**Interim Report**

**Level 4**

**Community Based Train Locating System (CBTLS)**

D.N.H Senevirathna

139180A

**Supervised by**: Mr. Saminda Premaratne

Faculty of Information Technology

University of Moratuwa

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Abstract

The main objective of this project is to propose and implement a real time train tracking system based on GPS, named Community Based Train Locating System (CBTLS), for the benefit of train passengers and train transportation of Sri Lanka.

The proposed system would be consisting of a native Android mobile application and a Web application. Any train passenger with a smart mobile device or a computer would be able to access the system through internet, update the train locations, compartment details, and view current and/or last known locations of a train, view analysis, predictions and suggestions on train schedules.

As an additional feature, a location aware alarm clock would be integrated into the native android application. This location based alarm is included in the system for the use of passengers to indicate when their destination has been reached.

Only the master data would be inserted into the system initially and the rest of the data required for system’s functionality is supposed to be inserted by the train passengers, and hence the system is community based.

In addition to the native android application’s functionalities, there would be an analytical component available in web application, allowing a selected set of users to view the patterns of transportation.

The location-aware android mobile application would allow the system to gather information regarding train’s location through passenger. The location would be gathered through GPS and the Network Location Provider of Android.

By providing a real time train tracking and management system it is aimed to improve the existing railway transport service. The availability of this real time train location and analytical information allows the Train Passengers to take accurate decisions on train schedules and alternative transportation methods.

The gathered Location data from the community is further processed by the web application to provide visual positioning using maps granting a wholesome view on train location. Positioning data along with analytical data would help train passengers and also the administration to identify the possible delays in trains and react to them effectively. This information could be used to facilitate accurate scheduling with regard to train arrival and departure on each station.

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Chapter 1

CBTLS – Community Based Train Locating System

1. Introduction

This chapter mainly focuses on the motivation, aims and objectives of the community based train locating system. The problems in the current train transportation system in Sri Lanka, identifying the problem to be addressed, the proposed method of addressing the problem and the proposed system is briefly explained in this chapter.

1. Background and Motivation

In today’s context, in city areas, especially around and in city of Colombo, a heavy traffic congestion could be observed daily on the roads, and it has become one of the major concerns in country as well. School students, University Students, Government and public sector employees, and general public have been facing a crisis when it comes to travelling in and out from Colombo daily.

The valuable man hours and other resources which are wasted on roads could be easily preserved by introducing proper alternative methods of transportation and by enhancing the efficiency, reliability and quality of currently available public transport systems.

When considering the alternative methods, Rail transportation has been considered as a main mode of transportation in Sri Lanka since a long time. Therefore it is very important to support and enhance railway transportation as an alternative method of transportation; this has been indicated in the annual report 2012 of Central Bank of Sri Lanka as below, (SLR - Sri Lanka Railway)

*“SLR has the potential to improve its services for transportation of passengers and freight thereby helping to reduce city traffic congestion to a great extent.”*

*“The limitations in the rail transport system, such as inadequate coverage, lack of carriages and inefficiency have compelled the general public to seek other modes of transportation. This has caused heavy traffic congestion, and thereby losses in terms of productive man-hours and energy utilization.” [[1]](#footnote-1)*

As mentioned above, the productive man hours, energy could be saved, and the heavy traffic congestion could be avoided to a certain extent by enhancing rail transportation service. The current issues mentioned above, inadequate coverage and lack of carriages could be addressed by providing required physical resources for the service.

The issue “inefficiency” could be considered as a main reason for general public to consider other modes of transportation in place of trains. The main objective of the system proposed here (CBTLS) would be to provide a means for the general public to use this “inefficient service” efficiently.

When considering the statistics provided by Ministry of Internal Transport - Sri Lanka, which is given in the table below, no. of passengers who has chosen train, increasing annually.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2010 | 2011 | 2012 | 2013 |
| Total trips operated (Both passenger and Goods trains) | 116,912 | 119,392 | 121,782 | 122,269 |
| No.of Passengers Carried (in millions) | 101.45 | 96.11 | 106.05 | 118.71 |
| Length the passengers carried on (Km in million) | 4,352.83 | 4,574.19 | 5,039.45 | 6,257.38 |

Table 1.1 - Sri Lanka Railways - Operational Statistics[[2]](#footnote-2)

