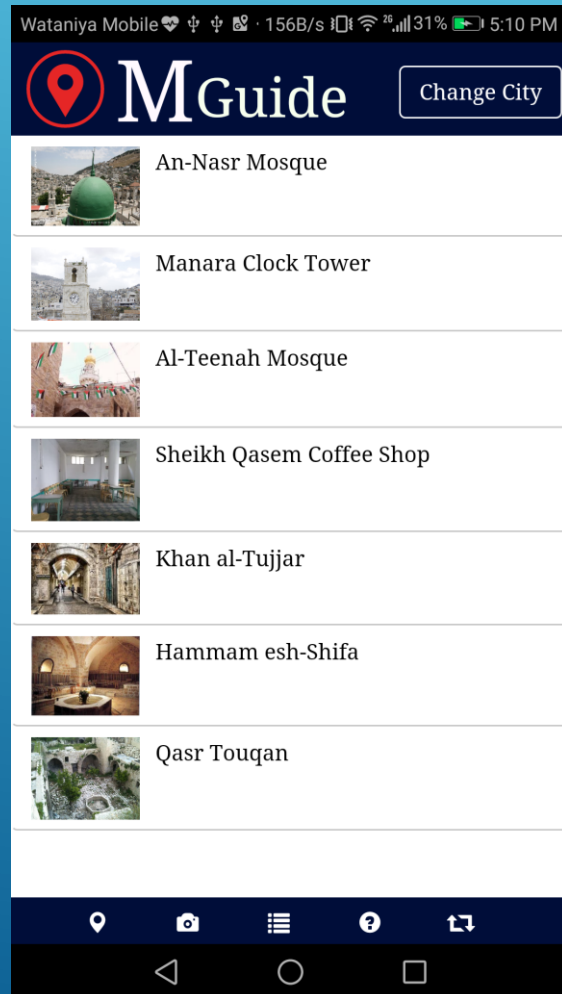
Functionality:

- list of cities.
- List of archeological places & information
- map of archeological places.
- AR Navigation & AR explore mode
- Update Content

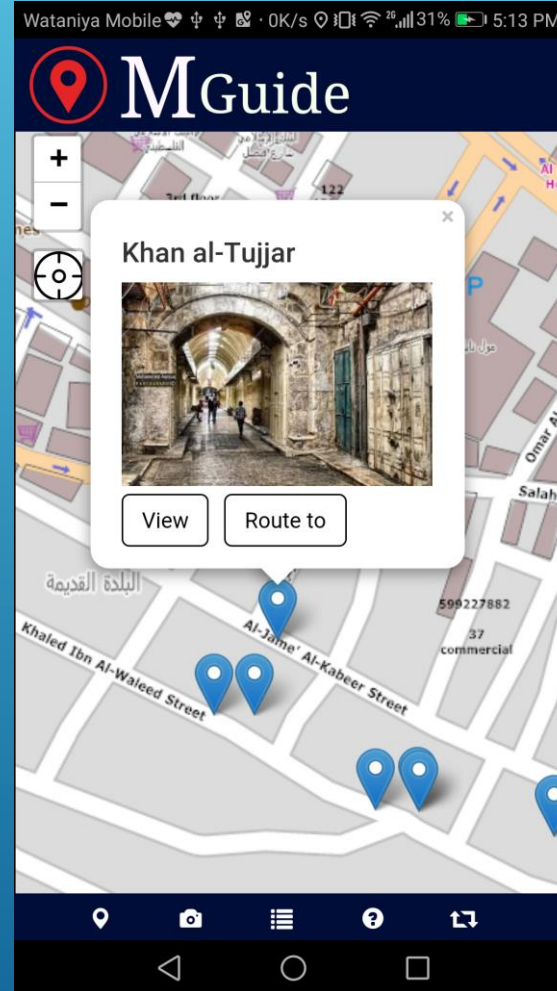
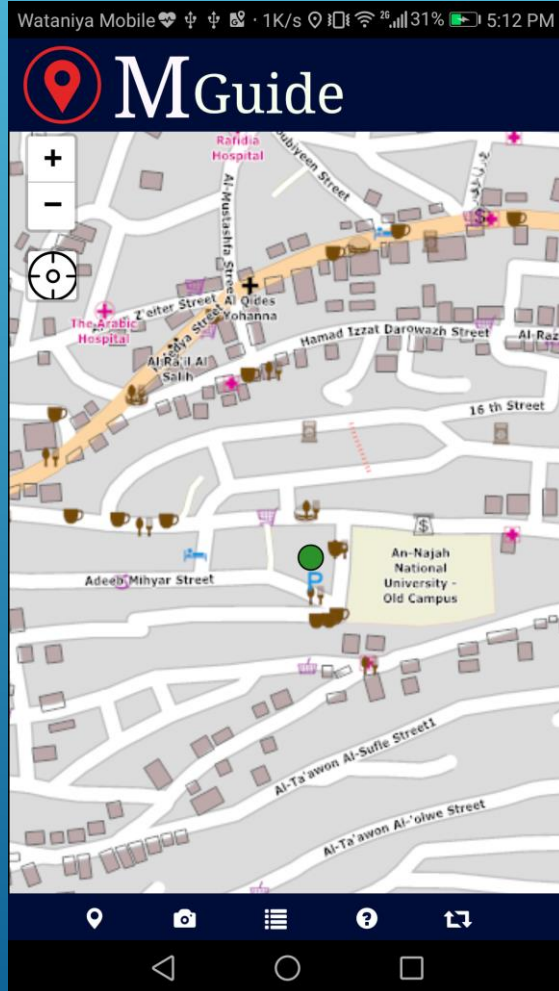
List of cities



