



Comprehensive Design and Analysis Project (IT 405)

**Location based crisis analysis and day planning with
artificial intelligence and IOT for smart city**

Project ID :

Supervisor: Hansika Mahaadikara

DECLARATION

We declare that this is our own work and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Name	Student ID	Signature

The Supervisor should certify the proposal report with the following declaration

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

.....

Signature of the Supervisor

.....

Date

ABSTARCT

This proposal is prepared for Sri Lanka Institute of Information Technology (SLIIT), Faculty of Computing (FOC) that will describe the Location based crisis analysis and day planning with artificial intelligence and IOT for smart city and how it affects the current society.

Traditionally, these matters are solved by making calls, asking other people and getting knowledge from various resources. But this information not enough to make a decision or come to a solution. So, these uncertain circumstances have motivated us to develop an automated system that works according to user inputs. Everyday a disaster, a crisis or something unexpected things can happen. But the information about those might not spread among people which causes people to face unprepared problems.

The concept of a Smart City highlights the need to enhance quality, interconnection and performance of various urban services with the use of information and communication technologies (ICT). Smart City technologies promote Internet of Things (IoT) based services in which real-world user interfaces use smart phones, sensors and RFIDs. IoT is presently one of the most important ICT models that are shaping the next generation of computing. This concept has major impact on how we build and deploy smart applications/solutions for smart cities.

So, our aim in this research is to keep people prepared for those uncertain unprepared events by setting up this application. A smart city is a high-performance urban context, where citizens are more aware of, and more integrated into the city life. In this proposal we design, implement and deploy a smart application that retrieves the user relevant information on the user's surroundings. This case study application let us discuss the challenges involved in creating a location-aware mobile service based on live information coming from the city IT infrastructure.

ACKNOWLEDGEMENT

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1. INTRODUCTION

A large number of people moving towards urban cities, by 2030 more than 60% of the population will live in urban environment. With this accelerated rise of the urban population, cities throughout the world are facing many risks and concerns. This situation has created an urgency for finding smarter ways to manage the challenges.

Introducing our app is a great step towards a better and faster smarter city. Because with our app people will be able to travel here and there without any trouble because they will be able to plan ahead. It will cause people to be more efficient and time saving in the busy world.

1.1. Background

Nowadays people are so busy with their day-to-day work. They have a very limited time gap to complete all the responsibilities. So, people will use anything that they can to maximize their efficiency and save their time to do daily tasks. In the present people tend to use technology to get things done than manually. Even the older technology is getting thrown away with the newer ones.

Here people can use the app to update disasters, crimes and crisis just by uploading a picture under the correct department that we have listed in the app. Also, people can plan ahead by using day planning with the weather and traffic analysis. Knowing these things in the busy world this will be much more helpful.

The proposed system is basically based on using Internet Of Things (IOT) and so that it leads to use technology on fulfilling analysis effectively and efficiently.

1.2. Problem Statement

1. There is no way (or at least no reasonably easy and convenient way) **to get** the raw **traffic data from Google Maps Javascript API v3**. ... It's not clear **from** the documentation how much **traffic data** that exposes as it's only **data** about "incidents".
2. Weather analysis might not be 100% correct because it's just a prediction. And its hard to give out the weather analysis of every area.

3. Its hard to predict the relevant department just by a picture when it is uploaded.

1.3. Research objectives

The primarily objective of our research is to develop a user friendly and timesaving automated smart city application.

- Preparing people for upcoming climatic problems
- People can quickly take action against disasters and crimes
- Avoiding traffic and picking best route for reaching destinations

1.4. Importance and Benefits of Research

Smart city application provides lots of benefits for the people in urban areas making their tasks easier,

- 1) Save time

This is the worthiest benefit of this research. Because people in urbanized areas struggle with the time management. This app will help them with that.

- 2) Accurate and secure information

People give false information about crimes and crisis. But when using our app, they will have to provide a photo attachment with the report that will make sure it's no false information.

