



Sri Lanka Institute of Information Technology

# E-Road Management System

E-Statistical Analyzer

**Project proposal – CDAP 2011**

**Project ID: P2011-072**

**Submitted by:**

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-DIT/08/M3/1604

**Submitted to:**

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**Date of submission**

## 1. Abstract

Policing of road traffic in Sri Lanka has become a major task for police. Due to increase in volume of road traffic in the Island the Sri Lanka police facing many challenges to get control of it. But this is a difficult task to manually control it. So the author and the team are planning to create an application to solve this problem. By logging on to this system the user will be able to see the traffic congestions in cities especially during the peak hours and will be able to see the alternative paths to particular places.

Author's task in this application is to create auto generated graphs for Road Vs traffic, Road Vs No of vehicles and Road Vs Time. By viewing these graphs the users of this application will be able to manage their time and prevent unwanted delays. In addition to this an auto generated mail will be sent to the users to advise them on special occasions such as Kandy Perahara, Nuwara Eliya season Anuradhapura season, Kataragama and Thalavila feast May Day and visit of Heads of states and State functions. System will also send alert messages to the users about the accidents, road blocks, fire, explosions and other disasters. So the users can plan their programs ahead and avoid the unexpected circumstances related to traffic.

Furthermore the application will points out the speed limits in dangerous bends and curves. This will be done by lesson learnt by past accidents. By the initial analysis the numbers of accidents are increasing because of increased number of vehicles, poor development of road and poor traffic management. So this system will help to reduce the accidents by having good safety management measures. A graph will be generated within the application to see the statistics of the accidents.

In addition this application will also support to extend the knowledge of the users on road traffics. For example, the system will provide advice such as accidents can be avoided by limiting speeds in particular places; maintain safe distance with the vehicle in front and wearing helmets both the rider and the back seat person.

## **2. Table of contents**

### 3. Literature Review

#### 3.1 Description of the project

The deliverable product is referred to as **E-Road Management System (ERMS)**. A more enhanced system with lots of new features is proposed. The existing **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.

#### 3.2 Problem Specification

The typical users of the system are Travelers, Administrator of ERMS & Administration staffs.

There are number of operations that are to be supported 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.

The other problem which was brought to our attention was, how an Administrator update the system in a short predate of time, to this problem sms function is used. So it's sufficient to change the approach according to the current situation in the World.

#### 3.3 Solution Outline

The vision of our project is to provide our client with an accurate and efficient system to solve the existing problem domain.

Automate their day-to-day functions by a web based system, and a mobile based web with more features such as each and every day relevant person can update the system by just login to their account through our website, and they can easily keep track of the details of roads through our proposed system. To make their existing website more user friendly, we decided to use Google map, send sms to update the system.

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.

### 3.4 Key Benefits

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.

