Sentiment Analysis in Transportation System

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Abstract: Delivering right information at the right time can boost usage of public transport system. There is a need to understand people's mobility needs, public transport usage and adaptability to provide better services. This website has a journey planner for the commuter adopting the concept of multi-modality in its approach and developments i.e. travel from one destination/direction to another using all possible modes. User must login with their login ID's. then they are redirected to homepage where they can give their credentials of travelling such as their source, destination and date of travel. Then there appears a list of transport mediums (buses, trains, flights etc.,) followed by cost of travel, start time and a book button, on clicking which, user can book his seats. User must give his feedback to the questions which are posed based on their mode of transport. Analyzing the feedback provided by the users using sentiment analysis a report will be maintained for each mode of transportation, in graphical representation.

1. Introduction

Sentiment analysis is contextual mining of text which identifies and extracts subjective information in source material and helping a business to comprehend the social sentiment of their brand, product or service while monitoring online conversations. Based on a scoring mechanism, sentiment analysis monitors conversations and evaluates language and voice inflections to quantify attitudes, opinions, and emotions related to a business, product or service, or topic. Sentiment analysis is sometimes also referred to as opinion mining. As part of the overall speech analytics system, sentiment analysis is the integral component that determines a customer's opinions or attitudes. We can show this by using an example:
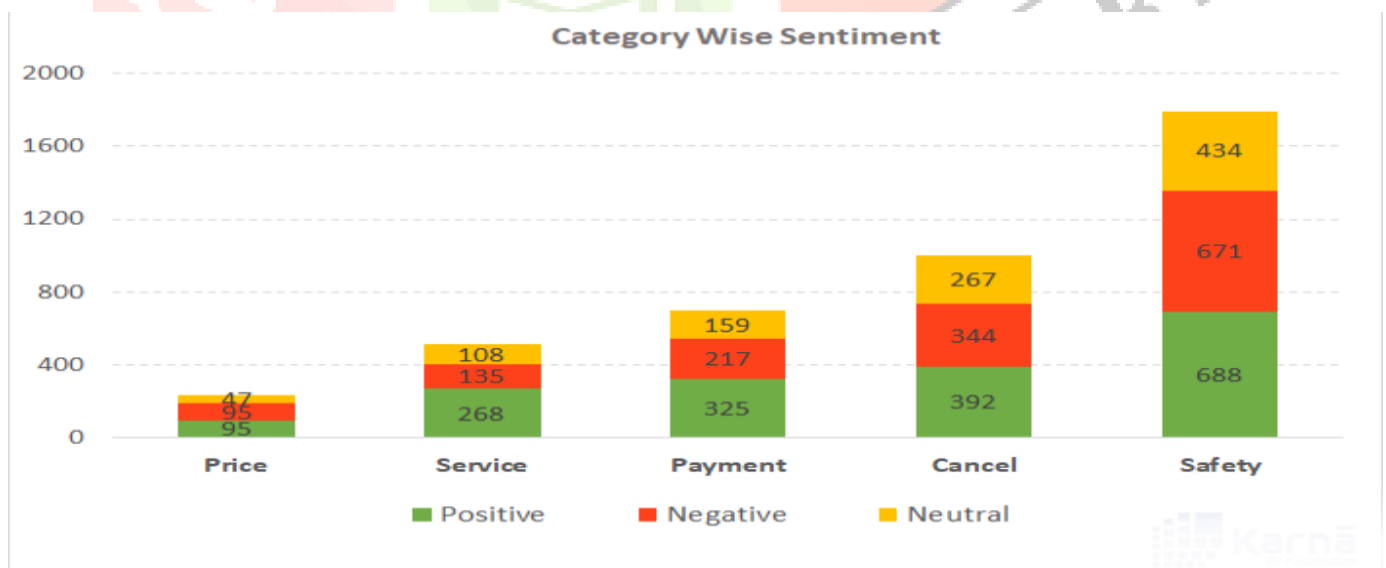

Fig 1.1 Sentiment Analysis of comments

Currently, sentiment analysis is a topic of great interest since it has many practical applications. As publicly and privately available information over the Internet is constantly growing, a large number of texts expressing opinions are available in review sites, forums, blogs, and social media. With the help of sentiment analysis systems, this unstructured information could be automatically transformed into structured data.

1.1 Goal And Possible Application

The goal of sentiment analysis is to computationally identify and categorize opinions expressed in a piece of text, especially in order to determine whether the writer's attitude towards a particular topic, product, etc. is positive, negative, or neutral. Sentiment analysis is also extremely useful in social media monitoring as it allows us to gain an overview of the wider public opinion behind certain topics. The applications of sentiment analysis are broad and powerful.

