

A Review on Overview on Indian ITS and Foreign ITS to Develop ITS in Nagpur City

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Abstract:- supervision the development of traffic is a biggest problem all over the world. Intelligent Transportation System (ITS) provides solution to the problems with the help of new technologies. Intelligent Transportation Systems is the use of PC, hardware, and correspondence advancements and the executives procedures in a consolidated way to give voyager in grouping to build the wellbeing and productivity of the street transportation frameworks, to work out and supervise the traffic troubles. In the present study we have studied major parts of the Intelligent Transportation System. The Objective of the paper is Study on the whole development of intelligent transport system in the human race and match up to with Nagpur intelligent transport system. Thus auxiliary plan and urbanized models throughout the long periods of real parts of ITS have been checked on here to make an examination investigation of Nagpur city Intelligent Transportation System. It will lead to the gaps in the awareness which can be studied further. The paper things to see the conclusions extracted from the studies of dissimilar systems and also give the future possibility in the field transportation to make it more users friendly and available.

I. INTRODUCTION

Intelligent Transportation Systems (ITS) is a perceived course to determine, or regardless limit movement issues. Shrewd Transportation Systems cover all methods of transportation - air, ocean, street and rail, and meets an assortment of parts of every mode - vehicles, foundation, correspondence and operational frameworks. Different nations have created procedures and methods, in light of their geographic, social, financial and ecological environment, to coordinate the different parts into a reliable framework. When all is said in done, any of the ITS applications utilizes a Traffic Management Center (TMC) where information is made, dissected and joined with other operational and control ideas to manage the mind boggling transportation issues.

A) Intelligent Transportation Systems Taxonomy

The ITS categorization is mostly based on the application of the system to precise level like vehicle level, infrastructure level and cooperative level, where the sensors, information processors, communication system, roadside messages, GPS updates and automated traffic prioritization signals, etc, are the key facial appearance in these system. The most frequently used cataloging of ITS is based on the positioning of the system as specified below,

➤ *Advanced Traffic Management Systems (ATMS)*

Incorporates different sub-frameworks, (for example, CCTV, vehicle identification, correspondences, variable message frameworks, and so forth.) into an expressive single interface that gives continuous information on activity review and predicts movement conditions for more productive arranging and tasks. Dynamic movement control frameworks, expressway activities administration frameworks, episode reaction frameworks and so on react continuously to evolving conditions.

➤ *Advanced Traveler Information Systems (ATIS)*

Give to clients of transportation frameworks, go related data to help basic leadership on course decisions, gauge travel times, and avoid clog. This can be empowered by giving distinctive data utilizing different advances technologies such as:

- GPS enabled in-vehicle direction-finding systems
- Dynamic street hugeness signs for continuous correspondence of data on activity blockages, bottlenecks, mishaps and backup course of action data amid street terminations and continuation.
- Site to give a shading coded organize delineate clog levels on roadways.

➤ *Advanced Vehicle Control Systems (AVCS)*

These are devices and ideas that upgrade the drivers' control of the vehicle to make travel more secure and more effective. For instance, in vehicle impact advice frameworks alarm the driver to a potential going to happen crash. In further developed AVCS applications, the vehicle could consequently split or steer far from a crash, in light of contribution from sensors on the vehicle. The two frameworks are free to the vehicle and can give significant repayment by enhancing wellbeing and lessening mishap incited blockage. The establishment of innovative devices and processors in vehicles permit consolidation of programming applications and man-made consciousness frameworks that control interior tasks, omnipresent figuring, and different projects intended to be incorporated into a more prominent transportation framework.

➤ *Commercial Vehicle Operations (CVO)*

Involves a group of satellite route framework, a little processor and a computerized radio, which can be utilized in business vehicles, for example, trucks, vans, and cabs. This framework manages steady observing of truck tasks by the focal office and gives traceability and security.

