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A Review on Various Road Safety Systems

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ABSTRACT

The Safe System (SS) approach to road safety emphasizes safety-by-design through ensuring safe vehicles, road networks, and road users. With a strong motivation from the World Health Organization (WHO), this approach is increasingly adopted worldwide. Considerations in SS, however, are made for the medium-to-long term. Our interest in this work is to complement the approach with a short-to-medium term dynamic assessment of road safety. Toward this end, we introduce a novel, cost-effective Internet of Things (IoT) architecture that facilitates the realization of a robust and dynamic computational core in assessing the safety of a road network and its elements. In doing so, we discuss about the various existing mechanisms for road safety.

Keywords : Internet of Things, Smartphone, Road Safety, Arduino, G-Sensor, Accelerometer

I. INTRODUCTION

Road traffic crashes are one of the world's largest public health and injury prevention problem .According to the World Health Organisation (WHO), more people die on road in India than anywhere else in the world. At least 13 people die every hour in road accidents in our country; the latest report of the national crime record Dureau reveals.

In 2007, 1.14 lakhs people in India lost their lives in road mishaps improper road infrastructure failure to follow the speed limit, and increase in drinking and driving habits are among the major factors contributing to deaths from road crashes, WHO said in its report on 'Decade of Action for Road Safety 2011-2010'.Currently road safety systems are available in high end luxury cars such as Audi, Mercedes, Benz, etc., to name a few. Example: On star Corporation provides subscription based communications, in–vehicle security, hand free calling, turn-by-turn navigation, and remote diagnostics systems throughout the united states, Canada and China turn-by-turn navigation and road side assistance .The motivation behind the work revolution is an attempt to make an embedded system to bring a positive difference in the field of road safety and road discipline.

The work tackles some major causes of road accidents such as breaking traffic signal and horning in No horning zone. It also has a major objective of exercising road discipline such as speed control in different areas and horn control in horn prohibited zones .This paper presents vehicle speed control in variable zone in this feature ;speed of the vehicle is controlled in different areas such as flyovers ,bridges ,highways ,schools ,hospitals ,cities and suburbs .Horn control of vehicle. Horn control of

vehicles in no honking zone–controlling unwanted disturbances in horn prohibited zone such as hospitals, public libraries ,courts, schools, etc.,

The Safe System (SS) approach to transport networks originated with the "Safe Road Transport System" model developed by the Swedish Transport Agency. In its essence, the approach migrates from the view that accidents are largely and automatically the driver's fault to a view that identifies and evaluates the true causes for accidents. Through the categorization of safety into the safety of three elements (vehicle, road, and road user), SS minimizes fatalities and injuries by controlling speeds and facilitating prompt emergency response. The model has been widely adopted since its introduction and is currently motivated by the WHO as a basis for road safety planning, policy-making, and enforcement.

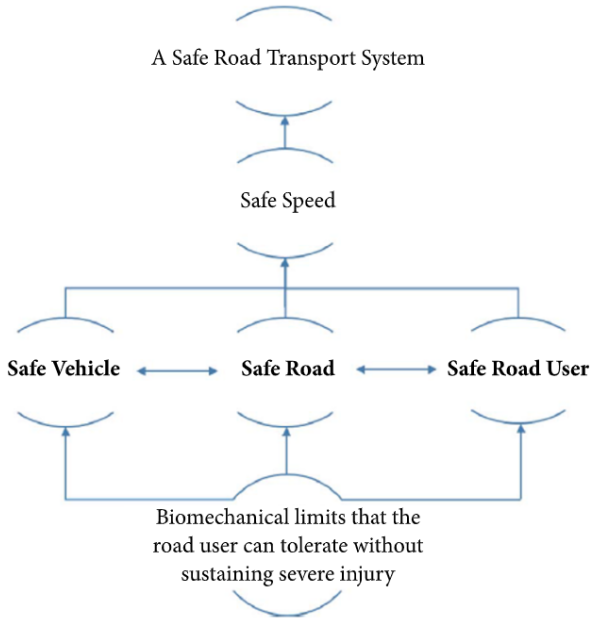

Figure 1 : The Safe-System-Based Safe Road Transport Systems

An illustration of the model is provided in Figure 1. A central emphasis is given to speed in the SS approach as it is the strongest and most fundamental variable in the outcome of fatality. The fragility of the human body makes it unlikely to survive a cushioned impact at a speed of more than 30 km/h, with lower speeds resulting in either death or serious injury [1, 2]. The objective of the SS approach is that the three model elements should be designed and monitored to proactively prevent deadly speeds from happening and allow for a reduced emergency response time in the event of an accident.