Architecture Diagram

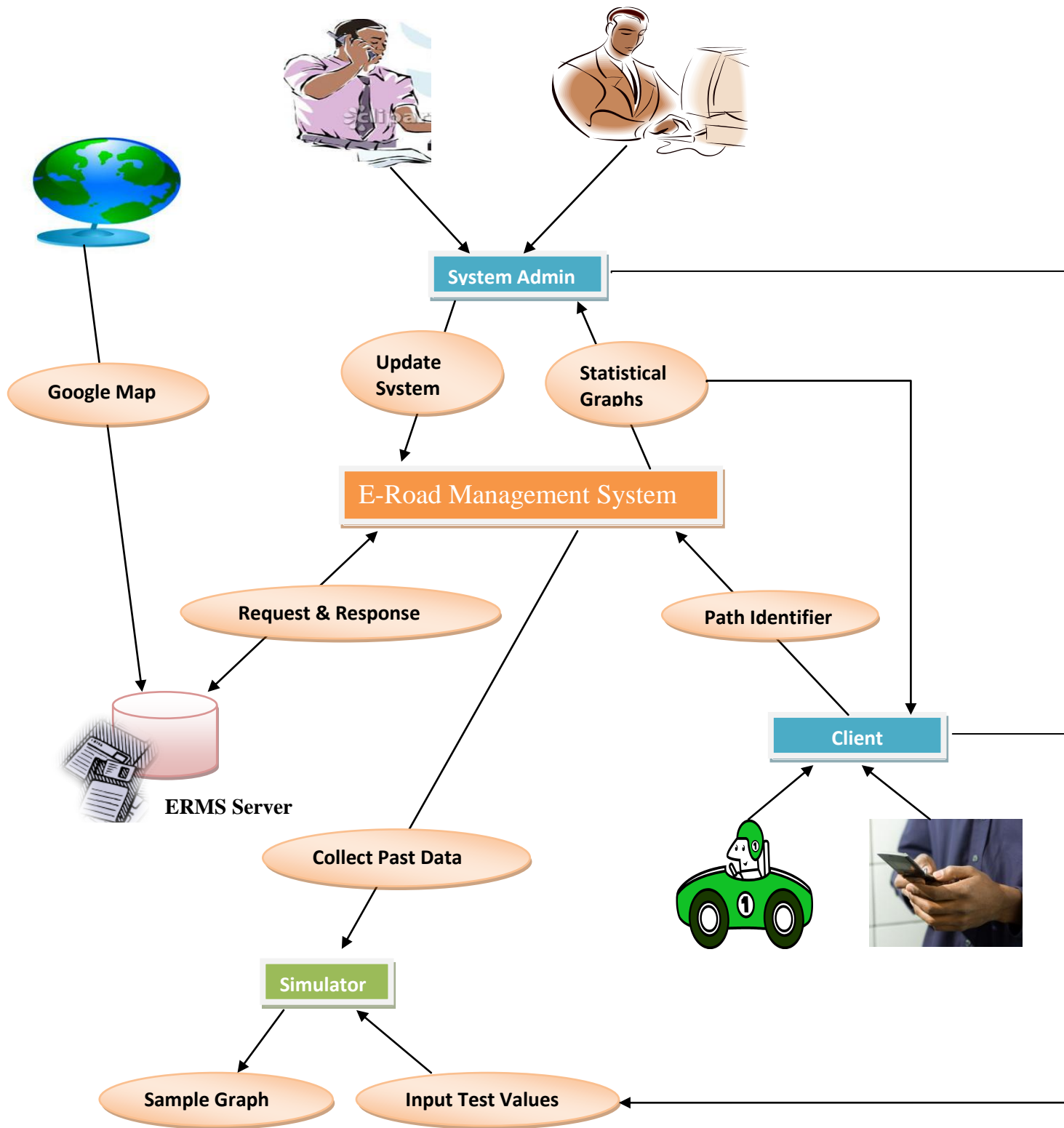


Figure -1-

## 4. Research Problem

Automotive technologies are gaining ground in modern road traffic-control systems, since the number of road vehicles and passengers is rapidly growing. There is a perpetual need for safety-critical traffic automation, and traffic engineering makes the dynamic or static analysis and the synthesis of automotive vehicle technologies possible. The main goal of engineering is the planning and management of traffic systems.

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 by us would have both specific and general objectives. Those objectives are mentioned below.

- System is mainly focus on the benefits and activities, which are done throughout the project. Before starting the project, we must have a certain specific strategies to deal with the problems and also a meaningful and achievable project must be chosen by us.
- Enable the Motorist/Clients to register online through our website.
- Keep track of the roads.
- Enable the system administrator to obtain reports.
- Provide a mechanism to get an idea about the future from the past statistical data.
- Ease the workload.
- Provides accurate and efficient reports.
- Minimizes the sever loss incurred to the company due to misuse of resources.
- Give an idea to the clients/Motorist about the roads and the best path.
- Provide an attractive and more user friendly website to the client
- Get the basic details of the Client (Name, Age, Contact No, and E-Mail Address)
- Through sending SMS or access the system through internet access able cell phone, update the system.
- Give an idea about important places in every district.
- Generate statistical graphs and reports.
- Simulator to get an idea about the future.

