



Sri Lanka Institute of Information Technology

E-Road Management System

Project proposal



Submitted by

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1. Abstract

As the time become the fourth dimension of the world and the modern societies tend to move towards a globalised system of World with time saving instant access of works, by means of perfect and speed up communication and it can be reached towards a higher place with the advancement of Information Technology.

In this competitive world the mobile communication became the easiest accessible way to meet these challenges in a tactful way. The mobile nature and today's mobile administration requires immediate information access and total flexibility towards the users for a successful infrastructural accomplishment for this fast growing world.

This technology comes through as the optimal portable solution for the information access, management and improved communication, while providing the strongest security measures in the market today.

With regards of the above mentioned theme a data base system and a proper scheme for real time path and vehicle guidance will be proposed and produced. The proposed System includes a unit equipped position determining system adapted to determine their present position with the processed information regarding precise location of the roads and land marks which can be retrieved via the mobile phones continuously.

Clients should be permitted to access the system anytime, anywhere and at any instance through web based mobile or mobile. The Administrator of the full control system should be able to keep update the system through sending sms to the system or by accessing to the system through the internet or update through internet accessible cell phones or GSM mobile phones . Anyone should be able to share resources and exchange ideas through the internet.

The inspiration for this research is to solve the problems of the client regarding the location where he/she on, paths towards the destination point, inform the Client about the pre-planned road blocks, accidents, place descriptions and provide better transport services to the Client.

With regards to the above problems, our team comes across with the solution called **E-Road Management System**. The ERMS unit broadcasts the update traffic patterns in real time, thereby enabling the Clients to dynamically calculate the desired optimal travel paths.

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3.Literature Review

4. Research Problem

Since the number of road vehicles and passengers is rapidly growing in the fast growing world, there is a perpetual need for gaining the precise location during the travel, safety-critical traffic automation, proper transportation with minimal timing. The main goal of our research to provide the accurate information of all these in a minimal lag time by means of information technology ,position determination with the help of GSM providers via mobile phones.

The project supports the development of reliable and optimal control structures for urban traffic and for motorway systems. The intelligent and cooperative set-up of actuation and its linkage to the central control system is vital for avoiding traffic jams and accidents. Moreover, environmental costs (e.g. pollution) can be decreased.

One aspect of the project aims at developing a traffic control algorithm for future technology. The design of the traffic control system can be evaluated in two steps – synthesis and analysis. Several models and multiple control strategies exist, and engineers must decide between them using a priori knowledge of the real system.

Previously collected information can help to choose the appropriate model, parameters, measurement and control methodologies to create the optimal solution. In many cases, control-related variables are almost inaccessible for design unless estimation techniques are applied. In a situation like this, the approximation, computer-based estimation of the variables could be useful.

Traffic simulations can be classified in several ways, including the division between microscopic and macroscopic, and between continuous and discrete time approaches. The methodologies of static and dynamic analysis of traffic systems are known. Several state variables, derived from the description of the dynamic system, can be used for operational and planning aspects. A

newly emerged area is demand estimation through microscopic traffic modeling.

The dynamic aspect of traffic simulation requires previously measured or estimated volumes of traffic. Since the measurement of certain variables in the dynamic description is rather costly, one tries to estimate them. For instance, the observation of constantly varying turning rates at a simple intersection is fairly costly. However, the number of turning vehicles could be applied to traffic light harmonization, or generally speaking to traffic light control.

5. Objective

The E-Road Management System (E-RMS), implemented to have to have both specific and general objectives. Those objectives are mentioned below.

- This is mainly focus on the reducing the traffic, to meet all requirements our system provide some services to our Client such as,
 - ✓ Providing best path to the Motorist with the help of Google Map. After Motorist's indicating where they want to go it may show the entire best path avoiding traffic and road blocks.
 - ✓ In real time if any road or two end points jammed in traffic, in a short amount of time it will be updated in the system. After that the system will automatically set a best path between two end points in Google Map.
 - ✓ If any accident happens, after the authorize person update the system. The system automatically looks for nearby Hospitals, Police Stations and send emergency alerts (using auto generated SMS & mails). And direct them to the point. All this happen in a short amount of time.
 - ✓ A calendar is provided in our system, using that calendar Clients can get to know about the pre-planned road blocks and the alternative paths.
- ❖ Transport services plays a huge role in a growth of a Country and tourism provides is the major income in our Country to get more income, we have to provide more and more services. To cover those two requirement our system provides following ideas,
 - ✓ Client can search a place (e.g. Colombo) and in on enter, the system will provide with pointing the place in Google Map

and pointing all important locations in that place just like Hotels, Schools, Hospitals, Airport, Railway Station, Police Station.

