

A Review on “Intelligent Transport System”

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Abstract— Transport condition in most Indian metropolitan cities is hurriedly deteriorating because of the increasing travel requirement and insufficient transportation system. Indian cities are facing multiple issues such as severe overcrowding; polluted air quality; increasing greenhouse gas (GHG) emissions from the transport sector; increasing road accidents; and an exploding expansion in the number of private vehicles. Intelligent Transport Systems are transport systems that apply modern information technologies to make better the operation of transport networks. Many forms and variations of Intelligent Transport System are in use extensively in developed countries.

Keywords: Intelligent Transport System

I. INTRODUCTION

The current condition in the Indian transport sector is unstable transportation system interaction. In the metro city, there is a lack of fast and sufficient public transport systems. The Transport system in the third world is affected by inefficiency, undependable service, congested roadways that slow down buses, and an operation that is completely uncoordination. India has been forced to keep Intelligent Transport System public transport fares totally low. That has sharply restricted the operating system of public transport, making it difficult to afford even routine maintenance and vehicle replacement, system modernization, and extension.

A. Needs of Intelligent Transport System

- Equivalent road Development.
- Less chances of accidents.
- It is not possible to build suitable new roads or to meet the demand.
- Make transportation systems more productive, secure, and safer through the use of information, communications, and management technologies.
- To improve the looks of public transport.
- Tackle rising overcrowding which decreases travel times and industry costs.
- To decrease the environmental impacts of transport.
- To make the cities using Intelligent Transport System, less congested and more capable.

B. Advantages of Intelligent Transport System

- Use of passenger information system based on current traffic conditions.
- Congestion-free routes and safety and emergency management system
- Economical public transport system.
- Provision of an intelligent parking system for economical and efficient parking.
- Use of an electronic ticketing system, online booking system for public transport.

C. Disadvantages of Intelligent Transport System

- Difficult to use in mixed traffic
- Preliminary difficulties in understanding
- Equipments of ITS is costly
- High maintenance cost
- The control system software could be hacked by hackers
- Can't make quick response to emergency or congestion due to sudden accident

D. Constituents of Intelligent Transport System

- Telecommunication systems: Public gateway mobile radio networks. Private mobile networks and network services are dedicated to road transport operators, co-operative driving, and vehicle-to-vehicle and vehicle-to-infrastructure technologies.
- Automatic Identification Systems (AIS): Radio frequency identification Smart cards; Video identification technology. Identification of vehicles through Long-range UHF RFID readers and Automatic Number Plate Recognition (ANPR). Real-time field intelligence, discovery, identification, and category of vehicles. Pre-defined and customizable business rules for national and public security checks and any other business necessary.
- Automatic Vehicle Location Systems (AVLS): GPS based; Cellular networks; Systems based on self-regulating identification devices, in case of fixed routes.
- Traffic data collection and self-regulating grouping systems Video, microwave, magnetic detection Electronic Data Interchange (EDI).
- Geographic Information Systems (GIS) is helpful in the various sector which is connected with transport systems like, Infrastructure planning and controlling, Transportation safety analysis Travel demand analysis, Traffic monitoring and control, Public transit planning and projects, Economic and environmental impacts assessment, Routing and scheduling, Vehicle tracking and dispatching.

II. CURRENT SCENARIO

India's road network is the second- biggest and one of the most active in the world, transporting 8.225 billion travelers and over 980 million tonnes of cargo yearly, as of 2015. As per 2017 approximation, the total road length in India is 5,603,293 km (3,481,725 mi); making the Indian road network the second-biggest road network in the world after the United States. India has a network of National Highways attaching all the major cities and state capitals, forming the low-cost backbone of the country. As of 2013, India has a total of 66,754 km (41,479 mi) of National Highways, of which 1,205 km (749 mi) are categorized as expressways. A total number of vehicles in India is between to 2001-2016 is

1,977,676. This data collated through (ministry of statistics & program implementation).

A. Current Mass Transportation in India

The challenges for the Indian public transport sector are:

- 1) Institutional gaps
- 2) Inadequate supply
- 3) Poor customer experience
- 4) Lack of the use of technology

Even with the current size of the urban population, Indian cities are facing a multitude of issues such as severe overcrowding; deteriorating air quality; expanding greenhouse gas (GHG) emissions from the transport sector; increasing road accidents; and an exploding development in the number of private vehicles (largely motorcycles). Bus is the predominant method of public transport both in intercity as well as intra city travel in India. As stated earlier, India is 31 per cent metropolitan zed currently which is expected to increase to 40 per cent by the year 2031. Currently, about 7001 million trips per day are being catered to by 140,000 government-run the buses in the country. With a vision to cater to 50% per cent of the urban transport trips using public transport at the current passenger ridership per bus, it is approximated that an additional 460, 00002 buses shall be needed to cater to the urban public transport demand in the year 2031 in addition to various other way of public transport.

B. In Future Requirement Digitalization In Mass Transportation

In Future replace all public bus transport fleets with hybrid technology. The full indigenous retro-fitted electric bus, converting existing conventional fuel buses into electric buses, developing. Contactless Payment in Public Transportation are Offering a fast and frictionless payment experience offers a compelling passenger experience, considerable operational cost-efficiencies and higher productivity of resources. Digital payments also help you make public transit more attractive and suitable for younger generations whilst expanding the sustainability of your city. This type of payments Method is highly Requirement in this Covid-19 Pandemic Situation.