## 6. Methodology

Architecture Diagram

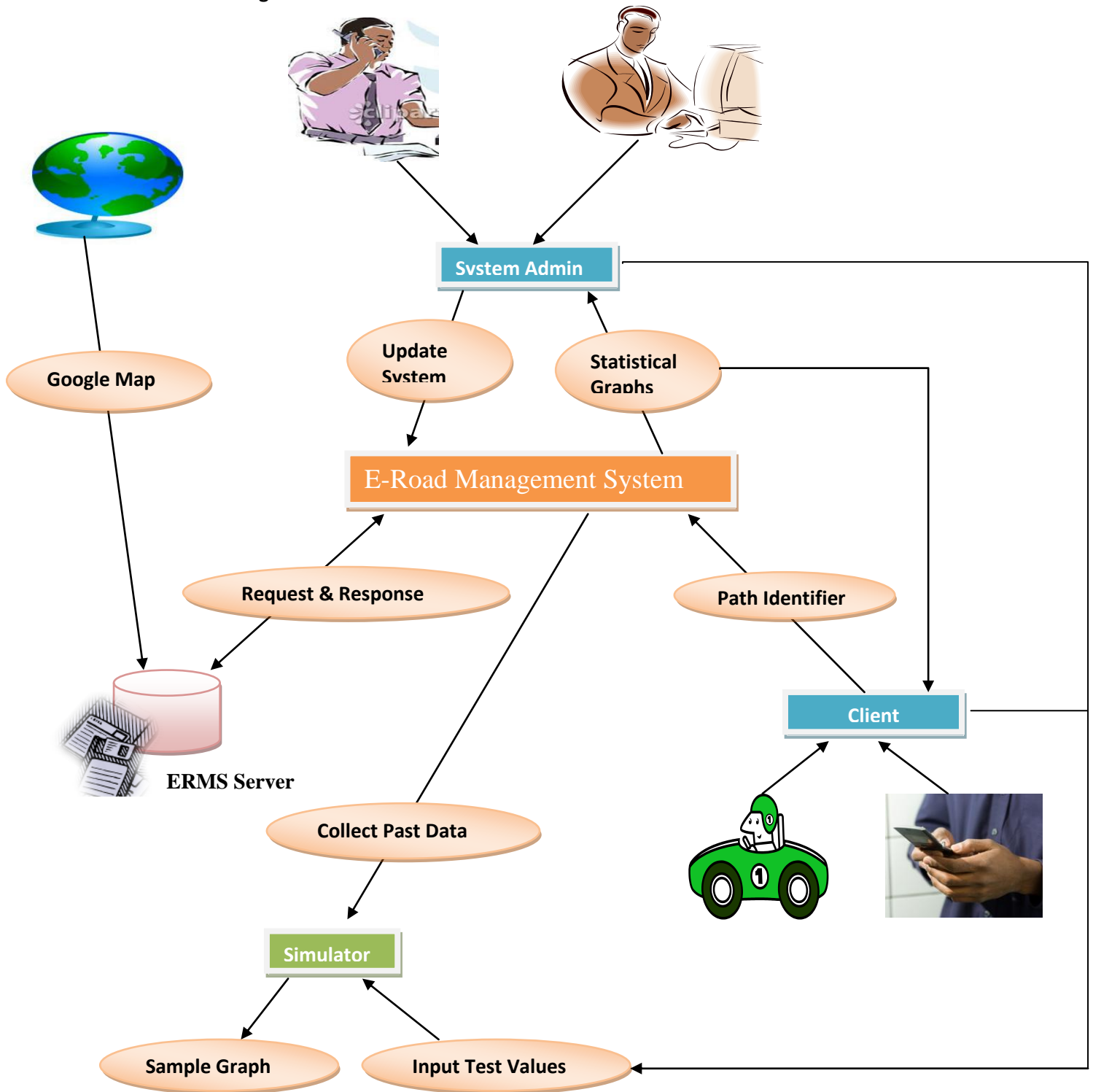


Figure -1-

## **Data collection**

Data collection will be carried out through two major sources; primary data and secondary data, which involves many methods of data gathering, where some of these methods will be applied in data collection process.

