International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-11 Issue-8, July 2022

Review Paper on E-Traffic Police IoT Based Auto-Detection of Traffic Rule Violation

Priya N, G Sai Mani Kumar, B Aravind Kumar, M Vinay Kumar Reddy, B Sree Harsha

Abstract: ***It is known fact that accidents are the major problem that is occurring now a days. Wearing helmets is one of the mandatory rule made by the government. Even after implementing these rules some of the bike riders are avoiding it. Because of this reason, we are seeing the increase of accidents. Also, due to slow reach of treatment accidents occurring at small areas are becoming fatal. current project looks to solve these problems. In this project a message will be sent to the rider that to wear the helmet, triple riding, signal jump, overspeed and also sends a message if driver isn't in active mode. These accidents leads to significant amount of death and disability. In India, Avoiding traffic rules like triple riding, signal jump, overspeed are causing major accidents. All the systems focus on changes occur in movement of vechicles, and sends a message if the rider avoids any of the mentioned traffic rules, which have been already explained in the literature survey.***

Keywords: Real Time Detection, Helmet Detection, Overspeed, Triple Riding and Signal Jump.

I. INTRODUCTION

Humans have created robots that assist them in a variety of ways and make their lives safer, whether for mundane purposes such as travelling to work or more exciting goals such as taking a plane vacation. Transportation alternatives have progressed in lockstep with technology improvements, and our reliance on them has skyrocketed. It has had a huge impact on our everyday life. We may now go to places at speeds our forefathers could never have dreamed. Practically everyone in today's world uses some sort of transportation on a daily basis. Some people can afford automobiles, while others must rely on public transportation. There are some standards and canons of behaviour that apply to everyone, regardless of socioeconomic status drive. One of them is remaining alert and active while driving. Hundreds of thousands of catastrophes have been linked to this dreadful invention on a regular basis as a result of our ignoring our obligations to ensure a safer journey. Following the rules and regulations of the road may appear to the majority of people to be a minor issue, but it is critical. A machine wields the most power while on the road, and in the wrong hands, it can be deadly, and in some situations, this negligence can put the lives of those on the road in jeopardy. Failure to admit when we are too tired to drive is one example of carelessness. Several academics have written studies on motorist dozeness detecting systems in order to hide and help a negative side consequence of similar negligence. However, the system's generated scores and compliances aren't always precise. With the expansion of the social economy in many nations, the number of automobiles has expanded year after year, resulting in a slew of issues such as road congestion, traffic chaos, and traffic accidents. Traffic accidents can result in a large number of fatalities and financial damages. Traffic infraction monitoring systems have been implemented in some high-risk road sections to preserve traffic order and limit the number of traffic accidents (such as school sections and main road sections). Various traffic offences, such as speeding, can be captured and processed by a traffic violation monitoring system., triple riding , helmet detection and signal jump.

Manuscript received on 28 May 2022 | Revised Manuscript received on 08 June 2022 | Manuscript Accepted on 15 July 2022 | Manuscript published on 30 July 2022.

***** Correspondence Author

Mrs. Priya N, Department of Information Science and Engineering, New Horizon College of Engineering, Bangalore (Karnataka), India. Email: priya.narayanan19@gmail.com

G Sai Mani Kumar, Department of Information Science and Engineering, New Horizon College of Engineering, Bangalore (Karnataka), India. Email: gellisaimanikumar1234@gmail.com

B Aravind Kumar, Department of Information Science and Engineering, New Horizon College of Engineering, Bangalore (Karnataka), India. Email: aravindkumarboddu181@gmail.com

M Vinay Kumar Reddy, Department of Information Science and Engineering, New Horizon College of Engineering, Bangalore (Karnataka), India. Email: vinaykreddy1999@gmail.com

B Sree Harsha*, Department of Information Science and Engineering, New Horizon College of Engineering, Bangalore (Karnataka), India. Email: sreeharsha.bathula2@gmail.com

II. PRODUCT SCOPE

There are a variety of products on the market that monitors signal jump, triple ride, helmete and overspeed are used in a variety of vehicles. This project performs a similar purpose, but with improved results and new features. It also warns the driver to reduce his vehicle speed when the sensor finds any object on its way.

