**CHAPTER 1**

**INTRODUCTION**

This thesis work is intended to document the bachelor project, whose name is “Traffic control system for cities of Punjab”. It covers the analysis, implementation and user’s guide of the project.

**1.1 Context**

Most of the problems faced by today’s traffic networks are caused by the ever-increasing usage of the traffic system. Traffic congestion is considered to be one of the prominent issues that needs attention. Traffic control and management experts and policy makers have come up with many possible solutions to solve the traffic congestion problem. Some of these solutions focused either on increasing the number of roads or lanes to cope with the demand, or on limiting the traffic demand by levying tolls and raising taxes for using the system. Also, due to political concerns and feasibility constraints, both of these options did not offer a promising solution. Another solution is to use the current system in a more efficient way. This option offers high benefits and potential both on the short term and the long term. This approach is worked out in this thesis, with a particular focus on the long term. In terms of conventional traffic control approaches, efficient utilisation is made possible by controlling and managing the roadside infrastructure intelligently, which in turn can improve the traffic performance.

Currently, this intelligence is introduced in the traffic systems by means of roadside based measures and control handles such as dynamic route guidance panels, ramp metering systems, dynamic speed limits, and also by means of infrastructure equipment such as sensors and actuators. Meanwhile, the other important element in the traffic system — i.e., the vehicles — have become much more intelligent. By this intelligence, we mean that the vehicles are equipped with a number of on-board sensors that help in gathering information such as their position and speed, and with many fast devices that process and present the obtained information in a meaningful and usable form [21]. These techniques can then assist or control the driver actions to sustain a safe and better driving operation.

**1.2 ITS(Intelligent transportation system)**

Road traffic is continuously changing in nature. New vehicle and infrastructure technology creates new traffic conditions. At the moment, Intelligent Transportation Systems (ITS) are becoming an increasingly important element in the traffic system. ITS can be described as telecommunications, computer and automatic control systems that interact with the vehicles in the traffic system and provide support for a more efficient utilization of the available resources. Examples of ITS include applications for traffic management, traveller information, public transport, logistics and driver assistance. The main motivation for changes and standard improvements in the traffic system has traditionally been to increase capacity and the qualityof-service, i. e. to allow increased speed and to reduce the time spent queueing. Today more attention is turning towards other issues such as road safety and the environmental impact of traffic. To remedy congestion, safety and pollution problems, it is important that the measures taken provide real benefits. In addition, scarce resources require prioritisation among alternatives. Impact assessments of proposed changes in the traffic system are therefore necessary. Traffic simulation models that describe operations in a traffic system has proven to be of use for such analyses.

ITS increase the complexity of the interactions between individual vehicles and the surrounding traffic and between vehicles and the infrastructure. Simulation is a powerful method for studies of complex systems. Traffic simulation is therefore likely to become more essential in studies of all road traffic systems. Many traffic simulation studies of the design of urban street networks and motorway operations have been performed. The road mileage is however in most countries dominated by rural roads (European Union Road Federation, 2007). So far, the use of traffic simulation for rural roads has not increased as much as the use of simulation for other road types. Today’s growing awareness of issues such as road safety and the environment has however brought an increasing interest in the performance of rural roads. Since traffic simulation has proven to be a useful tool for other road environments there is also a potential to use traffic simulation for rural roads to a greater extent than today. In addition, to account for the ever changing traffic system there is a need for flexible simulation models capable of describing effects of the ITS-applications of today and of the future. This thesis consider microscopic traffic simulation modelling of rural roads and the use of traffic simulation as a tool for evaluation of driver assistance systems. Various aspects of this wide area are covered by the papers that are included in this thesis. A traffic simulation modelling framework for rural roads is developed and applied for rural road design analysis. Issues in relation to the application of detailed traffic micro-simulation models are explored and requirements imposed on traffic simulation models to be used for analysis of driver assistance systems are analysed.

