International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 06 | June - 2021 ISSN: 2582-3930

A review on Intelligent Transportation System

A.K. Chitkeshwar*[1], Mrs. C. A. Chitkeshwar[2], Dr. S.S. Saraf[3], N.P. Bhopale[4], Mohd. Abdul Rehman[5]

[1] Civil Engineering, SGBAU/ P.R. Pote CoE & M, Amravati, Maharashtra, India

[2] Civil Engineering, SGBAU/ D.R.G.I.T.R, Amravati, Maharashtra, India

[3] Civil Engineering, SGBAU/ P.R. Pote CoE & M, Amravati, Maharashtra, India

[4] Civil Engineering, SGBAU/ P.R. Pote CoE & M, Amravati, Maharashtra, India

[5] Civil Engineering, SGBAU/ P.R. Pote CoE & M, Amravati, Maharashtra, India

---

Abstract - Intelligent Transport Systems or ITS are increasingly being used to improve road safety, reduce travel times. ITS services are designed to optimize transport times and fuel consumption thus providing safer transportation. ITS applications for road safety can be divided into three operational areas Data collection, Information exchange and emergency response & Enforcement. ITS along major urban corridors can resolve many traffic management safety issues, while creating a smart urban environment. The aim of this research paper is to conduct systematic analysis on ITS.

This paper, attempts to understand the application of Intelligent Transportation System (ITS) as a solution of present traffic congestion problem and how to decrease road accidents by the use of technology.

Key Words: Intelligent Transportation System (ITS),

1.INTRODUCTION

Intelligent Transport Systems, or ITS, is a new transportation system which aims to resolve a variety of road traffic issues, such as traffic accidents and congestion, by linking people, roads, and vehicles in an information and communications network via cutting-edge technologies. It includes, for example, a road traffic information provision system in which road traffic information is collected via roadside sensors and then provided to driver.

ITS is defined as the set of applications which are advance and aim to apply intelligent information and communication technologies in order to provide services for transport and traffic management. An ITS is an advanced application which aims to provide innovative services relating to different modes of transport and traffic management . The Intelligent Transport Systems (ITS) is a new road and traffic system which combines information, communication, and control technologies to properly integrate drivers, vehicles and roads in a way that supports people driving. ITS provides people with a variety of convenient road traffic applications.

The Advanced Traffic Management System (ATMS) field is a primary subfield within the Intelligent Transportation System (ITS). An Advanced Traffic Management System (ATMS) is to efficiently manage existing transportation resources in response to dynamic traffic conditions. An advanced traffic management system must incorporate all modes of transportation if it is to provide an effective management solution. Increasing traffic congestion coupled with improved. The Advanced Traffic Management System (ATMS) integrated solution of multiple technologies to improve the flow of vehicle traffic improve safety and minimize the road accident on highways.

Broadly, the ITS applications for road safety can be divided into three operational areas Data collection, Information exchange and emergency response & Enforcement.

1.1. Data Collection –

It involves implementation of sets of sensors to collect data relating to traffic environment. This data may include traffic data ,weather data accident and incident data and any other data relevant to the area

1.2 Information Exchange

The collected data is processed with the help of computers and software algorithms and presented in a meaningful and useful form.

1.3 Enforcement

Various enforcement tools and systems are available like red light and stop line violation detection, over-speed detection, overload detection, video incident detection system .

2. OBJECTIVES

- to improve traffic safety
- to relieve traffic congestion
- to improve transportation efficiency
- to reduce air pollution
- to increase the energy efficiency

3 . LITERATURE REVIEW

Mamta Bachani et al. attempts about the system known as Intelligent Transportation System-A Road for Tomorrow which is the solution of increased pollution, congestion and road accidents through deployement of hardware and software

Aditi Zear et al. The aim of this research paper is to conduct systematic analysis on ITS. found that by combining various

new technologies .ITS have become very efficient to solving transport related issues in smart cities.

Priyadarshini Panda et al. Presented *Intelligent Transport System becomes better transportation safety and plasticity and amplify global connectivity by means of productivity improvements extract through the group action of advanced publicity technologies into the moving support and in venteligent vehicle.*

Dilip K. Shinde et al. explains the various ITS technologies being put to use for safety of traffic operations in urban corridor of travel. It includes applications for providing information to road users as well as enforcement of traffic regulations.

Shubham Srivastava et al. explains various ITS applications and policy measures in India context and a brief about the issuses and challenges of ITS in INDIA.

4. Application areas of Intelligent Transport System

The entire application of ITS is based on data collection, analysis and using the results of the analysis in the operations, control and research concepts for traffic management where location plays an important role.

