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Smart Helmet

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***Abstract:** As the number of motorcyclists in our country rises, so do the number of traffic accidents and fatalities. The majority of these accidents are the result of drunk driving and a failure to wear a helmet. The majority of nations now require their residents to wear helmets while riding bikes and to never ride while intoxicated, but despite this, the laws are still broken. Drive Protection and Accident Detection Smart Helmet was developed in an effort to address this issue as engineers using the use of mechatronics. It is made up of an intelligent system that is built into the helmet and the vehicle. The helmet device makes sure the motorcyclist is wearing a helmet and is not drinking during the trip. If the aforementioned requirement is not met, it interacts with the vehicle unit to turn off the motorcycle's ignition system. Vehicle unit checks and intimates' accident and SMS notifies of accident using geometric coordinates. Geometric coordinates can be used to locate the injured cyclist using a basic GPS monitoring software. The primary goal of the suggested idea is to offer a safe and affordable smart helmet. The smart helmet was designed using a Wi-Fi enabled processor and an integrated network of sensors for the engine control system, accident alert system, and alcohol detection. When it comes to the driver's safety, the suggested system is quite beneficial.*
***Keywords:** Drive Protection, Accident Detection, Smart Helmet, Geometric Coordinates, GPS*

I. INTRODUCTION

The idea behind this project's development was to benefit society in some way. The number of two-wheeler accidents is rising daily, which is tragically taking many lives. According to a survey conducted in India, 698 incidents involving motorcycles occur annually.

There are a variety of potential causes, including improper driving skills, bike fitness, fast biking, carrying large loads, using a phone while driving, driving while intoxicated, etc. Sometimes the wounded party may not have been at fault for the collision; rather, it may have been the fault of the other rider. Nevertheless, the drivers who were involved in the collisions will be the ones who suffer.

If accidents are one problem, failing to receive treatment in a timely manner is another. According to a report, there are 698 incidents per year in India, and only around half of the injured people received prompt medical attention.

There are many causes for this, including the ambulance's delayed arrival and the lack of witnesses at the scene who could have notified the family or given the victim first aid. This is an everyday occurrence, thus the concept of coming up with a solution to it led to the idea of informing people about accidents as soon as feasible and in a timely manner.

After all, timing is essential, therefore if everything is finished on time, we can at least save half of the lives lost in bike accidents.

The purpose of this project is to provide information about the rider, including whether or not he or she has worn a helmet, whether or not they have consumed alcohol, and whether or not they have had an accident. This will be done by integrating IoT and using a GSM module to send information about the accident's location to the emergency contacts' mobile numbers.

II. OBJECTIVE

The main goal of the project is to create a low-cost, intelligent helmet that is built to prevent the bike from starting without it. This device offers protection and safety for riders against traffic accidents and can also determine whether the rider has ingested alcohol. The system is also built such that, in the event of an accident, the GSM system will find the cyclist globally and send an immediate message informing the emergency contacts of the accident's location.

III.CONSTRUCTION

ATMega328P Microcontroller serves as the foundation of the circuit. Three sensors are included in the device, located in three distinct directions, to let it identify accidents and alcohol consumption and respond appropriately. The ATmega328P microcontroller is necessary for these sensors to function. The touch sensor is positioned on the helmet such that it will make contact with the rider's chin.

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To determine whether the rider has consumed alcohol, an alcohol sensor is deployed in the helmet's air vent. These two sensors are connected to an external Unit Box, which will be placed in the two-wheeler. The micro-controller and relay used to start or stop the ignition are both found in the vehicle component. This unit box contains the shock sensor, which aids in the early identification of accidents. A LED light in the unit box will indicate if the requirement has been satisfied or not. The sensor detects an accident and sends a signal to the Arduino if one has occurred. Arduino will then use the GPS to determine its location and communicate the accident's location. Our smart helmet's purpose is to protect the bike rider and tell a family member of the accident's location. The GSM Module is used to accomplish this. Sending a message about the accident, however, is insufficient. Additionally, the accident's position must be relayed, and a GPS module is utilized for that.

IV. WORKING

Only when we turn on the DPDT switch does this helmet operate. The DPDT switch is connected to the receiver's LCD display, which displays whether or not the person is wearing a helmet, whether they have consumed alcohol, and whether an accident has occurred.

The LCD automatically turns on when the DPDT switch is activated. When the helmet is worn, the touch sensor inside the helmet is activated, confirming that it has been worn and displaying "Yes" on the LCD screen.

The alcohol sensor (MQ-2) is connected to the front side of the helmet's air vent such that if the wearer has consumed alcohol, "Yes" will appear on the LCD screen; otherwise, "No" will appear.

The microcontroller is installed in the receiver circuit, which is linked to the bike's spark plug, so that when the bike starts, signals will be passed by the relay by passing through it.

The GSM module, a separate circuit connected to the receiver circuit and equipped with a SIM card and a network for sending messages to emergency contact numbers, is also attached to the receiver circuit. When an accident occurs, a switch will activate with the aid of a shock sensor, and an automatic message will be sent to the emergency contact numbers with the aid of a GSM and GPS module and coding.