➤ *Advanced Public Transportation Systems (APTS)*

Applies condition of-craftsmanship transportation administration and data advances to open travel frameworks

to help effectiveness of activity and enhance wellbeing. It incorporates ongoing traveler data frameworks, programmed vehicle area frameworks, transport landing declaration frameworks, and frameworks giving priority of entry to transports at signalized crossing points (travel flag priority).

➤ *Advanced Rural Transportation Systems (ARTS)*

Give data about remote street and other transportation frameworks. Precedents incorporate robotized street and atmosphere conditions revealing and directional data. This sort of data is useful to drivers making a trip to remote or country zones. This has been broadly actualized in the United States and will be a significant advantage for nations like India, where provincial regions are generally scattered.

II. LITERATURE REVIEW

Ganesh kumar and Ramesh (2010) designed Emergency Response Management and Information System (ERMIS) for Madurai city, Tamil Nadu. In this investigation a point by point GIS database of transportation organize, mischance areas, healing centers, emergency vehicle areas, police and fire stations was readied and spatial examination was additionally completed for mishap records of years 2004– 2008. Course discoverer was intended to discover most brief, efficient courses and administration regions.

Purushothaman et al. (2011) proposed a similar GIS based Emergency Response Management System for Mysore City, India. The created framework gives the system based spatial examination, for example, network, discovering ways, distribution, finding the neighboring office, characterizing administration zones, dynamic division. Kumar et al. (2005) developed a GIS based advanced traveler information system for the Hyderabad city, India under Arc View GIS condition. GIS-empowered modules for the most brief way, nearest office, and city transport courses were joined in the framework. The created framework gives data about principal offices in Hyderabad City. Logi and Ritchie (2001) described a real-time Knowledge Based System (KBS) for decision support in the assortment of integrated traffic control plans subsequent to the occurrence of non-recurring congestion. In this investigation, two calculations were created i.e. information combination calculation for the investigation of clog and a calculation for the determination of control designs. The substantiation results demonstrated that by the utilization of Traffic Congestion Management (TCM) travel time lessened somewhere in the range of 1.9% and 29.0% and run of the mill stop speed decreased somewhere in the range of 14.8% and 55.9%.

Faghri and Hamad (2002) studied the use of GPS in traffic management. In their investigation utilization of GPS was involved in gathering movement information, for example, travel time, speed and deferral on 64 noteworthy streets in the province of Delaware. Whenever mean and fluctuation of the outcomes acquired by both the techniques were thought about and no huge contrast was watched. GPS information was observed to be half more proficient as far as labor. Hernandez et al. (2002) studied the utilization of man-made consciousness methods in rush hour gridlock the

executives and gave a multiagent design for wise activity the executives frameworks. Two multi-specialist information based frameworks, InTRYS and TRYSA2 were created to perform choice help for ongoing activity the board. The execution of both the frameworks was assessed and general pertinence of multi-operator models for astute activity the board was given.

Zhenlin et al. (2012) studied the efficiency of the Beijing Intelligent Traffic Management System (ITMS). In this study urban transportation frameworks, financial framework and vitality condition framework were taken as the information framework and the street activity the executives effectiveness and urban transport putting markers as the yield framework. The field information of Beijing from 2000 to 2010 are utilized for observational investigation. The aftereffects of the investigation demonstrated that the ITS enhanced the general productivity of the Beijing transportation. Thapar (2001) displayed a GIS based crisis reaction the executives framework for Hyderabad city which can give the valuable data in regards to various offices and ideal courses amid crisis circumstances. In this investigation the likely hazard zones were resolved dependent on the land utilize, building exercises according to National Building Code (NBC) rules. Proficiency and adequacy of the fire benefit was examined and dependent on this an Emergency Response Management System was created.

