MOBILE GUIDE

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OUTLINE

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- Tools and technologies
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- Augmented reality implantation
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MOTIVATION

Why we built this application?

- People don’t know too much about archaeological places in the city.
- The tourists can’t 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
WEB SIDE

It contains:

• Web server module
• Database module
WEB SERVER MODULE

- It contains client view and admin view.
- It handles 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

Palestine

Nablus
List of archeological places & information

- An-Nasr Mosque
- Manara Clock Tower
- Al-Teenah Mosque
- Sheikh Qasem Coffee Shop
- Khan al-Tujjar
- Hammam esh-Shifa
- Qasr Touqan

Sheikh Qasem Coffee Shop

Latitude: 32.218733
Longitude: 35.262344
Belong To: Ottoman Empire

Information

It is oldest coffee shop in Nablus that have 400 Square meters. The owner of the coffee shop did not change any thing in it or use new technology. So, it still have the same view same old stuff from 200 years ago.

Images
Provide map of archeological places
Provide AR Navigation & AR explore mode
Updating content

- Checking the need for update
- System already up to date
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 Km
Distance= dlat * (2\pi R / 360°) = 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
\[ \text{dLng} = p1.\text{lng} - p2.\text{lng} \]
Distance = \[ \text{dlat} \times \left( \frac{2\pi R'}{360^\circ} \right) = \text{dlat} \times (96.29) \]
HAVERSINE FORMULA

Final equation:

\[
A = \left( \left( \sin\left( \frac{d\text{lat}}{2} \right) \right)^2 \right) + \left( \left( \sin\left( \frac{d\text{lng}}{2} \right) \right)^2 \right) \times \cos(p1.\text{lat}) \times \cos(p2.\text{lat})
\]

Distance = 2 \times \arcsin(\sqrt{A}) \times R

R = 6,371 \text{ Km}
BEARING ANGLE EQUATION.

Equation to determine the angle from θ north.

Equation :

$$\theta = \text{atan2}( \sin \Delta \lambda \cos \varphi_2, \cos \varphi_1 \sin \varphi_2 - \sin \varphi_1 \cos \varphi_2 \cos \Delta \lambda ) \cdot \cdot \cdot$$

\(\varphi_1, \lambda_1\) is the start point, \(\varphi_2, \lambda_2\) 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.
Thank you