

# Arduino Based Real Time Drowsiness and Fatigue Detection for Bikers using Helmet

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## ABSTRACT

Vehicle accidents are rapidly increasing in many countries. Among many other factors, drowsiness and fatigue are playing a major role in these accidents and systems which can monitor it are currently being developed. Among them, Electroencephalography (EEG) proved to be very reliable. The conventional vehicle and the vision based detection for drowsiness is very much essential only when the driver is about to sleep and every so often very late in preventing fatalities on road. This paper is specially developed to improve the safety of the bikers. The proposed system has EEG-sensors which are implemented within the helmet to detect the drowsy state of the driver. The biomedical signal from the driver's brain is sensed by a Brain-wave sensor. This system provides real-time drowsiness and fatigue detection for the bikers by making a helmet to play a vital part with warning platform as a miniaturized sensor and to provide mind machine interface (MMI) to address the challenges like drowsiness and fatigue. When the biker is detected to be in drowse state the system alerts the biker by an alarm and motor gets slow down and stopped.

A driver who falls asleep at the wheel loses control of the vehicle, an action which often results in a crash with either another vehicle or stationary objects. In order to prevent these devastating accidents, the state of drowsiness of the driver should be monitored. The following measures have been used widely for monitoring drowsiness: • Behavioural measures—The behaviour of the driver, including yawning, eye closure, eye blinking, head pose, etc., is monitored through a camera and the driver is alerted if any of these drowsiness symptoms are detected. • Physiological measures—The correlation between physiological

signals (electrocardiogram (ECG), electromyogram (EMG), electrooculogram (EOG) and electroencephalogram (EEG)) and driver be very reliable. The conventional vehicle and the vision based detection for drowsiness is very much essential only when the driver is about to sleep and every so often very late in preventing fatalities on road. This paper is specially developed to improve the safety of the bikers. The proposed system has EEG-sensors which are implemented within the helmet to detect the drowsy state of the driver. The biomedical signal from the driver's brain is sensed by a Brain-wave sensor. This system provides real-time drowsiness and fatigue detection for the bikers by making a helmet to play a vital part with warning platform as a miniaturized sensor and to provide mind machine interface (MMI) to address the challenges like drowsiness and fatigue. When the biker is detected to be in drowse state the system alerts the biker by an alarm and motor gets slow down and stopped.

## I. INTRODUCTION

Vehicles Act 1988, every two-wheeler that is required to wear a helmet can tell your administrator what to do by sending a set of instructions to the microcontroller on Figure [1]. To do this, you use the Arduino programming language (wiring-based) and the Arduino [1] software (IDE), which is process-based. Over the years, Arduino has been the brains behind thousands of projects, from everyday objects to complex scientific tools [2]. A worldwide community of student producers, hobbyists, artists, programmers and professionals has gathered around this open source platform, their contributions have made adds an incredible amount of accessible knowledge that can be of great help to

novices as well as professionals [3]. • Arduino was born at Ivrea Interaction Design Institute as an easy tool for rapid prototyping, aimed at students with no background in electronics and programming [5]. There are different types of Arduino boards on the market, including: • Arduino UNO, Red Board Lily Pad Arduino, Arduino Mega, Arduino Leonardo [4]. All these Arduino boards have different specifications, features and uses and are used in different types of electronic projects [4]. Here we use an Arduino, a power supply, a single sensor, a relay and a small buzzer. The sensor is used to detect the person's drowsiness or fatigue and give a signal to the Arduino [5]. And the Arduino transmits the signal to the power supply and due to the power, the buzzer will work [5].

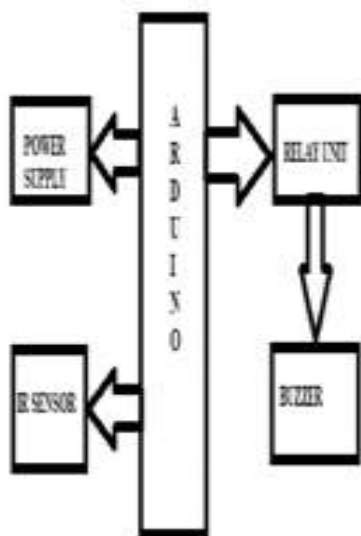


Fig:BlockDiagram

## ARDUINO

Here we will discuss Arduino. Arduino is an open-source electronics platform based on hardware and easy to use software. on an LED, the publication line is carried out in the helmet to detect the driver's drowsy state. Biomedical signals from the driver's brain are picked up by a Brain Wave sensor. The system provides real-time detection of drowsiness and fatigue to motorcycle riders by wearing a helmet that plays a key role with a miniature sensor warning platform and provides thinking machine (MMI) to address challenges such as sleepiness and fatigue. When it detects that the driver is drowsy, the system alerts the driver with a warning and the engine slows down and stops. Mega, Arduino Leonardo. • All

these Arduino boards have different specifications, features and uses and are used in different types of electronic projects.

