

“Smart Pedestrian Crossing System”

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Abstract: A smart city is arising as a possible solution to lessen the issue caused by the urban population growth and fast urbanization. Attention also has focused in the pedestrian crossing because they are one of the most dangerous places in the transport field. Even though there are enough traffic rules inculcated into everyday life of a person, there are increasing number of deaths and accidents of the pedestrians crossing the road, which are not able to be controlled. Traditional traffic equipment relies heavily on the very basic and limited warning capabilities that have not kept pace with our busier, more congested road networks, this technology has simply not evolved with time. And consequence rates remain relatively high while the impact of traditional traffic equipment is relatively low. Non-light control area intelligent pedestrian systems comprehensively monitor the pedestrians crossing or who will cross crosswalks for altering drivers that there ahead will be pedestrians crossing the lane. This warns the pedestrians of incoming vehicles, and also passes signals to drivers at a distance when the pedestrian are crossing the roads. The smart pedestrians crossing sign adopts a new technology of fully lit and edge lit. Infrared sensing system detects pedestrian's movement for activating warning system and illuminated system.

Key words: Pedestrians, Intelligent Pedestrian System, Infrared sensing system, smart city.

1. INTRODUCTION

Road safety is emerging as a major social concern in the country and the Indian government has been attempting to tackle this crucial issue for several years. Pedestrian deaths are major effect of improper safety warning in the city transport. Every year there are thousands of pedestrians who die fatally because of limited warning capabilities and not following the traffic rules. In July 2015, Indian Prime Minister Narendra Modi said his government will soon introduce laws to enhance road safety as traffic fatalities and injuries mount. Traffic collisions in India are a major source of deaths, injuries and property damage every year. The National Crime Records Bureau (NCRB) 2016 report states there were 496,762 roads, railways and railway crossing-related traffic collisions in 2015. Of these, road collisions accounted for 464,674 collisions which caused 148,707 traffic-related deaths in India. The three highest total

number of fatalities were reported in Uttarpradesh, maharashtra and tamil nadu, and together they accounted for about 33% of total Indian traffic fatalities in 2015.

Smart transportation, a key internet of things vertical application, refers to the integrated application of modern technologies and management strategies in transportation systems. These technologies aim to provide innovative services relating to different modes of transport and traffic management and enable users to be better informed and make safer and 'smarter' use of transport networks. In 2010, the European Union had defined Intelligent Transportation Systems (ITS) as a systems "in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users, and in traffic management and mobility management, as well as for interfaces with other modes of transport. Smart transportation includes the use of several technologies, from basic management systems such as car navigation; traffic signal control systems; container management systems; automatic number plate recognition or speed cameras to monitor applications, such as security CCTV systems; and to more advanced applications that integrate live data and feedback from a number of other sources. ITS technologies allows users make better use of the transportation network and also paves the way for the development of smarter infrastructure to meet future demands.

According to the Intelligent Transportation Society, ITS technology makes it possible to:

- Use a navigation system to find the best route based on real-time conditions
- Alert drivers of potentially hazardous situations in time to avoid crashes
- Be guided to an empty parking space by a smart sign
- Ride a bus that turns traffic lights green on approach
- Detect and respond promptly to traffic incidents
- Reroute traffic in response to road conditions or weather emergencies

- Give travelers real-time traffic and weather reports
- Allow drivers to manage their fuel consumption
- Adjust speed limits and signal timing based on real-world conditions
- Improve freight tracking, inspection, safety and efficiency
- Make public transportation more convenient and reliable
- Monitor the structural integrity of bridges and other infrastructure

The benefits of smart technology and the advantages they bring to transportation within a smart city are numerous.

- **Smart Transportation is safer:** By combining machine learning with IoT and 5G, autonomous transportation systems (both in vehicles and in stationary infrastructure such as intersections) have proven to reduce the “human factor” in accidents. Computers don’t get distracted or fatigued or emotional.
- **Smart Transportation is better managed:** Data collection is an important key to responsible public management of infrastructure. Smart transportation not only provides detailed data points for every aspect of the transportation system, but allows administrators to better monitor operations, track maintenance needs, and identify key sources of problems that need to be fixed.
- **Smart Transportation is more efficient:** With better management comes more efficient use. Quality data can help to pinpoint areas where efficiency can be improved. Maybe a slight adjustment in train schedules would provide for better fill rates, Or, perhaps bus routes would better serve the community if stops were allocated differently.
- **Smart Transportation is cost effective:** Because smart transportation makes better use of the resources available, it can cut down costs thanks to preventative maintenance, lower energy consumption, and fewer resources used towards accidents. Cost savings can also be gained by riders when inexpensive public transit is efficient enough to compete with private vehicle ownership.
- **Smart Transportation provides rapid insights:** City traffic management centre’s

(TMCs) can get rapid visibility and notifications for trouble spots or city-wide issues affecting congestion on city streets, public safety and emergency response systems, in order to take action or communicate more effectively with other agencies and emergency responders.

2. LITERATURE SURVEY

Road accidents continue to be a leading cause of death, disabilities and hospitalization in the country despite our commitment and efforts. India ranks first in the number of road accident deaths across the 199 countries and accounts for almost 11% of the accident related deaths in the World. As per the Road Accident Report for 2019, a total number of 449,002 accidents took place in the country during the calendar year 2019 leading to 151,113 deaths and 451,361 injuries. In percentage terms, the number of accidents decreased by 3.86 % in 2019 over that of the previous year, while the accident related deaths decreased by 0.20 % and the persons injured decreased by 3.86.