- 3) Instant updates and notifications

Whenever we get a report it immediately updates and send notifications so not only the departments also the other users can get to know about them.

- 4) Newsfeed

Users can check the newsfeed for latest updates that will help them

- 5) Ability to minimize damage

Just calling and reporting a crime or crisis will take a lot of time to process.

But with the app report will directly go to the closest department.

- 6) Anyone can use when logged in

Everyone with a smart phone will be able to sign in and use the app

7) User friendly

App is built so anyone can use, It can be used without any confusion. While being easy to operate technology

8) Secure data transfer

2. LITERATURE REVIEW

2.1 Background

This chapter describes the approaches and technologies, which were used by many researches to overcome the problem with Smart City applications and the outcomes of those projects. Also summarized description about the factors affecting the research problem and existing limitations and challenges will be described as follows.

Urbanization process is related to economic development, social development and environmental protection. Consequently, the urban population percentage is increasingly important. This last took the speed character to overcome the rural one since 2007 . Consequently, cities all over the world are at the height of seeking for optimal solutions to face new challenges that grow variably over space and time. The quick transition to a highly urbanized population has made from societies a process of presenting solutions regarding many key themes such as: Sustainable development, Education, Energy, Environment, Safety and Public services. Those challenges have led urban areas to be compound social ecosystems in which sustainability and good quality of life are important to be ensured.

A. GSM/GPS Assisted Road and Traffic Congestion Detection System

With this system users can know the traffic condition on the road using GPS and GSM. So users can use alternative routes as well. So the speed sensor of vehicle a controller can get the current

speed of the vehicle. When that speed falls below a present threshold the controller is informed the vehicle location. When such a vehicle speed decreasing happens in few vehicles white's location are contiguous each other the controller identifies there is a traffic grid lock in that location. So then controller informs other users about the grid lock. Then they can use alternative routes to save their times.

B. Traffic congestion detection based on GPS floating car data

They said congestion has been a major challenge to the urban traffic system. They used GPS floating car data(FCD) method to detect traffic congestion information is studied. They used data for experimentation. This data extract from traffic congestion information of a big city in China. They extract that thing through GPS data processing, map matching travel speed estimation and after that they show all those details inside the map. They said the GPS floating car technology to collect traffic information becomes more cost effective to collect traffic information in a large scale. They said compared with the traditional fixed detection devices such as (inductive loops, video cameras and radar based sensors) floating car data technique can collect traffic information more accurate and more wide in real time. They said that they consider using GPS floating car data to detect traffic congestion information.

C. Automatic vehicle accident detection and messaging system using GSM and GPS modem

In this research paper they have described the way in which a traffic accident is diagnosed and how people are informed about the crash. They use the accelerometer as a car alarm application. Using that application System can detect danger drivers. And also they use as a rollover or a crash detector of a vehicle after an accident. The server identifies an accident using accelerometer signals. If vehicle met with an accident vibration sensor detect the signal and Micro electro mechanical system [MEM] will detect that vehicle rolls over or not. Then send a signal to ARM Controller. Using GSM Modem Microcontroller sends alerts about location to police, and rescue team. Once the message is received, a police vehicle can reach that location if there is a minor accident, the driver informs all relevant sections that the driver will not be in danger. So they can avoid wasting time. Their main technical components are Vibration sensors, Micro Electro Mechanical System (MEMS) accelerometer. In the future, they will use a WIFI webcam based on the need to improve this system.

D. Detection of traffic congestion and incidents from GPS trace analysis.

This research paper contains detecting traffic congestions and incident from GPS data. They get those GPS data using GPS trackers or drivers smartphones. They manipulate the GPS and place in the road map. They assign this system to each road segment of the map and a traffic state based on the speeds of the vehicle, It send to the users traffic alert based on the classified segments. Their traffic alert contains the affected area, a traffic state. They give example for traffic state. eg: Incident, slowed traffic, blocked traffic and they give estimated velocity of vehicles in the area for

users alerts. They said this proposed system is give valuable support in traffic management for municipalities and citizens. They said their very important for urban and non-urban areas. Their experimental analysis was performed using a combination of simulated GPS data and real GPS data from city. Their result of the incident detection rate 91.6% and an average detection time lower them 7 mins.