Elements of the SS approach are as follows.

(1) Safe Vehicle. Emphasis on vehicle safety is verified through mandated regulatory testing and rating, as well as technologies such as electronic stability control. Beyond this, enforced checks (e.g., upon license renewals) combined with on the road reporting work to review the status of vehicle safety.

(2) Safe Road. The assessment of road (or road network) safety is multifaceted. Road inspection enables clear and direct observation of the state of the road and assesses the need for repairs or modifications. The structure of the road network is amenable to safety assessment through partitioning into what is called "Traffic Analysis Zones (TAZs)" [4]. In addition, considerations for crash data and other supporting data offer further insights into general safety assessment.

In 2011, the European Road Assessment Programme (EuroRAP) generated the European Road Safety Atlas for EU countries [5]. The atlas indicated the safety level of roads with a star rating based on specially equipped vehicles for multimedia-based data aggregation [6]. The EuroRAP efforts continue to implement an SS approach across the EU, along with several other national programmes within the International RAP, or iRAP, initiative [7].

(3) Safe Road User. There are several aspects to road user safety, including measures for education and awareness, travel distance, exposure, licensure, enforcement, and sober driving [3]. The need for

such characterization rises substantially as the findings of crash report analysis in cities typically note a critical dependence on either driver behavior or driver awareness [8]. A great need is further established in these studies for innovative mechanisms to instill safe driving at the licensing and post-licensing stages.

II. LITERATURE REVIEW

Pramodshelke et al. [9] had proposed that a review on Arduino Based embedded System in Car for Road Safety using RFID .In this work when the RFID tag is detected by the RFID reader the speed of the motor reduces in specified areas and it avoids accidents.

Ch . Sonali Shankar et al., [10] had proposed that a review on Arduino based Embedded System in Passenger Car for Road Safety .In this work the sound of the horn stops and speed is also reduced when the RFID tag is detected by the RFID reader.

Deepa et al., [11] had proposed that a review on Embedded System in Passenger Car for Road Safety.in this work the proposed features are automatic collision notification that gives notification to the victim's relative, red light traffic control makes sure the vehicle doesn't break signal, speed control alters speed in different zones, horn control prevents honking in horn prohibited zone, alcohol detection detects drunk driving and vehicle security is used to prevent theft Suhas Katkar et al., [12] had proposed that a review on An Embedded System In passenger Car For Road Safety. This project is designed to inform about an accident or theft that has occurred to the vehicle, to the family members of the travelling persons and concerned authorities. Anto bennet et al., had proposed that a review on An Embedded System in Passenger Car for Road Safety using GPS and GSM. This work is designed to inform about an accident that is occurred to a vehicle to the family members of the travelling persons.

Anto bennet et al., [13] had proposed that a review on an Embedded System in Passenger Car for Road Safety using GPS and GSM.GPS Receiver gets the location information from satellite in the form of latitude and longitude. The system can be interconnected with the alcohol detection and alert the owner on his mobile phone.

Anto bennet et al., [14] had proposed that a review on Alcohol Detection and Accident Avoidance Using locking With Tracking. This system will detect drunker driver by alcohol sensor through driver breathe fitted on steering in front of driver ,the message is sent to the police through GSM system and provides GPS base system to track those cars.

III. RELATED WORK

Many countries around the world ban the use of hand-held devices while driving, including the United States, Canada, Germany, Israel, Greece, Norway, and more. While smartphones can be a dangerous distraction, correct use of cell phone apps can reduce risk and promote safer driving behavior. Apps used with hands-free devices can monitor distractions, protect young drivers, call for help when needed, and prevent speeding. Following are few Top Road Safety Apps.

