MOBILE APPLICATION FOR TRAFFIC CLOGS

A PROJECT REPORT

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BONAFIDE CERTIFICATE

This is to certify that the project report entitled "**Mobile Application for Traffic Clogs**" submitted by RAJASEKHAR. B (CB.EN.U4CSE15406), ESHWAR GOWTHAM RAJ. B (CB.EN.U4CSE15407), KARTIK SRIDHAR (CB.EN.U4CSE15416), SAI RAM KUMAR. P.M.V.N.M (CB.EN.U4CSE15435) and SAI KRISHNA. S (CB.EN.U4CSE15250) in partial fulfillment of the requirements for the award of the Degree **Bachelor of Technology in Computer Science and Engineering** is a bonafide record of the work carried out under our guidance and supervision at Department of Computer Science and Engineering, Amrita School of Engineering, Coimbatore

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INTERNAL EXAMINER EXTERNAL EXAMINER

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Abstract

We intend to create a mobile application that would display locations of potential traffic clogs to the user with the help of Google Maps. The GPS co-ordinates of users are collected on opening the application. This is processed and the distance covered by a user in a particular time interval is found and locations with potential traffic clogs are shown with markers.

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List of Abbreviations

EST Eastern Standard Time

JRE Java Runtime Engine

UTC Coordinated Universal Time

XML eXtensible Markup Language

Chapter 1

Introduction

1.1 Background

The most famous traffic updates and traffic conditions in a place are given by Google Traffic View. Google has developed its Traffic View in such a way that it gets the GPS co-ordinates of all the mobile phone users in a city from cell phone network providers periodically. It then checks the speed in which the co-ordinates move in a particular time. Upon getting the average speed of users in a road or a lane, it classifies if the road has mild traffic or heavy traffic. However, this Traffic View by Google is restricted only to the major cities and the major roads in them. GPS co-ordinates of users play a vital role in any kind of traffic update.

1.2 Problem Statement

We intend to create a mobile application that would display locations of potential traffic clogs to the user with the help of Google Maps. The GPS co-ordinates of users are collected on opening the application. This is processed and the distance covered by a user in a particular time interval is found and locations with potential traffic clogs are shown with markers.

1.3 Specific Objectives

In our project, our area of consideration is the city of Coimbatore. We create an Android application with the help of Google Maps. The latitude and longitude of users are stored every five seconds when the user opens the application. Filtering of the co-ordinates is done. The filtered data is processed to find the distance the user covers in three minutes and based on that, a marker shows the locations of potential traffic.

1.4 Findings

This project, if scaled to a bigger application, can provide the user information on traffic conditions in almost any city or place depending on the accuracy of the GPS co-ordinates in that location. Note that Google Maps provides the Traffic View only to the major roads (Figure 1.1) in major cities.