Research Gap

Although accidents, crimes and disasters are a common occurrence in roads and urban areas, a quick report submission, identification and notification capabilities are lacking in most of the existing road based solutions as elaborated in the literature. The proposed Smart City Application is a solution which enhance the user experience.

Even though there are existing proposed applications available, they do not address most of the problems that the proposed system is going to address. Proposed mobile application consists of many features as a solution for the main issues people faced in day to day life due to traffic problems.

Features	Google Map	Above Papers	Research	Proposed App
Analyze the time taken for reach the destination	✓	✓		✓
When we submit the time to reach the destination show the start time	✗	✗		✓
When we start travelling show us the weather report on the passing areas	✗	✗		✓
Identifying the closest department relevant to the report	✗	✗		✓
Shows the closes route according to the weather and traffic data	✗	✗		✓

3. OBJECTIVES

Our objective is to provide the people in urban areas with day planning activities so they can maximize their efficiency, save time and avoid unwanted problems while they are travelling. At the same time, we provide people in urban areas with an easier way to report crisis, crimes and disasters and how to act accordingly.

Specific Objectives

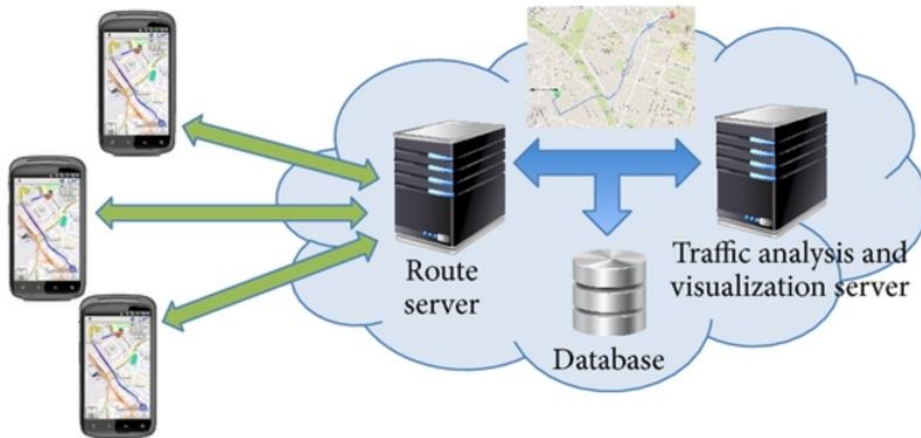
- Providing people with weather data
- Providing people with traffic data
- Arrange the quickest way to the destination
- Help people to report disasters, crimes and crisis
- Help people to how to act accordingly in a crisis

4. METHODOLOGY

This section includes detailed descriptions about the techniques and mechanism employed to make our “Smart City App” a reality. The descriptions include how software implementation of our project is carried out, what are the materials and data needed, and how they will be collected. It also includes time frames and schedules that are required in achieving its objectives. In addition to them, the research areas that we have identified to carry out this project are explained rationally.

System Overview

Our proposed system consists of a mobile application mostly focus on urbanized people who are travelling on a daily basis. With our application people will be able reach their destination by conserving their time. At the same time people will be able to report crisis and crimes by using the application will help the others to plan their route efficiently.



Functionality of the project main components

Vehicle detection and informing process

I. Registration for both departments and users

When a user installs the mobile application, the user needs to register via the application using Name, NIC, Email, Phone number and other necessary details. At the same time, we need to register departments with a separate database with only the admin privileges.

II. Send alerts and notifications

Whenever a user submits a report about a disaster or a crime it will quickly send a notification alert to the relevant department with time and location. When a report is sent it will show the sender where it has sent and the closest route to take to reach there.

