MIDDLE EAST TECHNICAL UNIVERSTIY

DEPARTMENT OF COMPUTER ENGINEERING

SOFTWARE REQUIREMENT SPECIFICATION

prepared by

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for project SINCAP

METU - Department of Computer Engineering

CENG 491 Senior Design Project I

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1. Introduction

This document includes software requirement specification of SINCAP augmented reality mobile game. The team structure will be shown at below.

Team Structure

1. Tolga CAN - Project Advisor
2. Dilek ÖNAL - Project Manager
3. Mustafa Şenol COŞAR - Developer
4. Metin KAPI - Developer
5. Musa KARABULUT - Developer
6. Tahir ŞAHİN - Developer

1.1 Problem Definition

This is actually not a problem. This will be a augmented reality mobile game for android devices which is SINCAP. In this project, We aim to develop an application that uses real world data for playing games like scavenger hunt which is one of many different types of games which can have one or more players who try to find hidden articles, locations or places by using a series of clues. The project will be worldwide. We will keep the GPS coordinates of the locations where the game will take place. The player will be able to collect clues by moving throughout the game location in real life. When the player goes to a game location, he/she will receive a notification by the game and will try to find a clue by looking through phone's/tablet's camera. The game has also has multi-player aspect as players will be able to interact with each other if they are close by. They will be playing a trivia game and the winner gets a bonus while loser gets a penalty. The game may have different modes like RPG, time attack and PvP. In RPG mode, there may be monsters obstructing the roads and

players will need to beat them to open the roads or have to take a detour. In Time Attack mode, there will be no monsters, however players will try to get the best time. In PvP mode, players will be able to challenge their friends to a game where only that group is going to play that scenario.

1.2 System Overview

Project Sincap is an application for android devices. It uses many sensors in smartphones which are GPS, gyroscope, accelerometer and electronic compass. Sincap uses GPS to identify the user location. Electronic compass and accelerometer is used for identifying which direction the user is looking at. Gyroscope is used for getting more precise results. Since the project is an augmented reality game, camera is used for getting the real world data to be augmented.

1.3 Definitions, acronyms, and abbreviations

Terms	Definitions
SRS	Software Requirements Specification
Sincap	A mobile augmented reality game
AR	Augmented Reality

GPS	Global Positioning System
3D	3 Dimensional
METU	Middle East technical University
Open World Game, OWG	A game type that allows players to move and act freely, out of storyline in a game map.
Treasure Hunt	A game mode that gives players hints, riddles, puzzles and directs them to certain locations to complete a quest
RPG	Role Playing Game, where players assume the roles of characters that introduced to players
Time Attack	A game mode that requires players to complete a quest in a given time
GUI	Graphical User Interface
IDE	Integrated Development Environment
Android SDK	Software Development Kit which is officially released for Android
Android Studio	Official IDE designed for Android
UML	Unified Modeling Language
Use Case Diagram	Diagram of interactions of users with the system
Class Diagram	Diagram that describes the structure of a system by showing its classes, attributes of these classes and method

	of these classes and relations between classes

1.4 Assumptions and dependencies

Estimation(Basic Schedule)

We plan to finish this project by June 2016. We divided our schedule to two main parts according to school semesters. In the first semester we worked to create a responsive server and collecting data while researching for AR, geolocation, game design. We created object and database models for users, regions, games and others. In the second semester we plan to apply our research knowledge to construct the game.

We held weekly meetings with team members to discuss current situation of the project. We held separate weekly meetings with our assistant to report our progress. Also once in two weeks we held meetings with our supervisor to obtain solutions for our problems in the project.

