# Traffic And Alternate Route Display Using Dijkstra's Algorithm

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**ABSTRACT**

This project involves building an android application on traffic management system. In the contemporary world, urban mobility is one of the unprecedented challenges to be tackled in the administration of a big city,there is a necessity for an effective system to combat with one of the unprecedented challenges.The traffic management system consists of a vehicle mounted board and a regional computing unit. The end users can interact with the system by wired or wireless connection of their smartphones with embedded system using GSM module. The user interface displays the traffic intensity in the particular road. Moreover, it is also provided with the functionality of determining the index of traffic congestion.By knowing the amount of time a physical object remains stationary in a particular area the intensity of traffic in that particular area can be found out.More the waiting time denotes more traffic in that region.Along with the traffic intensity index the end user is also provided with alternate routes using dijkstra's algorithm having lesser traffic intensity index.Along with that it also provides cost-effective, reliable and accurate tracking. When large objects or vehicles were spread out over ground, the owner corporations often find it difficult to keep track of what was happening. Also the need of tracking children to prevent the child missing cases has been more now-a-days. Therefore by placing an iot enabled sensor in any of the child's belongings we can track the location of the child or any other physical object

**Keyword** Android**: -** *Iot, Traffic,Tracking.*

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## 1. Introduction

Traffic congestion occurs when urban transport networks are no longer capable of accommodating the volume of movements that use them. The location of congested areas is determined by the physical transport framework and by the patterns of urban land use and their associated trip-generating activities. Levels of traffic overloading vary in time, with a very well-marked peak during the daily journey-to-work periods.Although most congestion can be attributed to overloading, there are other aspects of this basic problem that also require solutions. In the industrialised countries increasing volumes of private car, public transport and commercial vehicle traffic have exposed the inadequacies of urban roads, especially in older city centres where street patterns have survived largely unaltered from the nineteenth century and earlier.

The intricate nature of these centres makes motorised movements difficult and long-term car parking almost impossible. In developing countries the problem is particularly acute: Indian and South-East Asian cities often have

cores composed of a mesh of narrow streets often accessible only to non-motorised traffic.The rapid growth in private car ownership and use in western cities in the period since 1950 has rarely been accompanied by a corre-sponding upgrading of the road network, and these increases will probably continue into the twenty-first century, further exacerbating the problem. In less-developed countries car ownership in urban areas is in at a much lower level but there is evidence of an increased rate in recent decades, especially in South America and South-East Asia (Rimmer, 1977).Satis-factory definitions of the saturation level of car ownership vary but if a ratio of 50 cars to 100 persons is taken then in several US cities the figure is now over 80 per 100, whereas in South-East Asian cities the level rarely exceeds 10 per 100. One factor contributing to congestion in developing world cities is the uncontrolled intermixing of motorised and animal-or human-drawn vehicles. The proliferation of pedal and motor-cycles causes particular difficulties (Simon 1996).Our Solution is to provide an simple and effective solution to this problem.Now a days 80% of the people in the world having smart phones the smart phones uses the people different purposes. The major issue of child missing can be solved with the help of child tracking system android application. The android application uses GPS and SMS services and GPS helping in locating the missing childs location by the survey of missing children in 2004.There are of total 5996 Childs are missing. Out of these only 4092 children return or found by police. However 1904 children are missed. And the children ages 14 years and 17 years are missed or ran away from home. The parents are worried about there children. By missing the children the parents are scared to go to the family trip. These are lots of chances to miss the child in trip.The project is developed for those parents that they have worried to miss their child. In Today's world lots of childs have smart phones. With the help of smart phones GPS and SMS based tracking application parents can watch on their child.GPS is combined to GSM based SIM card into mobile to watch on child's location. The GPS uses longitude and latitude to track the location the SMS(Short Message Service)is used to communicate child side and parent side application.SMS service used when smart phones does not support internet connectivity. System able to send the childs smart phones exact location in the parents smart phone when parent demand to check the childs location.

## 2. LITERATURE SURVEY

PRESENT SCENARIO: Today the traffic in the urban areas arebeing controlled by traffic signals with pre-defined timers and sometimes manually operated by the local traffic police.This is leading to a havoc in the urban areas as it is difficult to maintain the massive traffic at all parts of the day.Therefore an efficient system is required to tackle this problem and also tracking the people especially children.

