

REVIEW ABOUT INTELLIGENT TRANSPORTATION SYSTEM

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Abstract: Rapid vehicular growth partnered with ever increasing population, rural to urban migration and economic upsurge has put immense amount of pressure on transportation infrastructure, especially on traffic management practices in urban India. This paper, attempts to understand the application of Intelligent Transportation System (ITS) as a solution to the current traffic management practices. ITS and its components have been discussed, followed by best practices of ITS employed around the world. Further, examples of various ITS application and policy measures in Indian context have also been discussed. Finally, a critical brief discourse has been addressed about issues and challenges of ITS application in India.

Keywords: ITS, traffic management practices, challenges of ITS application in India , policy measures.

1. INTRODUCTION

The term ITS was coined in 1994, and stands for “Intelligent Transport Systems” or “Intelligent Transportation Systems”. In a broad sense, an ITS is a system relating to mobility that has increased in sophistication through information technology (IT). However, the specific terms and concept differ according to the country and situation.

The Japanese government and the specified nonprofit corporation, ITS Japan, use “kodo doro kotsushisutemu” meaning ‘Intelligent road and transportation system’. But the institute of Electronics, Information and Communication Engineer, the Information processing Society of japan, the Institute of Electrical Engineer japan, and other use “kodo kotsu shisutem” meaning “ Intelligent Transport Systems”.

Intelligent Transportation Systems (ITS) is a well-known method to simplify, or nevertheless minimize traffic problem. The ITS aims at achieving traffic efficiency, reducing environmental, energy conversation, reduction in travel time, and enhancing comfort and safety of the users, with the help of information and communication technologies. The overall application of ITS consist of data collection analysis, and using the results of the analysis in the operations, control and research concepts for traffic management. ITS shrouds the components like means of transportation, physical function setup, communication and operations of any transportation forms including air travel, inland and ocean waterways, road and rail transportation.

2. Classification of ITS

The ITS classification is mostly based on the application of the systems to specific level, like vehicle level, infrastructure cooperative level, where the sensors, information processor, Communication systems, roadside message, GPS updates and automated trffic prioritization signals, etc., are key features in these, the common categorization of the ITS, which uses aforementioned application, comprises following:

- Advanced Traffic Management System (ATMS)
- Advanced Traveller Information system (ATIS)
- Advanced Vehicle Control System (AVCS)
- Advanced Public Transportation System (APTS)
- Advanced Rural Transportation System (ARTS)
- Advanced Commercial Vehicle operations System (ACVOS)

3. Components Of ITS

Traffic Management Centre (TMC) is the fundamental units of ITS. It is basically a technical setup administred by the transportation authority, where the data is collected and analyzed for further operation of TMC depends on the components like automatized collection, data transmission to TMC, precise analysis of received data and communication of trustworthy analyzed information to traveler.

3.1: Data Collection:

Real time observation and strategic planning needs precise, extensive and prompt data collection through verified hardware and competent software, that lays the foundation of further ITS functions. Automatic vehicle identifiers, GPS based automatic vehicle locators, sensors, cameras, etc. are few hardware used for data collection. These hardware are connected to the servers, generally located at data collection centres, which store large amounts of data for further analysis. The hardware mainly record the data loke traffic time, location, surveillances, travel speed, travel time, traffic count, vehicle weight, delay, etc.

3.2: Data Transmission:

This aspect of ITS consists of transmission of collected data from field to TMC and analysed information from TMC to traveler. Rapid and real time information communication is the key to proficiency in ITS implementation. Traffic related announcements are communicated to the traveler through VMS, internet, short range communication (DSRC) using radio and continuous Air Interface Long and medium Range (AILM) using cellular connectivity and intra-red links.

3.3: Data Analysis:

The data that has been collected and received at TMC is processed further in various steps which, consists of error rectification, data cleaning, data synthesis and adaptive logic analysis. Inconsistencies in the data and errors are identified with specialized software and rectified that is further altered and pooled for analysed further to forecast traffic scenario which is made available to deliver appropriate information to users.

3.4: Traveller Information:

Travel Advisory System(TAS) is used to inform the dependable transportation updates to the travelling users. This system delivers real time information like travel time, travel speed, delay, accidents on roads, change in route, diversions, work zone conditions, etc. This information is delivered by wide range of electronic devices like variable message signs, highway advisory radio, internet, short message services, automated cell phone messaging, public radio announcement, television broadcast and other modern media tools.

