# **SMART HELMET 5.0 FOR INDUSTRIAL INTERNET OF THINGS USING ARTIFICIAL INTELLIGENCE**

**ABSTRACT:**

Information and communication technologies (ICTs) have contributed to advances in Occupational Health and Safety, improving the security of workers. The use of Personal Protective Equipment (PPE) based on ICTs reduces the risk of accidents in the workplace, thanks to the capacity of the equipment to make decisions on the basis of environmental factors. Paradigms such as the Industrial Internet of Things (IIoT) and Artificial Intelligence (AI) make it possible to generate PPE models feasibly and create devices with more advanced characteristics such as monitoring, sensing the environment and risk detection between others. The working environment is monitored continuously by these models and they notify the employees and their supervisors of any anomalies and threats. This paper presents a smart helmet prototype that monitors the conditions in the workers’ environment and performs a near real-time evaluation of risks. The data collected by sensors is sent to an AI-driven platform for analysis. The training dataset consisted of 11,755 samples and 12 different scenarios. As part of this research, a comparative study of the state-of-the-art models of supervised learning is carried out. Moreover, the use of a Deep Convolutional Neural Network (ConvNet/CNN) is proposed for the detection of possible occupational risks. The data are processed to make them suitable for the CNN and the results are compared against a Static Neural Network (NN), Naive Bayes Classifier (NB) and Support Vector Machine (SVM), where the CNN had an accuracy of 92.05% in cross-validation.

**CONCLUSION:**

Our work has a history of electronic development in which the use of a multisensory helmet was established. Through a conditional model of input–output rules, we tried to detect the different situations to which a worker was subjected. However, the input–output techniques presented false positives and false negatives with 60% accuracy in the best of cases, which is why after several stages, it was decided to implement AI in the helmet. The 60% that was described a moment ago is due to the combination of different circumstances, that is to say, the correlation that exists on the independent characteristics, is for that reason, that through techniques that find linear and nonlinear relations we decided to innovate in the present work. Since it is necessary to find the patterns that determine a particular action, for them there are the techniques of deep learning as our work presents The comparison between different models of AI has been made in this research. Our innovation comes from the moment of using a CNN that in the literature has been used to analyze images or videos in intelligent helmets with the aim of saving lives. However, we proposed a multisensory approach to real-time feature analysis. Through the transmission of data through specialized IoT devices, a smart helmet has been designed to monitor the conditions in a working environment. The application areas of this proposal are industrial and agricultural sectors and any other sector that involves risk for the workers. Thanks to the helmet, different injuries can be avoided, and in case an accident occurs the damage caused to the worker is lessened through prompt attention or detection. It is possible to observe in Figures 9–11 that the MSA presented many false positives on majority classes in sample size, and even false positives of repeated classes (class 6) on more than five different classifications. NB and NN had a better performance in minority classes, however, there are three different classifications in false positives in classes such as 11, 9, 7, 2, 1 and 0. The NN has a strong resolution where the classes mentioned above still present false positives but with a decrease to 2 wrong classes in almost all cases.

**DESIGNING OF IOT BASED SMART HELMET**

**ABSTRACT:**

Main objective of smart helmet is to provide a means and apparatus for detecting and reporting accidents. With the rapid increase in number of 2-wheelers , frequency of accidents is increased rapidly. A major cause of the fatalities occur because either the person was not wearing a helmet, or his accident was not reported in time, and he could not be saved because of the delayed admittance to a hospital, or because he was riding while drunk. So efforts should be made to avoid accidents and to minimize their consequences. Today we are living in a world where the conditions of the road have no importance for people and they are regularly violated. In addition, its human nature to resist what is imposed on them. So there is a need to make smart helmets using IOT[6][7][8].