In Al-Suwaidi and Zemerl (2009),they solved the problem by application "Locating Friends and Family Using Mobile Phones with Global Positioning System (GPS)".Client server based approach used in the architecture.The registration of client phone done by server and after that login saved in database of server.Then client sends location coordinate updates to server the updates saved in database of server.Then with the help of Location Updates the location is tracked.This application was developed for helping to locate the family members and the friends. In 2011 the Chandra et al. used an approach with the help of SMS services.Applicatoin was implemented for JAVA mobile devices which supports GPS.The client shares his location through SMS to the web server.The Client views his location on the map. The paper by Almomani et al. (2011) proposes "Ubiquitous GPS Vehicle Tracking and Management System".This system architecture is Client-server based application and mobile application.In server side it uses GPS and SMS for storing user details.At Client side have a box which contains GPS tracking device and GSM modem.When user is registered and logged in web server then user details are saved to server.This application developed for monitoring driving behavior of their employees

**3. ARCHITECTURE AND IMPLEMENTATION**

Our solution depends on the communication between the vehicle mounted device and regional computing unit.The vehicle mounted device is nothing but the gsm enabled device which can transmit and receive signals.The regional computing unit is the place where all the calculations take place.The vehicle mounted board transmits signals in the form of radio waves about the status of the vehicle such as the waiting time etc..Then the regional computing unit receives the signals and all the calculations take place and is sent back to the board.Te vehicle mounted board consists of On board processor,Gsm module,In built memory.The data is thus stored in a mysql database for furthur usage.After getting the required data from the board the Regional computing unit which is a smartphone in our case is then forwarded to display the available routes for the destination.

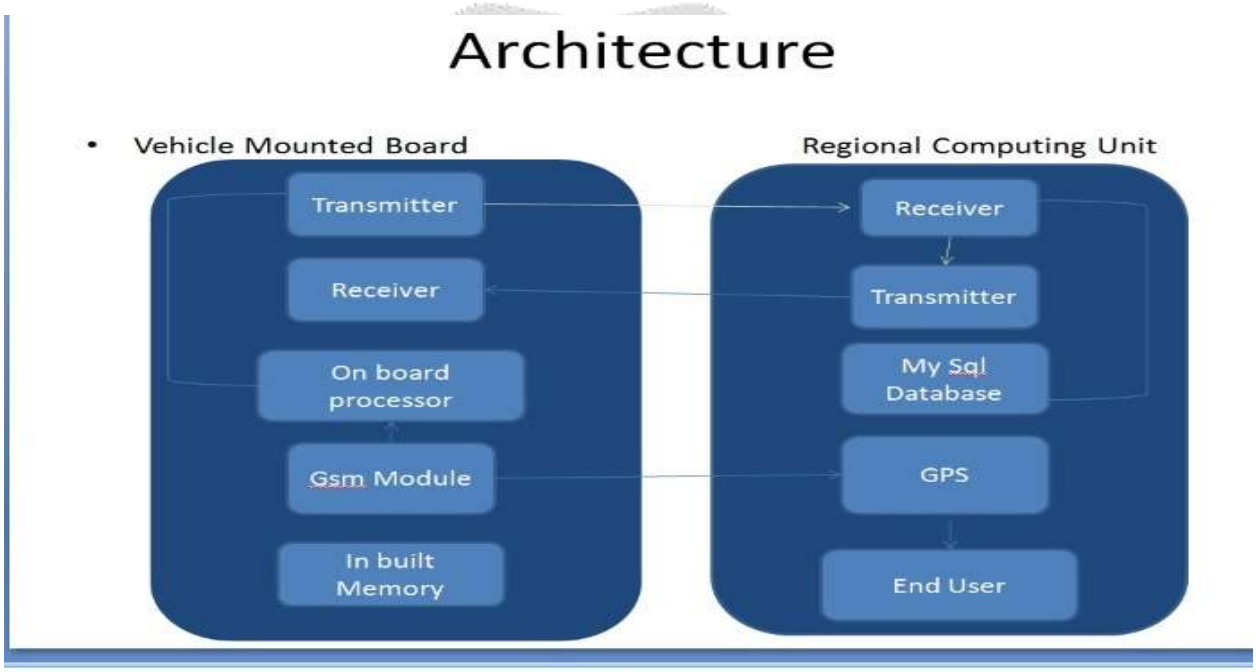


**FIG-1 ARCHITECTURE DIAGRAM**

### 3.1 Route Calculation

In this system the algorithm which is used to calculate the shortest route is dijkstra's algorithm..

