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Smart Vehicle for Traffic Rule Enforcement Using Internet of Things

Dr. K Raghuveer[1] , Pavan Kumar T P[2] , Prajwal S A[2] , Sathwik S[2] , Shashank Madhyastha[2]
[1]Professor & Head of the Department, Information Science Engineering, NIE, Karnataka, India
[2] Student VIII SEM, BE, Information Science Engineering, NIE, Mysuru, Karnataka, India

ABSTRACT

Road Traffic is one of the most vital problem in our hastily developing world. This paper presents of study of different aspects and issues related to the problem. This paper emphasizes on using prominent technology-Internet Of Things(IOT) for developing smart system to monitor various parameters related to road traffic and using it for effective solution. The survey of the existing systems and concerned techniques related to the problem area are discussed. Different issues like traffic rule enforcement, accident detection, parking, speed limit and related methods to solve these issues are explored. We propose our "Smart vehicle for traffic rule enforcement using Internet of Things" consisting of Raspberry pi, GPS as input and process it to gather information about the traffic rules and parking, and this will be displayed on the display screen. This helps to solve the problem of parking and accidents.

Keywords: : Internet of Things(IOT); Raspberry Pi; Arduino; GPS; Cloud; Display screen;

I. INTRODUCTION

The Internet of Things (IOT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. The Internet of Things (IOT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. Cloud Storage is a backend –as-a-service which provides seamless scalability and it removes the necessity of operating databases which are distributed in nature. It is a fast and fully managed service. The key feature of the server is that it can store a large amount of data centrally and also it is able to provide access to restricted users via the internet across different geographical regions just by connecting into the same network. The Raspberry Pi is a series of credit card–sized single-board computers developed by the Raspberry Pi Foundation. A private cloud server can be set up in a Raspberry Pi which could be used as a storage device for applications involving real time signals. Raspberry Pi is a cheaper microprocessor in which cloud computing infrastructure can be obtained using cloud platforms. Arduino is an open-source project that created microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices. It is used to send instruction to driver and communicate with wifi for data transmission. Vehicle monitoring technology is rapidly increasing in the present years, with many different forms of this technology now available. Essentially it monitors how, when and where a vehicle is being driven, records the data and

provide an analysis as feedback to the driver and/or other parties. Some also provide in-vehicle alerts if pre-set parameters are exceeded (for example, hard acceleration). The driving behaviors that are monitored are ones that influence the likelihood of the driver crashing (for example, speed) or the severity of the crash. These are proxies for crash and injury risk, and monitoring a driver's propensity to indulge in such behaviors enables the technology to calculate a risk rating for that driver. It also, potentially, enables measures to be identified that may reduce the driver's crash risk. In the road safety surveillance technology has the potential to provide a wide range of safety benefits, including: relatively inexpensive and continuous measurement of driving behavior and vehicle use, which is otherwise difficult to observe more accurate and objective data about driving for example, in improving safety, reduce crash rates and operational costs, meet their obligations and reduce the risk of prosecution or civil action a way to help novice drivers, and licensing authorities to monitor and improve the driving, accordingly a powerful research tool to enable the collection of large amounts of real-life, natural driving behavior and the effectiveness of safety interventions on that behavior a tool to inform further training and guidance to identify problem locations on their road network.

II. METHODS AND MATERIAL

Architecture

In this whole architecture we have created a rule table which is connected to the cloud using Amazon web services EC2. The Data base is created with front end on Microsoft visual studio and the backend is connected to the cloud using MYSQlite. There is a GPS device which collects the co-ordinates from the cloud and send the analog signals to the Arduino which converts the analog signals to the digital systems and sends it to the Raspberry pi 3.0. this device is connected to the display screen. The display screen gets the battery source from a external battery source. The display screen gives all the information about the traffic rule enforcement.