III. INTELLIGENT TRANSPORTATION SYSTEM AROUND THE WORLD

Improvements in canny transport framework are driven unequivocally by financial requirements, and ecological requests. An examination report titled "Astute Transportation Systems: A Global Strategic Business Report", distributed by Global Industry Analysts, Inc., gives a far reaching survey of patterns, item improvements, mergers, acquisitions and other key industry exercises inside the area of ITS. As per this report, the worldwide market for savvy transportation frameworks (ITS) is anticipated to contact US \$18.5 billion by 2015. The United States of America has the biggest territorial market for ITS, representing an offer of relatively 40% of worldwide income produced.

➤ *ITS-America*

Some US-ITS drives of unique center are Telephonic Data Dissemination, IntelliDriveSM, Next Generation 9-1-1, Cooperative Intersection Collision Avoidance Systems, Congestion Initiative, Integrated Corridor Management Systems, Clarus Initiative, Emergency Transportation Operations, Mobility Services for All Americans and Electronic Freight Management. The Telephonic Data Dissemination plot with the assignment of an across the country 3-digit phone number (511) to scatter current data about movement conditions, enabling explorers to settle on better decisions - decision of time, decision of method of transportation, decision of course. The IntelliDriveSM is a multimodal activity that influences on remote innovation to empower interchanges among vehicles, the framework, and passengers" individual specialized gadgets. Cutting edge 9-

1-1 activity is gone for expanding the present crisis 9-1-1 framework to build up open crisis interchanges benefits through all types of correspondence media. The Clarus Initiative, as name (Latin "clear") proposes, goes for a framework that can give clear, exact and pertinent data about mischances, climate, street fixes and postponements to clients. The activity will build up an alliance of private and government climate estimating offices and industry. The current perceived shortcoming of the United States is the inconstancy in execution of ITS among states and locales, in this manner prompting sporadic, disengaged, incremental, and a non-coordinated ITS the nation over.

➤ *ITS-Japan*

ITS in Japan was formalized around the point of convergence of the most recent decade. This period, called the shrouded time of ITS. Japan is a pioneer in vehicle based course structure. The key course structure was sold by Honda and orchestrated in its Accord show up in 1981 utilizing a gas rate whirling as a heading sensor. In 1987, Toyota Electro Multivision was introduced in its Crown delineate, which was the fundamental vehicle utilizing a Cathode Ray Tube to exhibit the guide. Today, Japan utilizes the best number obviously structures in its vehicles. As shown by a layout in 2006 by Cross Marketing Inc., over part of Japanese vehicles utilize moved course framework.

• *First phase*

The use of in-vehicle navigation systems and electronic toll collection was started in this phase.

• *Second phase (2005)*

Included quick crisis and save exercises, foundation of open transport associations as a component of the ITS and enhancement of data administrations to enhance the accommodation of transportation.

• *Third phase (2005-2010)*

Includes enhancement of framework and in-vehicle hardware, and association of legitimate and social frameworks appropriate to travel and transport.

• *Fourth Phase (after 2010)*

This would include, among different exercises, setting up a full-scale propelled data and broadcast communications society with broad optic fiber organize and imaginative social frameworks.

The Advanced Mobile Traffic Information and Communication System (AMTICS) were simultaneously created by Japan Traffic Management and Technology Association under the recommendation of the National Police Agency. It is an incorporated activity data and route framework that shows on screen in every vehicle, movement data assembled at Traffic Control and Surveillance Centers overseen by the police. The Universal Traffic Management System UTMS is another framework that has been actualized in Japan by the National Police Agency since 1993 to furnish drivers with continuous movement and direction data. The objective of UTMS is powerful administration of movement stream. Two-way infrared guides are utilized for both observing and correspondence

exercises.

➤ *ITS-Europe*

Europe's Intelligent Transport Systems falls under the umbrella of Road Transport Informatics (RTI). RTI revolves around two teaming up projects - Road Infrastructures for Vehicle prosperity in Europe (DRIVE) and Program for European Traffic with Highest Efficiency and Unprecedented Safety (PROMETHEUS). System headway is the basic target of the PROMETHEUS adventure, while DRIVE revolves around human lead issues and use of structures in the European social order. Other European Union (EU) open private association concentrating on explicit security uses of ITS innovations activities are esafety, INVENT, and Prevent.

