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AUGMENTED SMART HELMET

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ABSTRACT – *Motorcycle fatalities account for almost half of all accidents, posing a serious risk of death. The majority of accidents occur as a result of minor disturbances while driving. To address this, this paper proposes a number of strategies for avoiding disturbances when driving while still providing maximum comfort to the passenger. This helmet makes use of cutting-edge technology such as Augmented Reality and Internet of Things. The numerous sensors in this helmet provide the rider with necessary data that is displayed on the helmet. This helmet has a proximity warning device that warns the rider of hazards and prevents a crash, as well as emergency detection in the event of an accident.*

Key Words: **Internet of Things (IOT), Augmented Reality, Navigation, Safety, Smart Helmet.**

1. INTRODUCTION

According to a global survey report on road safety released in 2015 that included 188 countries, road accidents claim the lives of nearly 1.5 million people every year. Motorcycles are used by around a quarter of the 1.5 million inhabitants. The main explanation for this is because of risky and reckless driving [1]. The driver's distractions resulted in a fatal accident in a matter of seconds. Around 75% of fatalities in collisions occur within the first hour of the collision. As a result, urgent assistance and emergency services are critical. There have been many instances where an accident occurs in very remote locations, making the occurrence of it illustrious and resulting in deaths due to a lack of assistance. As a result, the mortality rate associated with motorcycle accidents is influenced by a variety of factors. This paper on the Augmented Smart Helmet, which is built on the Internet of Things (IoT), Augmented Reality, data sensing, processing, and analysis, will help reduce accidents while also providing comfort to the driver[2]. The Internet of Things is made up of smart machines that communicate and interact with each other, as well as other machines, objects, ecosystems, and infrastructures. The massive amounts of data produced are then processed into useful actions that allow us to "command and control" stuff, making our lives much easier and safer . The ability to remotely track, manage, and operate devices is one of the many advantages of IoT applications[3].

The existing project is essentially linked to a smart phone through blue-tooth for the purpose of making phone calls. Bike racers prefer smart helmets because they can view details about the laps on their helmets and even record them using a webcam.

Each hardware part had to be carefully chosen in order to incorporate these features and bring the concept to fruition. While the product's stability was not compromised in the decision to keep costs down, this financial factor had a direct impact on the type of proximity sensor and visual display that were eventually chosen.

This is not a novel idea in the field of Augmented Reality, which entails superimposing a virtual object into an actual reality[4]. These kinds of realisations come with their own collection of benefits and drawbacks.

2. OBJECTIVE

The goal of this Augmented Smart Helmet is to sense various parameters around them, such as fuel, speed, weather, humidity level, proximity from surrounding vehicles, vibration on the helmet, and motorcycle position, and display them on the helmet screen and send the information to an app via the Internet of Things[5]. This reduces the driver's distraction when driving because all of the relevant information is shown on the dashboard. This helmet keeps the rider up to date with all of the details. This also detects a significant vibration in the helmet during an accident, prompting the position to request urgent assistance for the emergency.

3. LITERTURE SURVEY

There are several companies that manufacture smart helmets. Smart helmets are self-contained and user-friendly. The helmet can be connected to the internet to perform a variety of functions, including traffic control, GPS directions, and built-in headphones[6]. The smart helmet's flexible inner layer becomes tough in the event of an accident, and the system is designed to provide full safety measures, including sending an emergency message to friends and family in urgent circumstances with a single button. Helmets are becoming increasingly popular in a variety of sports and among bike riders around the world. Engine control system, inbuilt cooling fan, inbuilt Bluetooth system, accidental warning system, mobile phone charging with solar power use are all features of smart helmets. These features are

piqueing consumer interest in smart helmet technology, which is designed to provide the rider with protection, safety, and comfort while on the road[7]. In order to generate a huge market for smart helmets in the future. The use of smart devices is expected to become more common in the future. Wearables for personal safety are expected to grow in popularity as consumer concerns about road safety grow.