### **PRIMARY DATA**

Primary data are the data gathered specifically for the purpose of carrying out this particular project. The data collection methods suitable for this project would be questionnaires, interviews and observations. Thus, questionnaire analysis will be used in collecting primary data for data analysis, in generation of the final outcome of the project, where questionnaires will be distributed among generated among general public.

### **SECONDARY DATA**

Includes both quantitative and qualitative data, and they can be used in both descriptive and explanatory research. Secondary data could be either documentary or survey data, where documentary data are the data gathered through written documents such as; journals, newspapers, books etc.

### **QUESTIONNAIRES**

Questionnaires will be used in this project, as this is a more convenient way to reach more people at some distance. It is also an appropriate method of gathering qualitative data. Since the author has planned to send the questionnaires via mail, this can be quickly done and data analysis can be carried out in a timely manner. It can be expressed statistically as the same question asked from large amount of people. The author expects to get more accurate and honest answers form the respondents. .

## **INTERVIEWS**

Interviews are planned in order to gather data on current problem of traffic and accidents. Although interviews are time consuming, it is useful for gather details like the participant's point of view, opinions and the background information on the research area, such as barriers in implementing an e- road management system and problems raised by having particular policies on road and public safety. Interviews are also useful to obtain additional in-depth information and clarification from some of the questionnaire respondents.

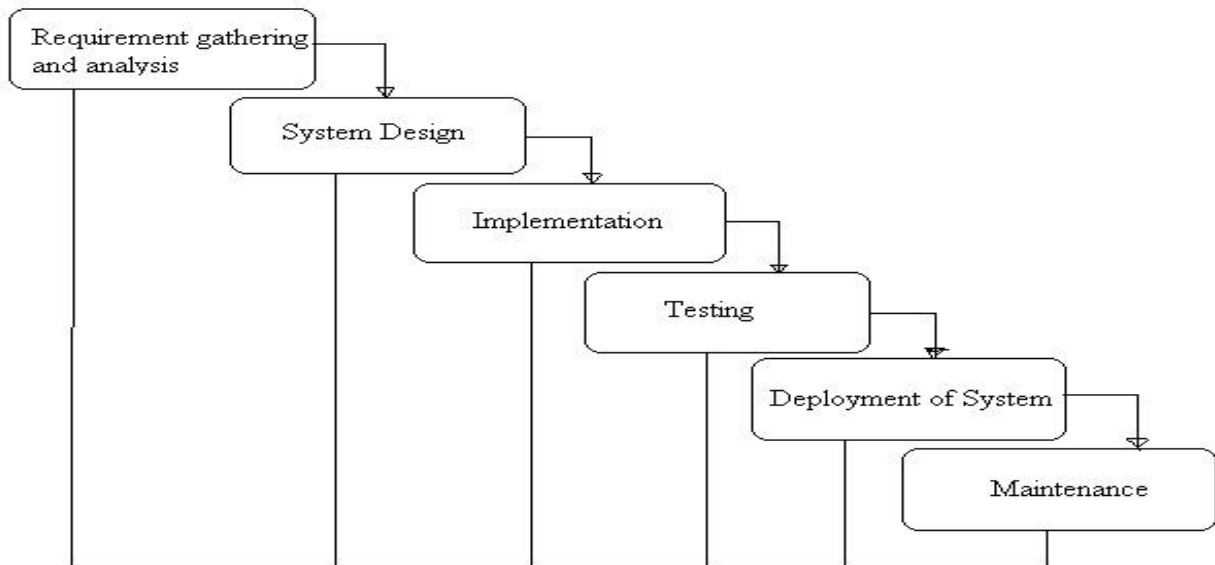
## **SURVEYS**

A survey is a data collection tool allows the researcher to gather large amount of data in short period of time. Surveys produce quantitative data, which has reliability and validity. The author will be conducting the survey through sending questionnaires via e-mail. This information is collected through use of standardize procedures, every participant will be asked the same questions. As this is a structured format of gathering valid data, the author will be using it to gather reliable data.