2. Overall description

2.1 Product functions

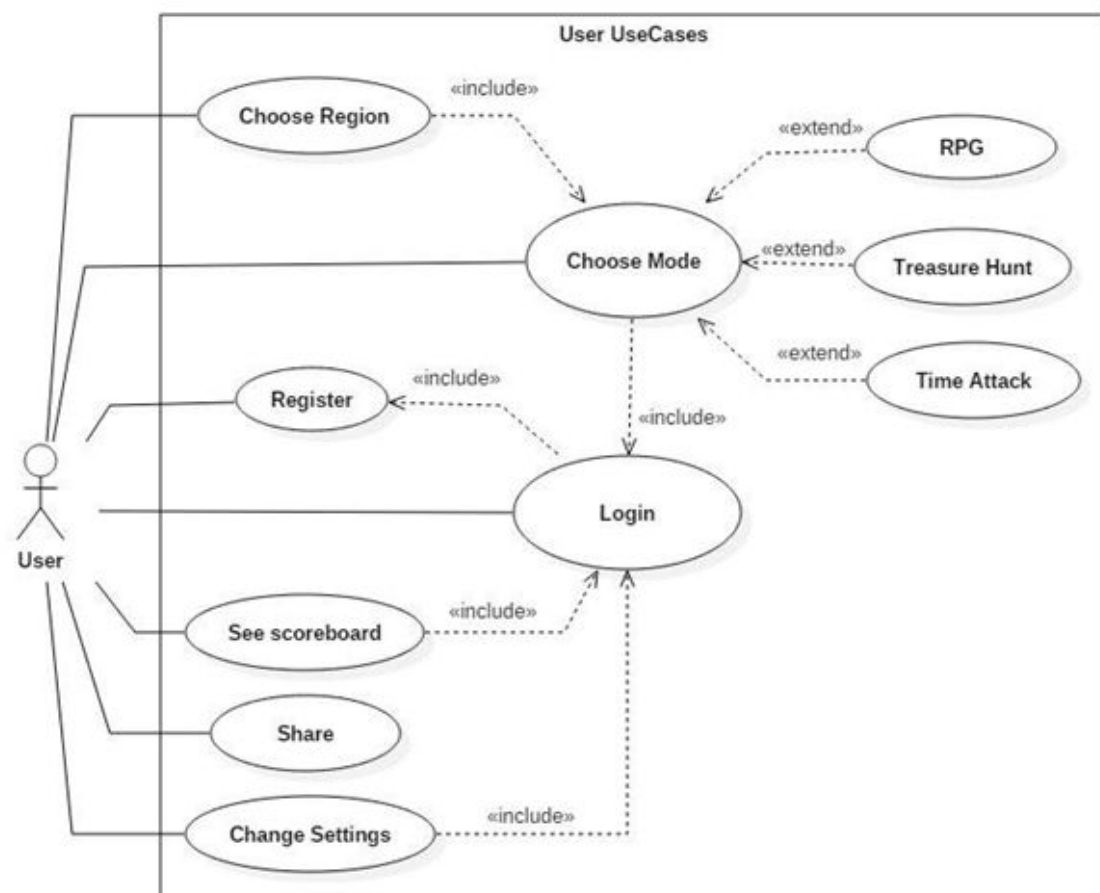### 2.1.1 Use case model survey

Figure 1. User Use Case Diagram

When actor is user;

- Register: User will be registered after this use operation..

- Login: User will be logged in the system after this operation.

- Choose Region: Region which game will be played in will be chosen after this operation.

- Choose Mode: Mode which game will be played in will be chosen after this operation.

- See Scoreboard: User can see the scoreboard for each region and mode.

- Share: User can share his/her achievement or game on social platform which he/she selects.

- Change Settings: User can change his/her application settings or account settings.
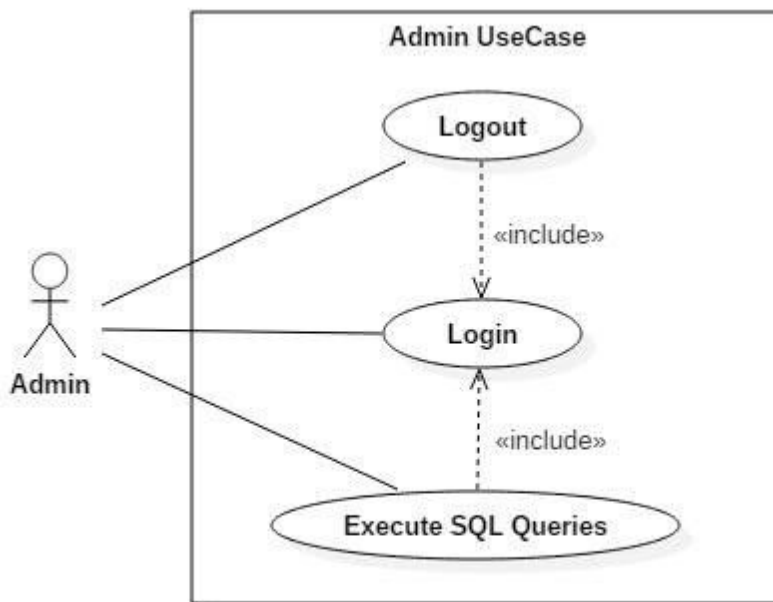

Figure 2. Admin Use Case Diagram

When actor is admin;

- Login: Admin can connect to server by doing this operation.