4. BLOCK DIAGRAM

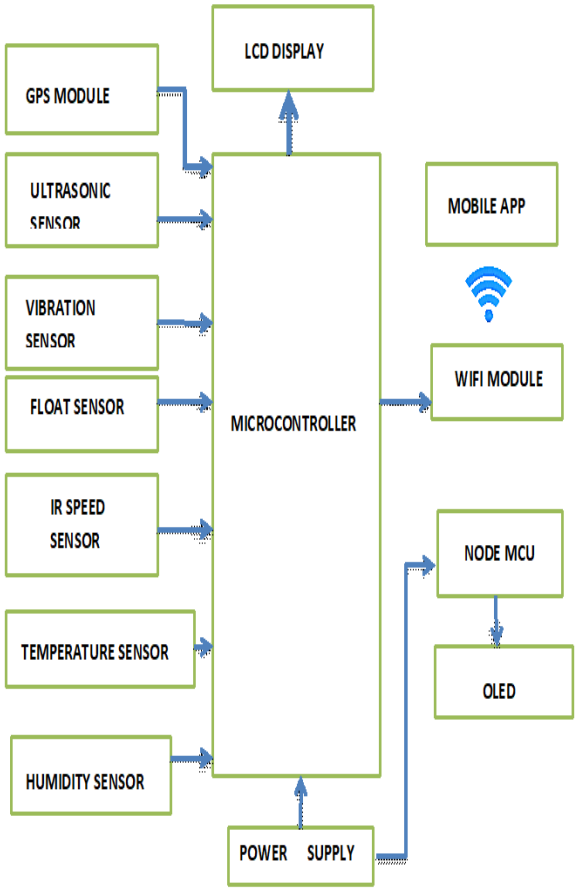

Fig -1: Block diagram

5.COMPONENTS

This project "AUGMENTED SMART HELMET" uses AT89C51 Microcontroller as the processing unit. The microcontroller is interfaced with many sensors to sense the parameters entitled to them. The processed output is transmitted to a receiving end using Internet of Things and a Software Application is also to facilitate the purpose of the project.

- AT89C51 Microcontroller.
- Ultrasonic sensor.
- Temperature sensor.
- Float sensor.
- Vibration sensor.
- IR Speed sensor.
- Humidity Sensor.
- Node MCU.
- WIFI Module.
- OLED Display.
- LCD Display.
- DC Motor.
- Glass.
- Power Supply Module.
- Single stranded wires.
- Battery.
- Blynk App.
- Arduino IDE.

