Synthesis Report on ITS Including Issues & Challenges in India

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ABSTRACT

Intelligent Transportation Systems (ITS) is a well-established method for resolving or at the very least minimising traffic congestion. ITS encompasses all modes of transportation, including sea, air, rail and landand intersects various components of each mode, including vehicles, infrastructure, communication, and operational systems, where data is collected, analysed, and combined with other operational and control concepts to manage complex transportation problems. The main goal of ITS is to develop, evaluate, analyse, and integrate new sensor, information, and communication technologies and concepts in order to improve traffic efficiency, improve environmental quality, save energy, save time, and improve safety and comfort for drivers, pedestrians, and other users.

Keyword : Intelligent Transportation Systems, Traffic Congestion, Vehicle

Introduction

Vehicle ownership is an essential indicator of a country's economic development. The indirect effect of automobile ownership, on the other hand, is severe traffic congestion. In the last decade, India's metropolitan centres have seen a massive growth in automobile ownership, which has resulted in a slew of roadblocks and traffic jams. The fact that India has a wide range of vehicles – two, three, and four wheelers – as well as a big pedestrian population complicates the situation [Figure 1].

The main cause of traffic congestion in India is that road space and infrastructure have not kept pace with the increase in traffic [2]. The magnitude of the situation is represented in a World Bank research that estimates that the economic losses caused in India as a result of traffic congestion and bad roads alone amount to $6 billion per year [3]. The immediate solution to this problem through infrastructural improvements is hampered by space constraints and other logistical issues. As a result, there is a pressing need to investigate and create improved traffic management methods in order to alleviate traffic congestion.

Intelligent Transportation Systems (ITS) is a tried and true method of reducing traffic congestion. ITS is a broad term that refers to the application of technology to improve transportation infrastructure. The main goal of ITS is to develop, evaluate, analyse, and integrate new technologies and concepts in order to save energy, improve environmental quality, increase traffic efficiency, save time, and improve safety and comfort for pedestrians , drivers, and other users. [4-6]

ITS Taxonomy

The most commonly used classification of ITS is based on the positioning of the system as given below.

Vehicle Level

Deployed within vehicles, including sensors, Technologies information processors and displays that provides information to the driver.

Infrastructure Level

Sensors on and by the side of roads collect important traffic data. Tools of communication provide drivers with pertinent information to manage traffic better. These tools include roadside messages, GPS alerts and signals to direct traffic flow.

Cooperative Level

Communication between vehicles, and between infrastructure and vehicles involving a synergic combination of vehicle level and infrastructure level technologies.

The commonly adopted functional taxonomy of the ITS is as follows (7):

Advanced Traffic Management Systems (ATMS) integrates various sub-systems (such as CCTV, vehicle detection, communications, variable message systems, etc.)

Advanced Traveler Information Systems (ATIS) provide to users of transportation systems, travel-related information to assist decision making on route choices, estimate travel times, and avoid congestion

Advanced Vehicle Control Systems (AVCS) are tools and concepts that improve a driver's vehicle control, making travel safer and more efficient [8].

Commercial Vehicle Operations (CVO) is a system that combines a satellite navigation system, a compact computer, and a digital radio for use in commercial vehicles like taxis vans and trucks.

Advanced Public Transportation Systems (APTS) uses cutting-edge transportation management and information technologies to improve the efficiency and safety of public transportation systems.

.**Advanced Rural Transportation Systems (ARTS)** give data on off-the-beaten-path roads and other modes of transportation. Automated road and weather conditions reporting, as well as navigational information, are examples.

The efficiency of the ITS, depend critically on the following components:
- Automated data acquisition
- Fast data communication to traffic management centres
- Accurate analysis of data at the management centres
- Reliable information to public/traveler

Data Acquisition

Rapid, exhaustive and accurate data acquisition and communication is critical for real-time monitoring and strategic planning.
Sensors and detectors.
Automatic Vehicle Identifiers (AVI) and Automatic Vehicle Locators (AVL).
Global Positioning System (GPS).

Communication Tools

Dedicated Short-Range Communications (DSRC) allows vehicles to communicate with roadside equipment in specific areas (for example toll plazas).
Transceivers and transponders are included in the On Board Units (OBUs).
Telematics connects automobiles to the internet.

Data Analysis

Data cleansing, fusion, and analysis are all part of data analysis. Data from sensors and other data collection devices must be validated before being sent to the TMC.

Traveller Information

Travel advisory system facilities are used for relaying transportation-related information to the motoring public. These include: Variable Message Signs, Highway Advisory Radio, Internet, Short Messaging Services, automated cell phone messaging, public radio announcement, television broadcast and other modern media tools.

INDIA

The ITS program in India is aimed at ensuring safe, affordable, quick, comfortable, reliable and sustainable access for the growing urban and rural population to jobs, education, recreation and such other needs. In India, a few ITS applications have been deployed in metropolitan areas such as New Delhi, Pune, Bangalore, and Chennai, focused on stand-alone deployments of area-wide signal control, parking information, enhanced public transportation, and toll collecting, among other things. All of them are, however, small-scale pilot experiments that are limited to big cities and are still in the early stages of implementation. As a result, there are no completely developed ITS applications with traffic management centres in India at the moment [9-11].

Issues and challenges of ITS in India

Some of specific actions required to meet the challenges to ITS in India include:
• Creating a national ITS standard for various ITS applications and components.
• Establishing a national ITS clearinghouse that records all ITS initiatives, including design, implementation, lessons learned/best practises, and

cost-benefit analysis.

• Developing and implementing automated traffic data gathering methodologies,

• developing a national ITS data archive, and

• developing models and algorithms suited for ITS implementations

To stimulate greater interest and, as a result, projects in the ITS domain, more interaction between academia, industry, and government agencies should be encouraged.

Conclusions

Before India to have a fully functional ITS system, a slew of concerns and challenges must be addressed. The main challenges identified are:

• Establishing ITS standards that are applicable throughout India's urban and rural areas;

• Designing an ITS that accommodates India's heterogeneous vehicle population; • developing a comprehensive data collection system;

• Establishing a Data Centre

• Establishing active interaction between academia, industry, and government agencies.

- ➢ Government setting up rules and regulations of traffic that will aid in ITS implementation
- ➢ To meet the challenges in setting up a comprehensive traffic management system, the following tasks have to be carried out.
- ➢ Measurement and monitoring the performance of existing transportation management systems throughout the country.
- ➢ Establishing aggressive, yet achievable, near and long-term performance goals for transportation systems.
- ➢ Optimizing the performance of transportation network through the use of real-time data, predictive traffic models, improved integration between individual systems, and other state- of-art tools and strategies for improving safety, mobility and the environment.

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