**CONCLUSION:**

Smart helmet is an effective solution to many problems. Wearing the helmet and being sober are necessary conditions for the bike to start, reducing the possibilities of accidents. Even if a person takes caution sometimes accidents do occur. Here our engine cut off feature reduces the chances of fatalities significantly. The smart helmet acts as a virtual policeman keeping the drivers in check and making roads safer.

**SMART HELMET USING IOT**

**ABSTRACT**

Now a day’s road accidents are increasing in our country due to the violations of traffic rules like drink and drive, not wearing helmet, over speeding which may leads to severe head injuries and death. By considering all these issues the idea of smart helmet came into our mind which will ensure the safety of biker. The main idea behind this is to provide protective headgear for the riders to make their driving safer than before. This can be implemented by using advanced features like alcohol detection, accident identification, location tracking , and fall detection. This makes it not only a smart helmet but also a feature of smart bike.

**CONCLUSION**

The “Smart Helmet using IoT” system will Overcome above mentioned issues and will Provide the safety to the biker and reduces the After effects of the accident, notifying about the Accident. Our system is cheaper than previously Existing systems. The surveillance feature in the System is helpful for parents for keeping the track Of their children’s location. As we are using Wi-Fi module it will send the SMS faster than GPS Module.

**A REVIEW ON SMART HELMET FOR ACCIDENT DETECTION USING IOT**

**ABSTRACT:**

As we know that accidents are increasing day by day, we can also notice that many laws and regulations are posed by government in order to avoid this accidents. Accidents can be defined as the unplanned event or the mistake that may occur resulting in injury and sometimes it also leads to death. The accidents in case of two wheelers are more compared to other vehicles. This may be avoided by wearing helmets and riding vehicles without consuming alcohol. This survey is on smart helmet for accidence avoidance and also examining various related techniques. This research also helps us to understand IOT technology which is being emerged now a days .From the literature survey we find that the method proposed using microcontroller RF transmitter and other sensors is cost effective but we find the system proposed using Raspberry pi module, Pi camera, Pressure Sensor, GPS system which uses image processing algorithms is most efficient since the image processing is included so that we can easily detect the use of helmet from the rider. Smart helmet system helps to provide safety and security to the two wheeler riders.

**CONCLUSION:**

The survey demonstrates Smart helmet for accident avoidance. The helmet should be designed in order to reduce number of accidents in two wheelers this can be done by designing the device using IOT technology. Some sensor like IR sensor, alcohol sensor, GPS modules etc can be used to design a cost effective and user friendly smart helmet. The result should be accurate and should be useful to the government and society. This smart helmet can also be changed to seat belt system in case of four wheelers and can be implemented in future.

**NOVEL COVID-19 DETECTION AND DIAGNOSIS SYSTEM USING IOT BASED SMART HELMET**

**ABSTRACT—**

Coronavirus is the new virus that has not been identified in humans before which it causes the coronavirus disease called COVID-19. This disease was firstly discovered in Wuhan, China, on December 2019 and spread to the world until now. The virus can easily pass from person to person which make it spreaded rapidly. One of the common symptom of COVID-19 that can be easily identified is fever. Since the virus outbreak, thermal screening using infrared thermometers are used at public places to check the body temperature to identify the indicated infectee among crowd. This prevention still lacking because it spends a lot of time to check the body temperature from every person and the most importance is the close contact of the infectee might lead to spreading it to the person who do the screening process or from the one in charge of screening to the checked people. This study proposes the design of system that has capability to detect the coronavirus automatically from the thermal image with less human interactions using smart helmet with Mounted Thermal Imaging System. The thermal camera technology is integrated to the smart helmet and combined with IoT technology for monitoring of the screening process to get the real time data. In addition, the proposed system is Equipped with the facial-recognition technology, it can also display the pedestrian's personal information which can automatically take pedestrians' temperatures. This proposed design has a high in demands from the healthcare system and can potentially help to prevent for coronavirus spreading wider.