6. CIRCUIT DIAGRAM.

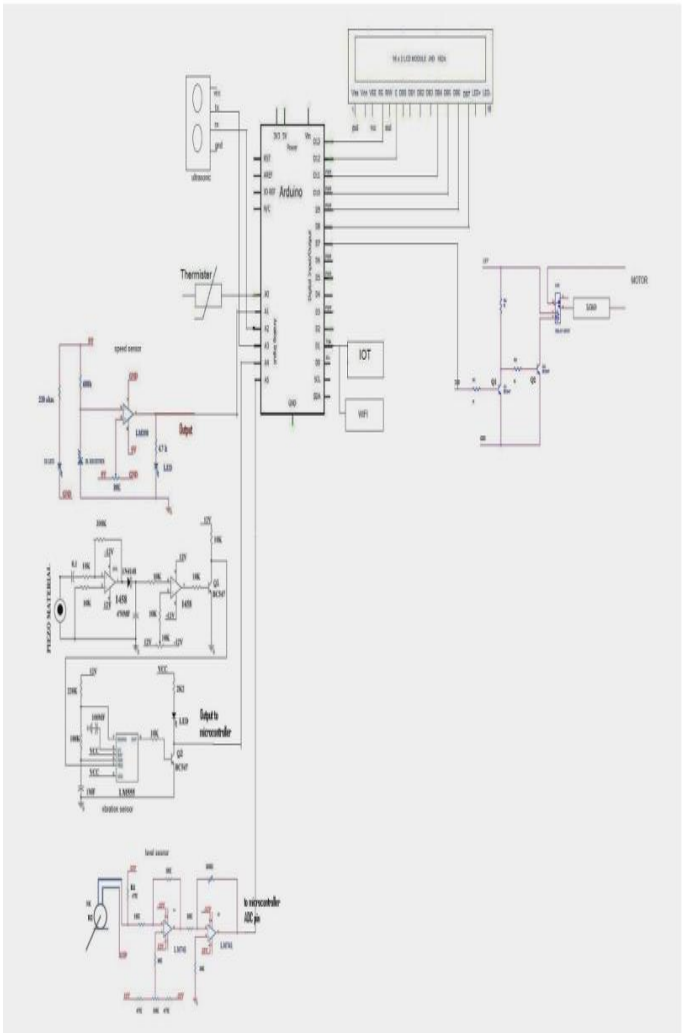

Fig -2: Circuit Diagram

7. WORKING

This prototype uses sensors to detect collisions or injuries, and communication hardware to transmit a message to a predefined emergency contact. As a result, the victim will be able to reach doctors as soon as possible[8]. The helmet is equipped with all of the necessary components and sensors to read the bike's speed and instruct the rider to reduce or increase speed in response to obstacles ahead of the bike. In addition to speed limit sensors, the helmet also tests whether the rider is inebriated while driving. If the rider is inebriated, the bike is not started, and the rider is not allowed to ride the bike. The Working part can be divided into two sections by hardware and software part of the helmet and vehicle.

The system's hardware is connected to the helmet and the Bike. When the vehicle is started with the aid of sensors connected to the vehicle, the fuel level is checked using the fuel sensor and reflected in the helmet's glass. In school zones and busy areas, the vehicle's speed is tracked with the aid of a speed sensor, and if the speed exceeds the limit, a warning signal is sent. With the aid of ultrasonic sensors the obstacles are identified around the vehicle. If accidents occurs with the aid of the vibration sensor, the speed of falling is measured and when it reaches above the limit , it sends message to the close by hospital , ambulance and the pre-defined number with the help of WIFI module. When the weather changes, the temperature in the display changes, as does the fuel level on the helmet.

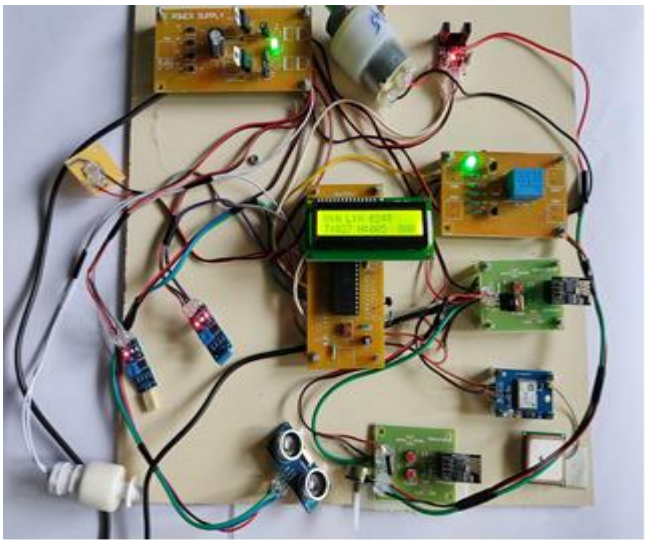

Fig -3: Picture of Proposed System

Fig -4: LCD Display

The software connection is based on IOT with the help of Node MCU, WIFI module which is interfaced with Blynk app to store the values and display it in the glass.With the help of wifi module it is connected to the Micro controller and Blynk app so that the values are displayed and stored.