Possible Applications Sentiment analysis algorithms can be applied in many fields, for instance:

- Analyse tweets and/or Facebook posts over a period of time to see sentiment of a particular audience.
- Automatically route social media mentions to team members best fit to respond.
- Automatically alert designated team members of online mentions that concern their area of work.
- Track customer sentiment about specific aspects of the business over time. This adds depth to explain why these specific aspects have shifted independently.
- Target individuals to improve their service, by automating sentiment analysis on incoming surveys, we can be alert the customers.

2. Objective and Scope

The main objective of this project is to provide a common mobility that is to provide a single interface where we can opt for any type of transport. Combining old and new ways of getting around will transform transport and cities, too. Through our website, residents will be able to travel place to place by using a website that mixes and matches a variety of public and private means of transport. Several such schemes are due to start this year. If they succeed, they could do for personal mobility what Airbnb and Spotify have done for accommodation and music: turn it into a service, accessed and paid for on demand. At a tap of a computer, this website will show the best way to get from place A to place B by combining public transport and a variety of options from participating private firms. Delivering right information at the right time can boost usage of public transport system. There is a need to understand people's mobility needs, public transport usage and adaptability to provide better services. This website adopts the concept of multi-modality in its approach and developments i.e. travel from one destination/direction to another using all possible models. In the ever rapidly changing world of technology, the use of applications and online services to avail transport services has seen a drastic development. In the view of delivering an even wider search and broader range of transport services to choose from, improves the user experience. This can be measured by using sentiment analysis. Sentiment analysis has seen a great deal of improvement in the recent times. Sentiment analysis is the process of determining the emotional tone behind a series of words. It is used to gain an understanding of the attitudes, opinions and emotions expressed within an online mention. It allows us to gain an overview of the wider public opinion behind certain topics. By using sentiment analysis algorithms graphs are generated which give a statistical view of several user experiences. These opinion graphs help the future users to make a better travel choice. In this project we apply the algorithm on a set of user review questions related to the travel. The algorithms which can be at different levels of complexity deliver the user's experience better as the complexity

3. Existing System and Drawbacks

There are separate websites for each mode of transport such as Tsrtc, Irctc, air India etc., We are just moving a step ahead and providing an interface for accessing all modes of transport in a single website and comparing the ways to use them. We are incorporating a feedback feature to improve the website. Mobility as a Service (MaaS) is the start-up behind the most ambitious of Finland's schemes. There is an app known as Whim [6] which will show best way to get from A to B within a city. Whim is currently being tested; it is due to go live in Helsinki this autumn and in two other Finnish cities late in the year. If there is no obvious route, a scheme like these might suggest a bicycle from the city's bike-share scheme (if one is close to your front door), followed by a train and then a taxi; an on-demand bus ("hail" it on the app and it will come and pick you up); or a one-way car-share to a tram and a rented "e-bike" with a small electric motor to alleviate the strain of pedalling for the final leg. Once a route has been chosen it will make any bookings needed, as well as ensuring that hire vehicles are available and public-transport sections are running on time.

Costs will be displayed for every option, making clear the trade- offs between speed, comfort and price. Customers will be able to buy one-off journeys or "bundles" modelled on mobile-phone contracts, allowing a certain amount of travel each month. The main disadvantage with Whim app is that it is restricted to a city. It gives only the roadway transport. Even in any other Indian websites, there's only confinement to a way of transport. That is there is no existing MaaS global.

3.1 Motivation for the Proposed system

Delivering right information at the right time can boost usage of public transport system. There is a need to understand people's mobility needs, public transport usage and adaptability to provide better services. So, this website has a journey planner for the commuter adopting the concept of multi-modality in its approach and developments i.e. travel from one destination/direction to another using all possible modes. User must login with their login ID's. then they are redirected to homepage where they can give their credentials of travelling such as their current place, destination and date of travel. Then there appears a list of transporting mediums (buses, trains, flights etc.,) followed by cost of travel, start time, duration of journey and a book button. This book button when clicked is redirected to the official website of corresponding bookings where user can book his seats. Analyzing the feedback provided by the users using AI (sentiment analysis) a report will be maintained for each mode of transportation. By analyzing the history of a user suggestions will be provided. User can even get the details of offers if any on particular journey in any mode of transportation. Feedback is the main advantage to users of our website. In other contemporary applications or websites, just rating is given about the journey. But in our website, we've collected feedback from users for every vehicle in our database in every aspect like cleanliness, hospitality, etc., by asking them in form of questions. For user friendliness, we've applied sentimental analysis for each of the questions and constructed graph for it. So that user can visualise the facts instead of interpreting them.