- Execute SQL Queries: For appropriate conditions, sql queries can be executed.

- Logout: Admin can disconnect from server after this use case.

2.1.2 Actor survey

We have two actors which are user and admin. Their use cases are mentioned above.

2.2 Interfaces

2.2.1 User Interfaces

Since the application will be an Android application that will run on smartphones, there will be a graphical user interface. The interaction with the application will be through touch screen. Additionally, changing position or direction of the device will also send an input to the application. The feedback will be through phone screen.

2.2.2 Hardware Interfaces

There are no hardware interfaces.

2.2.3 Software Interfaces

Software used in this project include a DBMS and server, Android operating system and an augmented reality library.

MySQL is used in the server as DBMS, however there is no direct communication with the DBMS. Server communication is performed by sending JSON objects to the server scripts and waiting for results.

The communication with the operating system is done through standard Android API.

The augmented reality library we will use is named DroidAR. However, it is not a final decision.

2.2.4 Communications Interfaces

The application will communicate with the server via HTTP protocol over internet.

2.3 Constraints

- Password should consist of at least six characters.

- E-mail address should be valid.

- Nickname should consist of at least two characters.

3. Specific Requirements

3.1 Functional Requirements

Functional requirements are listed below with use case scenarios.

Table 1) Register Use Case Scenario

Use Case Scenario	Register
Use Case ID	UC1
Included Use Cases	-
Primary Actor(s)	User
Description	User can register to use Sincap app.
Precondition	User should have e-mail account.
Trigger	User touches the "REGISTER" button.

Main Success Scenario	Step 1: User opens the register page. Step 2: User enters the required information. Step 3: System checks that information is valid. Step 4: System updates the database. Step 5: System directs to login page.
Alternative Scenario	In Step 2, if information is invalid, system warns the user about information.
Post Condition	User is registered in the system.

Table 2) Login Use Case Scenario

Use Case Scenario	Login
Use Case ID	UC2
Included Use Cases	UC1
Primary Actor(s)	User
Description	User can login to use Sincap app.
Precondition	User should be registered.
Trigger	User touches the "LOGIN" button.
Main Success Scenario	Step 1: User opens the login page. Step 2: User enters the e-mail and password.

	Step 3: System checks that information is valid.
	Step 4: User logs in to the system.
	Step 5: System directs to main page.
Alternative Scenario	In Step 2, if information is invalid, system warns the user about information.
Post Condition	User logged in to the system.

Table 3) Choose Region Use Case Scenario

Use Case Scenario	Choose Region
Use Case ID	UC3
Included Use Cases	UC2
Primary Actor(s)	User
Description	User can choose a region to play one of the game modes.
Precondition	User should have logged in to the Sincap.
Trigger	User touches the "CHOOSE REGION" button.
Main Success Scenario	Step 1: User selects a region where he/she wants to play. Step 2: System sends checkpoints to user's phone.

Alternative Scenario	-
Post Condition	User chose the region where he/she want to play.

Table 4) Choose Mode Use Case Scenario

Use Case Scenario	Choose Mode
Use Case ID	UC4
Included Use Cases	UC3
Primary Actor(s)	User
Description	User can choose a mode to play one of the game modes.
Precondition	User should have chosen a region to play.
Trigger	User touches the "CHOOSE MODE" button.
Main Success Scenario	Step 1: User select a mode which he/she wants to play. Step 2: System sends a game scenario to user's phone. .
Alternative Scenario	-
Post Condition	User chose a mode which he want to play..