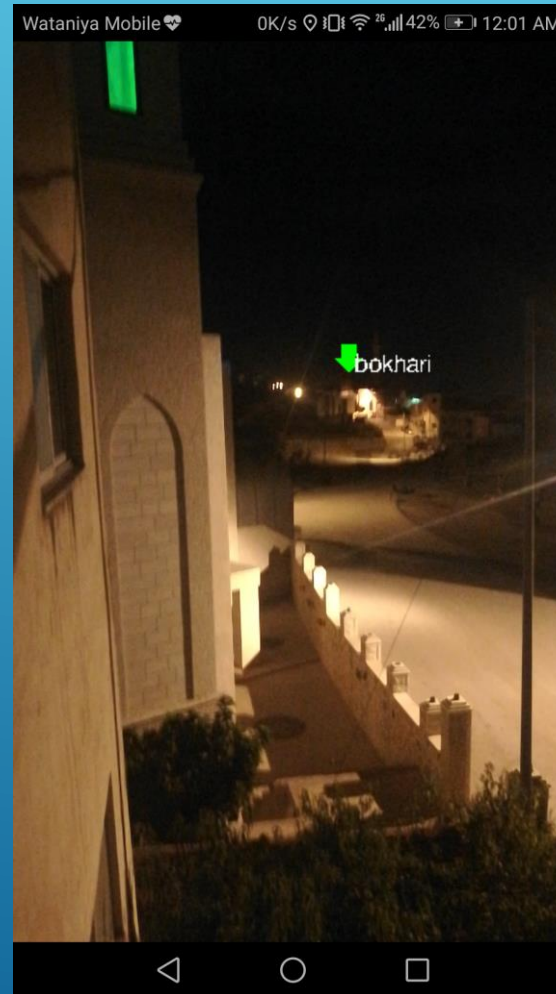
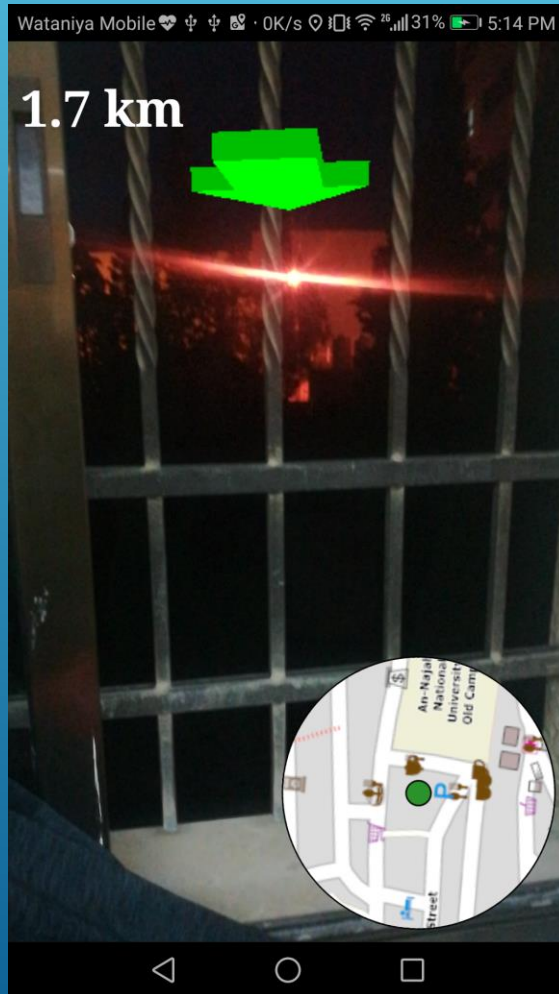
List of archeological places & information



