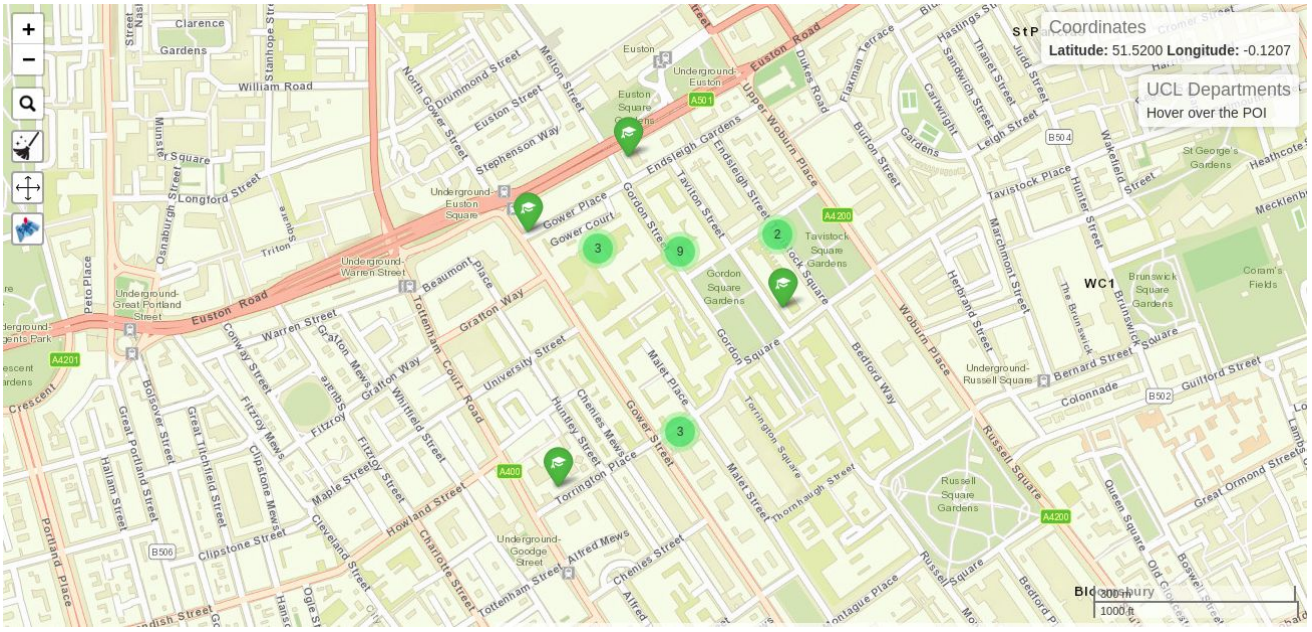

1. Introduction

1.1 What is UCL Question System app?

The **UCL Question System app** is a browsed-based web application that works in conjunction with the UCL Quiz app. The main operation of the application is data collection and the population of the back-end database that is used by the UCL Quiz app. In particular, it enables on user to record POIs in which information has been attached that is employed by the quiz app.

1.2 Which devices does the mobile app support?

The UCL Question System app can be used on any Android device that supports an android model above **2.3 (API Level 10) (Gingerbread)**, and is implemented based on the **Cordova Phonegap build**[1]. As a rule of thumb, Android versions become unsupported by Cordova as they dip below 5% of the Android users. A better intuition about the model's compatibility can be taken by the following Google's android device dashboard: https://developer.android.com/about/dashboards/

1.3 How it works?

The app automatically loads a POI (point of interest) dataset of UCL's buildings and zoom the map display on them. Double-clicking on the map display, a pop up window appears that prompts a user to store a POI at the location that he/she has chosen. Therefore, the user needs to fill a form and submit it. After that process, the selected point is stored in the dataset, and refreshing the website it can be seen that the dataset is now updated.

1.4 How much does the mobile app cost?

The app is available on any user.

2. How to install UCL Quiz mobile app?

The web app can be downloaded from this link (https://build.phonegap.com/apps/3145369/builds) using *two* different ways:

1) Download the **APK[2] (Android application Package)** file and transfer it to you mobile device using a *usb cable*. Before you start the installation, you need to check the *unknown sources*[3] options on your mobile, which can be found on the security settings tab (Fig. 1).

This needs to be done as the mobile app is an unknown source app for your mobile device, and the user's privileges are needed to accept the installation. Then, the UCL Quiz app can be normally installed on your device and an app icon is created on your home screen.

2) The application can be downloaded using a **QR app reader** (https://play.google.com/store/search?q=qr%20reader&hl=en_GB). Install one of the recommended QR apps, open it, and place the camera of your device over the QR code that is given for the UCL Quiz app. Then, download the app and install it. Similarly as step 1, the unknown sources option needs to be checked in order to permit the installation. After the installation, an app icon is created on your home screen.

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1. http://docs.phonegap.com/phonegap-build/overview/
2. APK : Android Package (APK) is the package file format used by the Android operating system for distribution and installation of mobile apps and middleware.
3. In most mobile devices the unknown sources options can be found on the Settings > Security tab. The path may differ for different mobile devices.

