A Semantic Approach of ITS: Perspective on Road Safety

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ABSTRACT

Around the globe each day billion of people depend on their free transportation systems and roadways. An ever increasing crowd on roads and the rising mobility that comes with it, nations around the world are facing a serious transportation challenge. The rapid globalization and shifts in population expansion round the clock increased with limited road system capabilities has resulted in constantly increasing mobility times, fuel consumption, environment pollution & the critical thereby reducing the efficiency of the transportation infrastructure. One of the ardent purposes behind implementation of new technology in road transport is to fight human errors that lead to accidents, and help drivers in driving tasks where machines can task more accurately than human beings. Many systems, especially driver support systems (dynamic vehicle control and crash evasion systems, speed control system, etc.) have the potential to prevent human errors, such as errors in distance keeping, lane keeping, selection of suitable speed, etc. This paper has a system tailored vision on the variety of ITS (Intelligent Transport System) applications[2], technologies and its different areas keeping in mind the possibility of applying artificial intelligence in terms of intelligent transport systems. The objective of it is to integrate and blend some areas and applications, decision making capability of ITS enabled vehicles using driver movement sensors & pattern recognition tools and hence better protection technologies discuss with all prospects. Furthermore, this research focuses on a wide field named Intelligent Transport Systems, discussed its resourceful applications, used technologies and its usage in different areas respectively.

Keywords: Intelligent Transport System, Dynamic vehicle control, crash evasion system, driver movement sensors

I. INTRODUCTION

Driving is an active process in which drivers may use the backing they get to attain further improvements .Some of them are driving faster, taking more risk, and this may produce new sources of error[3]. To envisage with the driving task, or systems that are designed to reduce driver workload decrease vigilance in a degree that is already dangerous. Necessarily the human errors created by new systems are carefully analyzed in an early phase of system cycle, and their sources eliminated before introducing the system into the market. The Artificial Intelligence successful applications could be found also as part of decision support process and as a part of economical and management information systems.

There may be special groups of drivers, first of all elderly drivers who, on the one hand are a primary target group for driver assistance systems (route guidance systems and other information systems, dynamic vehicle control and collision avoidance systems, speed control systems, etc.), on the other hand have special difficulties with learning new ways of driving**.**

1.1 An outline of Existing System

The work-related safety hazards,is to think about what goes on in the interior the workplace. But one of the greatest threats to your safety is not in the workplace, but rather on the road. Someone is injured every 20 seconds. Over 5 million of those injuries turn out to be disabling. A person dies in a crash on U.S. roads every 10 minutes[5]. In fact, motor vehicle accidents are the most common cause of death in the United States- more than cancer or heart attacks. When we think about the serious accident, it could change your life- and not for the better. As of now most of the research and implementation on with mechanical and may be prone of special system-created errors. Driver backing systems have to be tested especially with practiced users, to ensure that their design takes into consideration their special needs and their special shortcomings, too. Intelligent Transport Systems (ITS) is the use of electronic and computer technology to improve the sustainability, efficiency and safety of a designated transportation network which include telemetric and all types of communications in vehicles, between vehicles (e.g. car-to-

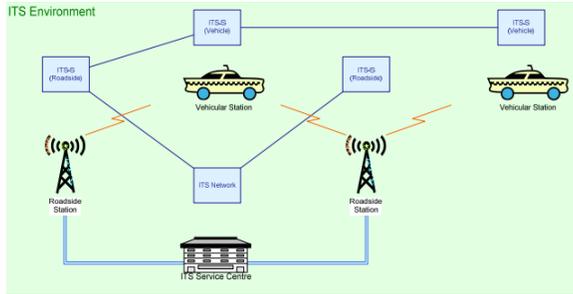car), and between vehicles and fixed locations (e.g. car-to-infrastructure)[7]

Fig 1   :-Simplified view of ITS [2]

1.2 Proposed System

Intelligent systems are in used with every aspect of systems, CARs are the critical systems which are real time and lives are involved.[4] This System not only deals with constituent monitoring. The importance of our software is to sense the driver perceived organ's behaviour in a technological aspect. Using decision making tool of artificial intelligence does even more than that like Passenger motion monitoring, behaviour analysis, System behaviour, Notification & co-ordinate using decision making tools of artificial intelligence.. As of now most of the research and implementation on with mechanical and may be prone of special system-created errors. Driver aid systems have to be tested especially with experienced users, to ensure that their design takes into consideration their special needs and their special shortcomings. The eye blink Sensor & Alcohol recognition patterns are the vital and of great importance from the perspective of passenger safety and traffic safety.

## 1.3 POINTS TO IMPROVE ROAD SAFETY ON DRIVER'S PERSPECTIVES

Following are the considerations on decision making tools of ITS on the driver's perspectives[5]

- Need of ITS
- Humanizing Traffic Conditions
- Improving Road Safety
- Reducing Environmental Pollution

1.4 Road Safety

Road safety is leading concern for any growth which is directly related to human life and ITS is a way through can save lives, time, and money as well as reduce threats to our environment. Here we are looking how ITS can implements and applied for making undemanding the task of the driver, that will also reduce the driver's risk of being occupied in a crash. So safety can be achieved through minimizing the variances that cause accidents on the transportation system, reduce the seriousness of the accidents / crashes that do occur, the early detection of and management of incidents and accidents once they have occurred in order to prevent fatalities and avoid the severity of injuries.