## **System Development methodology**

- **WATERFALL METHOD**

This model is a sequential design process, often used in software development process, where the progress is seen as downwards through the phases. In waterfall method the activities of one phase must be completed before moving to next phase. Once a stage is completed in waterfall method, there is no going back, since most software designed and implemented under the waterfall method is hard to change according to time and user needs. The problem can only fixed by designing an entirely new system, very costly and inefficient method.



- **AGILE METHODS**

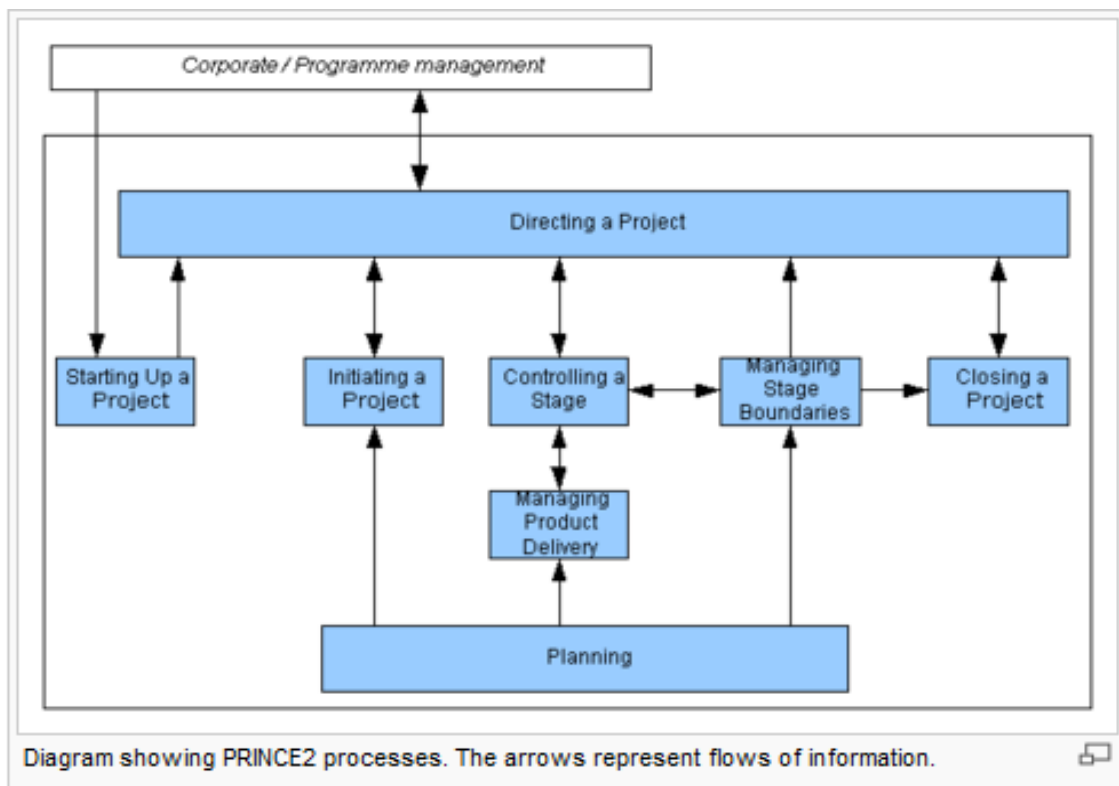
Iterative or incremental approach starts with planning and ends deployment with the cyclic interactions in between. Backtracking is possible within the iterative method. Author has seen agile methods as a sound for software development, as it adapts to change. With Agile, changes can be made if necessary without getting the entire program rewritten. Another advantage is it has launch able product at the end of each tested stage. This ensures bugs are caught and eliminated in the development cycle, and the product is double tested again after the first bug elimination.

- **TECHNIQUES AND TOOLS**

Use case modeling will be used to model the data. Use cases are powerful technique for capturing and communicating functional requirements for system development. The author finds this methodology the most appropriate to work with the stakeholders to identify the initial ideas of the system, model those ideas, and use that conceptual model to have stakeholder validate the requirements.

