**KONNECT: AN INTERNET OF THINGS(IOT) BASED SMART HELMET FOR ACCIDENT DETECTION AND NOTIFICATION**

**ABSTRACT**

The objective of the smart helmet is to provide a means and apparatus for detecting and reporting accidents. Sensors, Wi-Fi enabled processor, and cloud computing infrastructures are utilised for building the system. The accident detection system communicates the accelerometer values to the processor which continuously monitors for erratic variations. When an accident occurs, the related details are sent to the emergency contacts by utilizing a cloud based service. The vehicle location is obtained by making use of the global positioning system. The system promises a reliable and quick delivery of information relating to the accident in real time and is appropriately named Konnect. Thus, by making use of the ubiquitous connectivity which is a salient feature for the smart cities, a smart helmet for accident detection is built.

Keywords—Accident Detection; Cloud Computing; Hypertext Transfer Protocol; Internet of Things; Sensor; Ubiquitous Sensing

**CONCLUSIONS AND FUTURE WORK**

The smart helmet developed is a smart and reliable piece of technology that is cheap to develop and operate and yet not compromise on safety. Additionally, it offers several advantages over the existing methods of accident detection and notification systems that rely heavily on the data collected from cellular devices of the drivers. Also, most of the systems that are available in the automobile market are designed for only four-wheeled vehicles. Thus, the Internet of Things based application- Konnect, proposed in this paper will prove to ensure greater safety for the motorists. As a future extension of the work the smart helmet could be equipped to detect alcohol content in the breath of the motorist in order to keep a check on drunk and driving cases.

**SMART HELMET FOR SAFETY AND ACCIDENT DETECTION USING IOT**

**ABSTRACT**

Road accidents are increasing in our country, most of them are caused due to negligence of not wearing the helmet, drink and drive and over speeding which many leads to death or severe injuries due to lack of medical treatments provided to the injured person at right time. This motivates us to think about making a system which ensures the safety of biker, by making it mandatory to wear the helmet by the rider to prevent head injuries that may lead to immediate death, prevent drink and drive scenario by testing the breath of the rider before the ride, prevent over speeding and rash riding by alerting the rider and also to provide proper medical attention, if met with an accident by notifying the concerned person with the location details. Key Words: Accelerometer, Microcontroller, Alcohol detection, Accident detection, Notification.

**CONCLUSIONS**

The system designed provides safety and reduces the after effects of the accident, notifying about the accident will provide timely care and treatments to the victim reducing the severe impacts on the person. The fingerprint authorisation prevents vehicle theft and provides security. The alcohol detection will prevent drink and drive scenario and the effects of drink and driving to public and the rider himself. Android application built for the system will ensure the smooth functioning of the system. Speed monitoring of the vehicle will prevent over speeding rash riding and violation of traffic rules.

**HELMET DETECTION USING MACHINE LEARNING AND AUTOMATIC LICENSE PLATE RECOGNITION**

**ABSTRACT**

Motorcycle accidents have been rapidly growing through the years in many countries. In India more than 37 million people use two wheelers. Therefore, it is necessary to develop a system for automatic detection of helmet wearing for road safety. Therefore, a custom object detection model is created using a Machine learning based algorithm which can detect Motorcycle riders. On the detection of a Helmetless rider, the License Plate is extracted and the Licence Plate number is recognized using an Optical Character Recognizer. This Application can be implemented in real-time using a Webcam or a CCTV as input. Key Words: Automatic License Plate Recognition (ALPR), Deep Neural Network (DNN), Helmet Detection, Machine Learning, Mean Average Precision (mAP), Optical Character Recognition (OCR), You Only Look Once (YOLO).

**CONCLUSION**

From the results shown above it is evident that the YOLO object detection is well suited for real-time processing and was able to accurately classify and localize all the object classes. The proposed end-to-end model was developed successfully and has all the capabilities to be automated and deployed for monitoring. For extracting the number plates some techniques are employed by considering different cases such as multiple riders without helmets and designed to handle most of the cases. All the libraries and software used in our project are open source and hence is very flexible and cost efficient. The project was mainly built to solve the problem of non-efficient traffic management. Hence at the end of it we can say that if deployed by any traffic management departments, it would make their job easier and more efficient.