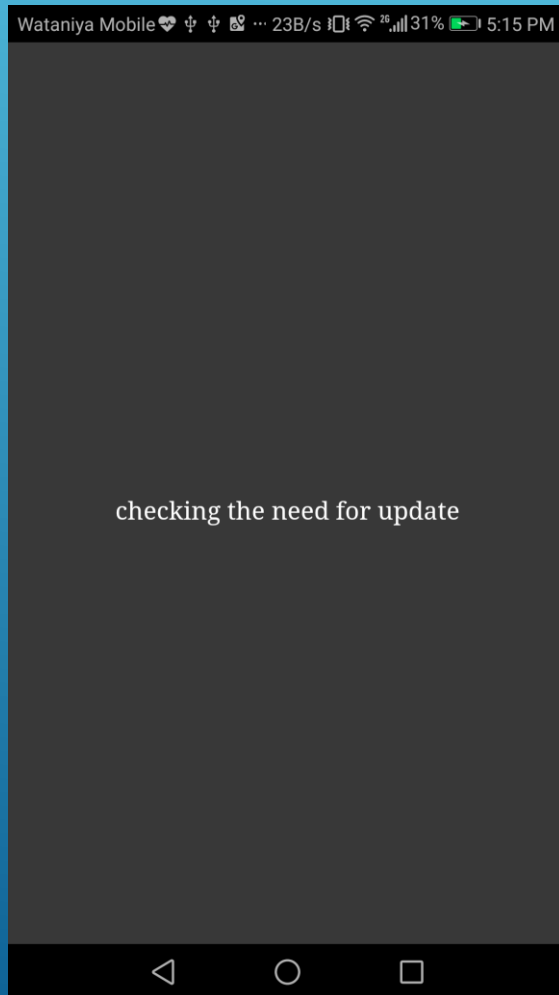
Provide map of archeological places



Provide AR Navigation & AR explore mode



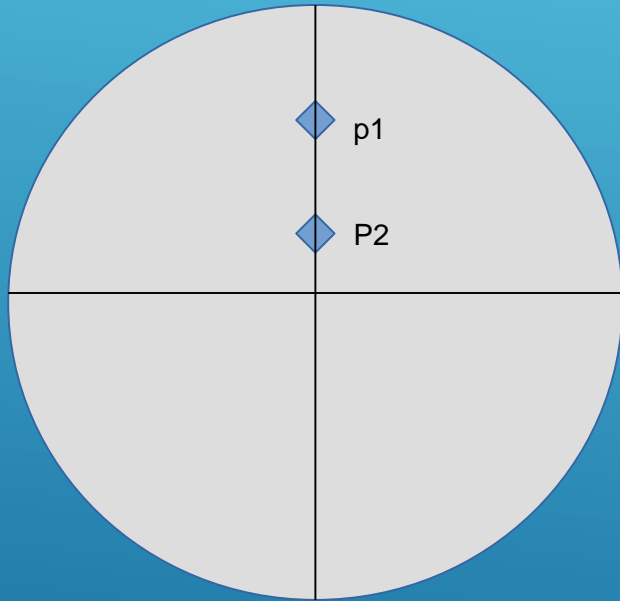
Updating content



AUGMENTED REALITY IMPLEMENTATION

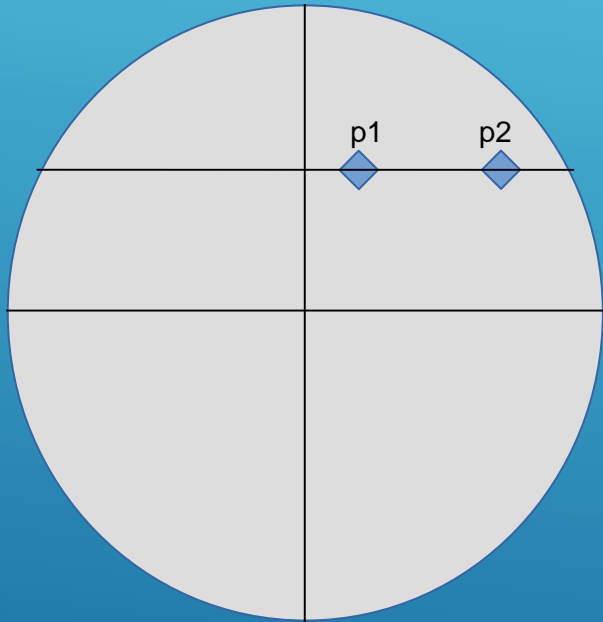
- We implement it using three.js
- We faced some difficulties to mirror the virtual world to real world and to solve this we used the following formulas:
 - Haversine formula.
 - Bearing angle equation.