Table 5) See Scoreboard Use Case Scenario

Use Case Scenario	See Scoreboard
Use Case ID	UC5
Included Use Cases	UC2
Primary Actor(s)	User
Description	If user wants to see the scoreboard he/she should touch the see scoreboard button
Precondition	User should have logged in to the Sincap.
Trigger	User touch the "SEE SCOREBOARD" button.
Main Success Scenario	Step 1: User touches "SEE SCOREBOARD" button. Step 2: System sends the scoreboard table to user's phone.
Alternative Scenario	-
Post Condition	User can see the scoreboard for each mode and region.

Table 6) Share Use Case Scenario

Use Case Scenario	Share
Use Case ID	UC6
Included Use Cases	UC2
Primary Actor(s)	User
Description	If user wants to share his/her achievement or game, he/she can share it on facebook, twitter etc.
Precondition	User should have logged in to the Sincap.
Trigger	User touch the "SHARE" button.
Main Success Scenario	Step 1: User touches "SHARE" button. Step 2: User selects the platform where he/she wants to share in. Step 3: Application redirects to selected platform with data.
Alternative Scenario	-
Post Condition	User shared his/her achievement or game.

Table 7) Change Settings Use Case Scenario

Use Case Scenario	Change Settings
Use Case ID	UC7
Included Use Cases	UC2
Primary Actor(s)	User
Description	User can change settings which he/she wants.
Precondition	User should have logged in to the Sincap.
Trigger	User touches the "SETTINGS" button.
Main Success Scenario	Step 1: User touches "SETTINGS" button. Step 2: User selects new settings. Step 3: System updates users settings.
Alternative Scenario	In Step 2, if user changes account settings, system requests password for confirmation. If the user enters wrong password, system redirects to settings page.
Post Condition	User changed his/her settings.

Table 8) Login Use Case Scenario (For Admin)

Use Case Scenario	Login
Use Case ID	UC7
Included Use Cases	-
Primary Actor(s)	Admin
Description	Admin should login to server.
Precondition	-
Trigger	Admin enters the server address.
Main Success Scenario	Step 1: Admin enters his/her username and password. Step 2: Admin panel is opened.
Alternative Scenario	In Step 1, if username or password or both is wrong, system gives a error.
Post Condition	Admin logged in to the system.

Table 9) Execute SQL Queries Use Case Scenario

Use Case Scenario	Execute SQL Queries
Use Case ID	UC8
Included Use Cases	UC7

Primary Actor(s)	Admin
Description	Admin can write sql queries and send it to server in order to execute it.
Precondition	Admin should log in to the server.
Trigger	Admin executes the appropriate function.
Main Success Scenario	Step 1: Admin sends sql queries to function. Step 2: System executes sql queries. Step 3: System updates the database tables.
Alternative Scenario	In Step 2, if query is wrong, system gives a error to admin.
Post Condition	Database tables are updated.

Table 10) Logout Use Case Scenario

Use Case Scenario	Logout
Use Case ID	UC9
Included Use Cases	UC7
Primary Actor(s)	Admin
Description	Admin logs out of the server.

Precondition	Admin should log in to the server.
Trigger	Admin writes the "exit" or "quit" command.
Main Success Scenario	Step 1: Admin writes the "exit" or "quit" command. Step 2: Admin disconnected from the server.
Alternative Scenario	-
Post Condition	Admin logged out of the server.

3.2 Non-Functional Requirements

3.2.1 Usability

- Thanks to user-friendly GUI, users get used to use application and learns to play game in a short time.
- Even if a user changes her/his mobile device, he/she can continue where game was left off, then start it up again at new device by entering her/his login email.

3.2.2 Reliability

- System should be up for 99% of the time excluding scheduled system maintenance.
- In case of a system crash, system can be brought up within four hours.

3.2.3 Performance

- The server should serve up to 1000 users per second.

- The server should respond in 5 seconds at maximum.

3.2.4 Supportability

- The application will run on any mobile device that has Android version 4.3 (jelly bean) and later versions.

3.2.5 Security

- The access permissions for system data can only be changed by the system's administrator.

- The communication between the system's data server and clients will be encrypted.