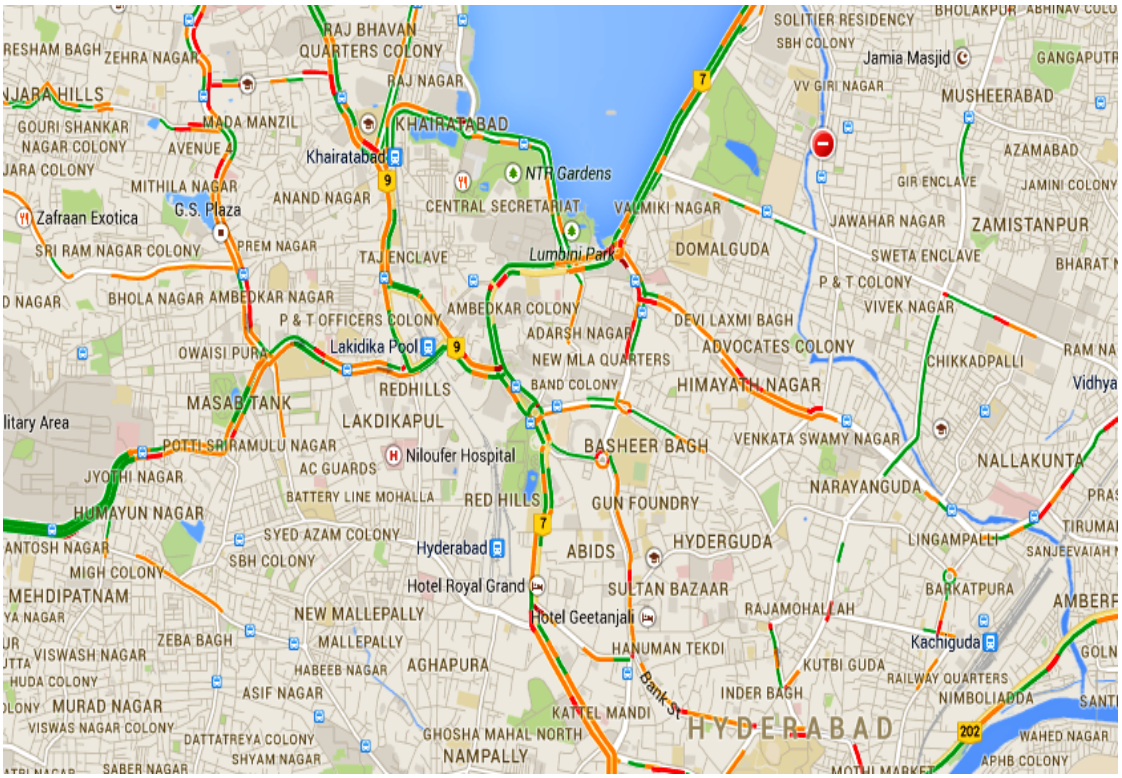

Figure 1.1: Google Traffic View

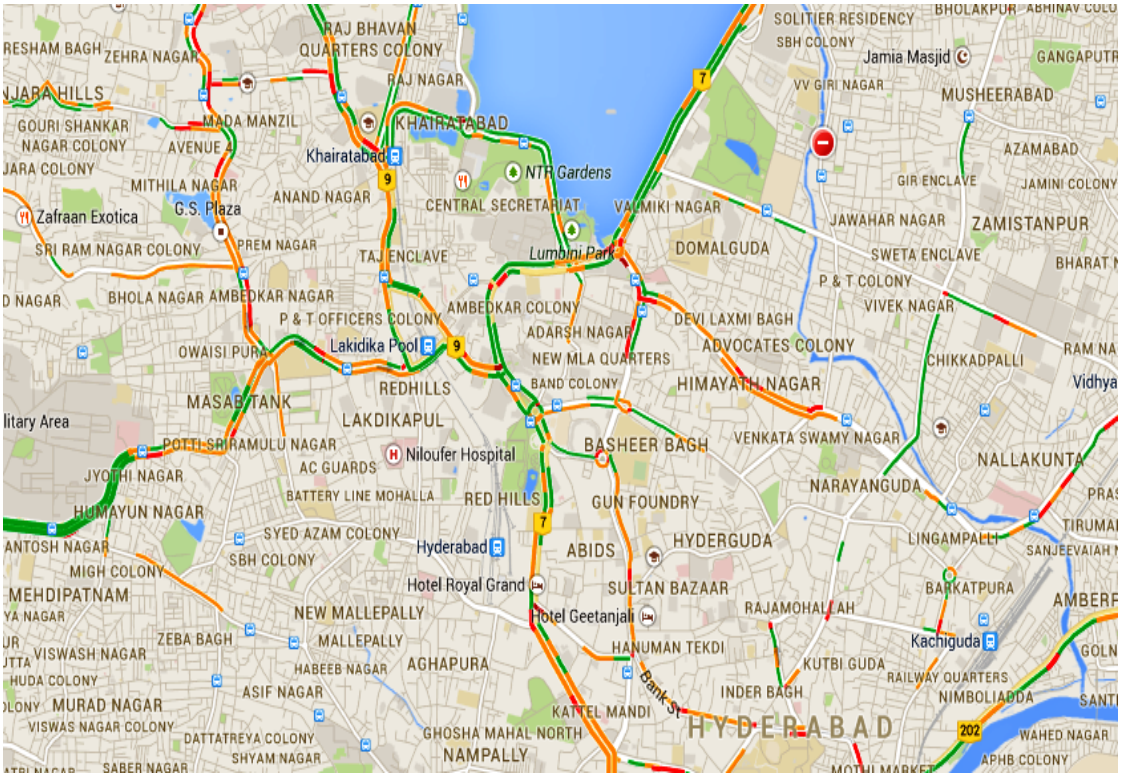

Figure 1.2: Google Traffic View

Table 1.1: Latitude and Longitude of Map Locations

MapLocation	Latitude	Longitude
A	37.944	121.47
B	37.924	120.178

Table 1.2: Latitude and Longitude of Map Locations

MapLocation	Latitude	Longitude
A	37.944	121.47
B	37.924	120.178
C	37.924	120.178

$$E = mc^2 \tag{1.1}$$

$$x = \frac{\alpha * \beta}{c * n} \tag{1.2}$$

Chapter 2

LiteratureSurvey

The following section provides a review of the literature related to the development of a mobile application that makes use of the GPS to provide locations of potential traffic clogs in the city of Coimbatore. The mobile application that is implemented in the Android platform makes use of GPS and Great Circle Algorithm to provide the locations. It is implemented by storing the locations of users, finding the distance travelled by them and providing the locations of potential traffic clogs.