- **PROJECT MANAGEMENT METHODOLOGY**

PRINCE2 project management methodology will be used in this project, is a process based method for effective project management. The author uses this methodology as it gives skills to feel confident in managing a project successfully within the available resources. Also PRINCE 2 is recognized as a world class standard method for project management. Using PRINCE2 enables managing the risks more effectively.



- **PROJECT PLANNING MANAGEMENT TOOLS**

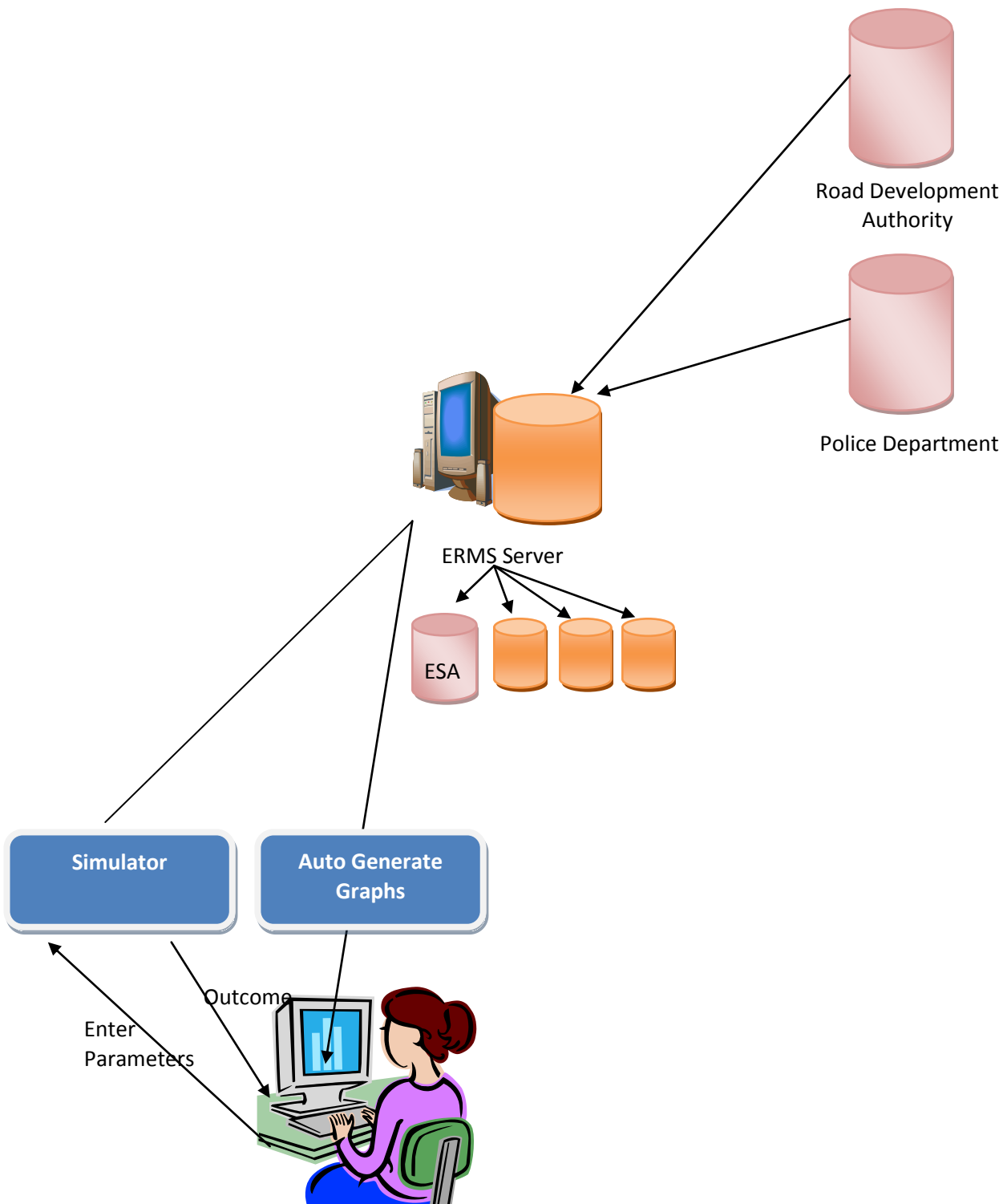
Microsoft Project is used to draw the Gantt chart and plan the activities. This Gantt chart illustrates a project schedule, start finish dates of the terminal elements and summary elements of a project. It also shows the dependencies between activities. Mile stones focus mainly on the end dates which reminds the particular task need to be complete or certain objective need to be achieved. The actual project plan for this project is given below in this chapter.