Fig 2:- Sensor Verification Panel[5]
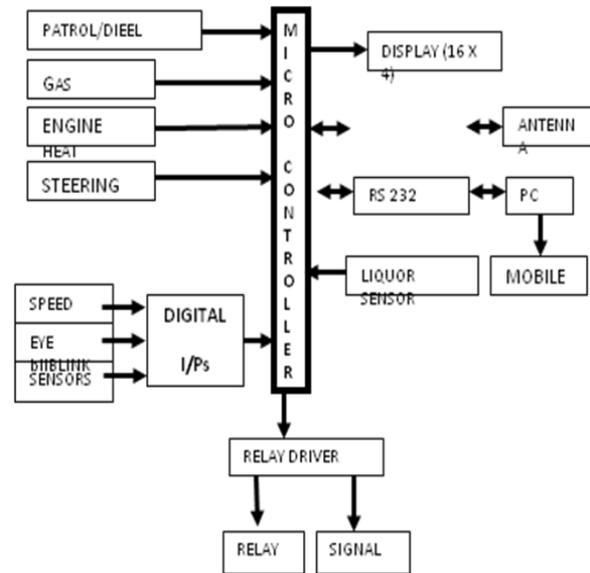
ITS is evolving at a rapid rate with new ITS technologies not even used commercially before being surpassed by even newer, better or faster technologies. ITS in one way or another now forms part of every single transportation project that is implemented around the developed and to a lesser extent the developing world

The system intervention itself may be a new source of errors when e.g. different information sources interfere with each other with the driving task, or systems that are designed to reduce driver workload decrease vigilance in a degree that is already dangerous. It is necessary that human errors created by new systems are carefully analyzed in an early phase of system development, and their sources eliminated before introducing the system into the market.

There may be special groups of drivers, first of all elderly drivers who, on the one hand are a
primary target group for driver assistance systems (route guidance.

II.   IMPORTANCE AND RELEVANCE OF STUDY

"The ITS is not a separate tool of study but a porch of the current one, in which information is given well-defined approach, better enabling transportation tool to let the people around the globe to commute efficiently."

Area where ITS implementations is required for improvement:

- Variable speed limits
- CCTV Camera

- Incident detection
- Weather stations
- Intelligent speed adaptation
- Advanced driver assistance systems
- Navigation systems
- Parking guidance
- Vehicle to infrastructure communication
- Animal and pedestrian presence detectors

2.1 How does ITS Improve Road Safety

CCTV Systems can be road or precinct based to monitor all aspects of the movement of vehicles and non-motorized transport on the road network.

Variable Message Signs can be used to provide advance warning to motorists of the driving conditions like Weather, Congestion Animals or pedestrians in the roadway, Closed roads .

1) [4]Adaptive cruise control (acc)

ACC system use sensors to monitor the distance to the vehicle in front. They can then reduce the vehicle's rapidity accordingly if the speed of the vehicle ahead is slow. Future generations of the system will be able to bring the vehicle   to a complete arrest in an emergency. They are meant for use on freeways rather than driving in the town/ city.

2) Lane departure warning system (ldws):-monitors road marking by the side of the car. If vehicle go out of its lane, it alerts the driver.

3) Driver weariness monitoring system's

It monitor the area at the back of the vehicle which is not covered by the mirrors.

No.	ITS Class	ITS Application
1	Advanced Traveller Information Systems (ATIS) Driver Assistance Systems (DAS) Advanced Driver Assistance Systems (ADAS)	Real-time Traffic Information Provision Route Guidance/Navigation Systems Parking Information Roadside Weather Information Systems
2	Advanced Transportation Management Systems (ATMS)	Traffic Operations Centers (TOCs) Adaptive Traffic Signal Control Dynamic Message Signs Ramp Metering
3	ITS-Enabled Transportation Pricing Systems	Electronic Toll Collection (ETC) Congestion Pricing/Electronic Road Pricing (ERP) Fee-Based Express (HOT) Lanes Vehicle-Miles Traveled (VMT) Variable Parking Fees

Fig2:- Functional requirement & specification[3]

If any movement is detected by this system, it warns the driver.

Cameras are used in this system to monitor a driver's eye/body movement. If it detects any sign of fatigue (e.g. a change in eye blinking rate or possible movement of the body)driver is intimated to be attentive.

III. FUTURE WORK

The future concept of communication between individual vehicles and the roadside infrastructure has the potential to bring about significant road safety and network efficiency benefits. Running alongside the DfT's earlier CVHS feasibility study to identify and quantify the extent of policy delivery benefit and to consider potential barriers, pitfalls and dis-benefits, we also committed to take part in the co-funded European Co-operative Vehicle Infrastructure Systems project (CVIS). These aids warn the driver about the presence of nearby objects or people without physical contact people behind the vehicle.

a)Adaptive frontage illumination SYSTEMS This system control the headlight beams according to the angle of steering to the travel direction.

b)Tyre pressure monitoring system Pressure in the tyres is monitored by this system and notifies the driver if they need readjustment.

Generally these systems warn drivers by visual and audible alerts.

c) Automated Emergency Vehicle Dispatch Systems automatically dispatches emergency services vehicles to an incident including real time information to on-board units in all vehicles. The system includes vehicle tracking and automated incident information capture[8]

The purpose of all these systems is to provide better information the driver about road and traffic environment and to provide early warning of hazards. They can reduce the risk of accidents.

IV.   CONCLUSION

The results of this research article have shown that many benefits are obtained through deployments of ITS systems in an urban setting in the correct circumstances. Here the decision making rule of ITS systems or groups of systems which are already present on series-produced cars nowadays are described.[12] New technology improvement provides gigantic opportunities to support the driver in the driving task. Many systems are display potential growth in terms of humanizing traffic safety, and some have shown cause in reducing the number of traffic accidents, such as ESC. On the other hand much research is still needed in order to evaluate the safety implications of many of these systems. The variation effect debated i.e. if and if so to what extend drivers adapt new driving characteristics when increased support is given from the vehicle in order to perform the driving task. In addition, safety benefits from enlarged vision during night time driving could decreased if enhanced vision result in higher driving speed

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