The esafety program advances the improvement, organization, and utilization of clever vehicle Safety Systems to upgrade street security all through Europe.

- The INVENT program moves in the direction of enhancing activity stream and activity wellbeing by improvement of novel driver help frameworks, learning and data advancements, and answers for more effective activity the board, to counteract or limit the seriousness of mishaps.
- The PREVENT programme integrates a number of safety functions in order to create a safety belt around the vehicle.
- The AGILE project developed a global navigation satellite service in the mobility sector having ultimate objective is to define a roadmap.
- The CONNECT program was gone for joining open specialists, street organizations and activity data specialist organizations, to arrange and build up ITS in focal and Eastern Europe. Austria, the Czech Republic, Germany, Hungary, Italy, Poland, Slovakia and Slovenia were a portion of the supporters of this venture enhanced cross-outskirt activity and transport using ITS.
- The NextMAP venture assessed the specialized and business achievability of improved guide databases required for in-vehicle ITS applications. It characterized and evaluated new guide prerequisites (geometric precision, extra data) for primary Advanced Driver Assistance Systems (ADAS) applications.

IV. PUBLIC TRANSPORTATION SYSTEM IN NAGPUR CITY

It is a quickly developing city and is the third most crowded city in Maharashtra after Mumbai and Pune and furthermore one of the nation's most industrialized urban communities. Nagpur is one of the 11 authoritative regions in the Vidarbha area of Maharashtra state. Nagpur locale lies between 20.35 deg – 21.44 deg North scope and 78.15 deg-79.40 deg East longitudes. It is relatively triangular fit as a fiddle. Nagpur region extends over a territory 9892 sq.kms Area under urban part 364.66 sq.kms while the zone under rustic division 9527.34 sq.kms as far as zone region Nagpur comprises 3.21% the aggregate zone of province of Maharashtra. Because of increment in populace and additionally transportation NMPL organization shaped

which gives the agreement to Vansh Nimay Infraprojects (VNIL) to run city transports and On 22 February 2012, the Nagpur Improvement Trust (NIT) consented to an arrangement with Delhi Metro Rail Corporation (DMRC) to set up the Detailed Project Report (DPR) for the metro in Nagpur. Open Transport is a mass transportation of individuals starting with one place then onto the next place through Bus, Rail, and metro, LRT, BRT with effective speed, recurrence, offices, solace, accommodation, and unwavering quality.

SR. NO.	Benchmark	Inference (MOUD Guidelines)
1.	Public Transport Facilities	The framework may require course justification and transport expansion to enhance the execution.
2.	Intelligent Transport System(ITS) Facilities	The city needs satisfactory ITS offices.
3.	Sustainability of public transport	The Public Transport of a city is budgetary not economical and needs extensive enhancement.
4.	Travel speed	Little increment in stream may cause significant increments in methodology delay and subsequently diminish in blood arterial speed.
5.	Integrated land use Transport system	Black out rationality between city structure and open transport framework.
6.	Non Motorized Transport	The city lacks adequate NMT facilities.
7.	Pedestrian infrastructure	The city has person on foot offices which may require a few upgrades at crossing points, trails and road lighting as a few sections of the city are not served by it.

Table 1:- Nagpur transportation Inference as per MOUD Guidelines

➤ *Intelligent Transport System (ITS) facilities in Nagpur*

- Passenger Information System (PIS)
- Automatic Vehicle Location System (AVL)
- Security Camera Network System (SCN)
- Bus Driver Console (BDC)
- On Board Ticketing Machines
- Central Control Centre

A PIS is a real time information display unit which helps in providing passengers with the necessary information related to their commute. The information displayed varies from the Next/Current Stop information, current location, expected time to reach the destination or the nearest metro station etc. Route data may be presented as a linear map, highlighting the current position of the bus and

the next stop that it is approaching. These maps are held as image files on the vehicle computer, and displayed when the bus reaches a pre-specified geo location. Likewise, audio files can be delivered in exactly the same way, notifying passengers of a particular stop as the vehicle approaches.