III. PROBLEM STATEMENT

Today the major issue which are causing road accidents are overspeed, triple riding and signal jump etc. because to these reasons we are witnessing major accidents around the globe. Triple riding and helmet detection, are in general a bit difficult to detect or observe, so we are implementing a camera to observe these rules. The foreseeable outcomes of this problem are likely to increase the awareness of importance of following traffic rules and also decreases the percentage of accidents around the globe.

The former is difficult to achieve and valuable, whereas the latter is impossible to obtain without the former, as driving for long periods of time is incredibly cost-effective.

IV. LITERATURE SURVEY

The impact of traffic infraction monitoring on driving behaviours and vehicle speed has been investigated by several academics. According to Zhu et al. [1,] traffic violation monitoring has a considerable impact on driving behaviour. Traffic violation monitoring can significantly minimise the likelihood of traffic collisions. The monitoring of traffic violations has a favourable impact on road traffic safety. Intersection traffic infraction monitoring, according to Pan et al. [2,] can effectively manage driver behaviour and limit the occurrence of speeding, which helps to reduce the occurrence of traffic accidents. Luo et al. [3] used a questionnaire poll to get drivers' perspectives on traffic infraction monitoring, and they found that it can notify the driver and reduce the occurrence of speeding, unlawful lane changes, and other behaviours. From a psychological standpoint, Zhang et al. [4] investigated the impact of traffic violation monitoring on driving habits. They believe that traffic violation monitoring has a negative impact on driving behaviour and that rear-end collisions increase dramatically when violations are monitored. Qian [5] investigated driving patterns at intersections with traffic violation monitoring and proposed that traffic violation monitoring aids in traffic safety. In response to China's unique national circumstances, Jiang et al. [6] investigated the influence of traffic violation monitoring on traffic accidents at intersections. They believe that traffic infraction monitoring can lower the number of traffic accidents while increasing the severity of those that do occur. According to Ahmed and Abdel-Aty [7], traffic infraction monitoring reduces left-turn traffic accidents but increases right-turn traffic accidents Traffic infraction monitoring, according to Chai et al. [8, has varying effects on different types of traffic accidents. Although traffic infraction monitoring reduces collisions, it increases the likelihood of rear-end collisions. Pulugurtha and Otturu [9] compared traffic accidents with and without traffic violation monitoring at intersections, finding that traffic violation monitoring at intersections increased rear-end accidents by 50% while lowering total traffic accidents by 16%. According to Higgins et al. [10], traffic violation monitoring has a considerable impact on driving behaviours, and the majority of drivers and nondrivers approve its implementation.

V.METHODOLOGY

A. Ardunio mega

The Arduino MEGA 2560 board is similar to the Arduino UNO board in appearance. It is far more powerful and lasts twice as long as the Arduino UNO. The Arduino MEGA has been superseded by this board. ATMega2560 is a possible name for it. In comparison to other Arduino boards, it may have larger memory space. The Arduino MEGA 2560 differs from previous Arduino boards in that it does not employ the FTDI USB-to-serial driver chip. Instead, it employs an ATmega16U2 that has been coded to function as a USB-to-serial converter. In terms of coding, it is programmed using the Arduino IDE software, much as all other boards. We don't need to add any further components or devices to get this board up and running. We can simply plug and play with this board to meet our needs because everything is integrated in, making it readily available. The Arduino Mega 2560 is a fantastic microcontroller board for applications that demand a lot of input/output pins or a lot of computing capability. Because a high number of input output pins are worthless for small projects, and a board with less memory fails to meet our needs, it is meant for more sophisticated projects. It can be used independently or in conjunction with other boards. It's mostly used to make a standalone project.