**SMART HELMET WITH EMERGENCY NOTIFICATION SYSTEM–A PROTOTYPE**

**ABSTRACT**

Motorcycles have higher rates of fatal accidents than any other automobiles in India. Hence, wearing a helmet alone is not sufficient to prevent accidents and save victims. Helmet wearing alone is not sufficient to save the life of a motor cyclist. The solution proposed in this work to address this life-threatening problem, is the Smart Helmet with Emergency Notification System (SHENS). This helmet not only protects the head of its rider but also his/her life by alerting the emergency service or an emergency contact when the rider has met with an accident. This smart helmet has the potential to act independently without any human intervention during road accidents. With the help of advanced sensors such as an infra-red sensor, impact sensor and accelerometer sensor, this smart helmet is also capable of detecting the consciousness of the accident victim and indicating the precise location of the accident. The alert to the emergency service is sent with the help of Global System for Mobile (GSM) module as a Short Messaging Service (SMS) containing the Global Positioning System (GPS) coordinates which indicate the location of the accident to which the emergency team is expected to reach to offer medical assistance. Thus, this smart helmet can be used to save millions and millions of lives by helping them to get timely medical attention in case of accidents. Keywords-smart helmet; smart helmet with emergency notification system (SHENS); global system for mobile (GSM); global positioning system (GPS); accident notification; emergency notification.

**CONCLUSION AND FUTURE WORK**

The SHENS has the scope to become a daily gadget like a mobile phone since it has the potential to save people from the danger of losing their lives during road travel. A large number of people using two wheelers for their day to day chores can make use of SHENS ensure their safety during road travel. This helmet can be very much helpful when the accidents happen in the highways and scarcely crowded roads as the Smart Helmet with Emergency Notification System (SHENS) has the potential to help the accident victims to get timely medical assistance without any interventions from anyone around. There are some improvements and feature addition that can be done to SHENS in order to provide the humanity a better user experience. Some of the works that can be done in future are as follows. An emergency push button that can send the notification directly to the emergency service in case of the helmet not experiencing a threshold impact but accident victim is badly hurt. An alcohol detection sensor which can detect alcohol in the breath of the rider can be added to the system in order to send text alerts indicating drunken drive by the rider to the nearest police station by integrating with the GSM module.

**HELMET DETECTION AND NUMBER PLATE RECOGNITION USING MACHINE LEARNING**

**ABSTRACT**

Motorcycles have always been the primary mode of transportation in developing countries. Motorcycle accidents have increased in recent years. One of the main reasons for fatalities in accidents is that a motorcyclist does not wear a protective helmet. The most common way to ensure that motorcyclists wear a helmet is by traffic police to manually monitor motorcyclists at road junctions or through CCTV footage and to penalize those without a helmet. But it requires human intervention and effort. This system proposes an automated system for detecting motorcyclists who do not wear a helmet and a system for retrieving motorcycle number plates from CCTV video footage. First, the system classifies moving objects as motorcycling or non-motorcycling. In the case of a classified motorcyclist, the head portion is located and classified as a helmet or non-helmet. Finally, the motorcyclist without a helmet is identified. Further we have developed a system which identifies the number plates and extracts the characters of the number plate using OCR algorithm.

**RESULT**

When we give the input video wearing helmet, it successfully detects the helmet and shows the confidence score and also it prints “Helmet Detected!” on the console. When the person is not wearing helmet the system searches for the number plate in the frame. Once detected it extracts characters and prints on the console.