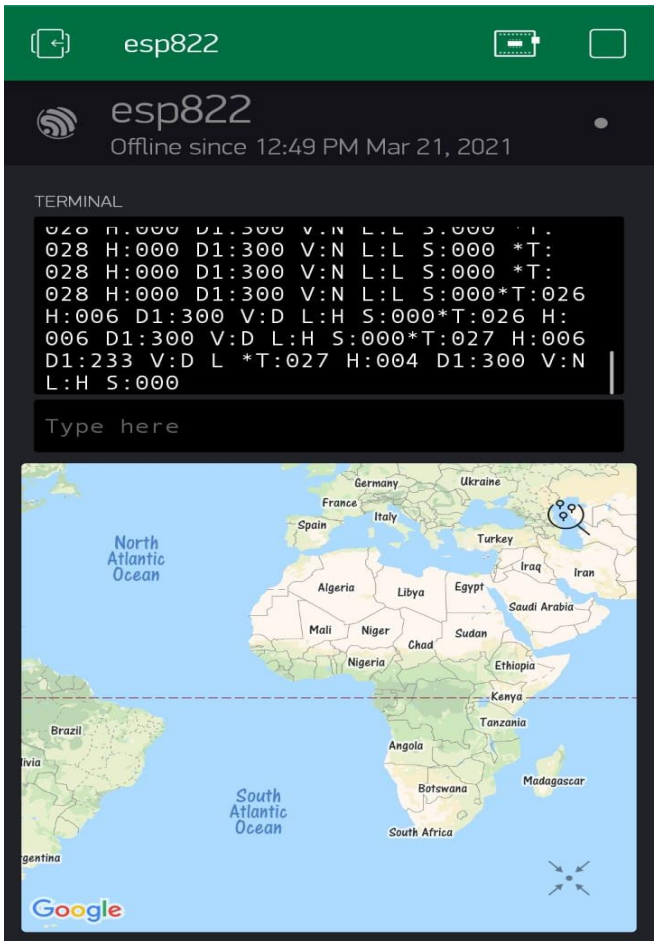

Fig -5: Blynk App

8. RESULTS

The circuit has been tested successfully. All of the sensors worked as expected. On the identification of fuel, obstacles, speed, and vehicle position.

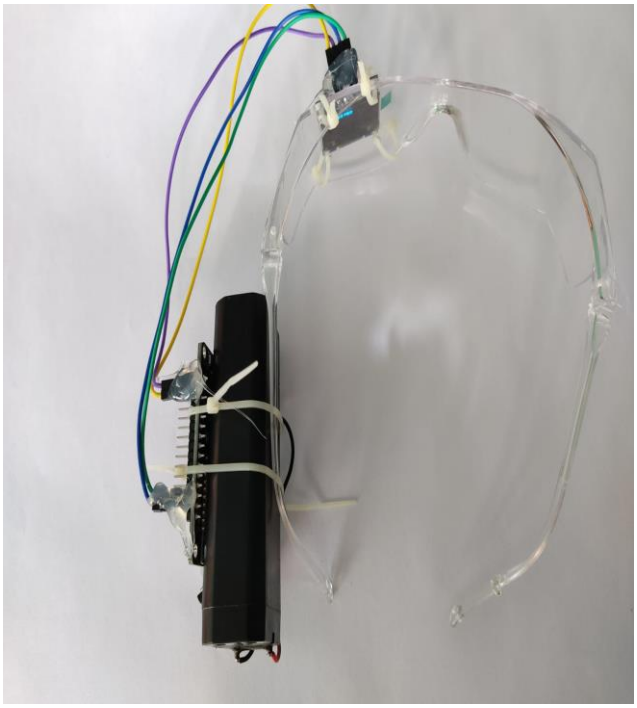

Fig -6: Glass with OLED Display

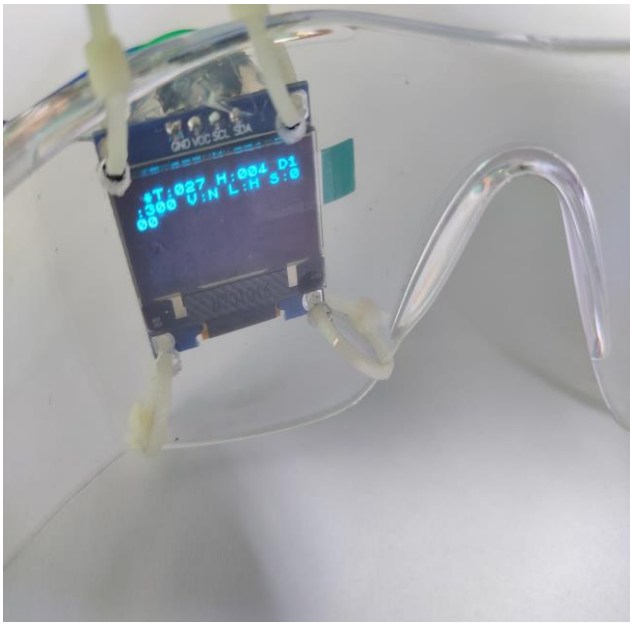

Fig -7: OLED Display displaying parameters

9. CONCLUSION

The Augmented Smart Helmet project aims to greatly improve motorcycle driver safety and awareness[19]. With an open and easy way for drivers to remain aware of their blind spots, the Smart Helmet will be a valuable asset for any motorcyclist interested in adding a blanket of protection while on the road. While the Smart Helmet is not intended to replace any existing road safety practises, it does provide drivers with an extra layer of protection.

10. ACKNOWLEDGEMENT

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