Raspberry pi 3.0

III. RESULTS AND DISCUSSION

EXISTING SYSTEM

Road transport is vital to development. Unfortunately, inadequate attention to safety has meant that road transport systems have developed in ways that have led to significant loss of lives, health and wealth. Reliable and accurate data are needed to raise awareness about the magnitude of road traffic injuries, and to convince policymakers of the need for action.

Reliable and accurate data are also needed to correctly identify problems, risk factors and priority areas, and to formulate strategy, set targets and monitor performance. Ongoing, data-led diagnosis and management of the leading road traffic injury problems enables appropriate action and resource allocation. Without this, there will be no significant, sustainable reductions in exposure to crash risk or in the severity of crashes. Data relevant to road safety are collected every day in most countries, but for these data to be useful for informing road safety practice, they must be properly coded, processed and analyzed in a computerized database system.

The purpose of this manual system is to give practical guidance on establishing data systems that produce timely, reliable data on road traffic injuries that can be used to inform road safety management. The manual system begins with road safety management, and what kinds of data are required for effective monitoring. The manual system also describes a range of strategies for improving data quality and strengthening the performance of systems already in place, and describes the steps needed to plan, design and implement a new system – noting that there is no single approach that will be right for every jurisdiction which is automated and it does not reduce the complexities of the existing system.

Finally, the manual system does not guide the user on how to disseminate road safety data and maximize the likelihood of its use, and on how to improve road safety, monitor results and assess the impact of interventions. Thus, there is a want of the application which reduces all the complexities and eases and safeguards the driver.

IV. PROPOSED SYSTEM

Traditionally, road safety has been assumed to be the responsibility of the transport sector. But road traffic injuries are indeed a major public issue, and not just an offshoot of vehicular mobility. The health sector would greatly benefit from better road injury prevention in terms of fewer hospital admissions and a reduced severity of injuries. A Safety Management System is a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures. Many in-vehicle monitoring devices are essentially with in-built accelerometers, GPS and other features. The advantage of safety surveillance system is that it provides data to show when, where and how a vehicle is being driven. This enables the driver to calculate the risk of an individual holder based on their driving style. By using the system, it provides a more accurate picture of what actually happening and the nature of the vehicle, which helps the driver to establish to reduce accidents, and ensuring about safety.

The user when he is on driving he may exceed the speed limit in few areas from the system the speed limit of the vehicle can be controlled by using "DC gear motor" thus by reducing the chances of accidents by controlling the rotation of the wheel. In case of any restricted areas such as schools, hospitals etc where horn is not allowed, the hardware device called "5V continuous buzzer" helps to control the inbuilt horn present in the vehicle. While travelling from one place to another there are chances of finding many of the obstacles in between, these obstacles may not be visible during night times, which may lead to accidents or any uncertain incidents. This cannot be controlled if the obstacle finding devices are not found in the vehicle. So, in the present system the user is known about these obstacles from notification on the dashboard by using GPS technology. Global positioning system finds nearby obstacles or any such foreign particles and notifies the driver about it. By this, the driver can avoid accidents and unexpected situations from being faced. The speed of the vehicles, no horn areas, and other details are maintained by the RTO department and can easily keep track of vehicles from this.

Nowadays, parking of vehicles is very difficult but from using the application it is made easy. It helps the driver to park vehicle in the permitted parking area. If the area has no parking permission then it notifies the driver about it and hence from this one can easily park vehicles. The driver will also be notified about the traffic signals such as red is to stop, green is to proceed and orange is to get ready. When it is red, the tire of the vehicle will be stopped by producing the nails as obstacle and it flattens as soon as the signal turns green.

V. CONCLUSION

The proposed application can widely be used in vehicles for reducing accidents and limiting the speed of the vehicle. Also the application lets know about the obstacles easily by notifications on the dashboard. Hence, the application can be used in day to day life to reduce hazards.

VI. ACKNOWLEDGEMENT

To ensure drivers safety and providing him the guidance about the obstacles as well. The system also helps to limit the speed of the vehicle thus by reducing the risk of accidents.

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