COS 790
Project proposal

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Project details

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Project type: Mobile iOS/Android application
Application name: Crowd/Tidbits
Sensors used: GPS sensor

Project description

The widespread penetration of mobile devices, and internet access on these, has resulted in an influx of information availability in the form of digital media. In this aptly-named information age, people are often inundated with information both relevant and irrelevant, and sifting through this can become a tedious task for the everyday user. This has resulted in a need to receive concise information, when it is relevant. The aim of this project is to create a mobile application that will serve as a crowd-sourced information sharing platform, which will allow users to provide and receive information tidbits that are relevant to a specific location. The application will track a user's location, and provide snippets that were shared by other users when they approach the location at which these tidbits were shared. Examples could range from something interesting to do or see in the area to warnings of crime hotspots and suspicious activity. The user will thus receive concise messages about things that are relevant to them, when it is relevant.

Requirements

- User must be able to upload short message tidbits
- Messages should be posted anonymously to protect privacy
- Indicate the importance of the uploaded information (warning, point of interest etcetera)
- Allow users to mark information that is no longer viable
- Track the user's location, and present notifications based on that
- Users should be able to select the levels of information they want to receive, and the distance at which they want to be notified
- Display a navigable map with a pin for every post, that can be viewed at any time
- Make use of some Maps API to display the map
- Ideally, the application should run in the background, without user intervention
- Backend server with CMS for administration
- Authentication of users

The footprint of the application on the device should be as small as possible, so most of the required computations should take place on the backend server in order to decrease memory usage, CPU time and battery consumption. For security purposes, the server should also manage database communication and transmit the minimum required amount of data to the application.

High level architecture and system components

The application will be targeted at both the Android and iOS platforms, and will offload the majority of computationally expensive tasks to the server so as to remain as lightweight as possible. The backend server (a Java webapp hosted on some application container) will expose a REST API, which will facilitate communication between the application and the; this will take place in the background and should not involve the user. The server should also supply a CMS (Content Management Service), so as to enable manual administration such as the removal of offensive content and unruly users. Such a web front end will also shield the administrators from direct database manipulation, if and when such intervention becomes necessary.

A database will be required to store data such as user information, audit logs and post content. The application should never communicate directly with the database, so all data enquiries should be directed through the server which will determine what should be received by the application. Communication with the database will take place through the use of available entity management infrastructures.

The below image shows a high level diagram of the communication that takes place between the components of the system. A request/response framework is used.
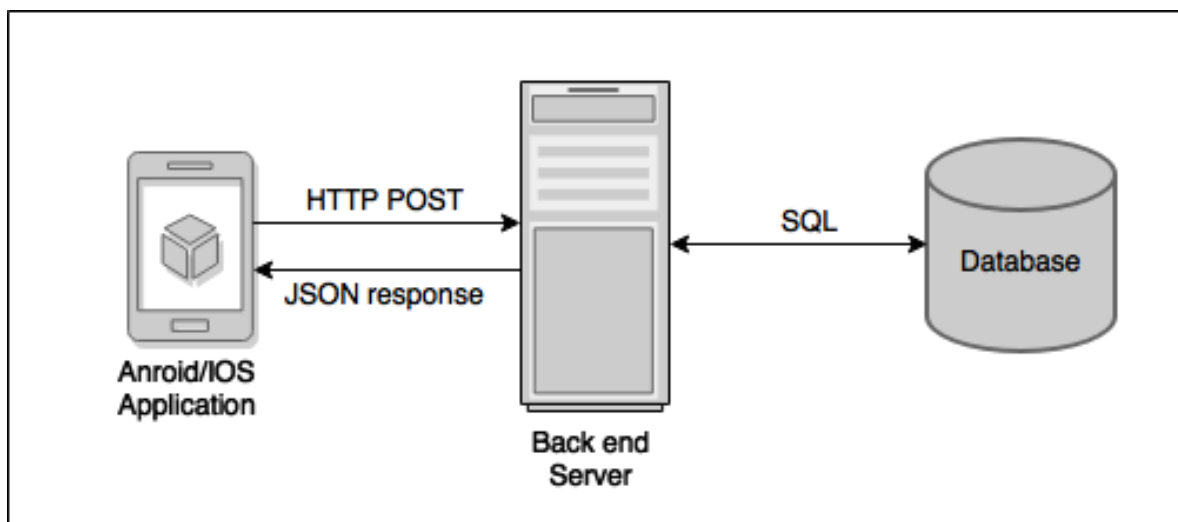
High level architectural overview

Challenges

Determining the duration that information should be viable and remain visible will need to be determined by the application, to avoid stale messages being displayed. How to determine this so that nothing important is removed, whilst maintaining sane levels of communication so as to not overwhelm the user.

Due to the crowd-sourced nature of the application, there will be no control over the information posted. Some form of automated moderation will be required, to limit inappropriate messages being displayed on the application. At the very least, censoring of common profanities should be implemented, along with a disclaimer that the vendor is not liable for the information posted.

Constantly using the GPS sensor of a mobile device requires a large amount of battery power, which will deter people from making use of the application. Using GPS sparingly where possible will alleviate this, however some research will have to go into how to optimally track a user without requiring constant location updates.

It is important to take the POPI act into consideration, and ensure that nothing that can be used to identify or trace an individual be stored in the database. If such data must be stored, it should be encrypted to ensure user privacy.

If information density becomes too high in some area, it will become difficult to display their pins on a map; especially given the limited screen real estate available on a mobile device. Some way of condensing or combining these will need to be found in order to declutter the map.