1 Advanced Traffic Management System
2 Advanced Traveler Information System
3 Advanced Vehicle Control system
4 Advanced Public Transportation System
5 Advanced Rural Transportation Systems
6 Advanced Commercial Vehicles Operations system

ATMS detects traffic situations, transmits them to control center via communication network, and then develops traffic control strategies by combing all kinds of traffic information. Furthermore, ATMS makes use of facilities to carry out traffic control and transmits the information to drivers and concerned departments, and implements traffic management measures, such as ramp metering, signal control, speed control, incident management, electronic toll collection and high occupancy vehicle control and so on.

2. Advanced Traveler Information System, ATIS ATIS, with advanced communication t echnology, makes road users can access real time information in the car, at home, in the office or outdoors as the reference of choosing transportation modes, travel trips and routes. The system mainly includes changeable message signs, Highway Advisory Radio (HAR), GPS, the internet connection, telephone, fax, cable television, information Kiosk and mobile etc

3. Advanced Vehicle Control and Safety System, AVCSS AVCSS applies advanced technologies in vehicles and roads, and helps drivers control vehicles in order to reduce accidents and improve traffic safety. The AVCSS mainly includes anti-collision warning and control, driving assistance, automatic lateral/longitudinal control, and the long-run plans of automatic driving and automatic highway system.

4. Advanced Public Transportation System, APTS APTS applies the technology of ATMS, ATIS and AVCSS in public transportation in order to improve the quality of service, and increase efficiency and the number of people who take public transportation. The syste m mainly includes.

5. automatic vehicle monitoring, VPS, computer scheduling and E-tickets Commercial Vehicle Operation, CVO CVO applies the technology of ATMS, ATIS and AVCSS in commercial vehicle operation such as trucks, buses, taxes and ambulances in order to improve efficiency and safety. The system mainly includes automatic vehicle monitoring, fleet management, computer scheduling and electronic payment. Intelligent Transportation System (ITS) is an emerging transportation system which is comprised of an advanced information and telecommunications network for users, roads and vehicles.

4.1 Background Situation of Promoting ITS

- To Solve Social Problems caused by Road
- To activate the Economy
- To reach an Advanced Information and Tele – communication Society
- To Co-ordinate different Transport Modes
- To reduce Driver's run

4.2 Problems in Transportation

- Traffic Congestion
- Fuel Consumption
- To Reduce Road Accidents

5. Intelligent Transportation Technologies

A) Wireless communications
Various forms of wireless communications technologies have been proposed for intelligent transportation systems. Radio modem communication
on UHF and VHF frequencies are widely used for short and long range communication within ITS. Short-range communications of 350 m can be accomplished using protocols, specifically WAVE or the dedicated short range communications (DSRC) standard being promoted by the Intelligent Transportation Society of America and the United States Department of Transportation. Theoretically, the range of these protocols can be extended using mobile ad hoc networks or mesh networking .Longer range communications have been proposed using infrastructure networks such as WiMAX Global System for Mobile Communications (GSM), or 3G. Long-range communications using these methods are well established, but, unlike the short-range protocols, these methods require extensive and very expensive infrastructure deployment

B) Computational technologies
Recent advances in vehicle electronics have led to a move towards fewer, more capable computer processors on a vehicle. A typical vehicle in the early 2000s would have between 20 and 100 individual networked microcontroller/programmable logic controller modules with non-real-time operating systems. The current trend is toward fewer, more costly microprocessor modules with hardware memory management and real-time operating systems. The new embedded system platforms allow for more sophisticated software applications to be implemented, including model-based process control, artificial intelligence, and ubiquitous computing. Perhaps the most important of these for intelligent transportation systems is artificial intelligence.

C) Sensing technologies

Technological advances in telecommunications and information technology, coupled with ultramodern/state-of-the-art microchip, RFID (Radio Frequency Identification), and inexpensive intelligent beacon sensing technologies, have enhanced the technical capabilities that will facilitate motorist safety benefits for intelligent transportation systems globally. Sensing systems for ITS are vehicle- and infrastructure-based networked systems, i.e., intelligent vehicle technologies. Infrastructure sensors are indestructible (such as in-road reflectors) devices that are installed or embedded in the road or surrounding the road (e.g., on buildings, posts, and signs), as required.

D) Video vehicle detection
Traffic-flow measurement and automatic incident detection using video cameras is another form of vehicle detection. Since video detection systems such as those used in automatic number plate recognition do not involve installing any components directly into the road surface or roadbed, this type of system is known as a "non-intrusive" method of traffic detection. Video from cameras is fed into processors that analyse the changing characteristics of the video image as vehicles pass.