4. ITS practices in INDIA

Quite a few ITS projects have been implemented in India mainly in Metros and other big cities like Delhi, Ahmedabad, Bangalore, Chennai, Pune, etc. These various projects are of individual nature, and focus limited functions of the ITS, like traffic signal management, organized parking management, public transportation management, and highway toll collection centres to name a few. Most of these projects and pilot projects and are in primary operating stages for future large-scale implementation. Few examples of existing ITS practices in India.

4.1: Chennai:

Chennai has initiated Advanced Traffic Management system. This system compares of putting up a complete monitoring system using surveillance centres for traffic rules violators, especially at junctions, named as Traffic Regulatory management System (TRMS). Special purpose cameras having latest technology and high resolution image capturing capacities like Automatic number plate reader cameras, Pan tilt zoom Cameras, and CCTV cameras have been installed at various locations junctions. Automatic Traffic Control systems, along with TRMS helps to supervise and adjust the traffic flows without physical interference in deciding and changing the duration of signal waiting time, by the computerized analysis of next three signalized intersection and its synchronization. Apart from these systems, FM radio is also one of the significant sources of transmitting crucial blockages due to extreme weather, etc. in Chennai.

4.2: Mumbai:

Mumbai has implemented Area Traffic Control Project that deals with management of traffic flows at major junctions. Technological help is also taken from latest gadgets like, accelerometer guns, smart cameras for vehicle number detection radar sensor, etc.

4.3: Bengaluru and Hyderabad:

A pilot project has been introduced where real-time traffic scenario of major intersection and its secondary connector roads can be obtained through internet in Bengaluru and Hyderabad. The real-time images are available 24 by 7 on this internet based portal for those major intersection and these images are updated at every 15 seconds interval. In addition to internet advisory information system, SMS based system is also available to the road users and motorists to get the updates for traffic jams and restricted accesses due to ongoing construction and maintained activities.

4.4: New Delhi:

In the year 2009 a pilot project known as 'The traffic people' was launched to provide real time traffic condition and updates of in-and-around New Delhi (including NCR region). Basically with a web-based platform, this project was initiated for providing morning and evening peak hour traffic condition of selected locations. The idea was also to initiate SMS service with monthly subscription charges, but this service failed to function due to weak response from the people and unviability of the data.

5. Issues and challenges of ITS in India

Worked bank study reports some of the key concern that India is facing in implementing ITS: inefficient road network structure, financial boundaries observed in the government, unorganized and out of control urbanization and population growth, lack of willingness and also resources for operations and maintenance of the roads, lack of automation demand and road user awareness, negligence avoidance of decision makers. Efforts have been made to employ ITS application has been implemented, which is comprehensive and focus on all aspects. This scenario says that through the ITS application are becoming popular with transportation authorities, still there are lot of avenues for it to flourish, all needed is a systematic approach. Benefits of ITS can only be seen to the fullest when the application is done at road network level and not in small scale or corridor level. Apart from

existing ITS application in India, much needed aspects of focus has to emergency management, congestion management, advanced traffic management systems, advanced traveler information systems, commercial vehicle operations, advanced vehicle control systems, etc. looking at the present transportation context. However, present projects show potential future advancements in ITS in India. The steps that can help overcome the ITS standard for its various constituents and application; formulation of ITS regulatory authority under combined supervision of Ministry of Road Transport & highways and ministry of Urban Development which will monitor, regulate and document the upcoming and ongoing ITS projects; setting up fully functional Traffic management Centers for coordinating the urban and regional ITS activities; evolving a set of methodologies for automatic data collection techniques for Indian Traffic condition; setting up a national data repository for ITS; involving multiple stake holder like academia; government agencies and industries for better decision making and implementation of ITS application; to enable ITS application in wide spectrum, the current infrastructure has to be made complete enough for its successful functioning.

6. Conclusion

The rapid vehicular growth partnered with ever increasing population, rural to urban migration ever economic upsurge has put immense amount of pressure and transportation infrastructure and especially on traffic management practices in cities and towns of urban India. Based on the international experiences and best practices observed in the countries like USA, Dubai, Canada, European nations, United Kingdom etc., the application of ITS seems a promising solution for advanced traffic control and management. There are many physical, social, economic and administrative challenges in front of ITS to flourish in India. India has just begun the journey in the field of ITS, still there is an urgent need of implementation the ITS application more comprehensive, primarily by formulating an ITS based transportation policy and secondary by making it mandatory for urban areas.

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