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"AURDINO BASED VEHICLE ACCIDENT CONTROLLER USING EYE-BLINK SENSOR"

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Abstract: Driver errors in vehicular incidents present a formidable and hazardous challenge to our community. These lapses in judgment and attention can lead to severe accidents, occasionally with fatal consequences, further compounded by the often-uncontrollable circumstances that follow. A multitude of factors contribute to these automotive disasters, including excessive speed, driving while fatigued, and a range of distractions like texting, engaging in conversations with passengers, or tending to children, among others. Although the public is generally aware of the risks associated with reckless driving, the full extent of peril stemming from driver fatigue might not be fully appreciated. The stark statistics serve as a stark reminder of the urgency surrounding this issue. Each day, roughly 1,374 lives are lost, amounting to nearly 400,000 annual fatalities. On average, we witness approximately 57 road accidents and 17 resulting deaths per hour, all stemming from motor vehicle accidents. What's even more concerning is that 54.1 percent of those involved in these car accidents fall within the age bracket of 18 to 34. Recognizing the gravity of this problem, the Government of India, in collaboration with the Department of Border Transport and the Department of Highways, has embarked on an ambitious plan to reduce road accidents and associated fatalities by 50 percent by the year 2022. This is not just a national concern but a global one, as car accidents have emerged as one of the world's most pressing security issues. In India alone, a staggering 500,000 road accidents were reported in 2015. One of the most perilous scenarios occurs when a driver, overwhelmed by fatigue, struggles to maintain control of their vehicle. Fatigued drivers are often unable to react swiftly to unforeseen situations, frequently leading to accidents. It is, therefore, imperative to deploy monitoring systems designed to detect driver drowsiness, effectively mitigating the risks of accidents. In response to this critical necessity, our focus is on the implementation of an eye twitch sensor, integrated into a program aimed at preventing car accidents. This paper scrutinizes the mechanisms for detecting various collision-related factors and the development of a system geared towards reducing such incidents."

Keywords: Keywords: Defensive Driving, Road Safety, Time and Money Savings, Vehicle Security

I. INTRODUCTION

Driver errors in vehicular incidents pose a significant and perilous challenge to our community. Such lapses in judgment and attention can result in grave accidents, occasionally proving fatal due to the often-uncontrollable circumstances that ensue. Numerous factors contribute to these car crashes, including excessive speed, driving while fatigued, and various distractions such as texting, conversing with passengers, or attending to children, among others. While citizens are aware of the risks associated with reckless driving, they may not fully comprehend the extent of danger posed by driver fatigue. Staggering statistics underscore the urgency of this issue. Approximately 1,374 lives are lost daily, equating to nearly 400,000 fatalities annually. On average, there are roughly 57 road accidents and 17 related deaths every hour, all stemming from motor vehicle accidents. Alarmingly, 54.1 percent of those involved in these car accidents fall within the age bracket of 18 to 34. In recognition of the gravity of this problem, the Government of India, in partnership with the Department of Border Transport and the Department of Highways, has initiated a comprehensive plan to reduce road accidents and associated fatalities by 50 percent by the year 2022. This reflects a global concern, as car accidents have emerged as one of the world's most pressing security issues. In India alone, around 500,000 road accidents were reported in 2015. One of the most perilous scenarios unfolds when a driver, overcome by fatigue, struggles to maintain control of their vehicle. Fatigued drivers are often unable to respond promptly to emergent situations, frequently resulting in accidents. Consequently, it becomes imperative to implement monitoring systems for detecting driver drowsiness, thereby mitigating accident risks. In response to this critical need, our focus centers on the utilization of an eye twitch sensor, integrated into a program dedicated to preventing car accidents. This paper delves into the mechanisms for detecting various collision-related factors and the development of a system aimed at reducing such incidents."