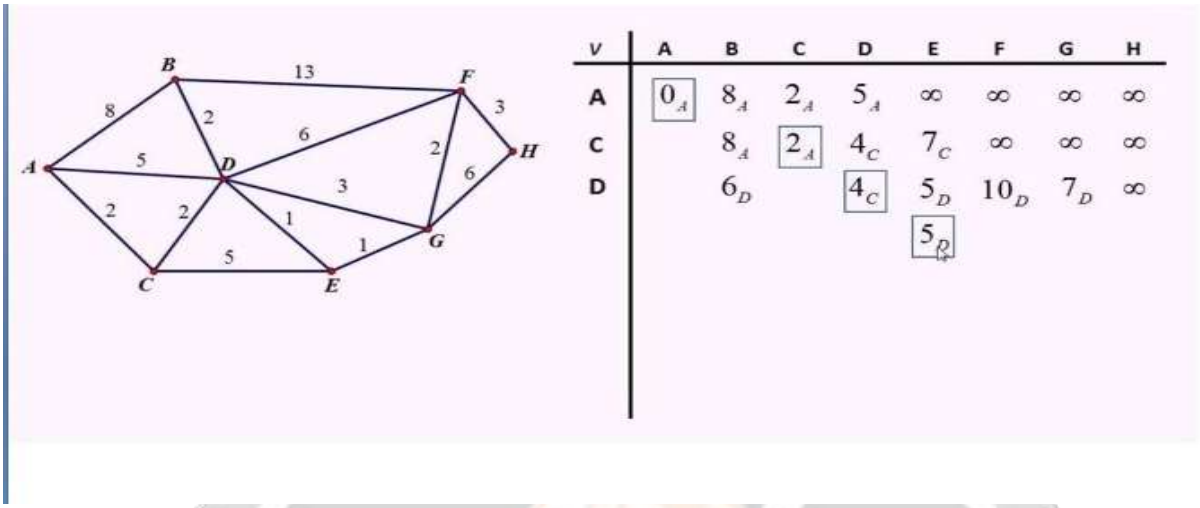


**Fig -2(DIJKSTRA'S ALGORITHM)**

It maintains a list of unvisited vertices.

It chooses a vertex (the source) and assigns a maximum possible cost (i.e. infinity) to every other vertex.

The cost of the source remains zero as it actually takes nothing to reach from the source vertex to itself.

In every subsequent step of the algorithm it tries to improve(minimize) the cost for each vertex. Here the cost can be distance, money or time taken to reach that vertex from the source vertex. The minimization of cost is a multi-step process.

For each unvisited neighbor (vertex 2, vertex 3, vertex 4) of the current vertex (vertex 1) calculate the new cost from the vertex (vertex 1).

For e.g. the new cost of vertex 2 is calculated as the minimum of the two ( (existing cost of vertex 2) or (sum of cost of vertex 1 + the cost of edge from vertex 1 to vertex 2) )

When all the neighbors of the current node are considered, it marks the current node as visited and is removed from the unvisited list.

Select a vertex from the list of unvisited nodes (which has the smallest cost) and repeat step 4.

At the end there will be no possibilities to improve it further and then the algorithm ends

The outer loop runs for |V| times

The inner loop runs for |V-1| times for a complete graph as each vertex has |V-1| edges.

Also, for each iteration of the inner loop we do an extractMin and a reduceKey operation for the vertex.

Hence the total running time has an upper bound of O(|V| * |V-1|). This is the upper bound, O(|V|2)

Point worth noting is that the complexity will actually depend on the implementation of the data structure which is used as the Queue.