- ✓ Buses, bus routes and distance also shown in the Google Map when Client searching for a place.
- ✓ Hotels, Hospitals, Railways, Airports, etc. are provided from an authorized web page (profile) there they can update their services and can provide services to our Client such as online reservation. After Client Search the place in Google Map and click on it Clients can view this page or profile.

❖ Mobile accessibility, it is help to anyone, who don't know the place or nothing about his location.

- ✓ Using a mobile phone also Clients can get to know or identifies best path.
- ✓ Client needs the system will provide alternative paths as well, such as trains and flight services. After having a look whether our Client like to reserve tickets they can reserve tickets through our system.
- ✓ If the client doesn't know the place then he/she can know the place that where he is now, and he can know about travel services by interacts with the system.
- ✓ Then they can get the services and pay through the phone or by cash.

❖ It is very help to guess the future by using the past data. So to get to know about the past and develop today's motor ways our system provide features such as,

- ✓ Auto generated statistical graphs between population,

accidents, vehicles and more.

- ✓ Simulator, this is use to get to know how it will look like if any change happens in population, vehicles, etc. When the Client input some values in any of those the following outcome will arrives by studying the past stored data in the system.

5.1 Existing System

- Sri Lanka does not have an automated system to monitor or to control the traffic. Policemen in the cities and/or the traffic light systems control the traffic.
- According to this system it is difficult for us to know where the traffic is blocked in advance. Therefore, we have no way of getting out of it or to avoid it until we reach the destination.
- In the mornings and in the afternoons (peak hours) some electronic media both radio and television announces the roads that are blocked at the time.
 - These announcements make the people a little amount of help avoiding busy roads and selecting alternative routes without much delay. The problem here is that announcements are made only at a particular time.
- Association of Automobiles has taken steps to make their members aware of damaged roads.
 - This approach is restricted to their members and also to certain areas.
- There is no any mobile application developed to send traffic alerts or something similar to it.

6.Methodology

E-Road Management System

(ERMS) provides the information regarding road traffic, road block, accidents, preplanned road blocks, guiding the easiest path or alternative path via the mobile tracking system. Already offered **ERMS** is also considered when designing the system as it already facilitates some of the administration process.

Thus the proposed system is going to be used in the environment as an integrated system, using the facilities provided by other existing systems as well. It acts through mainly GSM and position determining map by provide the information via the mobile phone for the clients.

The typical users of the system are Travelers and clients and it has to be maintained continuously by the Administrator of ERMS database & Administrative staffs of ERMS.

There are number of operations that are to be through the proposed system. Some of them are indicate accidents, road blocks, traffic in Google map and a calendar it carries the pre-planned road blocks by the Government in addition to this the system will provide an alternative path to the Client by using the Google map by graphically. Ultimately the client can get the precise location and easiest way for his destination in an effective manner within a short time and more accurate way.

Thus it should need a global system by getting the information of all locations in a defined area for the client and conveyed via GSM providers at the same time for the user. Thus the revelation of our project is to provide our client with an accurate and efficient way to solve the existing problem domain.

Automate their day-to-day functions by a web based system, and a mobile based web, helps the relevant person to update the system by just send a short message service or login to their account through our website via the mobile phone, and they can easily keep the details of their location, exit points, paths to the destination point, and availability of transportation services through our proposed system. To make their existing website more user friendly, we decided to use Google map with the position determining system, moreover updating via a short message service continuously.

Our other introducing feature is auto generate graphs, this will help to get a brief idea about the past in road vs. traffics time, road vs. no of vehicles uses a particular road, accidents per year and population vs. vehicles. This is more helpful to the government to take the decisions and other to get some idea. Also we are going to introduce a **simulator**.

By using this simulator we can get what will happened in the future when no of vehicles increase, when population increase and when road conditions change what will happen. We think this is little challenge for us.

Hence satisfying all the requirements specified the project is going towards the goal of developing a reliable and easy to use tool for the ERMS.

The new system is going to radically change the way the Traffic control, transport services, as the will be input directly into the computer in this function.

This solution will also provide the following non quantifiable benefits

- Better relation with Clients.
- More accurate motorway history and information.
- Improved management information.
- Faster processing of staffs and services details.