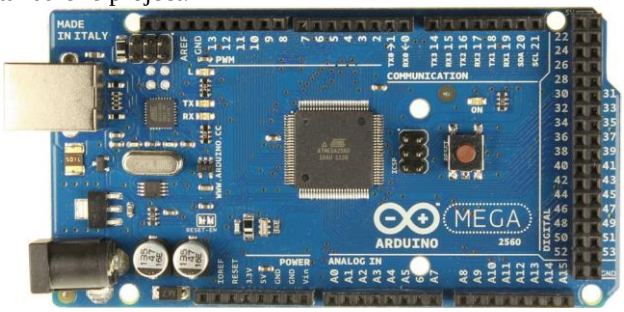

Fig 1.1: Arduino MEGA 2560

B. GSM

Global system for mobile communication (GSM) and is a mobile communication system which is used in communication . In 1970, Bell Laboratories came up with the idea for GSM. It is the world's most commonly utilised mobile communication system. GSM is an open and digital cellular system that uses the 850MHz, 900MHz, 1800MHz, and 1900MHz frequency bands to provide mobile voice and data services. For communication reasons, GSM technology was designed as a digital system employing the time division multiple access (TDMA) technique. A GSM digitises and compresses data before sending it along a channel with two separate streams of client data, each in its own time slot. The digital system can handle data speeds ranging from 64 kbps to 120 Mbps. Each cell is different depending on the implementation domain. In a GSM network, there are five different cell sizes: macro, micro, pico, and umbrella cells. Depending on the implementation environment, each cell's coverage area varies. The time division multiple access (TDMA) approach works by giving each user a different time slot at the same frequency. It can quickly adjust to data transmission and voice communication, with data rates ranging from 64kbps to 120Mbps.

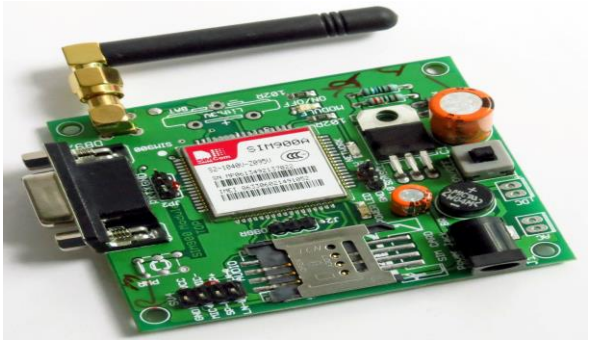

Fig 1.2: GSM

C. RFID Reader

It is a device that collects data from RFID tags, which are used to collect the information of the vehicle. and that information is transferred from the tag to the reader through radio waves [11] [12] [13].

The RFID tag, on the other hand, does not need to be scanned directly or have line-of-sight to a reader. To be read, the RFID tag must be within the range of an RFID reader, which can range from 3 to 300 feet. RFID technology allows several things to be scanned swiftly and provides for instant identification of a certain product even when it is surrounded by other items. An RFID tag, which is made up of integrated circuits with a tiny antenna for sending information to an RFID transceiver, uses digital data. An integrated circuit for modulating and demodulating radio frequency and an antenna for transmitting and receiving signals are found in the majority of RFID tags. Low frequencies of 125 to 134 kHz and 140 to 148.5 kHz, as well as high frequencies of 850 to 950 MHz and 2.4 to 2.5 GHz, are used. Because water absorbs wavelengths in the 2.4 GHz region, they are limited.