### 3.2 Mathematical Model

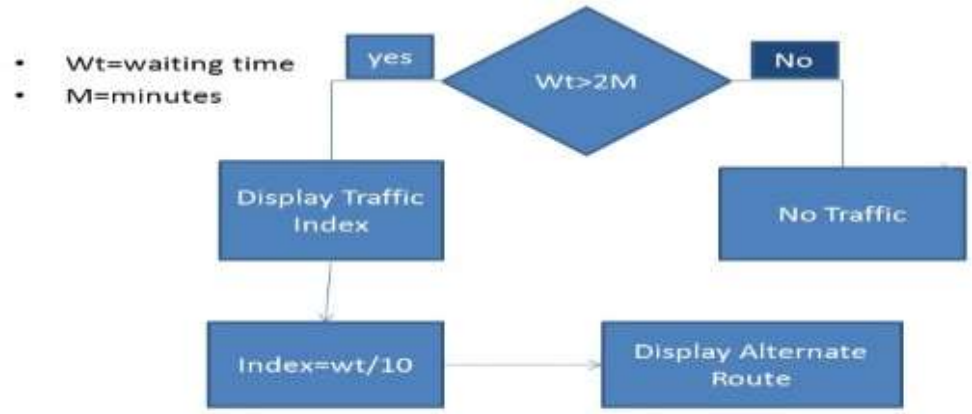


**FIG:3 MATHEMATICAL MODEL**

The Mathematical Model describes the logic of the system for alternate routes.

If the waiting time of a vehicle is more than 2 minutes then the traffic index will be displayed to the user else no index will be displayed.After displaying the indexes the user will be provided to choose between the various routes and then the chosen route will be displayed using GPS.

## 4. RESULTS AND DISCUSSION

It has been found that dijkstra's algorithm is much better than any other algorithm for determining the shortest path.The tracking system First is parent side and another is child side. Parent side acts as server and child side acts as a client. Basically there are two android phones one is at child side and another is at parent side. Parent's side used SMS service for communicating to child's mobile and with the help of map parent used to view child's location on map.That's why it uses internet and telephony services enable at parent side to track child's location. At child's side another android phone supports GPS and SMS facilities. Child side uses telephony services to communicate with parent side. In child side location services that is GPS is enabled and running in child side .And parent side uses internet connectivity to view child's location on the map. At parent side requirements are mapped for tracking and service(listener)for listening messages coming from child's side. On the child's side listener service always runs in background, at parent side used to send SMS for location of child Parent side listener used to listen Childs reply for location request. There are two main functions at child side. To listen and gets location from satellites or network provider. Listener is a very important service at Childs side to listen all SMS incoming and reply SMS which only related to location requests.When parent sends location requests to the Childs side, at child side it listens message and code for this message to reply the location requests on map at parent side.The application is programmed to listen the predefined strings. At the listener the instructions or commands are saved such as "$getUpdate$" will be used by sending parent side location requests. Whereas "$update$Coord"will be used at child side for location update.