A risk register is a tool commonly used in the project planning within the context of PRINCE 2. It has been decided to maintain a risk log according to overcome some unexpected risks. It will be helpful for identifying, analyzing and managing the risks. It contains the information on the identified project risks, impact of the risks and the contingency plan for the risks.

- **SOFTWARE DEVELOPMENT METHODOLOGY**

To develop module ESA under ERMS there are some specific software planned to use they are,

- Visual Studio 2010
- SQL server 2008
- Fusion Charts





## Graph Generation

Graphs are often an excellent way to display your results. In our system 'graph generation' is one of the most important parts for managing the traffic in Sri Lanka. It will help to easily read data on a graph rather than paragraphs as the data are visually appear in the graph. It handles large data in a small area.

### a) Road VS Traffic

Our system will be generating Road VS Traffic Graph in order to enable the users with effective time managed transport. For example this graph will help to quickly and easily identify the traffic roads in peak time by render animated charts. It will be useful for the users plan their time of the drive ahead. It will avoid problems to public and reduce the wasting time.

### b) Road Vs No of Vehicles

This graph will show the number of vehicles in a particular road. By viewing this graph traffic police can make decisions on managing signal time and traffic. This will enable to view the graphs and find quick ways to hospital ambulance service and emergency vehicles. This data will be helpful to diagnose the road crash problems and for monitoring road safety issues.

### c) Road VS Traffic Times

This graph will be used to show the peak traffic times in a particular road. For example X road will be more traffic at 8.00AM to 10.00 Am and 3.00Pm to 5.00PM. So this will help the users to select flexible time for travel. By viewing this people can also use different methods of transport by calculating the time.