HAVERSINE FORMULA GREATEST CIRCLE



$dlat = p1.lat - p2.lat$ $R = 6,371 \text{ Km}$
 $Distance = dlat * (2\pi R / 360^\circ) = dlat * (111.19)$

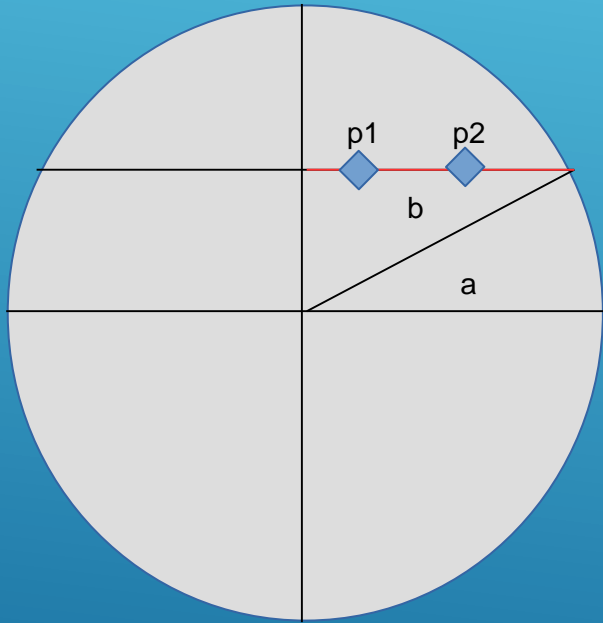
HAVERSINE FORMULA



Here it is not greatest circle so R will change we need to compute the new R.

P1 and p2 lay on 30° latitude.

HAVERSINE FORMULA



$$a = b = 30^\circ$$

$$\cos(30^\circ) = R' / R \Rightarrow R' = R \cos(30^\circ)$$

$$R' = 5,517.44$$

$$d\text{lng} = p1.\text{lng} - p2.\text{lng} \text{ Distance} = \\ d\text{lat} * (2\pi R' / 360^\circ) = d\text{lat} * (96.29)$$

HAVERSINE FORMULA

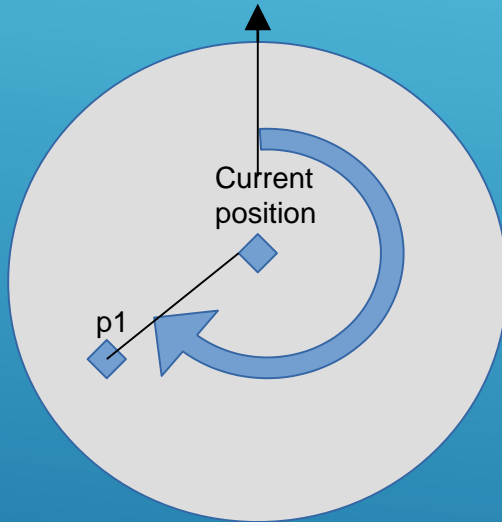
Final equation :

$$A = (\sin(dlat/2))^2 + (\sin(dlng/2))^2 * \cos(p1.lat) * \cos(p2.lat)$$

$$\text{Distance} = 2 * \text{asin}(\sqrt{A}) * R$$

$$R = 6,371 \text{ Km}$$

BEARING ANGLE EQUATION.



Equation to determine the angle from θ north.

Equation :

$$\theta = \text{atan2}(\sin \Delta\lambda \cos \phi_2, \cos \phi_1 \sin \phi_2 - \sin \phi_1 \cos \phi_2 \cos \Delta\lambda)$$