C. Role of 'Intelligent Transport System' In Development of Transport Sector

Intelligent Transport System is designed for the urban/state/private road transport organization. Intelligent Transport System provides an efficient solution for transport companies to schedule and monitor vehicles with the help of advanced technologies such as GPS, Wi-Fi and GPRS. • Intelligent Transport Systems (INTELLIGENT TRANSPORT SYSTEM) are the control and information systems that use integrated communications and data dealing with technologies for the purposes of improving the mobility of people and goods. Increasing safety, decreasing traffic over-crowding and managing work effectively. INTELLIGENT TRANSPORT SYSTEM (Intelligent transport systems) can save time, money and lives and protects public health, townscapes and landscapes – if they are properly planned and implemented with those benefit it Intelligent Transport System in mind. It does this through the appliance of information processing and communication

processing technologies to road transport – car, truck, bus, and tram, metro – and the road/rail transport infrastructure. Manages overcrowding and incidents to maintain a good level of service to road users provides the means to limit air pollution and noise from road transport – contributing to a better quality of public and environmental health.



Fig. 1: Role of Intelligent Transport System

III. INTELLIGENT TRANSPORT SYSTEMS

A. Autonomous Vehicle

The Vehicle has no control over Intelligent Transport System operation and the human driver does all of the driving. The vehicle's ADSS (advanced driver support system) has the ability to support the driver with either steering or accelerating and braking. The ADAS can oversee steering and accelerating and braking in some conditions, although the human driver is necessary to continue paying complete attention to the driving environment throughout the journey, while also doing the remainder of the necessary tasks. Involves full computerized whereby the vehicle's ADS is able to perform all tasks in all conditions, and no driving assistance is needed from the human driver. This full computerized will be enabled by the application of 5G Technology, which will allow vehicles to communicate not just with one another, but also with traffic lights, signage and even the roads themselves.

B. Advantages of Autonomous Vehicle

- Autonomous vehicle technology may be able to provide certain benefit it Intelligent Transport System compared to human-driven vehicles.
- One such potential advantage is that they could provide improved safety on the road – vehicle crashes cause many deaths every year, and self-operating vehicles could potentially reduce the number of casualties as the software used in them is likely to make fewer errors in comparison to humans beings.
- A slow-down in the number of accidents could also reduce traffic overcrowding, which a further potential benefit Intelligent Transport System is posed by autonomous vehicles.
- Additional benefits Intelligent Transport System that come with an autonomous car are the elimination of driving fatigue and being able to sleep during overnight journeys.

C. Autonomous Traffic Management

- 1) Reducing Traffic Congestions: Every major city and even some smaller cities face frustrating and time-

consuming traffic jams and congestions. Solutions based on society-centered community mapping applications like Google map, Techno GPS, Circuit Route, etc. Their proprietary mobile application software allows resident to create and update traffic maps, interact with each other using text messaging services, and receive real-time notifications regarding changes in road and traffic condition

- 2) **Smart Traffic Lights:** Although the Number of Vehicles on the road has significantly increased, most cities still use traditional, time-based traffic lights. Keeping up with designs in other road technologies, like smart roads, smart mobility, etc., smart traffic lights do more than just regulating the flow of traffic. Solutions enable the collection of various traffic data using the Internet of Things (IoT) sensors and devices to track, analyze, and optimize traffic lights for different locations, road types and based on the time in a day.
- 3) **Smart Parking:** As the number of vehicles driving inside the city increase, startups are solving for residents to find parking for their vehicles in various hubs of the city.

D. Telecommunication System of Intelligent Transport System

Telecommunications are an essential part of Road Network Operations and Intelligent Transport Systems linking regulate centers with roadside devices such as telephones, CCTV cameras, different Message Signs (VMS), and traffic signals. Digital communications enable the implementation and operation of modern traffic management technology and the latest INTELLIGENT TRANSPORT SYSTEM applications – including connected vehicles and Active Traffic regulation. CCTV is used growing and digital transmission of video images is reachable over distances without the image being degraded. Telecommunications networks resemble the nervous system in a human being. Particularly, the communications networks tie the different parts of INTELLIGENT TRANSPORT SYSTEM together, allowing for a truly integrated system.

E. Geographic Information System

Geographic Information System for Transportation is one of the leading GIS application fields like, Infrastructure planning and management, Traffic monitoring and control, Vehicle tracking and dispatching, Public transit planning and operations etc.

F. Traffic Data Collection

Traffic data collection plays an important role in 'Intelligent Transport System' like, Intelligent Transport System help in traffic analysis, management of traffic, and control of traffic flow. Below are some methods to collect traffic data.

- 1) **Video image detection:** video cameras record vehicle numbers, type, and speed by means of different video techniques e.g. trip line and observation. The system can be sensitive to meteorological conditions.
- 2) **Physical counts:** it is the most common method. In this case trained observers to gather traffic data that cannot be smoothly obtained through automated counts e.g. vehicle occupancy rate, pedestrians, and vehicle classifications.

- 3) **Pneumatic road tubes:** rubber tubes are placed across the road lanes to detect vehicles from pressure changes that are produced when a vehicle tyre passes over the tube. The pulse of air that is created is listed and processed by a counter located on the side of the road. This system may also not be good ordered in measuring low speed flows.

IV. CONCLUSION

The Transport and economic development of a country are closely related. The Need for transportation is increasing day by day in India with a growing population. Intelligent transport systems are the integrated application of advanced technologies using electronics, communication, and advanced sensors. These Applications provide travelers with important information while developing the safety and productivity of the transportation system. Intelligent transport systems are the integrated application of advanced technologies using electronics, communication, and advanced sensors. The system gains a bulky volume of data on various aspects of the transport operation, process them, and apply the result to guide traffic, optimize operations enhance safety and transport costs. So, Intelligent Transport System plays in important role in efficient development of transport sector by Intelligent Transport System proper application.

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