III. Newsfeed

Update every report on the front page as latest Posts in the newsfeed part of the application. So, whenever a user logged in he/she will be able to notice it.

IV. Show the user's location on the map

As GPS installed in every smart phone the application will interact with it to provide the user's current location and provide him/her with the closest locations and routes to destinations.

V. Show ambulance and emergency vehicle

When an emergency vehicle is deployed from a department it will show on the map. It will assume how long it will take to come and what route it takes to reach the destination.

VI. Traffic analysis

Take the live location of the user and by predicting movements of the user's vehicle while he is driving get the traffic details of the current location and distribute it with the other users when they request for the traffic data when making daily plans.

VII. Weather analysis

When the user selects his/her destination and time. We provide the user with the better climatic conditions by predicting the weather by better analysis.

VIII. Route Prediction

When the traffic data and weather data is analyzed take those data and provide the best route to reach the destination by creating an algorithm.

IX. Chatroom

Also, users will be able to share location status by chatting

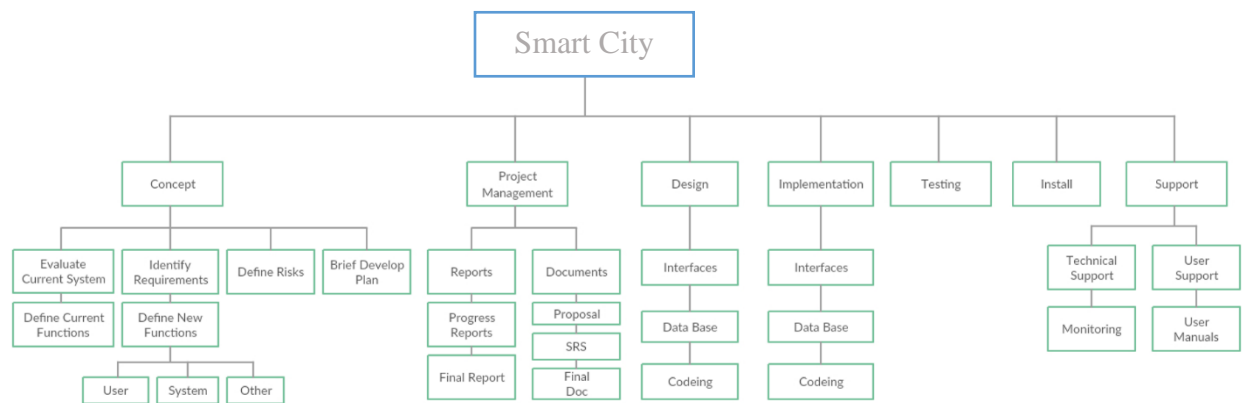
5. DESCRIPTION OF PERSONAL AND FACILITIES

Member	Component	Task
Tharindu		When the user selects his/her destination and time. We

		provide the user with the better climatic conditions by predicting the weather by better analysis.
Nethini		Providing the user with the easiest and the closest route to reach his/her destination by creating an algorithm with the traffic analysis data and the weather report data. Also, users will be able to share the situations using a chatroom.
Lakshitha		Take the live location of the user and by predicting movements of the user's vehicle while he is driving get the traffic details of the current location and distribute it with the other users when they request for the traffic data when making daily plans.
Tharuka		Managing the departments and user logins separately. Get the user inputs of a crisis report separate it for the proper department and send as an alert notification to the closest department with the

		<p>exact location. When the report is sent it will show the user where the report is sent and it will show the route. Update the newsfeed with the latest news.</p>
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6. DEVELOPMENT LIFE CYCLE



REFERENCE

1. <https://docs.microsoft.com/en-us/bingmaps/rest-services/getting-traffic-incident-data>
2. <https://openweathermap.org/current>

3. [Md. Syedul Amin](#), [Mohammad Arif Sobhan Bhuiyan](#),[Mamun Bin Ibne Reaz](#) and [Salwa Sheikh Nasir](#), GPS and Map Matching Based Vehicle Accident Detection System.

December 2013