3.2 Overview on the Proposed System

Signup/Login page of the Sentiment Analysis in Transportation system consists of a button to signup, login. The new user should get registered by filling the details given in form displayed when clicked on signup button. And already registered users can login with credentials (Email id and Password).

Users: User when logged in with their login ID's they are redirected to Home page where they can select options provided for travelling such as their source, destination and date of travel. Then there appears a list of transport mediums (buses, trains, flights etc.,) followed by cost of travel, start time and a book button, on clicking which, user can book his seats. In Feedback page user can give his feedback to the questions which are posed based on their mode of transport. Based on these users feedback a report will be generated for respective mode of transportation, in graphical representation form. These generated reports can be viewed by user in feedback page by selecting source, destination and transport number (Bus number, flight number or train number).

Admin: An admin in the backend performs the sentiment analysis for the feedback provided by the users on the respective transport system and ensures the proper functionality of the whole system.

Use case diagram:

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. Use cases are used during the analysis phase of a project to identify system functionality. They separate the system into actors and use cases.
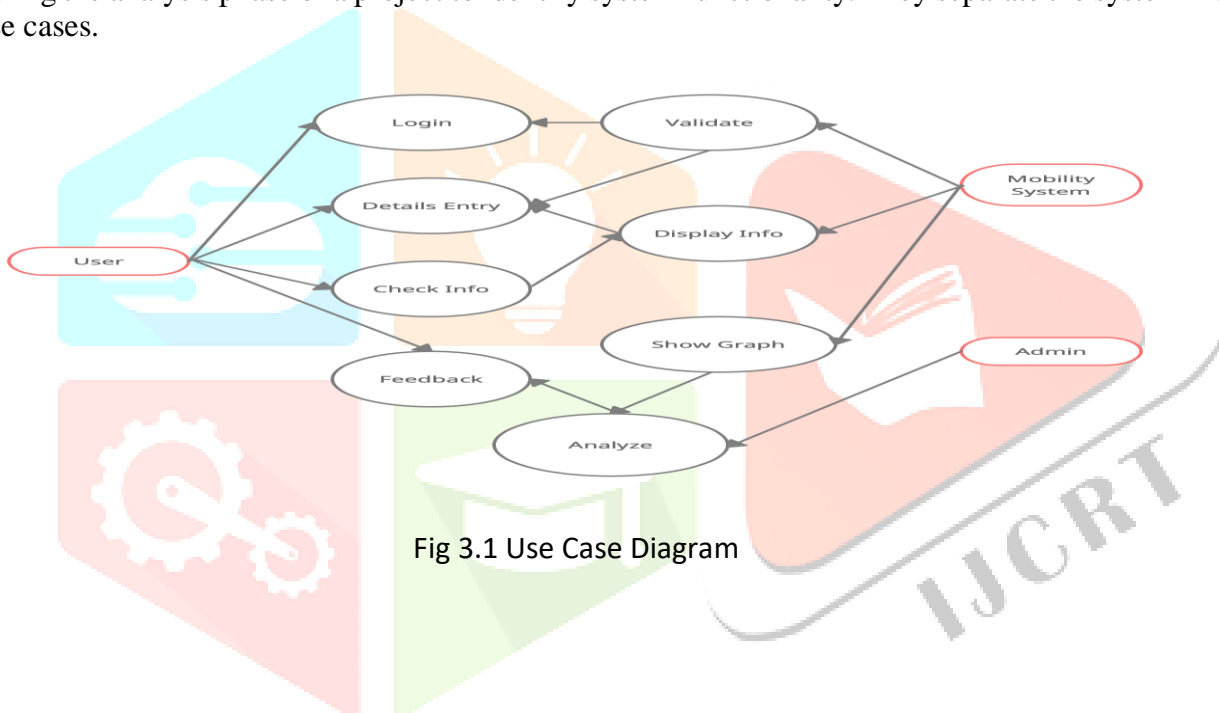

Fig 3.1 Use Case Diagram

Class Diagram:

In A Class diagram we directly map UML diagrams with object-oriented systems. A class diagram depicts a collection of classes, interfaces, connections, collaborations, and limitations.
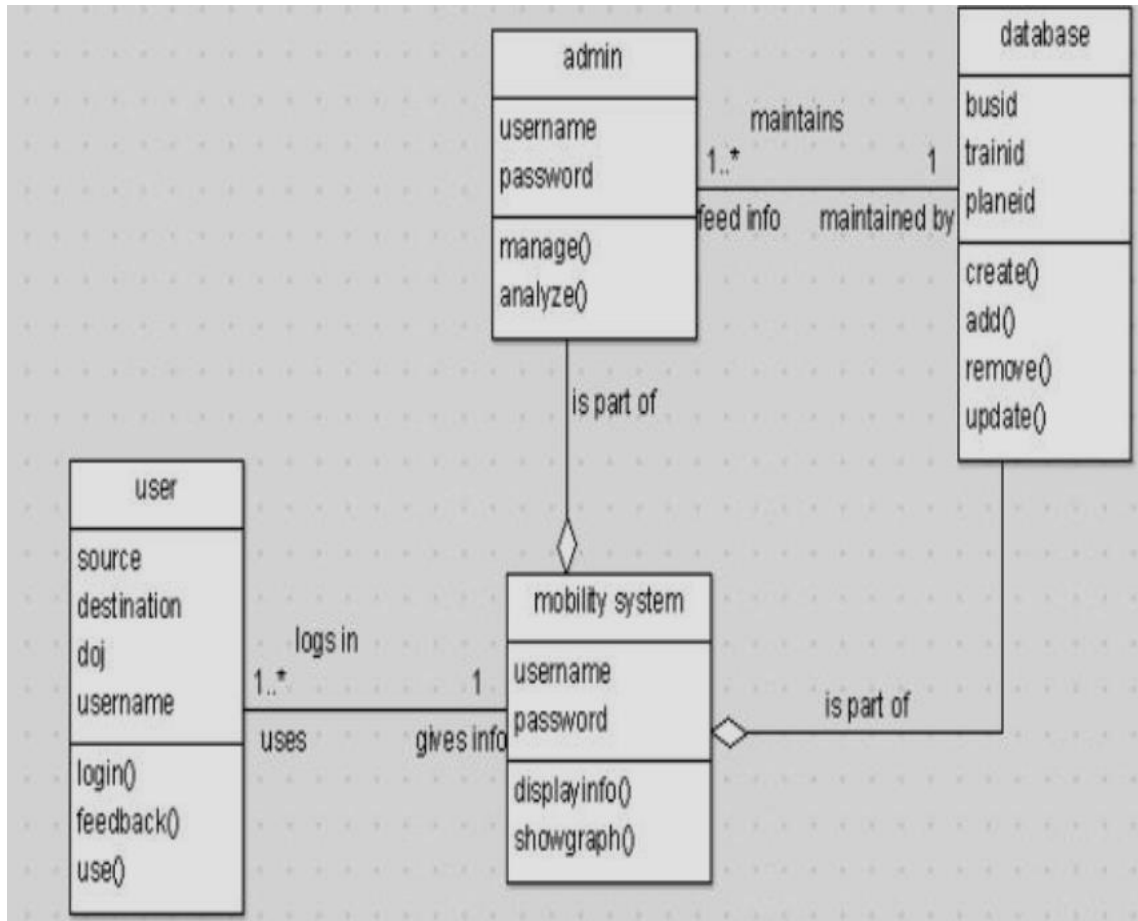

Fig 3.2 Class Diagram

4. Methodology

4.1 Front End

Front End :The front end of a website is the part that users interact with. Everything that you see when you're navigating around the Internet, from fonts and colours to dropdown menus and sliders, is a combo of HTML, CSS and JavaScript. It is the practice of converting data to graphical interface for user to view and interact with data through digital interaction HTML

HTML :(Hyper Text Markup Language) is used to create electronic documents (called pages) that are displayed on the World Wide Web (WWW). Each page contains a series of connections to other pages called hyperlinks. Every web page you see on the Internet is written using one version of HTML code or another. HTML code ensures the proper formatting of text and images so that your Internet browser may display them as they are intended to look. Without HTML, a browser would not know how to display text as elements or load images or other elements. HTML also provides a basic structure of the page, upon which Cascading Style Sheets (CSS) are overlaid to change its appearance. One could think of HTML as the bones (structure) of a web page, and CSS as its skin (appearance).

CSS :Cascading Style Sheets, fondly referred to as CSS, is a simple design language intended to simplify the process of making web pages presentable. CSS handles the look and feel art of a web page. Using CSS,you can control the colour of the text, the style of fonts, the spacing between paragraphs, how columns are sized and laid out, what background images or colours are used, layout designs and variations in display for different devices and screen sizes as well as a variety of other effects. It provides powerful control over the presentation of an HTML document.

Java Script : JavaScript was initially created to "make web pages alive". The programs in this language are called scripts. They can be written right in a web page's HTML and executed automatically as the page loads. Scripts are provided and executed as plain text. They don't need special preparation or compilation to run. In this aspect, JavaScript is very different from another language called Java. Today, JavaScript can execute not only in the browser, but also on the server, or actually on any device that has a special program called the JavaScript engine. The browser has an embedded engine sometimes called a "JavaScript virtual machine". It is most commonly used as a client-side scripting language. This means that the code is executed on the user's processor instead of the web server thus saving bandwidth and strain on the web server. It can be used to manipulate data, the DOM and a webpage as a whole without having a backend service or language. JavaScript code is written into an HTML page with JavaScript in it, the script

is sent to the browser and it's up to the browser to do something with it. JavaScript runs on the client side of the web, which can be used to design how the web pages behave on the occurrence of an event. It is no way related to java as its name suggests but it is used for client-side scripting.