- This solution will provide e-mail and internet facilities to all staffs of the ERMS.

For our web based mobile access system initially the place and area of our research will be defined in terms of precise location using longitude and latitude. We are selecting an area that can be easily accessible in various ways with the optimal transportation to the destination points with ticket reserving facilities.

After the definition of the area the information regarding the entry points, exit ways and information of roads will be collected manually and web access basis from the governance, police department and road development authority with the proper direction, accurate length, grading of the road, important landmarks, such as historical points, government institutions, private firms and various important places in view of the easiest convenience of the client.

As doing this, the most effective care on our clients and travelers kept in mind for their easily accessible paths in a quick web access basis via the GSM providers while they travelling. For that the collection of data regarding the roads and the land marks will be done in an effective manner with their distance between each landmark, distance from every road, distance between the roads and distance of the roads. This will enable the client in an accurate way to guide the destination point from the start point or from the point on the way.

After collecting all the data, the data will entered to our database in terms of longitude, latitude, location, distance of the roads and landmarks. Then entering data will be synthesized in a clear manner for an easy detection purpose to save the time in a quick access way. It should be kept in mind the most easiest landmarks not be missed and the names of the roads will be in their ancient name with their grading.

After processing all these data the map will be constructed with the geographical distribution by using the proper identification system as in the same way which has mentioned unversely at present. The identification marks will be put on clearly first then they will be noticed with their own names. Then only the client can easily palatable for our system in various occasions i.e. the user friendly accessibility. For an example to name the road in our map,

- the staring of the road,
- its end point,
- the direction of the road,
- the grade of a road (A- 45) ,
- the ancient name (Galle road)
- geographical distribution (longitude & latitude)
- the directions to and fro the destination and start points.

And for the mapping of a land mark

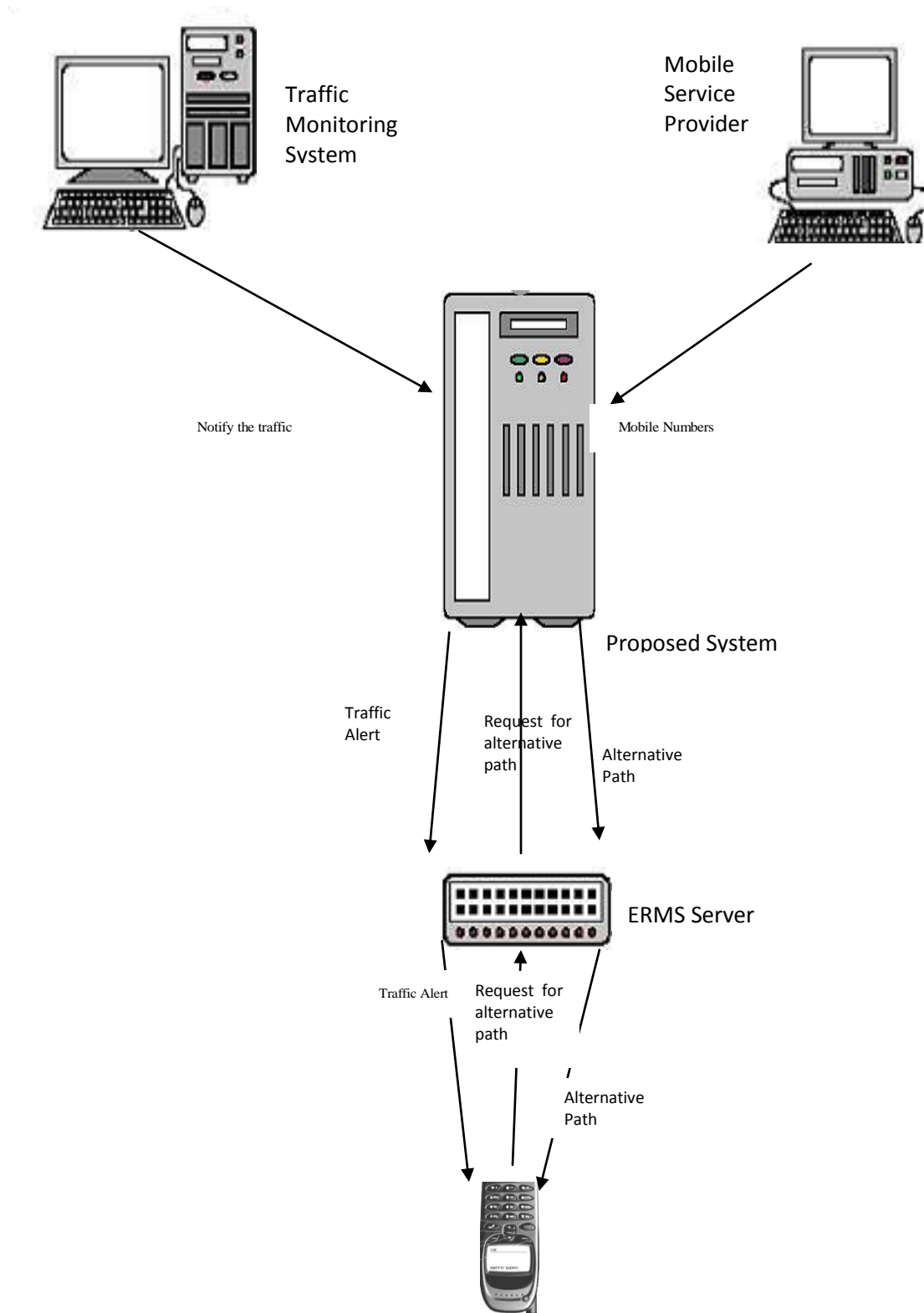
- The precise location in longitude and latitude
- The road name
- The importance
- Identification mark (eg. Red cross for hospital)
- Its proper name

