

## SMART TRANSPORTATION SYSTEM FOR SMART CITY (SOLAPUR)

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### Abstract:

*Public transport is the most affordable, efficient type of transportation from a pollution point of view. It is the only way to the problems of traffic. But, due to improper scheduling, inconvenient timing, insufficient resources and lack of passenger satisfaction most people prefer private transportation. To overcome such a problem and make the public transport more convenient, safe and efficient we have developed a mobile application in combination with OR techniques. Initially, we have done the survey of crowded places and analyses the crowd peak hours, convenient nodes, routes and timing as per public demand. we focus to develop the mobile application exclusively for city bus transportation.*

*We optimized the city routes by considering people's destination with the help of the OR techniques like transportation model, assignment model etc. We have developed an android app which gives information about the live location of all buses, the timetable of overall city buses and their respected routes. The app also shows the nearest bus stop based on user location for user's convenient and they get information regarding their required bus number and its start to end destination route.*

**Keywords:** *Smart city Solapur, smart transportation system, OR techniques, Android mobile Application etc.*

### 1. Introduction:

Smart cities require smart transport services. Proper movement of people, logistics, goods and services accelerate the growth and development of a region. Smart planning and efficient transportation network are a must for any region for people's convenience. A city's local transport system acts as a key mode of transport for the smooth functioning of the city. In the absence of right transportation channels, life comes to a halt for people residing in urban areas. Well planned and efficient management of transport channels enriches the quality of life in small and modern hi-tech cities.

Providing the exact schedule and live tracking of public transportation is the prime moto of our project. Passengers must be aware of their required buses and hence their time of arrival so that they can plan their trip accordingly. The 'm-Indicator' app provides information about the city buses, local trains, etc. for Mumbai city. With over 10 million users, mostly boarding through local trains, gets benefited through the app. But the app doesn't show the updates regarding the live tracking and the cancellation and delays of the service. Live tracking of buses or trains makes people more attracted to public transport if implemented.

Public transport is more efficient and safer, equitable transport mode. One of the best benefits is the low carbon emission resulting in less pollution. This shall lead to a less polluted environment and hassle-free lifestyle. City transportation is key to the quality of life of citizens. Large and megacities have local and metro train network as a key mode of transportation. Low quality of public transport, safety, poor road conditions, road safety concerns, crowded roads, lack of traffic management, issues regarding traffic must be improved. Also, we have gathered information regarding the schedule, route information and maps from the Solapur municipal transportation.

### 2. Literature review:

Developing Advanced transportation System in Global Positioning System (GPS) is the main objective of the current project. In this system shortest path, closest facility and city bus routes were included. Besides these features' location, wise information and city bus information is included.

#### Shortest path

Route planning is a process that helps vehicle drivers to plan a route prior to or during a journey. A variety of route optimization criteria or planning criteria may be used in route planning. The quality of a route depends on many factors such as distance, travel time, travel speed and a number of turns. These factors all can be referred to as travel cost. Some drivers may prefer the shortest path based on distance and some prefer based on travel time. [1]

The route selection criteria can be either fixed by a design or implemented via a selectable user interface.

In the current project, route selection is via a user interface. In the optimization of the routes (road segment length), the distance was stored in a digital database and the route planning algorithm was used. The calculated travel time was used as travel cost in the performance of path optimization. [1]

#### **Closest facility**

In the closest facility, problem route length and travel time (drive time) were considered as travel costs. Different facilities like hospitals, bus stations, and tourist places were taken as themes in the project. Closest facility algorithm calculates all the routes from selected origin/places to facilities based on travel cost. It compares the travel costs of these routes and gives one optimal route as output. [2]

#### **City bus routes**

City buses with their numbers were stored in a database in a compressed format because on one road segment there will be more than one bus. A search tab was used to find bus number from start destination to End destination. According to the bus number, road segments on the map were selected and highlighted.

In the case of a public emergency such as natural disasters, accidents, public health and social security, if people fail to take timely effective response measures, the consequences would be incredibly bad. So, how to optimize emergency transportation and logistics system scientifically, and enhance the emergency support and emergency response capacity of the entire emergency management and emergency system, are the keys to improve stability, reliability and timeliness of public emergency warning defence system. [5] Many scholars have done a lot of researches in dealing with emergencies. On the base of studying a large number of related documents, this paper summarized the optimization method of transportation and analysed the existing shortcomings, and finally came to the conclusion and future research directions. [6]

### **3. Methods and discussion:**

#### **Public Transportation System:**

The service is designed towards the inspiration for public transport to use maximum people. The goal can be achieved by effective automation, planning and management of public transportation with the help of proper scheduling, live tracking of bus and details of different routes. Also Optimizing routes by using Operational Research techniques like assignment model, Transportation model etc. [3] The information helps in knowing vehicle schedules and present a quick response to operators during any delay or

emergency. It also helps in ensuring the security of people engaged in public transportation systems. [4]

#### **Timetable:**

Different types of timetables can assist travellers in knowing the arrival and departure time of the respected bus. The information help travellers in making informed decisions or any last-minute readjustments they wish to make in their trip.

#### **Route Information:**

If travellers/people have preceding information about the routes best suited for their journey their travel becomes easy and comfortable, especially for a new region people. Real-time information about traffic conditions, the time required to reach their destination and other instructions about the routes can ease travel. The user can access all this information through their smart-phones or before proceeding their journey from public transportation. They can also check about the travel time duration, traffic flow condition, alternate routes.



**Fig. Application Logo**

The main objective of the project is to provide a Favourable and suitable bus system that helps people with their special necessities. We have developed an android app to help the people reaching the nearest bus stop, live location and schedule of a respected bus. but at the bus stop, it is very challenging for the person to know when and which bus is arriving, to solve this problem the solution is to allow communication between a bus and a user's Smartphone. In this case, a transit web server is established as a centre to connect buses, bus stops, and smartphones. Buses send GPS coordinates to the web service time to time to update bus schedules, bus timing and the web server makes this information available to Smartphones. When the bus arrives at the bus stop.

Android: Android is a mobile operating system as well as a development language. Php-Script in Language / Server-Side Language. [7]

MySQL: (Data Base) MySQL is (as of July 2013) the world's most widely used open-source relational database management system (RDBMS), enabling the cost-effective delivery of reliable, high-performance and scalable Web-based and embedded database applications. It is widely used as the database component of LAMP (Linux, Apache, MySQL, Perl/PHP/Python) web application software stack. This GSM modem is a highly flexible plug and plays quad-band GSM modem for direct and as integration to RS232. Supports features like Voice, Data/Fax, SMS, GPRS and integrated TCP/IP stack. Control via AT commands (GSM 07.07,07.05 and enhanced AT commands) Use AC - DC Power Adaptor with following ratings · DC Voltage: 12V /1A. [7]

#### 4. Conclusion:

It is the main objective of our project is to promote the use of public transport in general masses. By providing real-time information about transport schedule, delays consumers will be drawn towards public transport reducing private car usage thereby lowering traffic congestion and lowering pollution levels.

The GPS kit installed in all the SMT (Solapur Municipal Transportation) buses shows us the real-time location of the bus which makes it more convenient for the passenger. We have developed an android app showing the time schedule, route and bus no. with live tracking of the bus. This gives the people more economic mean of transportation with advance information of transits.

The new and modern transportation system is very much depended on a smart-phone android mobile application for route guides, actual schedule, real-time location, arrival and departure details etc. This will give a boost to the smart-phone application market and also to the Solapur municipal transportation.

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