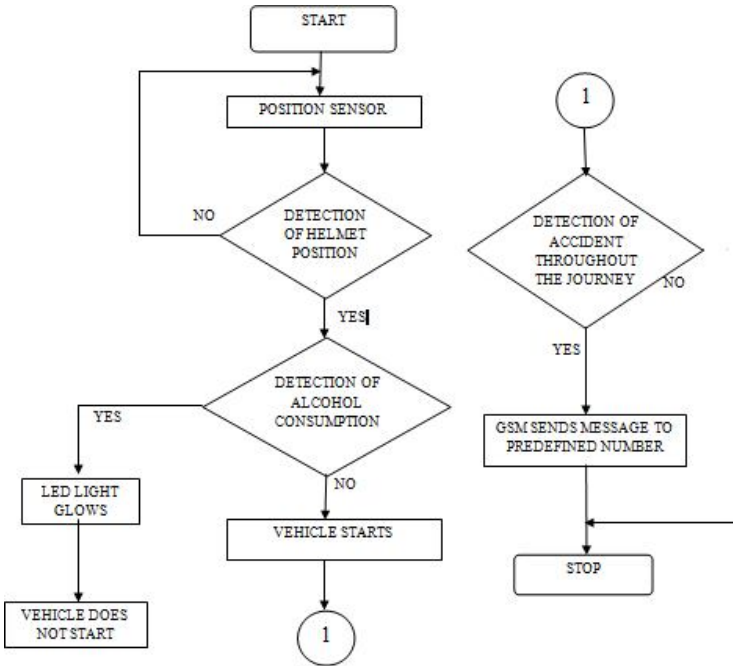


Fig. 1.

V. CONCLUSIONS

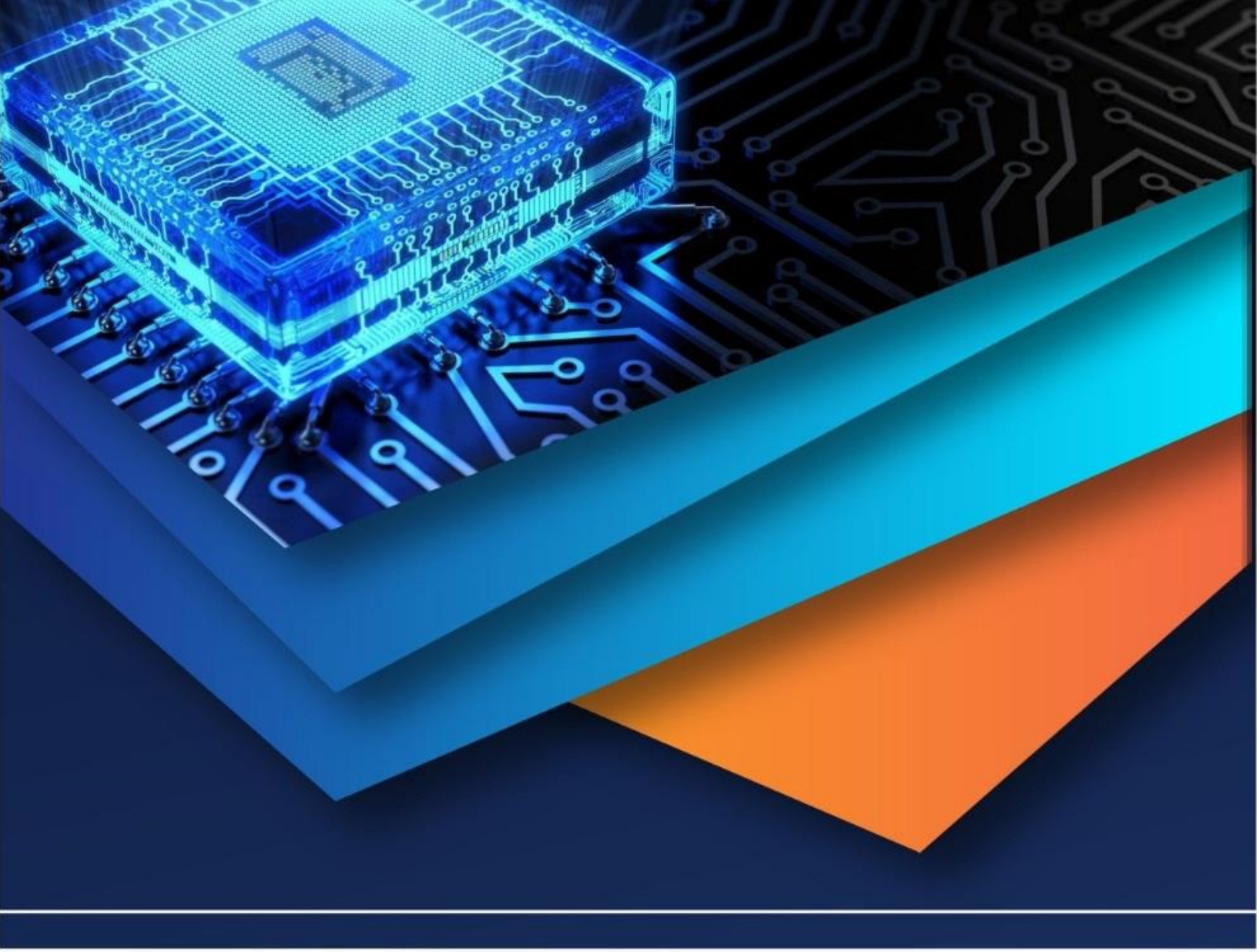
The created system guarantees:

1) The rider wears a helmet at all times.
2) A rider should not operate a motorcycle when intoxicated.
3) Accident detection for quick assistance.

If this project is carried out by the government, it will have a good real-world scope. It can aid in reducing the number of two-wheeler traffic accidents, which are a major source of fatalities worldwide. By making helmet use mandatory and testing for alcohol during bike start-up, this reduces the number of accidents on the road. The use of GSM and GPS technology helps to make driving safer. The rider's first line of defense will be this helmet. This project is being carried out with consideration for both public safety and traffic flow as well as traffic laws. The government's implementation of such a project gives the rider protection while also saving the traffic police a lot of time.

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