With these fixed points we are keen on collecting the transportation facilities available in that area which can be used by the clients, ticketing methods and various service provider centers adjacent to that area will be mapped. Then the

ways of getting the transportation from the current location of the client has been showed in the mobile with the request of the client. And ultimately the transportation will be provided with the request of the client with the easiest paths to the destination.

This massive work up process required the help of various authorities and it should be in terms of most security of the client. That point will be analyzed properly during the process of work up of our research. All the tribulations of the clients and the solutions of the problems will be digested by the fastest mobile communication and they will be processed in the central database system and the final solutions can be retrieved by the client at the same instance with the minimal lag time.

6.1 Structure of give alternative paths of the Proposed System



6.2 Architecture Diagram

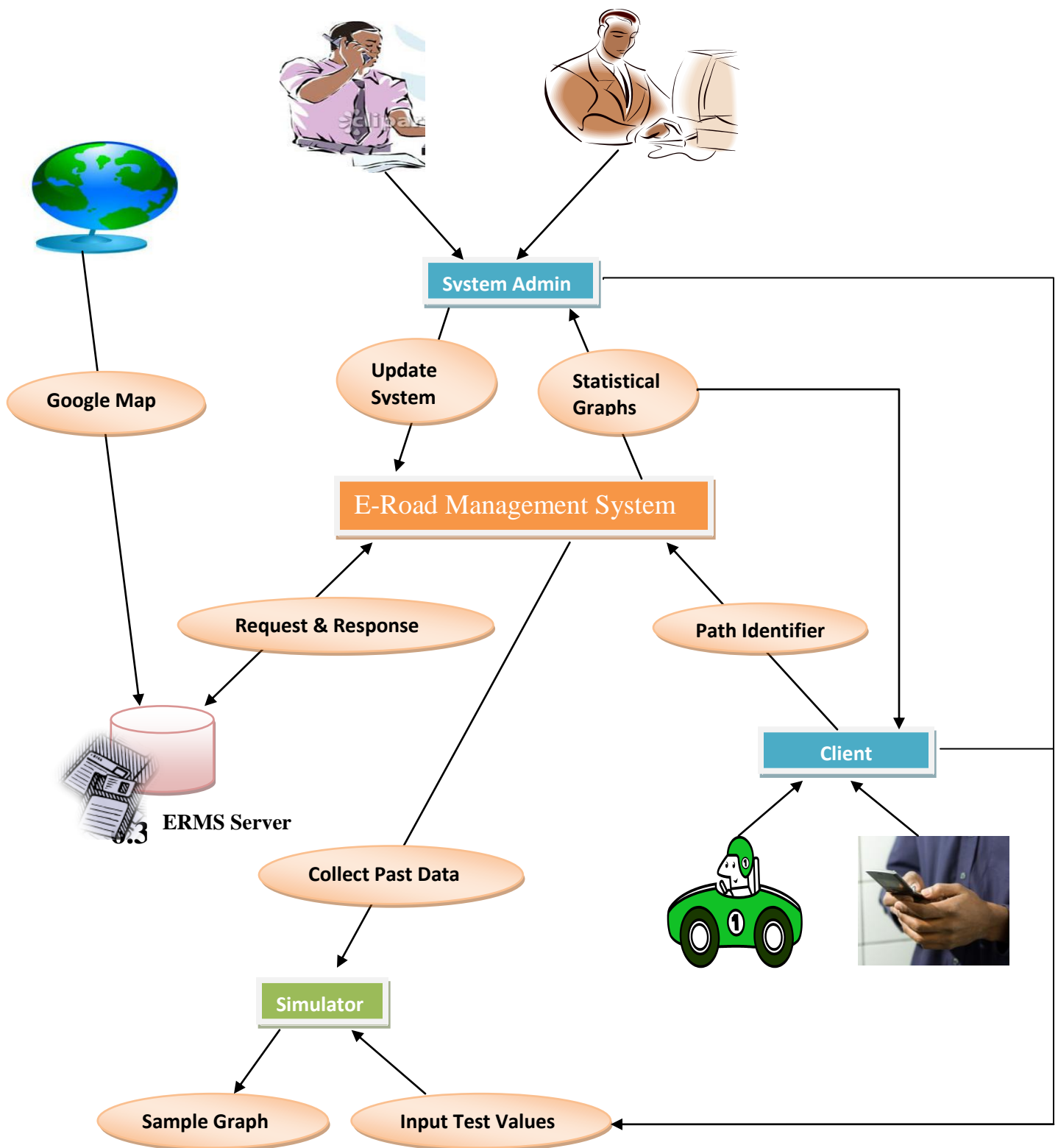
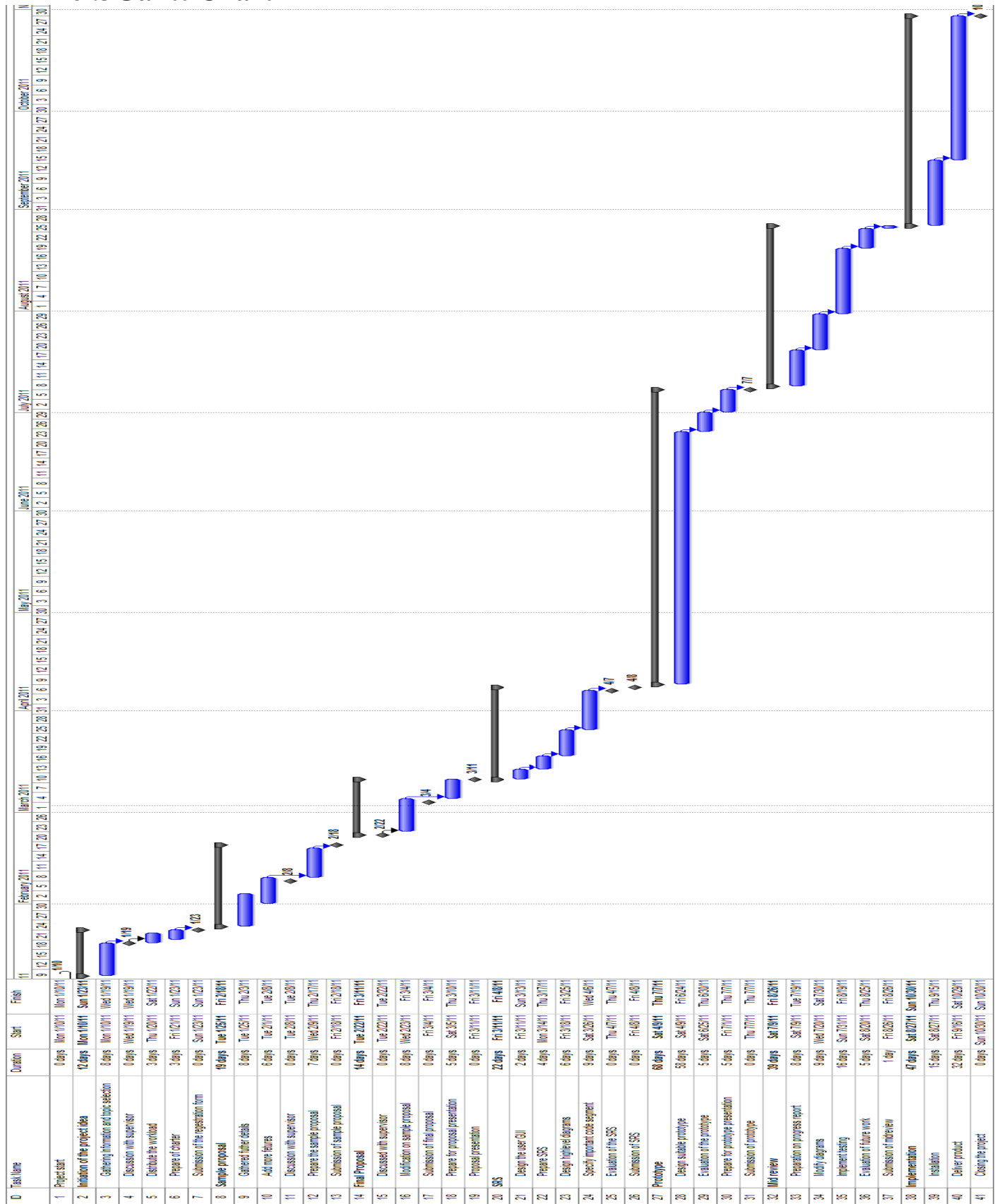