**CONCLUSION:**

An innovative real-time early detection of coronavirus and monitoring system using smart helmet which integrated with thermal imaging system has been developed. The smart helmet can also detect high body’s temperature in the crowds and send the measured data to be displayed on a phone application. As the latest big issue nowadays that happened across the world, the spreading of coronavirus give so much attention and awareness among people. Early detection of the coronavirus symptoms will be one of the suitable ways to prevent the spreading of coronavirus. As the high body temperature of people is one of the very common symptoms, a real time monitoring system of the screening process that automatically appearing the thermal image of temperature of people is needed. So the diagnosis of the screening process will be less time consuming and less human interactions that might cause the spreading of the coronavirus faster. It can be concluded that the remote sensing procedures, which provide an assortment of ways to identify, sense, and monitoring of coronavirus, give an awesome promise and potential in order to fulfil the demands from the healthcare system.

**SMART HELMET CONTROLLED VEHICLE**

**ABSTRACT –**

Smart Helmet Controlled Vehicle is a project undertaken to increase the rate of road safety among motorcyclists. Several countries like India enforcing regulations to wear a helmet while riding. The idea is obtained when the increasing number of fatal road accidents over the years is cause for concern among motorcyclists. The accident detection system communicates the vibration 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 SMS alert. Using the Global Positioning system the vehicle location is obtained.

**CONCLUSIONS:**

The system implemented is very useful and advantageous application for two wheelers or with some modification even cars. Implementation of this system by manufactures or by individuals will decrease the deaths ratio from accidents. The medical staff will be well prepared than an emergency case and will efficiently treat the casualty. Hence it can be inferred that the SMART HELMET CONTROLLED VEHICLE is a flexible system to operate and remarkable improve the life expectance of the victim.

**LIFE SAVING DEVICE: A SMART HELMET**

**ABSTRACT –**

The aim of this unique helmet is to provide Safety to the bike rider. With the help of Proper Switch Mounted in helmet the two-wheeler would not start without helmet so safety of rider is assured and if accident has occurred our system will give information to the ambulance about the accident, so they can take certain measures to save the life of the person who meet with an accident. It is developed using Arduino. We place sensors in numerous sides of helmet that is connected to Arduino board. So once the bike rider crashes sensors sense and therefore the Arduino extract Globel Positioning System (GPS) location information from GPS that is interfaced with Arduino. When the device information exceeds most limit of pressure then Global System for Mobile communication (GSM) module will sends message to ambulance, police or family members. In case of minor injuries, the rider can stop message by the SMS stop switch. We also introduce one unique feature for ignition the bike engine when helmet is stolen.

**CONCLUSION:**

In paper, we represented a smart helmet based system which will successfully able to detect whether the rider as worn the helmet or not. It also sets an alcohol sensor rider has consumed alcohol beyond permissible levels. This helmet will overcome the range of road accidents that takes place each day. If accident occurs it will sends the victim's location to family members and nearby police station. Also, death rate can drastically be reduced by implementing this circuit as mandatory while riding and make everyone's life easier and smoother. We also implement a new feature like Bluetooth controlled bike starter. The project can be increased by adding Google Glass Technology. Also, biker will see navigation and it alert him when taking sharp turns. Further, it can implement on cars also.

**ACCIDENT DETECTION SYSTEM BASED ON INTERNET OF THINGS (IOT)- SMART HELMET**

**ABSTRACT:**

The objective of our smart helmet is to provide the means for detecting and reporting accidents. The working of this smart helmet is very simple; vibration sensors are placed in different places of the helmet where the probability of hitting is more, which are connected to the microcontroller board. When the rider met with an accident and the helmet hits the ground, these sensors sense and gives to the microcontroller board, then controller extracts GPS location using the GPS module that is interfaced to it. When the data exceeds the minimum stress limit then the GSM module automatically sends a message to the registered emergency contacts and the link through which the location and the speed of the victim will be displayed in the mobile application and in a web application.