The decline in road accidents, killings and injury reported during the calendar year 2019 appear to have been a result of the Motor Vehicle Act implemented in States from September 1st 2019 which focused on road safety and included, inter-alia, stiff hike in penalties for traffic violations as well as electronic enforcement. The other trends noted in 2019 were very similar to those recorded in the previous years. National Highways which comprise of 2.03 percent of total road network, continued to account for a disproportionate share of 35.7 per cent of deaths in 2019 pointing to need for improved enforcement and correctives to be put on National Highways. State Highways which account for 3.01% of the road length accounted for 24.8 percent of deaths. Other Roads which constitute about 95 % of the total roads were responsible for the balance 39% deaths respectively, and electronic monitoring of the same. Like in the previous years, the working age group of 18 – 60 accounted for a share of 84 percent in the total road accident deaths. Under the category of Traffic Rule Violations, over speeding continued to be a major killer even in 2019, accounting for 67% of the persons killed followed by driving on the wrong side of the road which accounted for 6% of the accident related deaths.

Road traffic accidents are amenable to remedial actions and the Ministry has been implementing a multi-pronged road safety strategy based on Education, Engineering (both of roads and vehicles), Enforcement and Emergency Care as detailed in Chapter 9 of the Report. In 2019, the Ministry focused on the identification and rectification of Black spots and identified 5583 black spots in the

country in 2018. The identification of these Black Spots has been a critical intervention and has helped MORTH focus and plan out its rectification efforts. The matter is being reviewed in a systematic manner with a portal being prepared for it and the progress being reviewed at the highest level periodically.

According to the road accident report of the Union transport ministry, 12,330 pedestrians were killed across the country in 2014. The number steady rose to 13,894 in 2015, 15,746 in 2016, 20,457 in 2017 and 22,656 last year. The road accident report of 2018 showed that west Bengal topped the list of pedestrian fatalities with 2,618 deaths. 62 pedestrians die daily in India, up 84% in 4 years.

3. EXISTING SYSTEM.

Traditional traffic equipment relies heavily on the very basic and limited warning capabilities that have not kept pace with our busier, more congested road networks, this technology has simply not evolved with the time. A consequence of this is that incident rates remain relatively high whilst the impact of traditional traffic equipment is relatively low. The painted zebra crossing does not provide any sharp warning for the vehicles and most times people land on the crossing in the busier times of their life. The light pedestrian signal also not that effective in visibility for the pedestrians nor the drivers. There this poor warning capacity of traditional traffic system leads in so many fatal pedestrian accidents.

4. PROPOSED SYSTEM.

The evolution of smart city has given a way in solving lot of transportation and traffic issues making the humans life easier and better. Here is one of the smart transportation system for a better traffic safety. Non-light control area – intelligent pedestrian systems (Objective Dual-aspect warning for both driver and pedestrian). Non-light control area- intelligent pedestrian systems comprehensively monitor the pedestrians are crossing or will cross crosswalks for alerting drivers there ahead will be pedestrians, please slow down and give way; alerting pedestrians you will pass crosswalks, please be careful, ensuring the safety of both driver and pedestrian.

Variety Activation Modes.

- Touch button- pedestrians activate the system.
- Pedestrian Automatic Activate Bollards – As pedestrians cross between bollards, the system automatically activates.
- Detector – As pedestrians move into the detecting zone the system automatically activates.

A variety of ways to comprehensively monitor the pedestrians who will cross or are passing the crosswalks for effectively activating the system.

Objective Dual-Aspect Early warning

After activating the system:

- The warning device (luminous sign + road stud/luminous sign) facing drivers start flashing to warn drivers.
- The voice alarm sounds to warn pedestrians.

Effectively early warning both in day and light:

- Luminous sign and road stud both adopt daytime visible light design.
- Pedestrian fill light system automatically operates at night to illuminate pedestrian waiting area.
- 360° dynamic early warning: Flash warning sign, road stud and voice alarm module effectively warn pedestrians and drivers from vision and hearing points.

Enhance safety consciousness and regular Behaviours.

- The drivers receive the warning signal and pay attention to the road status, and slow down.
- The pedestrians receive the warning signal to enhance safety awareness and be careful to cross the road.

Thus ensuring the safety of pedestrians and drivers.

Multiple Activation Modes for great warning.

- Three activation modes for satisfying complex traffic condition in urban area.
- Use dual warning road stud for both the safety of driver and pedestrian.
- Use fully lit and edge lit traffic sign and pedestrian fill light system (operate all night, stop at the day) for effective warning in both day and night.

These activation modes and warning equipment's provide better technology for reducing the pedestrian accidents and thus ensuring safety.

5. CONCLUSION

Smart transportation can generally be divided into two broad categories, *public infrastructure* and the *automotive industry*. These two sectors become "smart" when networked sensors are integrated into infrastructure and vehicles in an effort to accomplish the goals of remote management and control, safety, and efficiency. Regardless of the advantages and

disadvantages of smart cities, the technology is here and being used today. Across the US and the world, smart sensors and controllers are being implemented in train networks, passenger information systems, and public transport dispatch. Therefore intelligent pedestrian ensures safety and security of the pedestrian and the driver. Hoping this smart systems will eventually decrease the accidents occurring and giving us a safe transportation and easier lifestyle for the humans.

6. REFERENCES

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