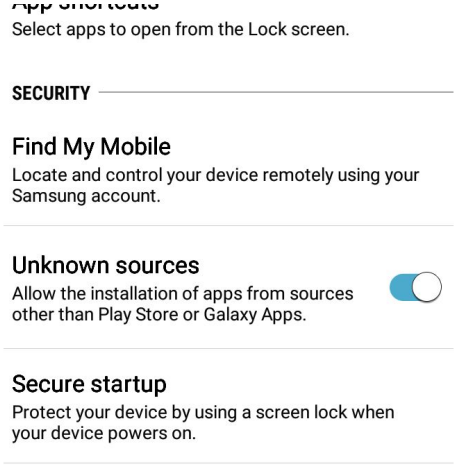

Fig 1. The unknown sources option needs to be enabled so that the mobile app could be normally installed.

3. Mobile App Features

Besides the main purpose of the mobile app to collect data for the UCL Quiz application, a variety of map-based commands are accessible from the user that assist him/her to have better experience using the application.

3.1 Map-based Options

The app is also equipped with more commands that operate over the UCL POI dataset. These commands are described below:

Search Command 

A building might be searched based on its **name** using this command. A marker is used to represent the building that is found.

Clean Command 

Markers that may remain from a search process or the geolocation are cleaned from the map.

Full Zoom Command 

The map zoom changes so that a full display of the data is given.

Geolocation Command 

Enables the geolocation of the user and marks his/her location on a map. The accuracy of the geolocation is shown with a buffer around the marked position of the user. Based on the user desire, the geolocation command can be activated or deactivated.

3.2 More Capabilities

When a user clicks on a POI, a pop up that contains information related to the clicked point is shown. The pop up contains information such as the **name,** the **question** that is asked for that point, its **correct** answer, and its **geographical coordinates** [Fig 2 (A)].

Hovering over the map and the POI dataset, information related to their content is shown at the bottom-left corner of the map [Fig. 2 (B)]. This information is similar with what is given in the pop up window.

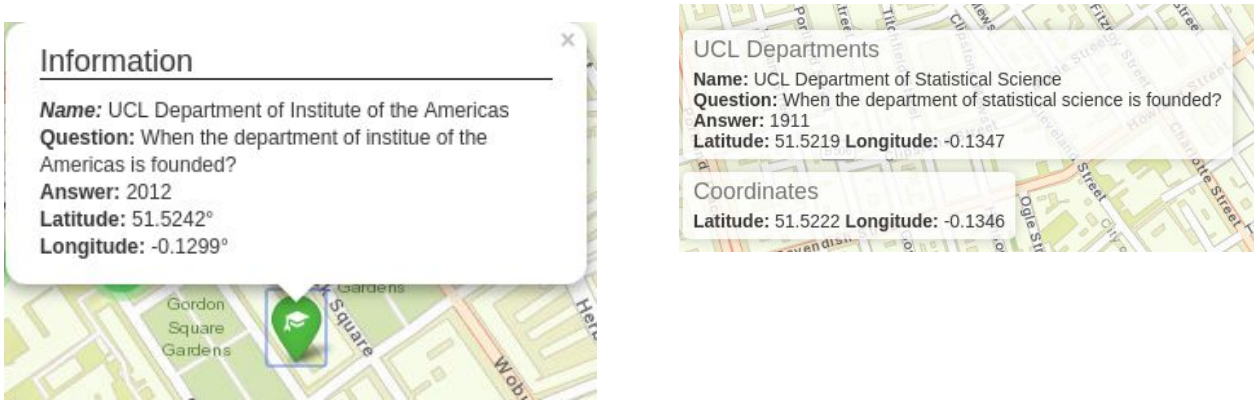

Fig. 2: (A) A pop up window that contains information related to the selected point is shown on the left image. (B) While a user hovers over the map and the buildings of UCL, related information is displayed on the bottom-left corner.

In order to make the map display more visually attractive, the buildings of UCL are concentrated in small clusters (Fig. 3). Each building that may fell within the buffer zone of a cluster, is added on that cluster and removed from the display. As a zoom level of the map changes, and the display reaches to its maximum zoom level, the cluster dissolves.

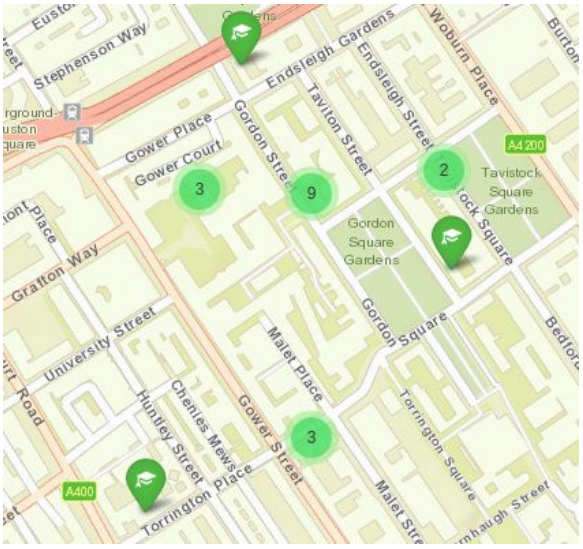

Fig. 3: The buildings of UCL are grouped, such as small clusters have replaced the appearance of the markers.

Lastly, the map is equipped with a scale bar (Fig. 4), which uses metre or foot as the measurement unit. The scale bar is often important when a user wants to estimate a distance from his/her location.

Fig. 4: The scale bar option that is provided by the UCL Question System App

4. Sources

https://github.com/Leaflet/Leaflet.markercluster
https://github.com/lvoogdt/Leaflet.awesome-markers
https://leafletjs.com/
https://github.com/stefanocudini/leaflet-search