**CONCLUSION:**

In recent days, the occurrence of most of the accidents is by motorbikes. This alarming rise in motorbike accidents leads to loss of many lives. The lack of treatment in the proper time is the major reason for many deaths. The major causes may be the late arrival of the ambulance or no person at the place of accident to give information to the ambulance or family members. The system offers a solution to this problem by introducing accident detection and reporting system aiming to save at least half the lives that are lost due to bike accidents. In future, this system could be implemented for lock protection and for other safety purposes. It could also be implemented to control the speed of the vehicle and to prevent the rider from over speeding by passing the information to the rider’s family. The early detection and reporting will account for the responsibility of saving many lives. The development of accident detection and reporting system with required specifications has resulted successfully. The test cases give expected output, without any dispute. The minor defects occurred during the tests are detected and rectified. The developed system works efficiently by providing quick and immediate responses.

**SMART HELMET AN INTELLIGENT BIKE SYSTEM**

**ABSTRACT—**

An accident is a specific, unexpected, unusual and unintended external action which occurs in a particular time and place, with no apparent and deliberate cause but with marked effects. Carelessness of the driver is the major factor of such accidents. In order to overcome this we introduces an intelligent system, Smart Helmet, which automatically checks whether the person is wearing the helmet and has non- alcoholic breath while driving. Here we have a transmitter at the helmet and the receiver at the bike. There is a switch used to sure the wearing of helmet on the head. The on condition of the switch ensures the placing of the helmet in proper manner. An alcohol sensor is placed near to the mouth of the driver in the helmet to detect the presence of alcohol. The data to be transferred is coded with RF encoder and transmitted through radio frequency transmitter. The receiver at the bike receives the data and decodes it through RF decoder. The engine should not on if any of the two conditions is violated. MCU controls the function of relay and thus the ignition, it controls the engine through a relay and a relay interfacing circuit. A RF Module as wireless link which able to communicate between transmitter and receiver. If rider getting drunk it gets automatically ignition switch is locked and send message automatically to their register number with their current location. So when accident occurs, it will send message by GSM to register numbers with their current location by GPS module. It can use to receive call while driving. The distinctive utility of project is fall detection, if the bike rider fall from bike it will send message automatically.

**CONCLUSION:**

The outcomes of the project have showed that the bike ignition can begin if the helmet is worn. So, it’ll mechanically decrease the impact from accident and it can avoid bike from being taken. AVR microcontroller is good in controlling all the system and the sensors. Executing the wireless system that frequency Module to send signal from helmet unit to the bike unit. Due to this wireless affiliation is healthier than wired link. In future We can implement various bioelectric sensors on the helmet to measure various activity. We can use tiny camera for the recording the driver’s activity. It will be used for passing message from the one vehicle to a different vehicle by exploitation wireless transmitter. We have used solar battery for helmet power offer by victimization same power offer we are able to charge our mobile.

**BIKERS PROTECTION THROUGH SMART HELMET AND STUNT DETECTION**

**ABSTRACT-**

Brain injuries from bike accidents are the leading causes of permanent disability and sometimes even sudden deaths. Despite existing rules making use of safety helmets mandatory at the time of bike riding, most riders do not use them. Also, the delay in shifting an injured person to the hospital after an accident increases the chances of adverse outcome. Deaths due to stunt biking have also increased drastically. This motivates us to create a system which can enhance the safety of bikers, by ensuring the use of helmet. We intend putting together a safety system that when installed on a motorcycle makes certain that the engine ignition occurs only after the rider is wearing a helmet. And also in case the rider crashes, a message with the location of the rider is sent to a nearby hospital and also the family members of the rider. We also intend to detect various stunts performed by the biker and notify the nearby police station using a tilt sensor, GPS and GSM.

**CONCLUSION:**

The results of this project have proved that the motorcycle’s engine will only start when the helmet is worn. It makes one’s bike secure at crucial times especially when one is away from bike and someone is trying to steal it.