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

Software Requirement Specification

Project ID: 19-045

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DECLARATION

I declare that this is my own work and this document 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.

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1. INTRODUCTION

1.1. Purpose

The purpose of this document is to specify the requirements for the following component of the system SMART CITY which will be implemented as a result of the research project 'Location based crisis analysis and day planning with artificial intelligence and IOT for smart city'.

- Weather data and Traffic data Analysis

This document contains the functional and non-functional requirements, technologies, assumptions, interfaces etc. used to develop this system

1.2. Scope

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 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. The functionalities and methodologies of the system are broken down to separate components and these components are being developed by the team members.

The outline view of the procedure flow of the proposed system is that once the user gives instructions such as the locations that will give a dynamic route plan by considering the weather conditions and traffic conditions, one of the locations. The system will initially provide alternative plans as well, user can select a plan he/she prefer the most.

1.3. Definitions, Acronyms and Abbreviations

1.3.1. Definitions

Terms	Definition
Software Requirement Specification	A document that completely describes all the functions of a proposed application and the constraints under which it must operate
Database	A set of data or information retrieved and stored by the system.
SRS	A fully descriptive document of the software system to be developed which contains all the functional and non-functional requirements.

Table 1.3.1 Definitions

1.3.2. Abbreviations

Abbreviations	Description
SRS	Software Requirement Specification
App	Application
API	Application Programming Interface
DB	Database

Table 1.3.2 Abbreviations

1.4. Overview

Main objective of this research is to develop a cross-platform mobile application to Route selection by showing the shortest route private vehicles, shows ongoing traffic, track the user's location and shows the route to the nearest end point by using traffic and weather analysis. The mobile will cover whole data (traffic and weather) collection scenario. It creates a traffic and weather.

The remainder of this document will illustrate the requirements and the overall description of them and their perspectives and functionalities. Furthermore, it will discuss

functional requirements and non-functional requirements, performance requirements and design constraints.

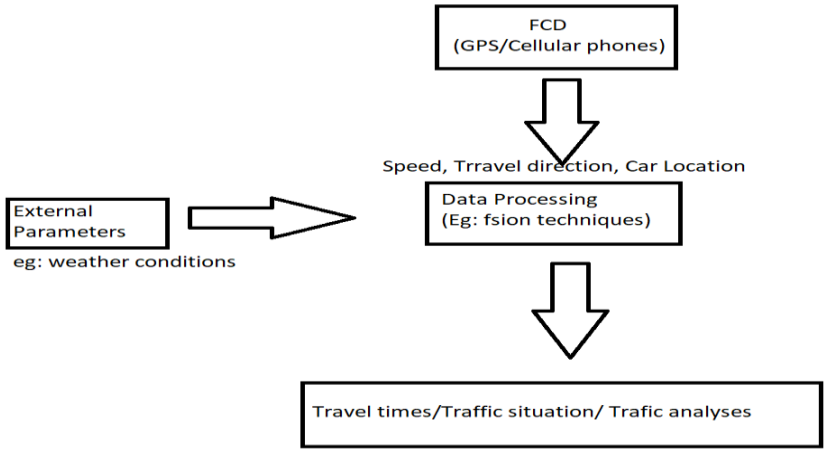
The rest of the sections of this document are organized as follows; product perspective and descriptions, different interfaces such as system interfaces and user interfaces etc., system requirements, summary of major functionalities, users and characteristics of the system and the background of the general factors affect the functioning of the components in discuss in relation to the complete product.

This document will gain the assistance of many standard high-level diagrams and UML diagrams including entity relationship diagram, class diagram, use case scenarios.

2. OVERALL DESCRIPTIONS

This document is mainly focused on the system requirements and the user requirements of the app as there are more researchers to be done. A detailed Description of the mobile app will be providing in the Literature review.

This section gives an overview of the components of the system. Basic functionalities of the components and how its behavior with other systems will be explained. Interaction with stakeholders and what are the functionalities available for each type of stakeholders will also be explained here as well as the constraints and assumptions. The proposed system is basically based on using Internet of Thing (IOT) and so that it leads to use technology on fulfilling analysis effectively and efficiently.