The development was largely based on the methods discussed in Exploiting cellular networks for road traffic estimation: a survey and a research roadmap, by Danilo Valerio, Alessandro DAlconzo, Fabio Ricciato, Werner Wiedermann [1] which was submitted to the IEEE International Advance Computing Conference (IACC) during the year 2009. The authors provide a detailed research on the problem of using cellular network signalling for inferring real-time road traffic information for the implementation of a mobile application that will provide guidance to users on the road after taking into account the GPS co-ordinates. The application is specifically meant for the common man on the road to help him plan his route by getting to know the locations with potential traffic jams. The advantages and disadvantages of the usage of GPS data from cellular phones are discussed. The main research challenges that must be faced in designing and implementing an intelligent road traffic estimation system via third-generation cellular networks are identified. To provide

real time road traffic information to users, the current location alone will not be sufficient. GPS technology needs to be combined with other systems for collecting, processing, and distributing of road status data to the end users. Currently, data collection is done by road operators by using road sensors, cctvs, and emergency calls from road users. Data is then processed in traffic control centres and forwarded to third party entities for the final dissemination to the road users via FM radio or other communication means. This approach presents a cost hurdle: a complete coverage of the road network would not be possible without the employment of new infrastructure. Driven by the fact that each road user on a car is also a potential user of a cellular network, it is natural to consider mobile operators as an alternative source of road traffic information. A survey of existing approaches for inferring road traffic condition by using cellular network signalling is presented. Research works the main activities that have been conducted by industries and public institutions have been summarized. The existing approaches the main problems and limitations in the light [1] [2] [4]

Chapter 3

Proposed System

3.1 System Architecture

The architecture diagram of the Road Traffic Forecasting through Live GPS-feed is shown below. The main parts are cell phone devices and a server containing a database, a filter and a data processor. The functioning of each part is explained below.

The application, once opened, collects the GPS co-ordinates from every mobile phone. Each mobile phone is device. Every five seconds, the application records the GPS co-ordinates of users in a server. These co-ordinates are processed to find the distance covered by a single user in three minutes. This is done for every device using the Great Circle Algorithm and the areas with traffic clogs are shown with the help of location markers on the map in the device. The front end is an Android application that makes use of Google Maps to show locations of potential traffic snarls. These locations are shown as location markers. The working of the architecture is as follows.

1. The application is opened in the cell phone and the device starts to send its co-ordinates to the server.

2. The server receives the co-ordinates and keeps recording them in a database. Note that the latitude and longitude values are received every five seconds and are recorded.

3. Garbage co-ordinates can be received if the GPS of the mobile device is switched off. Note that receiving the same co-ordinate for a long time does not classify it as garbage. The received co-ordinates are filtered to remove these garbage co-ordinates.

4. The filtered data is then processed. The distance travelled by every mobile device in three minutes is calculated. This is done using the Great Circle Algorithm. If the distance covered is less than one hundred meters, then that location has a potential chance for a traffic jam.

5. the locations of potential traffic clogs are identified, they are sent as a response to the mobile device application which would display those locations with markers and warn the users.

3.2 System Specification

The proposed system requires a mobile phone with the following specifications.

- Android operating system (Jelly Bean or KitKat)
- 3.12 MB (maps integration) + a minimum of 700 KB of memory space in the cell phone
- Packet data facility (minimum of 30 kbps)
- Wi-Fi facility
- GPS facility

The following permissions are requested before installing the application in the mobile phone.

- Approximate location (network based)
- Precise location (GPS and network based)
- Read Google service configuration
- Full network access
- View network connections

3.3 Methodology

3.4 Implementation

Chapter 4

Results and Discussion

On opening the app, a map is displayed which shows the area with traffic clogs. With a sample data set around Coimbatore, the following results (Refer Figures 4.1 and 4.2) were achieved .