4. Data Model and Description

4.1 Data Objects

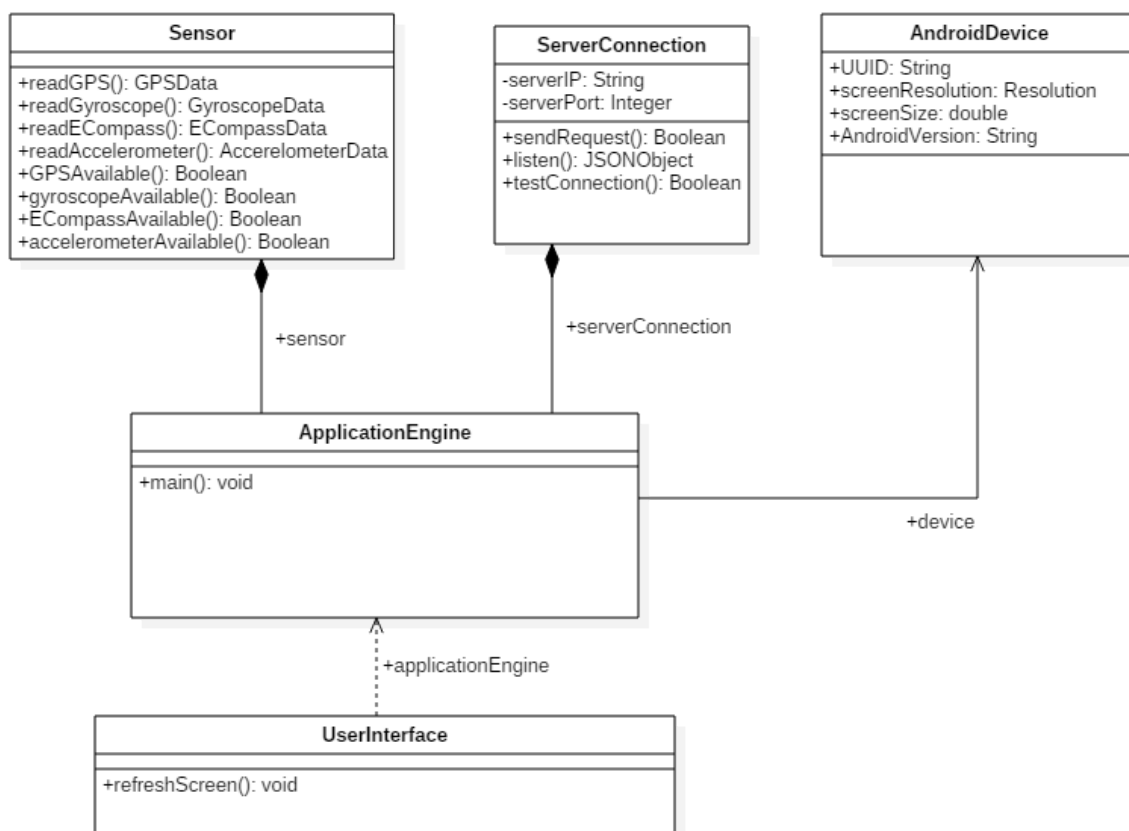Class diagram of system can be shown at below.

Figure 3. Class Diagram

4.2 Logical Database

In this section, logical view of database and ER diagram can be shown.

Data	Attributes	Use
User Data	- User Name - Email - Registration Date - Birthday - Registration ID - Is Admin - Unique User ID	This data is used to identify the record informations.
Login Data	- Login ID - User ID - Login Date	This data is used to store user login information on the client local storage. Whenever the user launches the application, it fetch from SQLite instead of making request to server.
Location Data	- Location ID - Location Name(s) - Location - Coordinate(s) - Description(s)	This data is used to identify the detailed locations of the facilities and the faculties on the main campus of METU or (somewhere).

Admin Data	• Admin ID	This data is used to enable someone(admin) to gain access to the system resources and is used to specify access authorizations too.
Game Mode Data	• Mode ID • Mode Name(s) • Level ID	The data includes levels related to the game mode .
Game Level Data	• ID • Mission ID	The data is used to identify scenarios of the game modes, each scenario has different missions to be completed.
Game Mission Data	• ID • Story(s) • Location(s)	This data is used to specify the missions that the users have to complete in each level as they progress in the game.
Message Data	• ID • Receiver • Sender • Message Content	The data is used to enable users to communicate each others.
User Statistics Data	• User ID • Score(s) • Last Login • Date(s)	This data is stored on the system server and the client storage and used to generate the user informations.