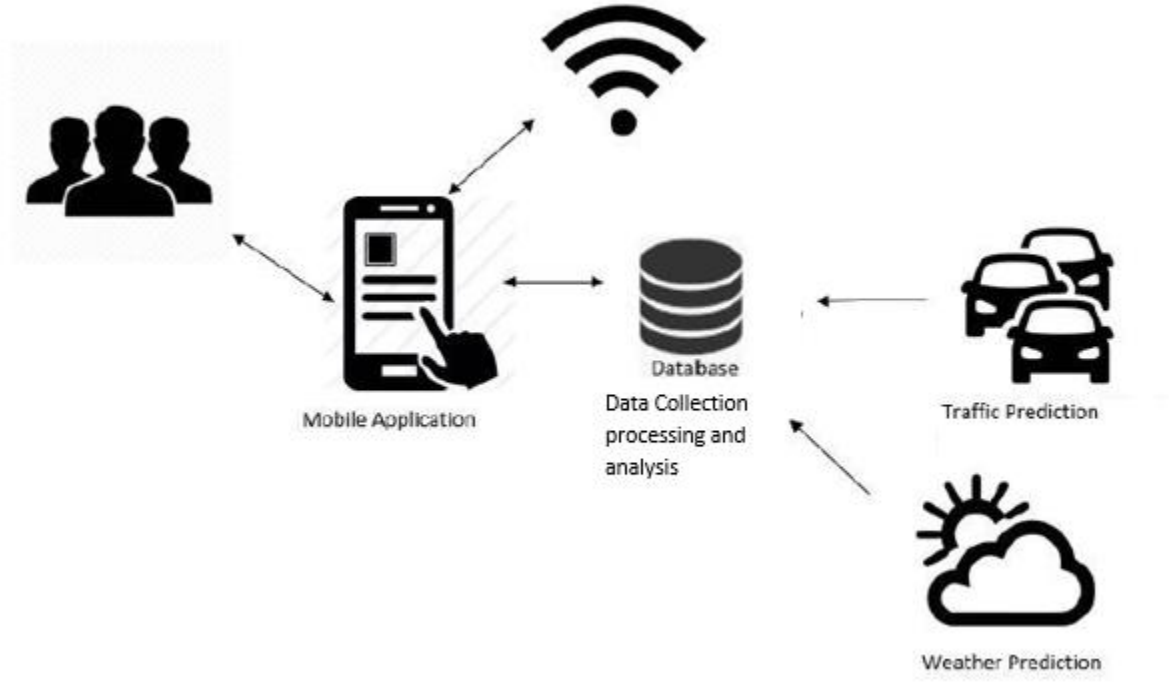
2.1.Product Perspective

Providing the user with the easiest and the closest route to reach his/her destination by creating and algorithm with the traffic analysis data and the weather report data. Also, user will be able to share the situations using the chatroom.

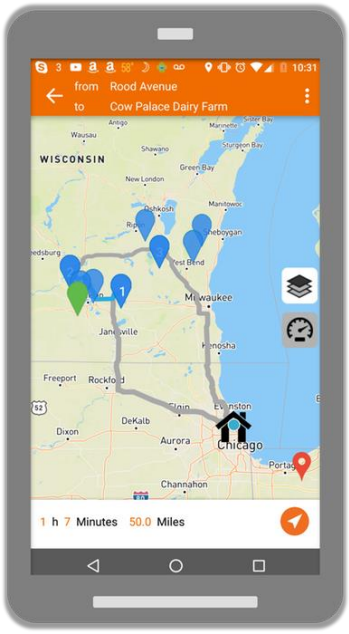
The proposed Smart City Application is a solution which enhance the user experience. Even though there are existing proposed applications available, they do not address most of the problems that the proposed system is going to address. Proposed mobile application consists of many features as a solution for the main issues people faced in day to day life due to traffic and weather problem.

2.1.1. System Interfaces

- Facebook – To authenticate the user by using the Facebook account
- Google Plus - To authenticate the user by using the Google account
- GitHub – To store and pull the work



2.1.2. User Interfaces



2.1.3. Software Interfaces.

Database:

Firebase is easy to work with android online apps. Therefore, it is being used as our Database.

Code/text Editor:

Android Studio will be our main code editor.

2.1.4. Communication Interfaces

As Mobile is a mobile-based application, the connection to the internet should be established prior to the execution of the application. Therefore, Android or iOS enabled mobile phone with 4G/LTE/Wi-Fi connection needed for high speed connectivity of internet.