Considering data shown in Table 1 above, the important figure in this context would be the “No.of Passengers Carried”. The variation of this figure is given below,

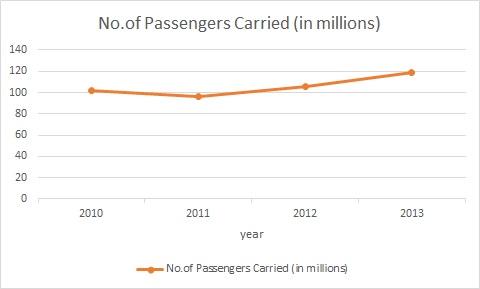


Figure 1.1 - No.of Passengers Carried (in millions) over 2010 - 2013 period

The increased number of passengers over the years indicates the increasing demand for the train as a mode of transportation.

In order for Sri Lanka Railway Service to draw and retain more passengers, there are several issues which need to be immediately addressed. Delay of Trains in Sri Lanka is very common and it is considered to be an unavoidable scenario, the general public have got used to it. As a transportation service, railway should maintain its reliability, and it’s important in country’s economic aspects as well.

Usually, a train might get delayed from 10-15mins to many hours, and in certain common scenarios, the train gets cancelled as well, this is without any further notification. These situations have even caused clashes among the passengers and the railway administration in the history, but the problem still remains unresolved to date.

A fixed schedule is maintained by the Railways department of Sri Lanka on train arrival and departure, it is available online, in mobile applications, and as various services, but the major issue is, it does not get updated based on potential delays and cancellations.

As a result the commuters face many problems and waste time and energy that can be used more productively. For people who are using trains for their daily transport, there’s no means of recovery of their time in scenarios when trains are delayed or cancelled.

If the passengers could know whether the train they expect to travel in is on time or not, before coming in to the station, preferably if they could know the current location of the train, they would be able to make a better decision on their method and time of transportation.

In railway administration’s point of view, if they could collect the train details on each and every schedule daily, along the entire route, that data could be used to analyse the existing issues in the system, the reasons for the train delays, locations where trains gets delayed. Then that analytical data can be used to identify the issues, find solutions to them and finally enhance the service.

Similarly, such analysis is important for passengers as well, when deciding which train to travel on, since the expected time of arrival at the destination indicated in the railway’s timetable would be much different from the actual time of arrival.

There are passengers who uses trains for their daily travelling, or frequently, who are much familiar with the railway system, specially the stations. There are some passengers who might seldom use railway transportation, especially like tourists. Such people might not be aware of the location of destination stations they want to travel to.

Such scenarios could be observed while travelling in train, people get in to the wrong train, which will not stop at their destination station, or people who have missed their destination station.

Usually in train stations, an announcement is made when a train is arrived in the station, indicating the next set of stations in where it would stop, but these announcements are not very clear, and most of the time is in Sinhala language, therefore people like tourists, who are not familiar with Sinhala, face a lot of issues when finding the correct train and destination stations. If there was a way for them to get an indication when they are reaching their destination, it would be a great help and they would grow in confidence to use railway service again.

1. Aims and Objectives of the CBTLS

The expected outcome of this research is to provide a comprehensive software application solution - named as Community Based Train Locating System (CBTLS), for the train passengers in Sri Lanka, which would help them for an efficient usage of current train transportation service in Sri Lanka.

CBTLS would be aiming at enhancing the usage of rail transportation service in Sri Lanka for passengers, by introducing new features for them which are not available in current systems as given below,

* Facility for the passengers to update train’s current location actively or passively
* Searching and locating trains in real time
* Providing information about the passenger density in each compartment of the selected train
* Predicting and suggesting most suitable train to take based on destination, and time of arrival at destination desired by the passenger.
* Analysis of data collected over a period on a given train, and indicate more accurate travelling times.
* Location based alarm to indicate if the passenger has reached the destination.

The proposed system will also be an enhancement and combination over the features available in currently available systems for the same purpose.

Additionally, the CBTLS would facilitate the storage and analysis of historical data related with each train by storing them in a centralized database. With this facility, authorized users would be allowed analyze patterns of train travelling daily, hence the delays could be determined.

As a community based system, it would allow registered users to post their comments, criticisms and suggestions regarding a selected train. Those could be allowed to be flagged by other passengers as appropriate or inappropriate by using a thumbs up system. Authorized users would be allowed to view these comments, criticisms or suggestions by the passengers.