4.2 BACK END

MYSOL : MySQL is an open-source relational database management system (RDBMS) where the data can be stored and retrieved on user requests. MySQL is one of the best RDBMS being used for developing various web-based software applications. MySQL is written in C and C++. Its SQL parser is written in yacc. The MySQL server software itself and the client libraries use dual-licensing distribution. In "Sentiment Analysis for Transportation System" we used the MYSOL 5.5 version. In this Sentiment Analysis for Transportation System we have User data, Transport data, Train data, Bus data and Flight data. User table has a one to many relationships with the Train, Bus and Flight tables and each of these tables have one to many relationships with the Train review, Bus review and Flight review tables respectively which stores the feedback related information.

PHP

Hypertext Preprocessor is a server-side scripting language designed for Web development, but also used as a general-purpose programming language. PHP code may be embedded into HTML code, or it can be used in combination with various web template systems, web content management systems, and web frameworks. PHP code is usually processed by a PHP interpreter implemented as a module in the web server or as a Common Gateway Interface executable. The web server combines the results of the interpreted and executed PHP code, which may be any type of data, including images, with the generated web page.

PYTHON

It is an interpreted high-level programming language for general purpose programming. Uses an elegant syntax, making the programs you write easier to read and understand. It comes with a large standard library that supports many common programming tasks such as connecting to web servers, searching text with regular expressions, reading and modifying files. Python has great support for NP. It has many API's that allow you to use NLP and machine learning features without writing any code, It consists of predefined functions and libraries for sentimental analysis which can be used directly by importing them. Text Blob is the python library for processing textual data which has to be installed and then imported. It provides a simple API for dividing in to common natural language processing (NLP) tasks such as part-of-speech tagging, noun phrase extraction, sentiment analysis, classification, translation and more. Python's well-known libraries for machine learning are TensorFlow, NumPy, Keras, Theano. TensorFlow is just a computational framework for expressing computational libraries for python. TensorFlow and other platforms use NumPy internally for performing several operations on Tensors. In this project we used "PyCharm" IDE (Integrated Development Environment) for python programming PyCharm is a cross platform IDE for Python programmers. It embodies all the tooling a Python programmer needs to be productive including an excellent programming text editor, syntax highlighting, code completion, project navigation, database tooling, and project options for web development. The following are the features of PyCharm

Project Code Navigation - Instantly navigate from one file to another, from method to its declaration or usages, and through classes hierarchy. Learn keyboard shortcuts to be even more productive

Code Analysis -Take advantage of on-the-fly code syntax, error highlighting, intelligent inspections and one-click quick-fix suggestions to make code better

Python Refactoring -Make project-wide code changes painlessly with rename, extract method/superclass, introduce field/variable/constant, move and pull up/push down refactoring's

Web Development with Django - Even more rapid Web development with Django framework backed up with excellent HTML, CSS and JavaScript editors. Also, with Coffee Script, Mako and Jinja2 support

Google App Engine Support - Develop applications for Google App Engine and delegate routine deployment tasks to the IDE. Choose between Python 2.5 or 2.7 runtime

Version Control Integration - Check-in, check-out, view diffs, merge - all in the unified VCS user interface for Mercurial, Subversion, Git, Perforce and other SCMs

Graphical Debugger - Fine-tune Python or Django applications and unit tests using a full-featured debugger with breakpoints, stepping, frames view, watches and evaluate expressions

Integrated Unit Testing - Run a test file, a single test class, a method, orall tests in a folder, Observe results in graphical test runner with execution statistics