For site server should have over 100Mbps internet speed to because the system not only sending the data to client but to some external interfaces as well. For end user at least 1Mbps speed to use without any lag.

2.1.5. Memory constraints

Mobile device should have at least 3GB RAM and 16GB free memory space.

2.1.6. Operations

Route selection is a sub component of this smart city this based on geometric and location based services, In this section this system will track the user's location and shows the route to the nearest end point also from this system the users can ongoing travels, because this system links with the applications, and also we provide a new feature this system enable to join rides with co-riders.

2.2.Product Functions

2.2.1 Use case Diagram

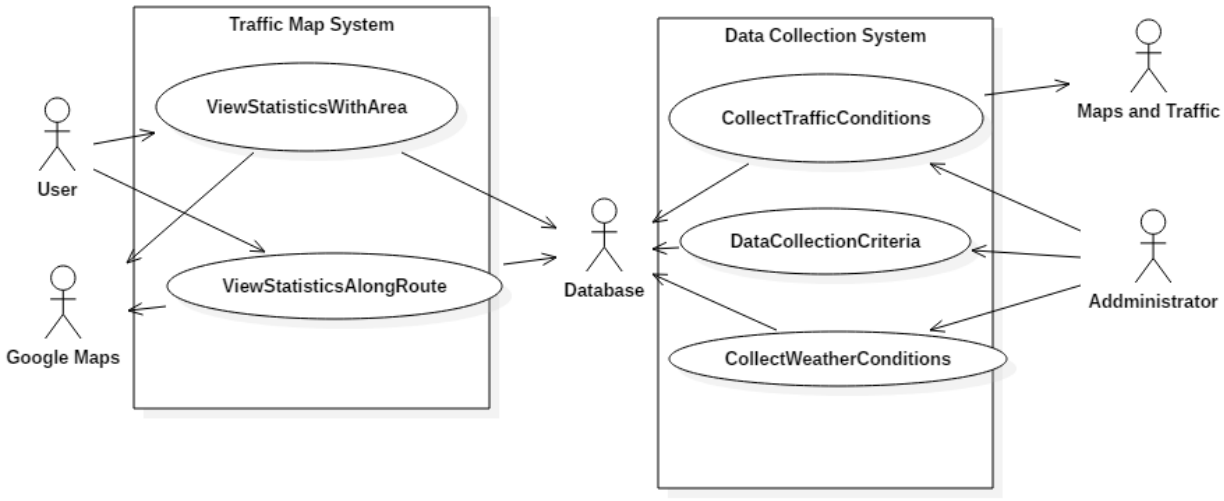


Diagram 2.2.1 Use Case Diagram

2.2.2. Use Case Scenario

Use case Name	Creating latest route
Pre –Condition	Classification of latest route
Post-Condition	Get the location according to latest route
Actor	System
Main Success Scenarios	1. Get Classification of latest route 2. Identify classify start point and end point 3. The use case ends with user successfully travels from start point to end point.
Extension	1. a. User not giving access to GPS data. 1. b. User not connected internet.

Table 2.2.2.1 Use Case Scenario

Use case Name	Feedback system for service providers
Pre –Condition	Service providers should be logged into the system and provide services for the selected customers.
Post-Condition	Rating and commenting about the customers.
Actor	Service Provider (API)
Main Success Scenarios	1. Agreeing with a specific customer to provide a specific work. 2. Providing the service for the selected customer. 3. Rating the customer and adding comments. 4. The closest service provider search in app and the system routes them to customer location. 5. Service provider accept the request and customer is notified that a service provider is on the way 6. System notifies user via text message when service provider is one minute away from the meet location

	7. service provider and customer meet at meet location
Extension	1. a. Selected customer is unavailable and select another customer. 1. c. Rated customer is not allocated to this domain.

Table 2.2.2.2 Use Case Scenario

2.3. Constraints

This system is a mobile application. Therefore, mobile application constraints should consider with this app. To work with better level of quality below mentioned memory limits are needed by the application.

- Mobile phone should have either Android or iOS operating system to run the application.
- The Android version should be 6.0 or above. iOS version must be 9.0 or above.
- Mobile phone CPU should be 1GHZ or above for optimal performance. So that all the processing tasks would be done faster, and user would gain the output results very faster.
- Mobile phone RAM should be 3GB or above for better performance.
- Internet connection is required for the software to function properly. High bandwidth is encouraged for smooth operation.