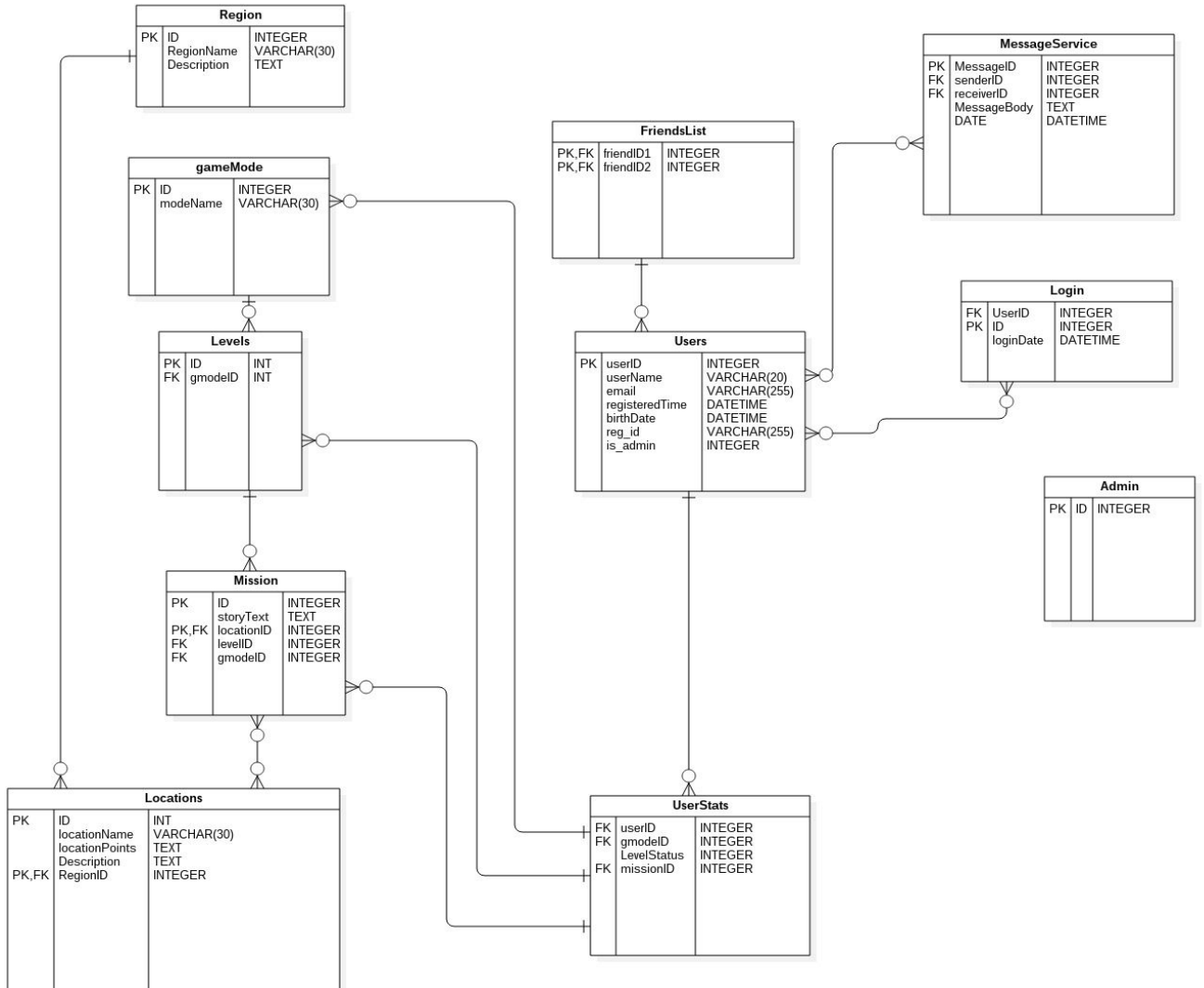|		This data is stored on the client local storage. It is used to enable users to add other users to the their friend list.
Friend List Data	• Friend(s) • Friend2(s)	

Figure 4. ER Diagram

5. References

- We did not refer to any other documents.