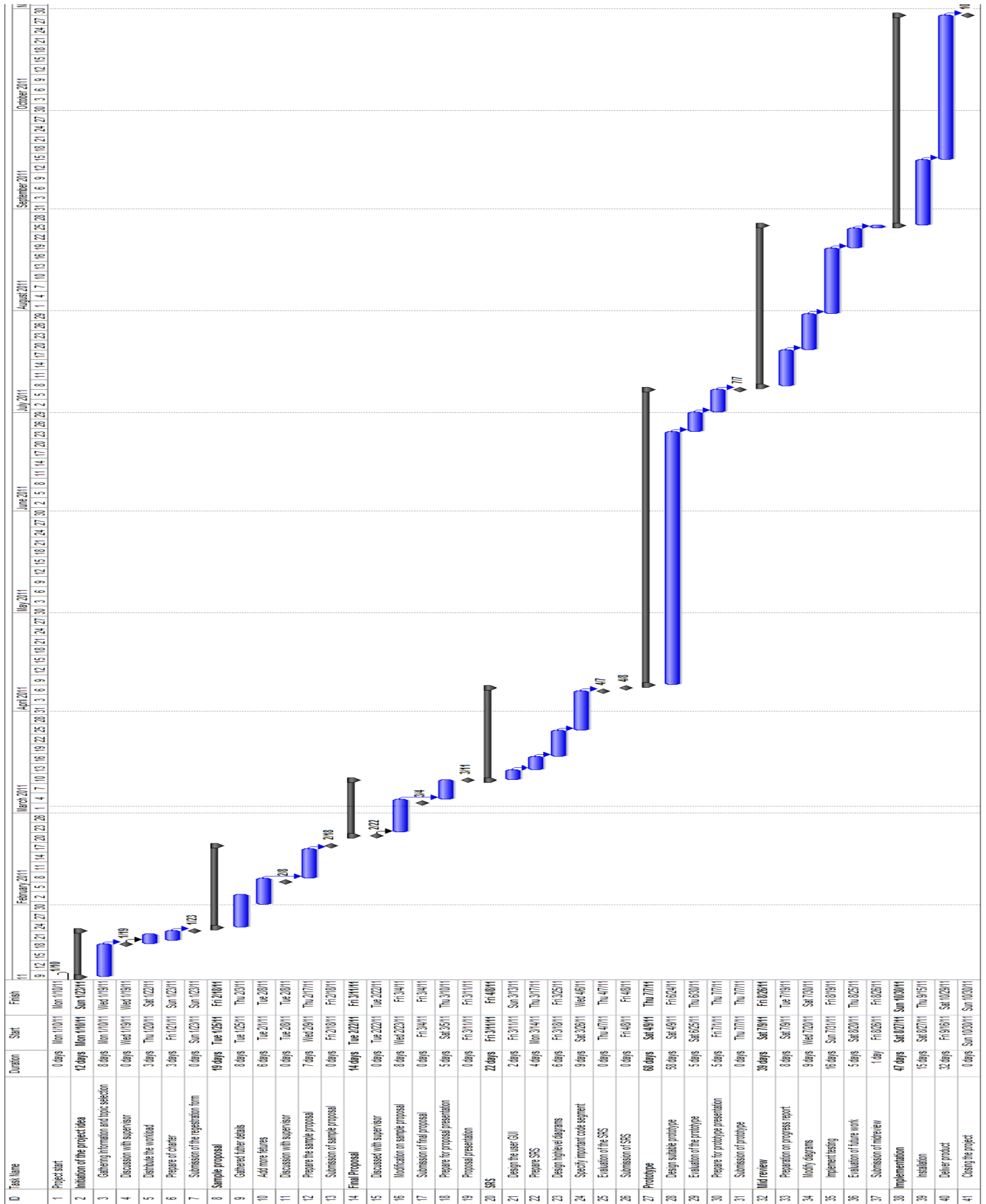
- d) **Accident statistics.** This graph will show the number of accidents held at the particular road. Traffic police can make preventive actions for these places by viewing the graph. Also by giving alert about these particular places people can reduce future accidents. Government can make further development to the particular roads if the accident is happening because of poor infrastructure.

### **System Auto Generate the mail**

The system will auto generate the mail to give alert information's about road blocking in some special conditions to users. It will send mails with snap shots of the Google map. It helps users to easily identify the path of blocking areas and roads.

### **System act as an advisor**

To reduce the accidents and other problems this application will be giving advice by giving notifications to the user about safety travelling and giving awareness on road rules. This will be helpful to school children and the other users.



## 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
<b>P.Premje</b>	Feasibility study Requirement Gathering Requirement Analysis Design Coding Testing Documentation	<ul style="list-style-type: none"> <li>• Microsoft SQL Server 2008</li> <li>• WinA&amp;D</li> <li>• Rational Rose</li> <li>• Visual Studio 2010</li> <li>• Flash</li> <li>• Photoshop</li> </ul>
<b>R.Darshitha</b>	Feasibility study Requirement Gathering Requirement Analysis Design Coding Testing Documentation	<ul style="list-style-type: none"> <li>• Microsoft SQL Server 2008</li> <li>• WinA&amp;D</li> <li>• Rational Rose</li> <li>• Photoshop</li> <li>• Visual Studio 2010</li> </ul>

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

## 8. Budget with Budget Justification

Description	Amount Rs.
<b>8.1 Software Expenses</b>	
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/=
<b>Total Software Expense</b>	<b>94400.00</b>
<b>Total Employee Salary</b>	<b>2, 70,000.00</b>
<b>8.2 Other Expenses</b>	
Printouts	2000/=
Photocopies	1000/=
Traveling expenses	1000/=
Internet browsing	4000/=
Stationery	1000/=
Transport expense	5000/=
<b>Total other expenses</b>	<b>14000.00</b>
Domain Server	6000/=
<b>Total Expenses</b>	<b>20000.00</b>

## **9. References**

## 10. Appendixes