3. Specific Requirements

This section contains all of the functional and quality requirements of the system. It gives a detailed description of the system and all its features.

3.1. External interface requirements

3.1.1. User interfaces

3.1.1.1. Data (Weather and Traffic) Collection and analysis interface:

In this section user interfaces belong to the Route selection and ride sharing component is described. To make sure that the both expert and novel users find it easy to use the system, UIs have been developed simply and user friendly as much as possible.

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

3.1.1.2. Interface to show the shortest route

When the user gives the location, the system will display the best route to reach the destination by private vehicles, bus and train with the current traffic condition.

3.1.2. Hardware Interfaces

No specific hardware integrations.

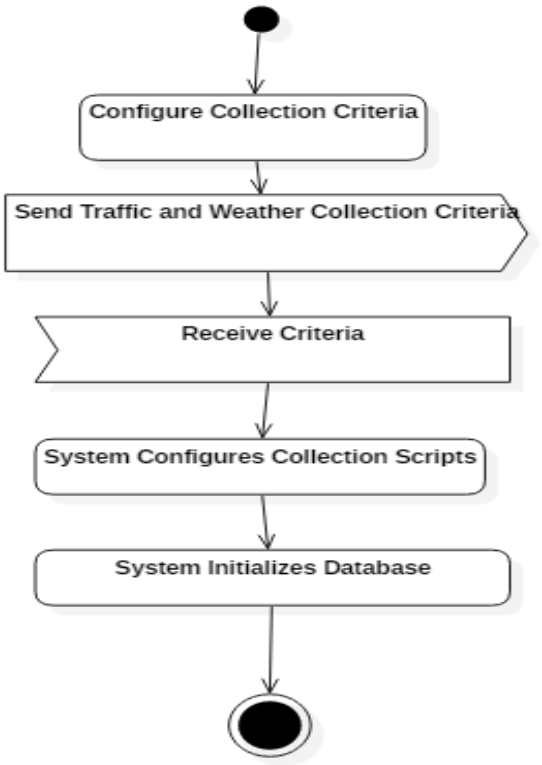
3.1.3. Software Interfaces

- Selinium – used as the cod editor
- .Net – used as the run-time environment to execute the script
- Visual Studio Code – used as the code editor.
- Android – used as platform (required Android 6.0)
- iOS – used as platform (required iOS 9)

3.1.4. Communication Interfaces

For site server should have over 100Mbps internet speed to because the system not only sending the data to client but to some external interfaces as well. For end user at least 1Mbps speed to use without any lag.

3.2. Activity Diagram



Dagram3.3 Activity Diagram for traffic and weather Collection Criteria

3.3. Design Constraints

Data collection(weather and traffic) mobile app handling live session. Therefore, while developing this mobile application main constraint is the display current state. Designer should follow a very consistence design throughout the application and should choose a very promotional and a state of art design

3.4. Software System Attributes

3.4.1. Availability

If the system delivers the requested services at a given time, then the system's availability is success. The data collection (weather and traffic) should be available to the user whenever he/she needs it, while the internet connectivity is available.

In the presence of a considerable speed internet connection, the application should be available to access and function as it should at all time.

3.4.2. Maintainability

The requirements are changing rapidly day by day and the technology is getting advanced, so the existing system getting expired. The new requirements must be identified, gathered and new features should be added to the system to achieve the performance and the productivity. Considering it the traffic and weather criteria. app is being designed to assists for the updates of the software in future. The code is commented wherever it is necessary, especially in critical and complex code segments. This will help the developers or the maintaining team for further modifications in future. Object oriented design will ensure easy enhancements and modifications in the future. Proper coding standards and proper naming conventions will be used while development.

3.4.3. Security

User should be authenticated through username and password. Security is a major software requirement of any software application. Therefore, the system should provide complete security mode to maintain the security of the system. Authority and authentications are given for accessing the system.

3.4.4. Reliability

System will be tested under several testing criteria so as to make sure that its probability of failure is low. The generated outputs will be tested using real data in order to certify the accuracy of them. Failures should be informed to the user as they happen.

3.6. Other requirements

- Functionality should be suitable to all end users
- Extensibility & Modifiability
- Adaptability

4. SUPPORTING INFORMATION

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