Customizable & Extensible - Bundled Textmate, NetBeans, Eclipse & Emacs keyboard schemes, and Vi/Vim emulation plugin.
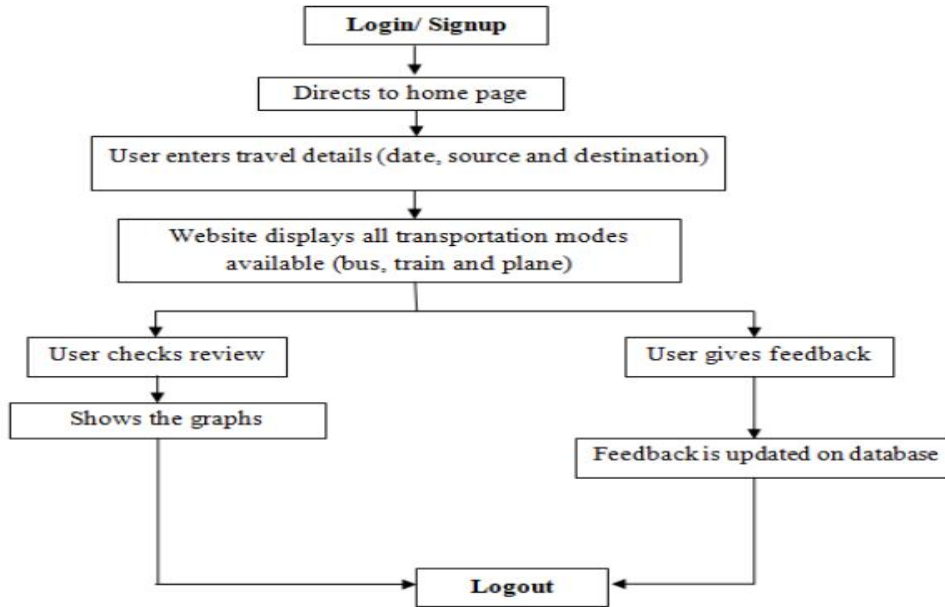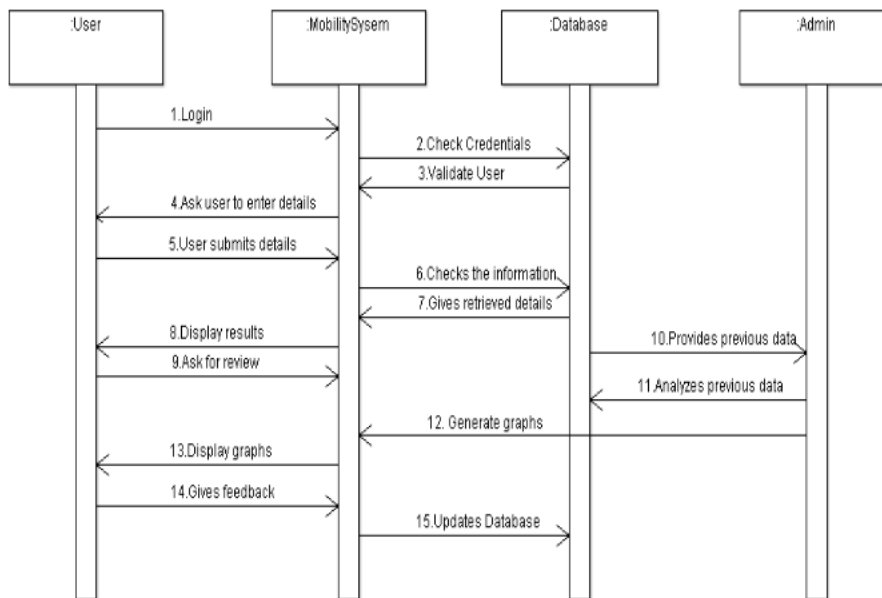
5 . Architecture

Fig 5.1 Flow Chart for Sentiment Analysis for transportation system
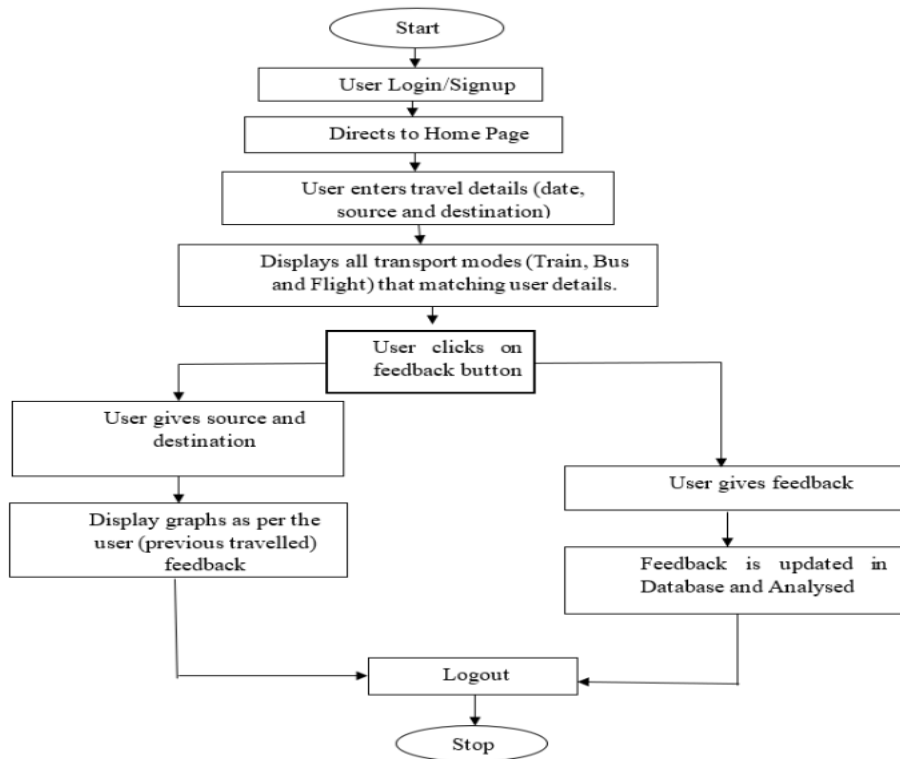
5.1 Flow Chart