Fig 1.3: RFID reader

D.RFID Cards

Radio-frequency identification is the abbreviation for radio-frequency identification. RFID cards are used in applications that require personnel tracking or identification, as well as access control. Today's cards use a variety of RFID frequency bands, including 125 kHz low frequency proximity, 13.56 MHz high frequency smart cards, and 860-960 MHz ultra-high frequency cards (UHF). Smart cards and proximity cards are frequently referred to as "RFID cards." The frequency band utilised for RFID is determined by the application, taking into account the security level, read range, and data transfer speed requirements. 125 kHz (LF) - A common proximity card format for employee badges and access control at doors and gates. For physical and logical access control, 13.56 MHz (HF) is a higher security format used for credit cards and employee badges. 860-960 MHz (UHF) - Used for identification, access control, and transaction operations, UHF cards have a read range of up to 50 feet.

Fig 1.4: RFID cards

VI. CONCLUSION

It perfectly satisfies the system's objectives and criteria. The frame has reached a stable condition in which maximum mistakes have been eliminated. By implementation of this project 60-70% of effeciency is achieved in preventing road accidents due to carelessness of not wearing helmets, triple seat two-wheeler driving, signal jumping, overspeeding and drowsy driving. The project provides awareness to users who are familiar with the frame and helps them to understand its main areas, as well as the fact that it alleviates tension for individuals suffering from fatigue-related disorders by informing them of their dozing position while driving.

FUTURE SCOPE

By adding databases to this project we can create a feature which will detect the driver's licence and other details. If all of these arguments are employed, the delicacy can be greatly improved. We can also improve the design by including a detector that monitors heart rate in order to prevents causing unexpected heart attacks in motorists.

REFERENCES

1. H. Zheng, W. Chang, and J. Wu, "Traffic flow monitoring systems in smart cities: coverage and distinguishability among vehicles," Journal of Parallel and Distributed Computing, vol. 127, pp. 224–237, 2019. [CrossRef]
2. Z. Cheng, J. Lu, Z. Zu, and Y. Li, "Speeding violation type prediction based on decision tree method: a case study in Wujiang, China," Journal of Advanced Transportation, vol. 2019, Article ID 8650845, 10 pages, 2019. [CrossRef]
3. F. Chen, M. Song, and X. Ma, "Investigation on the injury severity of drivers in rear-end collisions between cars using a random parameters bivariate ordered probit model," International Journal of Environmental Research and Public Health, vol. 16, no. 14, 2019. [CrossRef]
4. G. Wu, F. Chen, X. Pan, M. Xu, and X. Zhu, "Using the visual intervention influence of pavement markings for rutting mitigation-part I: preliminary experiments and field tests," International Journal of Pavement Engineering, vol. 20, no. 6, pp. 734–746, 2019. [CrossRef]
5. Ross Girshick, Jeff Donahue, Trevor Darrell, Jitendra Malik, UC Berkeley, "Rich feature hierarchies for accurate object detection and semantic segmentation", 2014 IEEE Conference on Computer Vision and Pattern Recognition [CrossRef]
6. Shaoqing Ren, Kaiming He, Ross Girshick, and Jian Sun, "Faster R-CNN: Towards Real-Time Object Detection with Region Proposal Networks", arXiv:1506.01497v3 [cs.CV] 6 Jan 2016

7. Yali Nie , Paolo Sommella , Mattias O'Nils , Consolatina Liguori , Jan Lundgren1, "Automatic Detection of Melanoma with Yolo Deep Convolutional Neural Networks", 7th IEEE International Conference on E-Health and Bioengineering - EHB 2019
8. S. Divya, K. Cheldize, D. Brown, and E.E. Freeman, 2017. Global burden of skin disease: Inequities and innovations. Current Dermatology Reports, 6(3), pp. 204–210. [CrossRef]
9. Kenue, S.K., "LaneLok: Detection of Lane Boundaries and Vehicle Tracking Using Image-Processing Techniques - Part 11: Template Matching Algorithms," Vehicle Systems.
10. Zhang Qishan, Wu Jinpei, Yang Dongkai, "Intelligent Vehicle Location and Navigation System and Apllication, BeiJing: "Science Press, 2002 298.
11. C. Demonceaux, A. Potelle, and D. Kachi-Akkouche, "Obstacle Detection in a Road Scene Based on Motion Analysis," IEEE Trans. Vehicular Technology, vol. 53, no. 6, pp. 1649-1656, Nov. 2004. 1260. [CrossRef]
12. M. Lee, C. Yao, H. Liu," Passive Tag for Multi-carrier RFID Systems", IEEE 17th International Conference on Parallel and Distributed Systems, 2011.
13. B. Jin, D. Zou and Y. Gan, "Research and design of traffic detection based on GPRS", IEEE conf. on advanced computer control (ICACC), (2010) March.