E) Inductive Loop Detection:
Inductive loops can be placed in a roadbed to detect vehicles as they pass through the loop's magnetic field. The simplest detectors simply count the number of vehicles during a unit of time (typically 60 seconds in the United States) that pass over the loop, while more sophisticated sensors estimate the speed, length, and class of vehicles and the distance between them. Loops can be placed in a single lane or across multiple lanes, and they work with very slow or stopped vehicles as well as vehicles moving at high speed.

6. CONCLUSION

Intelligent Transport Systems or ITS, are increasingly being used globally to improve road safety, reduce travel times and help improve decision making by road users by providing relevant and timely data. Introducing intelligent transport system will definitely going to affect journey. It will reduce the possibility of road accidents, it will reduce average journey time by reducing travel time, it will also reduce fuel consumption and hence also contributes to environment. ITS holds a good point in making our journey safe.Today's need to reduce congestion in metropolitan areas. ATMS can effective system for reducing congestions. It is an easy and effective way to cut down the growing of accidents and traffic jam.

REFERENCES

[1] Mamta Bachani - Intelligent Transportation System International Journal of Scientific & Engineering Research, Volume 4, Issue 1, January-2013

[2] Aditi Zear - Intelligent Transport System: A Progressive Review Indian Journal of Science and Technology, *Vol 9(32), DOI: 10.17485/ijst/2016/v9i32/100713, August 2016*

[3] Priyadarshini Panda -A review paper on intelligence transportation system International Research Journal of Engineering and Technology Dec -2016

[4] Shubham Srivastava et al. INTELLIGENT TRANSPORTATION SYSTEM IN INDIA, JETIR June 2019

[5] Dilip K. Shinde, Prof. Ashish P Waghmare, INTELLIGENT TRANSPORT SYSTEM (ITS) International Research Journal of Engineering and Technology (IRJET), JULY 2019

[6] Attar A, Chaudhary P, Dhuri P, Vaidya K, Venkatesan N. Intelligent Traffic Management System. International Education and Research Journal. 2015 Nov; 1(4):1-3.

[7] Lee JK, Jeong YS, Park JH. s-ITSF: a service based intel-ligent transportation system framework for smart accident management. Human-centric Computing and Information Sciences. 2015 Dec; 5(1):1-9.

[8] Habtie AB, Abraham A, Midekso D. Road Traffic state estimation framework based on hybrid assisted global posi-tioning system and uplink time difference of arrival data collection methods. Proceedings of IEEE International Conference on AFRICON, 2015 Sep, 1-5.

[9] Mikulski J. Introduction of telematics for transport. Proceedings of IEEE International Conference on ELEKTRO, 2012 May, 336-340

[10] Yu R, Zhang Y, Gjessing S, Xia W, Yang K. Toward cloud-based vehicular networks with efficient resource management. Network, IEEE. 2013 Sep; 27(5):48-55.

[11] R. Sen, P. Siriah, and B. Raman. Roadsoundsense: Acoustic sensing based road congestion monitoring in developing regions. In *IEEE SECON*, June 2011

[12] H. Sundmaeker, P. Guillemin, P. Friess, S. Woelfflé, Vision and challenges for realising the Internet of Things, Cluster of European Research Projects on the Internet of Things - CERP IoT, 2010

[13] Sikdar, P. K., Reddy, T. S., Velmurugan, S. and Sivanandan, R., Intelligent Transport System, Area Review Paper, Indian Roads Congress, 62nd IRC Session, Kochi, January 2002.

[14] R. Sen, B. Raman, and P. Sharma. Horn-ok-please. In *Mobisys*,June 2010

[15] R. Sen, P. Siriah, and B. Raman. Roadsoundsense: Acoustic sensing based road congestion monitoring in developing regions. In *IEEE SECON*, June 2011

[16] M. Weiser, R. Gold, The origins of ubiquitous computing research at PARC in the late 1980s, IBM Systems Journal. (1999).

[17] Alsabaan M, Naik K, Khalifa T, Nayak A. Vehicular networks for reduction of fuel consumption and CO2 emission. Proceedings of 8th IEEE International Conference on Industrial Informatics (INDIN), 2010 Jul, 671-676

[18] Rajabifard A, Thompson RG, Chen Y. An intelligent disaster decision support system for increasing the sustainability of transport networks. Natural Resources Forum. 2015 May; 39(2):83-96.

[19] Wang FY. Parallel control and management for intelligent transportation systems: Concepts, architectures, and applications. IEEE Transactions on Intelligent Transportation Systems. 2010 Sep; 11(3):630-638.

[20] Pell A, Nyamadzawo P, Schauer O. Intelligent transpo rtation system for traffic and road infrastructure-related data. International Journal of Advanced Logistics. 2016 Jan; 5(1):19-29.