Figure -1-

6.3 Gantt Chart



7. Description of Personal and Facilities

| Group Members | Module Name | Description |
|--------------------------------|---|--|
| P.Premje DIT/08/C1/0215 | E-Destination Management Service | -DestinationManagementService. -Audio tracker. |
| R.Darshitha DIT/08/C1/0195 | E-Mobile Tracker | -Mobile access to the system. |
| Y.Tharangini DIT/08/M3/1604 | E-Statistical Analyzer | -AnalyticalSimulator. -Statistical Graphs. |
| V.Thivaharan DIT/08/C1/0235 | E-Path Identifier | -Traffic Controller |
| | | |
| Group Members | Roles | Resources |
| P.Premje | Feasibility study Requirement Gathering Requirement Analysis Design Coding Testing Documentation | <ul style="list-style-type: none"> • Microsoft SQL Server 2008 • WinA&D • Rational Rose • Visual Studio 2010 • Flash • Photoshop |
| R.Darshitha | Feasibility study Requirement Gathering Requirement Analysis Design Coding Testing Documentation | <ul style="list-style-type: none"> • Microsoft SQL Server 2008 • WinA&D • Rational Rose • Photoshop • Visual Studio 2010 |

| | | |
|---------------------|--|---|
| Y.Tharangini | Feasibility study Requirement Gathering Requirement Analysis Design Coding Testing Documentation | <ul style="list-style-type: none">• Microsoft SQL Server 2008• WinA&D• Rational Rose• Photoshop• Visual Studio 2010 |
| V.Thivaharan | Feasibility study Requirement Gathering Requirement Analysis Design Coding Testing Documentation | <ul style="list-style-type: none">• Microsoft SQL Server 2008• WinA&D• Rational Rose• Visual Studio 2010• Flash• Photoshop |

8. Budget with Budget Justification

| Description | Amount Rs. |
|-------------------------------|--------------------|
| 8.1 Software Expenses | |
| Microsoft SQL server 2008 | 8500/= |
| Rational rose | 9000/= |
| Visual Studio2010 | 37,500/= |
| Photoshop-CS3 | 5700/= |
| Coral Draw | 10,000/= |
| Flash Professional-CS3 | 10,000/= |
| MS-Office | 13,700/= |
| Total Software Expense | 94400.00 |
| Total Employee Salary | 2,70,000.00 |
| 8.2 Other Expenses | |
| Printouts | 2000/= |
| Photocopies | 1000/= |
| Traveling expenses | 1000/= |
| Internet browsing | 4000/= |
| Stationery | 1000/= |
| Transport expense | 5000/= |
| Total other expenses | 14000.00 |
| Domain Server | 6000/= |
| Total Expenses | 20000.00 |

9. References

Web sites referred:

- **For mobile application**

www.developer.com

www.4guysfromrolla.com

www.codeproject.com

www.garret.ru/~knizhnik/wap.wml

www.cellmania.com

- **For Others:**

<http://www.idrc.ca>

<http://en.wikipedia.org>

<http://en.wikipedia.org>

<http://www.epractice.eu>

<http://www.acps.com.sa>

<http://www.eroad.co.nz>

<http://www.pocketmedialive.com>

www.e-mobilesoft.com

www.gpstracker.com

- **For Traffic monitor and control**

www.transportation.ucla.edu

www.roadtraffic-technology.com

www.trafficwatchni.com/default.asp

www.ronake.com

www.solardome.com

10.Appendixes