AUTHORS PROFILE

Priya N, assistant professor in New Horizon College of Engineering and technology with total teaching experience of 14 years in various institutions, completed M.TECH (Computer Science and Engineering) from [SJCIT(Sri Jagadguru Chandrashekaranatha Swamiji Institute of Technology)in 2013 and B.E (I.S.E) from [East Point College of Engineering and Technology, affiliated to Visvesvaraya Technological University, Bangalore]. Total of 2 international scopus indexed paper published, 8 papers in national conferences, few to name are flower identification system using vision based technique, Block chain Based Framework for Document Verification, Architecture for Semi-real time graphical simulation in warehouse management system, Architecture for Semi-real time graphical simulation in warehouse management system, Intrusion detection based on clustering algorithm,Anamoly Detection across multi domain networks based on privacy preservation, Security on cloud based on role, Domain for providing energy for wireless sensor networks based on the data search algorithm with clusters, An effective treatment plan for patients to reduce overcrowding in hospitals,K-means clustering for epilepsy classification.

G Sai Mani Kumar (1NH18IS034) presently studying final year of Engineering in the Department of Information Science and Engineering (I.S.E) at New Horizon College of Engineering affiliated to Visvesvaraya Technological University, Bangalore. Currently working on a project related to traffic violation using Internet Of Things (IOT) and MATLAB. In which Matlab will used for processing the images , and hardware components in Iot will detect which parameter is driver violating and then send the message to the driver. And I have finished my Intermediate at Sri Chaitanya Junior College in the year 2018. And completed my schooling at Urdu Boys High School in the year 2015.

B Aravind Kumar (1NH18IS022) presently studying final year of Engineering in the Department of Information Science and Engineering (I.S.E) at New Horizon College of Engineering affiliated to Visvesvaraya Technological University, Bangalore. Currently working on a project related to traffic violation using Internet Of Things (IOT) and MATLAB. In which Matlab will used for processing the images , and hardware components in Iot will detect which parameter is driver violating and then send the message to the driver. And I have finished my Intermediate at Narayana Junior College (Nellore) in the year 2018. And completed my schooling at Ratnam High School in the year 2016.

B Sree Harsha (1NH18IS020) presently studying final year of Engineering in the Department of Information Science and Engineering (I.S.E) at New Horizon College of Engineering affiliated to Visvesvaraya Technological University, Bangalore. Currently working on a project related to traffic violation using Internet Of Things (IOT) and MATLAB. In which Matlab will used for processing the images , and hardware components in Iot will detect which parameter is driver violating and then send the message to the driver. And I have finished my Intermediate at Sri Chaitanya Junior College in the year 2018. And completed my schooling at Vimala English Medium High School in the year 2016.

M Vinay Kumar Reddy (1NH18IS054) presently studying final year of Engineering in the Department of Information Science and Engineering (I.S.E) at New Horizon College of Engineering affiliated to Visvesvaraya Technological University, Bangalore. Currently working on a project related to traffic violation using Internet Of Things (IOT) and MATLAB. In which Matlab will used for processing the images , and hardware components in Iot will detect which parameter is driver violating and then send the message to the driver. And I have finished my Intermediate at Sri Chaitanya Junior College in the year 2018. And completed my schooling at Nalanda English Medium High School in the year 2016.