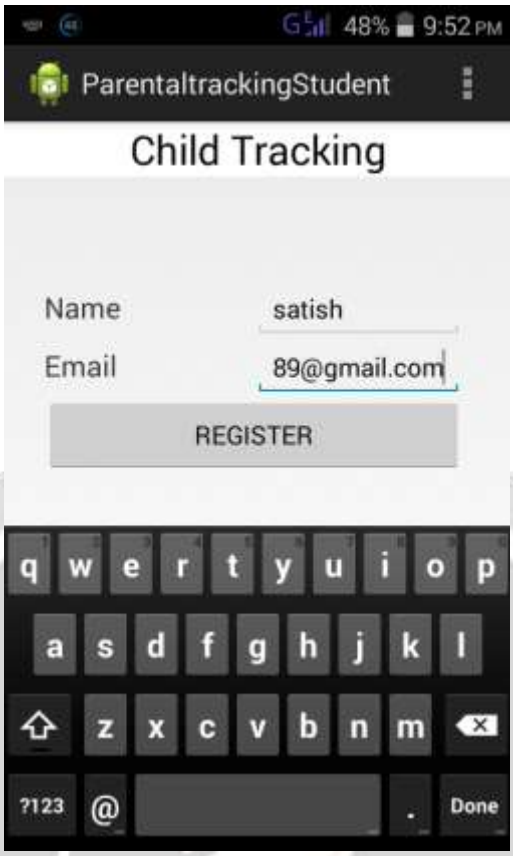


**FIG : 4 MODULE 1**

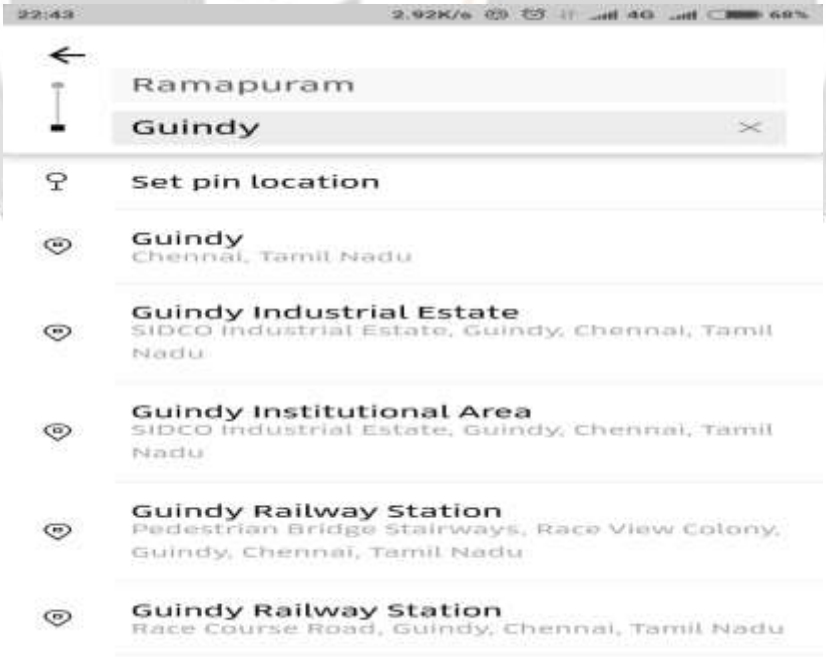

**FIG:5 MODULE 2**

| ROUTE | NEXT POINT | TRAFFIC INDEX |
|---|---|---|
| Route 1 | Arcot Road | 3 |
| Route 2 | Mount Road | 2 |
| Route 3 | Kamarajar Salai | 5 |

**TAB : 1 TRAFFIC INDEX**

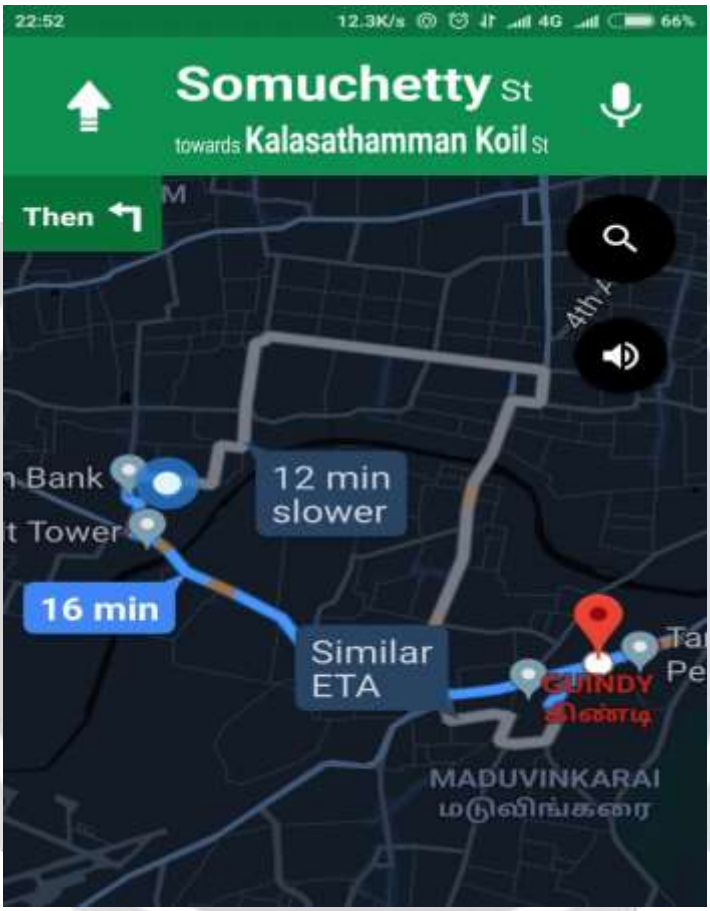


**FIG : 6 MODULE 3**

**5. ACKNOWLEDGEMENT**

We would like to thank Ms.S.Shanthalakshmi Madam for guiding us successfully to finish this project.

**6. CONCLUSION**

Initially we planned to implement our routing system using floyd warshall's algorithm.But as it turns out it is not so efficient in determining the shortest paths.So after a long discussion we thought of implementing our system using dijkstra's algorithm.

1) It is used in Google Maps

2) It is used in finding Shortest Path.

3) It is used in geographical Maps

4) To find locations of Map which refers to vertices of graph.

5) Distance between the location refers to edges.

6) It is used in IP routing to find Open shortest Path First.

7) It is used in the telephone network

where as floyd algorithm has various disadvantages like

1)It is much slower. O(V^3).

2)Harder to understand.

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