**1.3 Project Objectives**

The project aims to build the simulation model, show its behavior and present its result in a graphical user interface. The program will provide an interface to edit the traffic network. The program will also provide an interface to specify parameters such as simulation speed and traffic intensity levels before simulation starts or dynamically change during the simulation. Finally, the program will provide statistical results for data gained from simulation.

In summary, there will be two parts to the project.

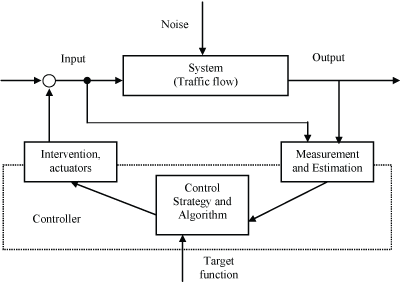
1. An interface to build any traffic network.

2. A simulation displaying the model run on the data supplied and producing statistical results.

**1.4 IRS advanced traffic management system**

IRIS is an [open source](http://www.opensource.org/docs/osd) advanced traffic management system. It provides an integrated platform for transportation agencies to manage traffic monitoring and control devices. The software is written in [Java](http://www.java.com/) and licensed for anyone to use under the [GPL](http://www.gnu.org/licenses/old-licenses/gpl-2.0.html). In addition, all dependencies required to install and operate an IRIS system are available as free software. IRIS stands for Intelligent Roadway Information System.

The IRIS software presents an intuitive map-based interface to system operators. This user interface has been refined over many iterations by getting feedback from operators to streamline their workflow.



**1.5 Functional area of intelligent traffic management**

Information technology (IT) has already revolutionized many industries, including transportation systems by bringing information to bear on the transportation network. IT will significantly help to solve surface transportation challenges over the next several decades, as an “infostructure” gets built alongside countries’ physical transportation infrastructure. Intelligent Transportation Systems focus on developing and deploying data solutions for traffic problems. The term Intelligent Transport Systems (ITS) has been introduced in transport and traffic engineering during the 1990s, and can be defined as holistic, control, information and communication upgrade to classical transport and traffic systems enabling significant improvement in the performance, traffic flow, efficiency of passenger and goods transportation, safety and security of transport, reduction of pollution, etc. [2].

The scenarios describe applications of ITS which deploy communications, control, electronics, and computer technologies to improve the performance of highway, transit (rail and bus), and even air and maritime transportation systems as seen on figure 1. Intelligent transportation systems include a wide and growing suite of technologies and applications such 4 as real-time traffic information systems, in-car navigation (telematics) systems, vehicle-toinfrastructure integration (VII), vehicle-to-vehicle integration (V2V), adaptive traffic signal control, ramp metering, electronic toll collection, congestion pricing, fee-based express (HOT) lanes, vehicle usage based mileage fees, and vehicle collision avoidance technologies.

**1.5.1 Special function areas**

1. Traffic guidance,

2. Incident management,

3. Demand management,

4. Meteorological information,

5. Road maintenance.

**1.5 Organization of Thesis**

The structure of the rest of the Thesis is as follows:

Chapter 2 presents the background of various IRS approaches for various systems and it covers the detail about. It also includes literature review of study.

Chapter 3 Tells about the present work, methodology in detail. It explains the algorithm and flowchart of present study.

Chapter 4 presents the results of study and compares this with existing techniques on the basis of different output parameters.

Chapter 5 contains the conclusion and future work. In the end references are marked.