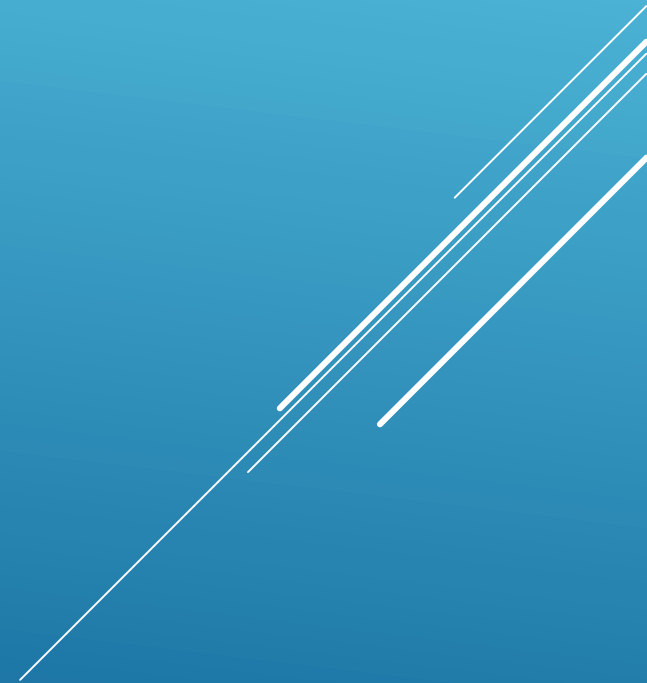
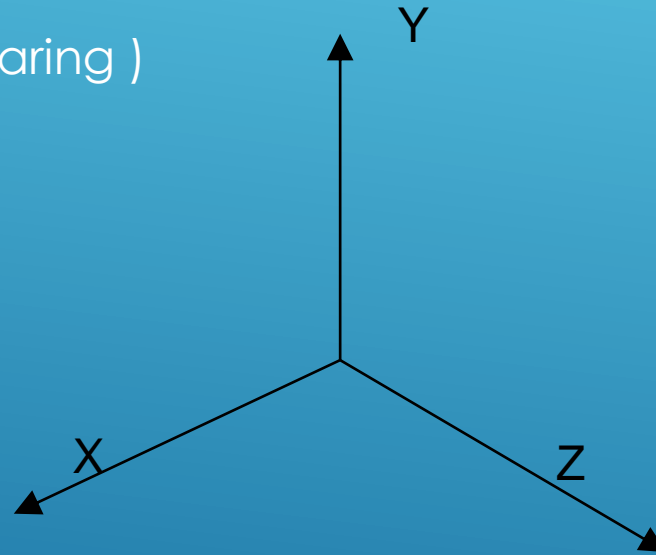
ϕ_1, λ_1 is the start point, ϕ_2, λ_2 the end point ($\Delta\lambda$ is the difference in longitude)

SET OBJECT IN THE VIRTUAL WORLD

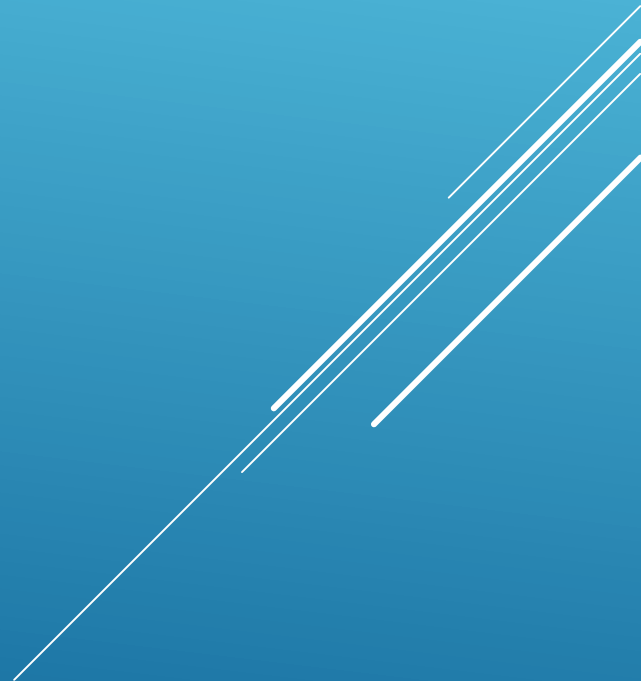
X coordinate = Distance * sin (bearing)

Z coordinate = Distance * cos (bearing)

Y coordinate not used.



DEMO TIME :D



LIMITATION & DIFFICULTIES



FUTURE WORK

- Provide 3d objects in explore mode
 - List of visited places
 - Provide accounts for users
 - Create lists of places
 - Group users that touring in same city
 - Group tracking.
- 
- Several white lines of varying lengths and orientations are positioned in the bottom right corner of the slide, creating a modern, abstract graphic element.

Thank you

Three parallel white lines of varying lengths are positioned in the bottom right corner of the image, slanted diagonally upwards from left to right.