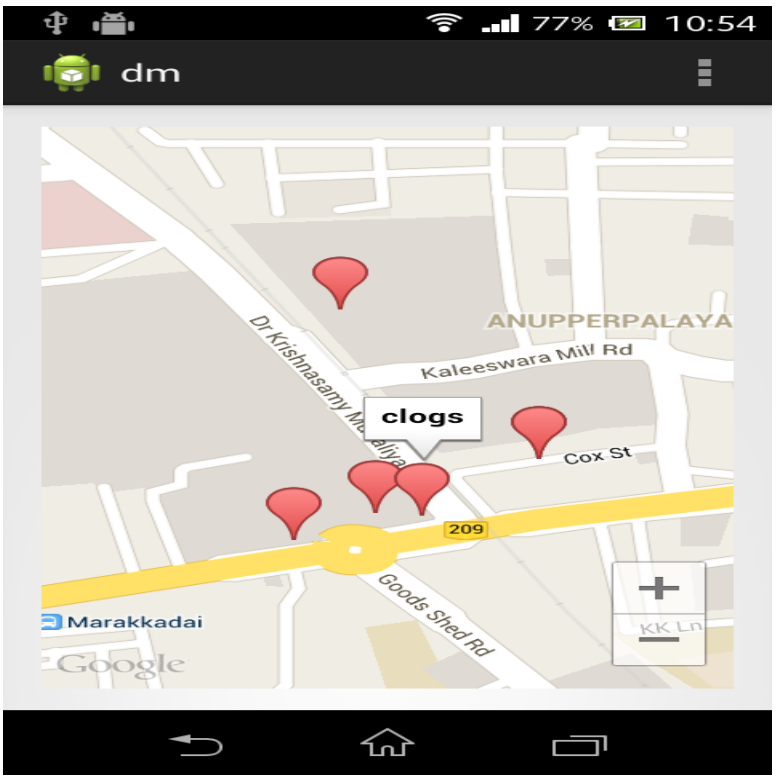

Figure 4.1: Traffic near Coimbatore fly over

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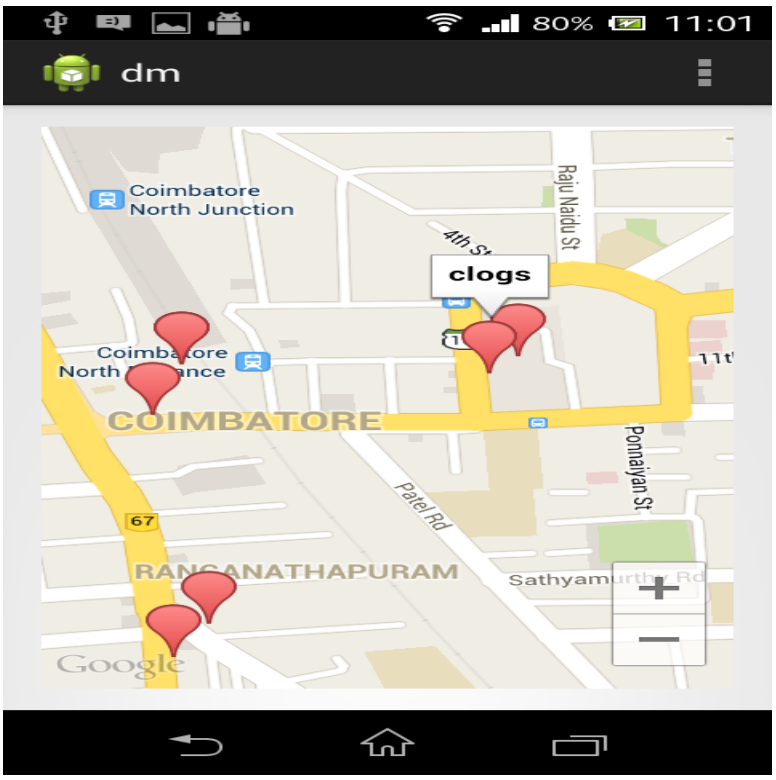

Figure 4.2: Traffic near Coimbatore fly over

Chapter 5

Conclusion and Future Work

The application can be further developed by fixing certain locations that are prone to traffic clogs in a city as reference points. The potential traffic clogs are found using the above method and the location markers can be displayed only to those users within a perimeter of two kilometres from the traffic clog. This would enable the user to receive only those traffic updates that are required for him/her. Another improvement would be to predict the destination of the user as he travels and provide traffic updates which he will require on the go.

Implementing an application of this scale would require a very strong database which will be able to store a lot of values from many users. The accuracy of the GPS co-ordinates in a particular location also plays a major role. For the application to be accurate, the GPS co-ordinates in the users location must also be accurate. The users must also have good internet access as they travel. To receive better results on traffic conditions, the application would require a decent number of users who are using the application. Catering to very few users may not prove to be accurate.

Chapter 6

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