5.2 System Architecture

Fig 5.2 System Architecture

5.3 Sequence Diagram

T I D	Test case objective	Test case Description/ Testing Process	Expected Result	Actual Result	Pass /fail	Action/ Notes
1	User trying to enter correct details in login form	User should enter login details	Home page is displayed	Home page is displayed	PASS	User should be able to do necessary operations
2	User trying to enter username in a specified field of login page	User should enter username in text format in a text field	User must get invalid username if user enters invalid username	User must get invalid username if user enters invalid username	PASS	User should be able to do necessary operations
3	User trying to enter password in a specified field of login page	User should enter password in text format in a text field	User must get invalid password if user enters invalid password	User must get invalid password if user enters invalid password	PASS	User should be able to do necessary operations
4.	User trying to click on login button	User should click on login button	User must be directed to Home page	User must be directed to Home page	PASS	User should be able to login
5	User trying to enter correct details in registration form	User should enter registration details	Home page is displayed	Home page is displayed	PASS	User should be able to do necessary operations
6	User trying to enter already existing user details in registration form	User should enter already existing user's registration details	Home page is displayed	Details already exists message	FAIL	User should not be able to do necessary operations

Fig 5.3 Sequence Diagram

6 . Testing

| 7	User trying to click on registration button	User trying to click on registration button	User must be directed to Home page	User must be directed to Home page	PASS	User should be able to register
8	User trying to select correct travel details	User should select travel details	Display all modes of available transport list	Display all modes of available transport list	PASS	User should be able to view details
9	User trying to select previous than current date	User should select date	Unable to select date	Unable to select date	PASS	User should not be able to select previous dates than current date
10	User trying to click on view button	User trying to click on view button	User must be directed to respective mode of transport page	User must be directed to respective mode of transport page	PASS	User should be able to view details
11	User trying to fill details in feedback form	User should fill all details in feedback form	Database must be updated with submitted details	Database must be updated with submitted details	PASS	User should be able to submit form
12	User trying to view bar graphs	User should select all details to view form	Bar graphs should be displayed	Bar graphs should be displayed	PASS	User should be able to view bar graphs w.r.t selected details

