

# Travelex: Augmented Reality using Google GeoFences

*Mixed Reality Class*  
Professor: Marissa Diaz Pier

Adrian Garcia Betancurt  
Master in Computer Science  
Monterey Institute of Technology and Higher Education  
Guadalajara, Jalisco, Mexico  
Email: adriangarcia0920@gmail.com

Obed N Munoz  
Master in Computer Science  
Monterey Institute of Technology and Higher Education  
Guadalajara, Jalisco, Mexico  
Email: obed.n.munoz@gmail.com

**Abstract**—The tourism is a growing market and every company or local business involved on this are looking for attracting more and more tourists to their destinations.

This paper explains the use of Google Geofences for providing real-time notifications to tourists who holds a smartphone. The notifications provides information about the near places and some recommendations about the interesting places to visit. The Travelex mobile application is planned to improve the tourists' experience with the ability of knowing what are the most visited places and at the same time it will be providing a way for posting feedback and share with others.

## I. INTRODUCTION

With the enormous boom of powerful smart devices like smartphones, wearables and more recently the Google Glasses, the Augmented Reality (AR) is becoming the new trend topic in the world. This combination of virtual and physical world information has not been utilized at all in the Tourism field.

Augmented Reality (AR) is providing an extension of key visual and non-visual elements that are improving user experience in her/his interaction with the technology.

This paper explains how Google Geofences Java Framework can improve the user experience on touristic places. Google provides an innovative API that can provide

### A. AR trends

Augmented Reality solutions on this

### B. Related Projects

Talk about Prisma Project

gimbal

1) *Research*: - tourism in Guadalajara

- Tourism in Mexico Destinations

- Augmented Reality best practices

### C. Hardware Requirements

Nowadays that smartphones are being used by a 63.5% of the 4.55 billion of mobile phone users[1], it's a great opportunity to introduce mobile applications that take advantage of mobile technology like 3G/4G and GPS.

In order to run the Travelex application, it's necessary to have a smartphone with the following specs:

- Operative System: Android (15 to latest versions)
- GPS enabled
- Internet connectivity (WiFi or 3G/4G)

1) *Justification*: Given the current number of Android based smartphones (52.1%)[2], it's a good start point for this application to be released.

It's also easier to implement the Google Geofences on an Android phone because the code can more natively implemented.

### D. Programming Techniques

Android is an Operative System is mainly based in Java programming language. The Travelex application was fully developed on Java with the implementation of RESTful calls for the Google Geofencing API and some SQL queries for the database interaction.

Below are the required development tools and frameworks:

- Programming Language: Java
- Database: SQLite
- API: RESTful with Google Geofences
- Frameworks: Google Geofences, Android SDK
- IDE: Android Studio

1) *Justification*:

2) *Comparison*: - Comparison between Google Geofences/Gimbal

## II. OUR WORK

### A. Identifying places of Interest

Based on the top 10 touristic places in Mexico shown in the TripAdvisor website[3]:

- Playa del Carmen
- Puerto Vallarta
- Mexico City
- Cabo San Lucas
- Zihuatanejo
- Tulum
- Oaxaca
- San Miguel de Allende
- Puerto Escondido
- Acapulco

In order to provide the first proof of concept (POC), we started in our city; Guadalajara, which is also a touristic city.

### B. Google Geofences Implementation

A geofence defines a region of interest. For example, this may be a polygon outside of which a particular set of entities is not expected to stray. Geofences apply to particular collections.

Each geofence has a number of properties [4]:

- ID: An opaque string used to refer to the geofence in calls to various methods. The ID for a geofence is assigned by the API at creation time.
- Name: A user-defined string describing the geofence.
- Collection IDs: Zero or more IDs of collections to which the geofence applies.
- Polygon: A polygon specifying the geofence's region. Crumbs recorded for entities belonging to one of the geofence's collections that fall within this polygon make the geofence active. This is required.

For the Travelex first approach the work-flow consists in the following 4 steps:

- The application opens the SQLite database file where it obtains the pre-defined GeoFences
- GeoFences information is sent to Google Geofencing API through a RESTful API to be created and monitored
- A BroadcastReceiver service is started to receive transactions from Google API when it identifies when the user is near to a registered touristic place.
- The BroadcastReceiver service is started every time the phone is booted in order to let the Google API the phone's current location

## IMAGE Flow Chart

NOTE: In our first testing approach, geofences were pre-defined and loaded at installation time in the SQLite database file.

### C. Project Schedule

Gant Diagram

1) *Personnel Needs*: How many developers, testers (internals and externals) (national/internationals)

### D. Impact of the project

- Helping the tourists \* Economy perspective - Improving local business \* Government perspective - Generating more jobs

FODA diagram

## III. CONCLUSION

The conclusion goes here.

## IV. FUTURE WORK

- Adding more Places - Enabling Explore capability - Enabling Near Places capability - Adding feedback mechanism - Adding Visual Recognition - Enabling users uploaded places

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