1. CBTLS Implementation – how will it address the issues

This may have two-three sections.

In the first section you should write brief introduction including background and motivation for the project. In this you must also show the importance of the problem with the support from literature. This section should have citations to refer to items in the list of reference. Then write Aim and Objectives of the project under a separate heading.

In the next section, briefly state about your solution in terms of users, input, output, process, technology, features, and system requirements.

As the third paragraph, you should also add a section about the structure of the dissertation. For example, Chapter 2 describes the problem domain. Chapter 3 is on …….

1. Review of others’ work

Give a suitable name for this heading. For example: Current issues in MIS. This section should give a full description about background information of the project. Based on a literature survey, you should state about others’ approaches to solve similar problems and highlight your problem. Try to provide a table for comparison of different approaches. This section should necessarily have citations to refer to items in the list of reference.

1. Technology adapted

Sometimes, you may have more than one chapter for this topic. Give a suitable name for this heading too. An example title could be Expert Systems - beyond MIS. Here you should state about the technology that you adapt to solve the problem. Clearly point out how/why these techniques are appropriate to solve your problem. This should not be a description of some technologies, without referring to the problem that you address. This section should also have citations to refer to items in the list of reference.

1. Your Approach

Again give a name to reflect what your project is about (e.g. Using expert systems for

expanding MIS). Here you write on how you adopt the technology to solve the said

problem. This description may be presented with reference to users, inputs, outputs,

process, technology that implements the solution.

1. Analysis and Design

This contains details of design (or analysis and design) of your solution. Here you

should necessarily include a diagram to show at lest the top level deign of the

proposed system. Describe the modules in the diagram stating WHAT each module

does and its interaction with other modules/components. When ever you introduce a

Figure/Table remember to name Figures/Tables with a caption, and cite Figure (using

the caption) in the body of the text.

1. Implementation

In the interim report, this chapter may not be very descriptive. However, in this

chapter you provide implementation details of each module that is stated in the design

diagram. Remember to maintain the consistency between design and the

implementation sections. In describing the implementation, you should state about,

software, hardware, flowcharts, algorithms, pseudo codes, code segments as per each

module in the design. All these flowcharts, algorithms, etc. may be defined as figures

or listing and cite them inside the text. Extra details of implementations (e.g. source

codes, screenshots) should go to an Appendix.

1. Discussion

In general, after the implementation chapter, you should report on the

evaluation/testing of the solution. At the interim report you may not have done a

proper testing. If you have some test results, you can report them here. Then gives

good summary about what was discussed in the report. More importantly, you should

write how your solution differs from similar works by others. In this section, you

should also state further work of your project. As such present your plan for

evaluation of the system.

1. Reference

Here you should give details of citations that you have used in the text. An entry in list

of reference generally includes information such as Author, Year, Title of the Article,

Name of Journal/conference, page numbers. There are various reference and citation

styles, but you should use the one shown in the sample below.

<http://www.railway.gov.lk/web/index.php?option=com_content&view=article&id=126&Itemid=180&lang=en#IT>

<https://play.google.com/store/apps/details?id=com.sasyabook.runningtrainstatus>

<https://play.google.com/store/apps/details?id=lk.icta.mobile.apps.railway>

<https://play.google.com/store/apps/details?id=com.esri.android.VRMobile&hl=en>

<http://www.slrail.info/tracking/indexEnterSite.html>

<http://www.sundaytimes.lk/140629/news/launch-of-system-to-keep-track-of-trains-105121.html>

http://synergyy.com/2014/08/how-to-search-where-the-train-is-in-sri-lanka-system-to-keep-track-of-trains-click-www-slrail-info-25661/

1. Appendixes

You may have several appendixes to refer to further details related to chapters like:

Technology adapted, Analysis and Design, and Implementation.

1. "economic and social infrastructure - Central Bank of Sri Lanka." 2013. 4 Feb. 2015 <<http://www.cbsl.gov.lk/pics_n_docs/10_pub/_docs/efr/annual_report/AR2012/English/7_Chapter_03.pdf>> [↑](#footnote-ref-1)
2. "Statistics - Ministry of Transport." 2013. 4 Feb. 2015 <<http://www.transport.gov.lk/web/index.php?option=com_content&view=article&id=141&Itemid=113&lang=en>> [↑](#footnote-ref-2)