**HELMET DETECTION AND NUMBER PLATE RECOGNITION USING MACHINE LEARNING**

**ABSTRACT**

are very few automobiles in developing countries because motorcycles have always been the predominant mode of transport. Motorcycle crashes have been on the rise in the last few years. A number of people who are involved in traffic collisions include motorcyclists who do not wear reflective helmets, since they do not believe they provide sufficient protection. Once the traffic police spot those driving motorcycls on a whole-or mMotorcycles in junctions-without helmets, they also use video from CCTV to take control of the drivers of those vehicles and penalise those who are riding without one. However, it can only be achieved through human action and commitment. Secondly, the classifies moving vehicles as motorcycle or nonmotorcycle. for example, when referring to the head component, in the case of a motorcyclists, it is graded as either full face or non-full face. An excellent image analysis of the motorcycle number is then used to extract the characters that were missed by the identification software and/ Finally, the character count of the motorcycle is found, and from the motorcycle is examined using OCR software.It is an Object Detection Algorithm used to identify faces in an image or a real time video. The algorithm uses edge or line detection features proposed by Viola and Jones in their research paper “Rapid Object Detection using a Boosted Cascade of Simple Features.A Convolutional Neural Network is a Deep Learning algorithm which can take in an input image, assign importance to various aspects/objects in the image and be able to differentiate one from the other. CNNs are used for image classification and recognition because of its high accuracy. The CNN follows a hierarchical model which works on building a network, like a funnel, and finally gives out a fully-connected layer where all the neurons are connected to each other and the output is processed.

**CONCLUSION**

Our bike scanning and tracking device is capable of finding a bike owners that doesn't need any human interference as yet it has been used to recognise helmetless motorcyclists successfully; it has had already been very effective in identifying motorcycl use, though, in all likelihood, with respect to achieve the initial phase of the larger objective of regulating motorcycle use. this marks out of 100 on a multiple-choice question when you look at the total of correct answers Actions can only be done if the cars are located in the 'expanded in size', regardless of their state of the remaining amount of motion. Any motorcycle has a serial number, and hence, is able to carry several numbers from other instances of the same class. Anything that is needed to extend this scheme is a licence plate number registry for cars, as well as licence information. Any of those who doubt the competence of irresponsible drivers will be found out.

**HELMET DETECTION USING MACHINE LEARNING AND AUTOMATIC LICENSE PLATE RECOGNITION**

**ABSTRACT**

Motorcycle accidents have been rapidly growing through the years in many countries. In India more than 37 million people use two wheelers. Therefore, it is necessary to develop a system for automatic detection of helmet wearing for road safety. Therefore, a custom object detection model is created using a Machine learning based algorithm which can detect Motorcycle riders. On the detection of a Helmetless rider, the License Plate is extracted and the Licence Plate number is recognized using an Optical Character Recognizer. This Application can be implemented in real-time using a Webcam or a CCTV as input. Key Words: Automatic License Plate Recognition (ALPR), Deep Neural Network (DNN), Helmet Detection, Machine Learning, Mean Average Precision (mAP), Optical Character Recognition (OCR), You Only Look Once (YOLO).

**CONCLUSION**

From the results shown above it is evident that the YOLO object detection is well suited for real-time processing and was able to accurately classify and localize all the object classes. The proposed end-to-end model was developed successfully and has all the capabilities to be automated and deployed for monitoring. For extracting the number plates some techniques are employed by considering different cases such as multiple riders without helmets and designed to handle most of the cases. All the libraries and software used in our project are open source and hence is very flexible and cost efficient. The project was mainly built to solve the problem of non-efficient traffic management. Hence at the end of it we can say that if deployed by any traffic management departments, it would make their job easier and more efficient.

**HELMET DETECTION AND LICENSE PLATE RECOGNITION**

**ABSTRACT**

Nowadays, road accidents are one of the major causes that lead to human death. Motorbike accidents can cause severe injuries. The helmet is important for every motorcyclist. However, many fail to conform to the law of wearing helmets. Here is the software using CNN, to recognize the motorbike drivers who are not obeying the helmet law. The system consists of motorbike detection, helmet vs no helmet classification, and motorbike license plate recognition. The motorbikes are scanned using the feature vector HOG. Once the motorbike is detected, by CNN, it identifies whether the motorcyclist is wearing a helmet or not. If the motorcyclist is identified as not having a helmet, then the license plate of the motorcycle is detected using Tesseract OCR. Keywords: Helmet Detection, Convolutional Neural Network, Tesseract OCR, License Plate Extraction

**CONCLUSION**

A Non-Helmet Rider Detection system is developed where a video file is taken as input. If the motorcycle rider in the video footage is not wearing helmet while riding the motorcycle, and then here we are uploading an image to identify the license plate number of that motorcycle is extracted from image and displayed. Object detection principle with YOLO architecture is used for motorcycle, person, helmet and license plate detection. OCR is used for license plate number extraction if the rider is not wearing a helmet. Not only the characters are extracted, but also the frame from which it is also extracted so that it can be used for other purposes. All the objectives of the project are achieved satisfactorily.