Fig 6.1 Test Cases
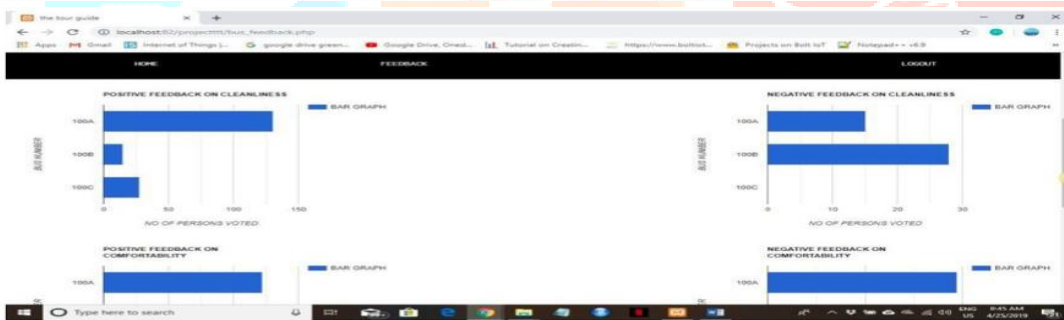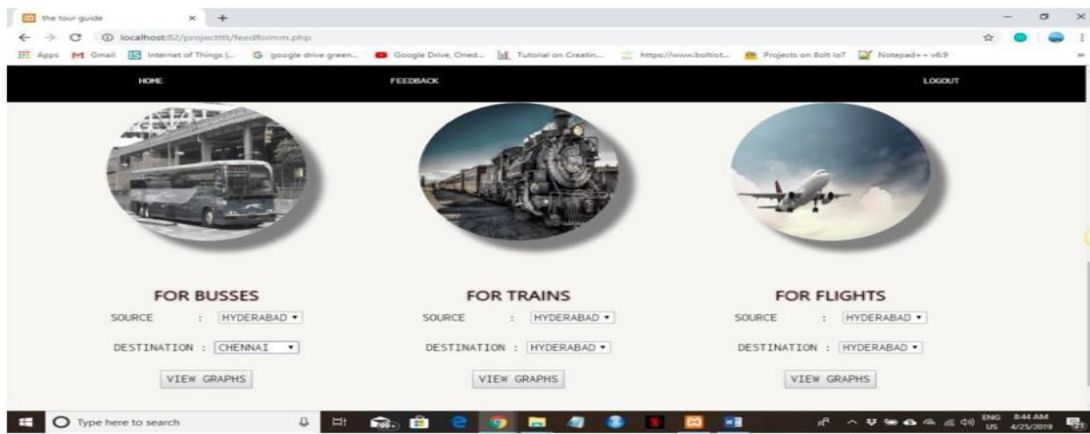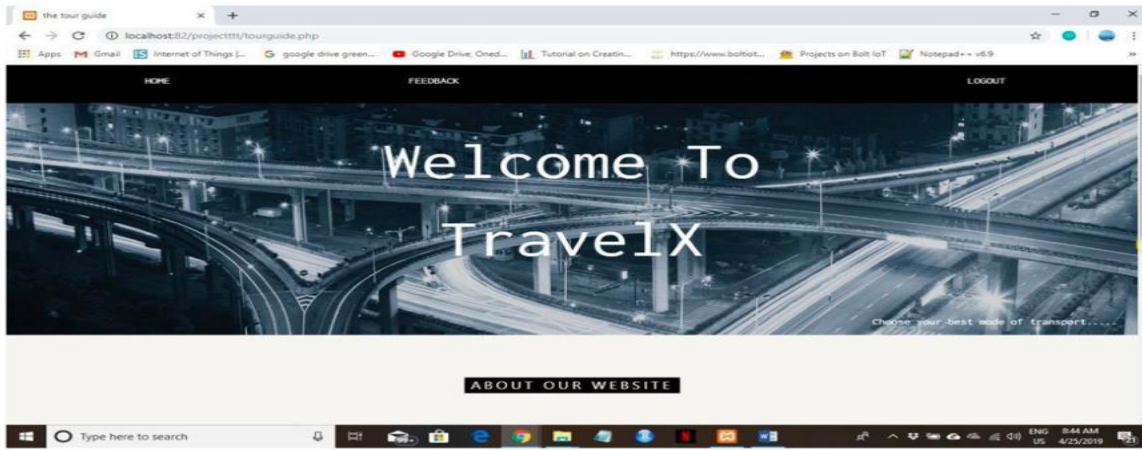
7. RESULT AND CONCLUSION
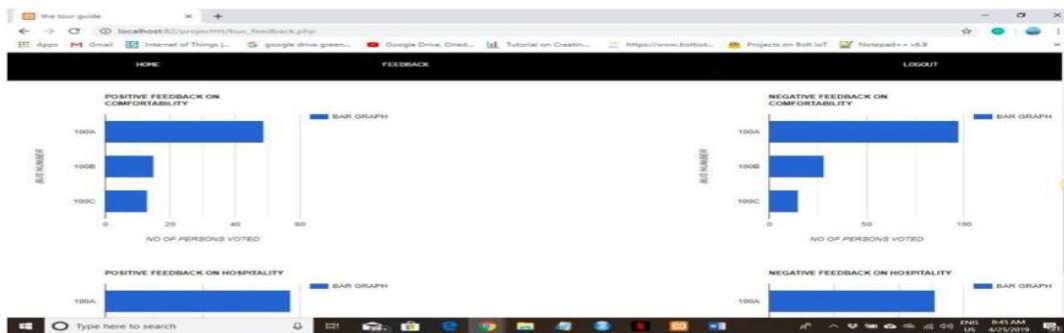
Fig 7.1 Output

Fig 7.2 Output

Conclusion : Soon we can make the user book tickets in our own website. Even we can make other roadway means such as cabs and all other things available. Passengers are being pooled in larger vehicles, too. Book a ride and the app will show pick-up and drop-off points close to your origin and destination, any walking required and the fare. "It's the bus that catches you," will be a new moto. At $2-6 a trip it is not much expensive than a regular bus, but a comfortable seat is guaranteed. Self-driving is not out of the picture entirely. Car-sharing schemes, which offer most of the benefits of owning a car, but at much lower cost, are revving up. Some features allow car to be rented based on time inverval. Vehicles may have to be returned to the point of hire; or schemes may allow one-way trips between designated parking spots. Boston Consulting Group reckons that the 5.8m people now signed up for car-sharing schemes worldwide and could grow to 35m in the next five years.

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