Kruzr – Driving Assistant for Distracted Driving
Kruzr Road Safety App Kruzr is a free android-based app that detects when you're driving and automatically screens incoming calls and messages. Kruzr tells senders you're on the road and will respond later. Don't worry, you won't miss critical calls. Kruzr automatic driving assistant allows urgent calls to proceed, while less important calls and messages can be retrieved later.

Safely Home – Detects Accidents
Safety Home Road Safety App Safely Home is a free Android app that automatically detects road accidents

without any human intervention. If you're in an accident, the app notifies your emergency contacts. Safely Home includes a "Save a Life" feature to help injured accident victims get help quickly. The app also provides traffic updates, and GPS-guided Roadside Assistance for mechanical problems.

Drive Mode: Safe Driving App

Drive Mode Road Safety app Drive Mode is an Android app that includes a voice-control option for streamlined interfacing with your favorite applications, as well as simple swipe or tap functionality. With Drive Mode voice control, drivers can easily access navigation, music and messaging apps.

Drive Mode can be setup to launch when you start driving. The app will ignore calls and messages in "Do Not Disturb" mode, send text message auto replies, or you can choose to reply to calls and messages using seamless voice commands, and much more.

AT&T DriveMode

ATT Road Safety App

AT&T Drive Mode is a free app for Android and Apple users and is available on all carriers. This app silences incoming messages when the GPS detects you are driving 15mph or faster, and turns off when you drop below 15 mph for two or three minutes. It offers you a list of up to five contacts you can call hands-free. Parents of young drivers can receive alerts if the app is turned off. AT&T Drive Mode is also available in Spanish.

iBolt Dock'n Drive

iBolt Road Safety App The iBOLT Dock'n Drive app requires the use of an iBolt docking station. This Android-based app provides automated answering of incoming calls. The "It Can Wait" feature places incoming text messages on hold while the phone is docked. Messages are delivered to the phone when it's not docked. You can set the auto reply message, such as "Driving right now, will get back to you shortly".

Fleetsafer

Fleetsafer is aimed at employers who want to reduce the risk of employee liability for accidents on the job. The app appears on company-issued tablets and smartphones. It detects the driving state and automatically puts the device into safe mode. Only emergency calls may be made.

MamaBear

MamaBear Family Safety is a free app for Android and Apple devices. Recognized as the "Best Parenting App" in 2017 by Mumi Family Awards, MamaBear provides parental alerts for speeding, and provides GPS locations for young drivers. MamaBear also allows parents to monitor their child's text messages, social media, and arrival and departure times at locations away from home.

Drive Safely Pro Road Safety App

The DriveSafe.ly app is designed to prevent distracted driving accidents by providing hands-free access to emails and text messages. Powered by a text-to-speech program, Drive Safe.ly Pro converts messages in 27 languages. The app reads text messages and emails aloud in real time, allowing drivers to keep their hands on the wheel and eyes on the road.

In this system, various sensors such as soil moisture, DHT11 sensors are connected to the input pins of arduino microcontroller. The sensed values from the sensors are displayed in LCD. If the sensed value goes beyond the threshold values set in the program, the pump will be automatically switched ON/OFF by the relay circuit and it is connected to the driver circuit which helps to switch the voltage. The farmer will be intimated about the current field condition through GSM module and also updated in the web page. By using this system, the farmer can access the details about the condition of the field anywhere at any time.

IV. CONCLUSIONS

This work illustrates the viability of an economic road safety monitoring and assessment solution through exploiting advances in the Internet of Things (IoT) within the context of smart cities. The introduced architecture facilitates robust and dynamic road safety assessment that complements the Safe System approach motivated by the World Health Organization (WHO), which has been increasingly adopted worldwide. An application of the dynamic assessment framework for route planning is also demonstrated. Future work involves exploring further applications, especially in the context of raising driver awareness of the road safety conditions during their trips.

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