**DETECTION OF NON-HELMET RIDERS AND EXTRACTION OF LICENSE PLATE NUMBER USING YOLO V2 AND OCR METHOD**

**ABSTRACT**

In current situation, we come across various problems in traffic regulations in India which can be solved with different ideas. Riding motorcycle/mopeds without wearing helmet is a traffic violation which has resulted in increase in number of accidents and deaths in India. Existing system monitors the traffic violations primarily through CCTV recordings, where the traffic police have to look into the frame where the traffic violation is happening, zoom into the license plate in case rider is not wearing helmet. But this requires lot of manpower and time as the traffic violations frequently and the number of people using motorcycles is increasing day-by-day. What if there is a system, which would automatically look for traffic violation of not wearing helmet while riding motorcycle/moped and if so, would automatically extract the vehicles’ license plate number. Recent research have successfully done this work based on CNN, R-CNN, LBP, HoG, HaaR features,etc. But these works are limited with respect to efficiency, accuracy or the speed with which object detection and classification is done. In this research work, a Non-Helmet Rider detection system is built which attempts to satisfy the automation of detecting the traffic violation of not wearing helmet and extracting the vehicles’ license plate number. The main principle involved is Object Detection using Deep Learning at three levels. The objects detected are person, motorcycle/moped at first level using YOLOv2, helmet at second level using YOLOv3, License plate at the last level using YOLOv2. Then the license plate registration number is extracted using OCR (Optical Character Recognition). All these techniques are subjected to predefined conditions and constraints, especially the license plate number extraction part. Since, this work takes video as its input, the speed of execution is crucial. We have used above said methodologies to build a holistic system for both helmet detection and license plate number extraction.

**CONCLUSION**

A Non-Helmet Rider Detection system is developed where a video file is taken as input. If the motorcycle rider in the video footage is not wearing helmet while riding the motorcycle, then the license plate number of that motorcycle is extracted and displayed. Object detection principle with YOLO architecture is used for motorcycle, person, helmet and license plate detection. OCR is used for license plate number extraction if rider is not wearing helmet. Not only the characters are extracted, but also the frame from which it is also extracted so that it can be used for other purposes. All the objectives of the project is achieved satisfactorily

**A SURVEY ON HELMET DETECTION AND NUMBER PLATE RECOGNITION FOR SAFETY AND SURVEILLANCE SYSTEM**

**ABSTRACT**

Now-a-days two wheelers is the most preferred mode of transport. It is highly desirable for bike riders and the pillions to use helmet. This paper uses image processing technique by which motorcyclists without helmet will be detected. In this project moving vehicles can be detected using the input as image or a video and then classified into motorcyclists and non-motorcyclists by background removal and based on size of the image being detected. If in case motorcyclist is detected without a helmet, the vehicle details with the person(s) on vehicle and the number plate is captured in the form of an image. An algorithm is designed to recognize number plates of motor cyclists using images or videos taken by camera. The recognition of number plate algorithm has different steps like Vehicle Classification, Pre-processing, choosing the ROI(Region of Interest), Recognition of number plates characters using image processing algorithms, storing in the database with the image as the proof with date and time recorded . A database will be designed with the proof stored with the offence to identify every offender accurately and arrest the suspect’s vehicle and hence imposing violation fines, the system uses pure machine learning in order to identify different types of helmet that it comes across with minimum cost. Keywords: motorcyclists without helmet, number plate recognition, image processing.

**CONCLUSION**

Health is the vital need of any person and so injuries during riding vehicles can lead to serious accidents and sometimes it can be fatal resulting in the death of the people. This project mainly uses deep neural networks for image recognition of the person in the input given in the form of a video or an image and the system recognizes the rider and the pillion for wearing the helmet or not and using optical character recognition (OCR), the number plate details are read and stored in the database which saves the lives of many by forcing riders to wear helmets during travelling on two wheelers.