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**CHAPTER 2**

**LITERATURE SURVEY**

Automated guided vehicles (AGVs) are used for the internal and external transport of materials. Traditionally, AGVs were mostly used at manufacturing systems. Currently, AGVs were also used for repeating transportation tasks in other areas, such as warehouses, container terminals and external (underground) transportation systems. This paper discussed literature related to design and control issues of AGV systems at manufacturing, distribution, transshipment and transportation systems. It was concluded that most models can be applied for design problems at manufacturing centres. Some of these models and new models already proved to be successful in large AGV systems. In fact, new analytical and simulation models developed for large AGV systems to overcome large computation times, NPcompleteness, congestion, deadlocks and delays in the system and finite planning horizons (2006). The article summarizes the hardware and strategies of the Bus Priority System, describes the second and third generation software systems, evaluates the various strategies, and presents research in traffic simulation and vehicle detection (1979). The Iris/ARTES 10 programme of the European Space Agency (ESA) aims to develop a satellite system for air traffic services (ATS) and aeronautical operational control (AOC) complementing the existing and future aeronautical communications infrastructure. This paper presented the approach to and the results of the Iris communication capacity assessment conducted in the first phase of the programme. The approach discussed within this paper was based on a combination of the message exchanges defined in the ldquo communications operating concept and requirements for the future radio systemrdquo document (COCR) of EUROCONTROL and FAA and realistic air-traffic scenarios. The generated voice, data and air traffic was intended for two major purposes: first to identify capacity and protocol requirements for the design of the Iris communication system and secondly as input for the system performance evaluation (2008).

**CHAPTER 3**

**PRESENT WORK**

**CHAPTER 4**

**EXPERIMENTAL RESULTS**

This chapter provides the information of simulation platform and experimental results of study. The results of different techniques are compared on the basis of output parameters.

**4.1 Simulation Platform**

Linux

**4.2 Introduction to Linux Operating system**

As biological data sets have grown larger and biological problems have become more complex, the requirements for computing power have also grown. Computers that can provide this power generally use the Linux operating system

* Linux is a command line interface, used by most large, powerful computers.
* It is very popular, and very easy to find information and get help.
* Linux is very stable - computers running Linux almost never crash.
* Linux is very efficient which can smoothly manage extremely huge amounts of data.
* Most new bioinformatics software is created for Linux - it’s easy for the programmers

**4.3 Architecture of the Linux Operating System**

**Kernel**

The Linux kernel includes device driver support for a large number of PC hardware devices (graphics cards, network cards, hard disks etc.), advanced processor and memory management features, and support for many different types of filesystems (including DOS floppies and the ISO9660 standard for CDROMs). The kernel (in raw binary form that is loaded directly into memory at system startup time) is typically found in the file /boot/vmlinuz, while the source files can usually be found in /usr/src/linux.The latest version of the Linux kernel sources can be downloaded from [http://www.kernel.org](http://www.kernel.org/).

**Shells and GUIs**

Linux supports two forms of command input: through textual command line shells similar to those found on most Linux systems (e.g. sh - the Bourne shell, bash - the Bourne again shell and csh - the C shell) and through graphical interfaces (GUIs) such as the KDE and GNOME window managers. If you are connecting remotely to a server your access will typically be through a command line shell.

**System Utilities**

Virtually every system utility that you would expect to find on standard implementations of UNIX has been ported to Linux. This includes commands such as ls, cp, grep, awk, sed, bc, wc, more, and so on. These system utilities are designed to be powerful tools that do a single task extremely well (e.g. grep finds text inside files while wc counts the number of words, lines and bytes inside a file). Users can often solve problems by interconnecting these tools instead of writing a large monolithic application program. Like other UNIX flavours, Linux's system utilities also include server programs called daemons which provide remote network and administration services (e.g.telnetd and sshd provide remote login facilities, lpd provides printing services, httpd serves web pages, crond runs regular system administration tasks automatically). A daemon (probably derived from the Latin word which refers to a beneficient spirit who watches over someone, or perhaps short for "Disk And Execution MONitor") is usually spawned automatically at system startup and spends most of its time lying dormant waiting for some event to occur.

**Application programs**

Linux distributions typically come with several useful application programs as standard. Examples include the emacs editor, xv (an image viewer), gcc (a C compiler),g++ (a C++ compiler), xfig (a drawing package), latex (a powerful typesetting language) and soffice (StarOffice, which is an MS-Office style clone that can read and write Word, Excel and PowerPoint files).

**CHAPTER 5**

**CONCLUSION AND FUTURE SCOPE**