## II. METHODOLOGY

The objective of the paper is to develop a Arduino based real time drowsiness and fatigue Detection for bikers using Helmet, where the data is acquired through electroencephalography. The drowsiness and fatigue of the user is sensed by the sensor which is using in the Helmet. The sensor senses the Drowsiness or Fatigue of the person and gives the signal to the Arduino and Arduino transmits the signal to the Buzzer then the buzzer starts on and its starts sounding, and the motor stops slowly to stop the bike to prevent road accidents.

Arduino is an open-source Electronics platform, and it has two platforms one is software and another one is hardware, and we can write programs for hardware in Arduino. We can run this project via Bluetooth also not only internet. The two boards are interfaced with each other by the Bluetooth Wireless Connection i.e., Bluetooth Module. This system can also be worked with Zigbee Module

**POWER SUPPLY** A power source is an electrical device that supplies electrical energy to an electrical load. The main function of the power supply is to convert the current from the source to the correct voltage, amperage and frequency to power the load. Therefore, power supplies are sometimes referred to as electrical energy converters. Some power supplies are standalone, separate pieces of equipment, while others are built-in to the load device

## IR SENSOR

The infrared sensor is used as a strobe sensor to detect the driver is flashing. The IR sensor consists of an IR emitter and is received by an IR receiver. The transmitter and receiver are fixed in the glass parallel to each other. These types of radiation are invisible to our eyes, but an infrared sensor can detect this radiation.

## RELAY UNIT

A relay is an electrically operated switch that can be turned on or off, passing current or not, and can be controlled by a low voltage, such as 5V provided by Arduino pins. Controlling the relay module with Arduino is as easy as controlling any

## BUZZER

A whistle or beep is an audio signal device, which can be mechanical, electrical or voltage (referred to as piezo). Typical uses for whistles and beeps include alarms, timers, and confirmation of user input, such as mouse clicks or keypresses. Depending on the construction, the following types of whistles are available

- Piezoelectric whistles.
- Magnetic buzzer.
- Electromagnetic whistle.

## III. RESULT

This paper was specially developed to improve the safety of motorcyclists. The proposed system includes EEG sensors implemented in helmets to detect driver drowsiness Biomedical signals from the driver's brain are picked up by a Brain Wave sensor. Results intended to help normal people overcome accidents caused by drowsiness and fatigued drivers detected alarms to help wake up drivers, reduce engine speed to avoid serious injury

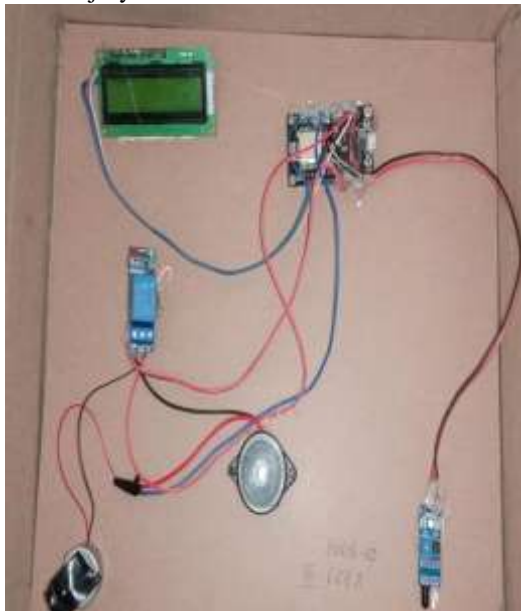


Fig:Experimental Kit

## IV. CONCLUSION

By using real-time Arduino-based Drowsiness and Fatigue Detection for motorcycle riders using helmets, we can reduce accidents worldwide

In this article, the system is designed to reduce accidents caused by drowsiness or fatigue. when the driver status is updated on the localhost, it can be checked from time to time to know the status or condition of the driver

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