Automatic Vehicle Location System (AVLS) is a unit which provides real time information of the vehicle with the help of onboard GPS devices. The AVLS facilitates Central Control System (CCS) to empower open data framework to go about as a wellspring of data to be shown on general society show screens (for both on and off-board) and voice based information. The AVLS technology is also used in off-board passenger information system. The AVLS technology comprises of following components:

- Bus Mounted GPS based driver console
- On- Board passenger information system
- Off- board passenger information system
- GIS based fleet monitoring & control system

The AVLS system enables operations team to monitor vehicle movement in real-time and synthesizes the AVL field data to deliver the same on the public information system. The LED displays the upcoming stations on the board which can include the nearest Metro Station. The next stop messages shall be independently programmable for audio and visual presentation. The signs shall be capable of presenting the information listed below as vehicle travels between stops. The total amount of information and timing shall be dependent on where the vehicle is on the route, and the time between the stops. The timing of the delivery of messages shall be user configurable. The information may include:

- Route and Destination;
- Metro Stations covered;
- ‘Via’ information;
- Next Stop name;
- Special messages, e.g. for announcements;
- Current time (visual only)

Bus Driver Console is a unit installed on board and gathered in a way that it coordinates with the dashboard of the transport. The driver console will be a Man Machine Interface (MMI) to the system. The Driver Console Unit with remote correspondence module (in view of GPRS/EVDO/Wi-Fi) will be utilized to give vehicle following precisely and dependably. The back end framework will have the capacity to create reports of the vehicle plan adherence and worked kilometers by each transport, by course and by armada. The unit will allow AFCS (Automatic Fare Collection System) devices such as handheld ticketing unit and bus card valuator’s to use its GPRS/EVDO communication module as a data path to transmit AFCS data to the CCS (Central Control System).

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framework will have the capacity to create reports of the vehicle plan adherence and worked kilometers by each transport, by course and by armada. The unit will permit AFCS (Automatic Fare Collection System) gadgets, for example, handheld ticketing unit and transport card valuator to utilize its GPRS/EVDO correspondence module as an information way to transmit AFCS information to the CCS (Central Control System). This will enable driver to control all parts of the ITS usefulness on the vehicle, including:

- Schedule Adherence (lateness or earliness in minutes)
- Alarms
- Headway (distance to leading and following vehicles on same service)
- Communications (both data and voice)
- Fuel efficiency

Electronic Display Boards are illuminated LED display boards placed at all the Bus Stations. The information generated on the server on-line, about arrival of a particular route bus at a bus station, would be processed by the CPU using a dedicated software and communicate to the respective stations the probable arrival time of a bus.

V. CONCLUSION

Based on the international understanding the best practices observed in the country which is urbanized such as USA, European nations, United Kingdom, etc, the function of ITS seem a promising solution for advanced traffic control and management. In array to complete the full potential of ITS in Nagpur, a careful systematic approach is required in the propose and scheduling, development and implementation, which tackle the problems of user needs and benefits, system architecture and integration issues while at the same time giving due intelligence to other national and global medium and long haul destinations identified with so much issues as land utilize and territorial arranging, foundation configuration, conveying framework the executives, and numerous other essential regions that are specifically or in a roundabout way slanted because of ITS achievement. Once implemented, it will bring Nagpur on the global map as one of the smartest cities of the world with best transport management. The great potential offered by technologically and economically viable ITS was rapidly recognized as an efficient way to resolve many simple and complex transportation problems. Recent expectations in relation to this potential have suggested, for example, that ITS will lead to a 50 per cent reduction in road fatalities; a 25 per cent reduction in travel time; a 50 per cent reduction in traffic delays; and a 50 per cent reduction in city pollution.

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