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II. SYSTEM DESCRIPTION

Embedded system devices are an important part of daily life. These are a combination of hardware and software, in which software is commonly known as hardware embedded software. One of the most important features of these systems is that they provide o/p within time limits. So we often use embedded systems on simple and sophisticated devices as well. In many devices like microwave, calculators, TV remote control, home security and crowded control systems, embedded system applications are very much involved in our real life. Embedded system block diagram is shown in Fig 1. Embedded devices are widely divided into several categories, depending on the hardware and software and the microcontroller "8 or 16 or 32-bit" Airbags are currently a variety of features found in cars that are useful for car safety and security. In particular, these vehicles have been standard front airbags since 1998. This function aims that when the driver is sleepy, a buzzer signal in the system is provided, which reduces the driver's speed. The marketable design will still shut off the car power to maximize the chances of avoiding road accidents and opening the window for preventive and mitigation measures.

III. SYSTEM DESIGN IMPLEMENTATION

System block diagram is comprise of: Eye blink (IR): related to sleep detection and alert the driver with the components used in the proposed operation are Eye blink length and frequency, Power supply, Buzzer, LED ARDUINO (UNO), Relay Module, DC as shown in Figure 2. The main component is Arduino Uno which is an ATmega328 based microcontroller (MC) that performs all functions related to controlling the embedded system circuit. The blinking module works by illuminating the eye area with infrared light, and then detecting changes in scattered light using an image transistor and a separation circuit. Each of the components is described below.

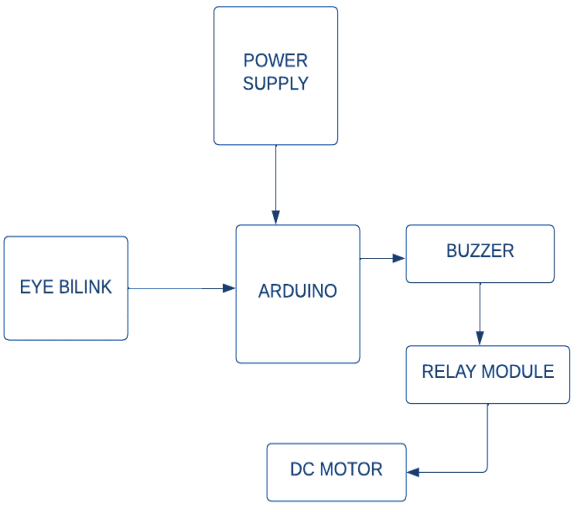

Figure 2: Schematic Block Diagram

A. **Arduino**

Arduino is an open source MC board based on ATmega328P MC and developed by Arduino.cc. The board has 14 PINs and 6 analog pins. All of this will help the microcontroller by attaching the board to a computer for continuous operation. Strom supply of this board can be made using AC to DC Converter, USB cable, otherwise plug.Figure 3 shows arduino.

Figure 3: Arduino

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B. Eye Blink Sensor

Using a phototransistor and a separator circuit, the blink sensor illuminates the eye area and eyelid with infrared light and detects changes in the reflected light. This study includes measuring and monitoring the blink of an eye with the help of an IR sensor. Closed eye indicates that the output of the IR receiver is high except that the output from the IR receiver is low. Figure 4 shows an instant blink sensor with an IR attached to it.

Figure 4: Eye Blink Sensor

C. Buzzer

The "Piezoelectric Sound Modules" presented here work on the concept of conversion using natural piezoelectric ceramic oscillation. These buzzers are available in lightweight, portable sizes ranging from a small diameter of 12 mm to large electrical outlets from peizo. The one shown in fig 6 below is a simple word that when enabled makes a continuous beep. To alert the driver when he first falls sleepy, the buzzer will be connected to the Eye-Blink Sensor.

Figure 5: Buzzer

D. LED

LED is an semiconductor light source. LED is a separate diode form and has certain electrical features of the PN junction diode. The LED therefore allows the current to flow forward and blocks the energy flowing in the opposite direction. The LED takes up less than 1 mm in the field. LED technology used to perform various electrical and computer functions.

E. DC Motor

A DC is an electric motor that converts mechanical energy into electrical energy. The first widely used car was the DC engine, as it could be used for current direct distribution systems. The speed of a DC car can be adjusted to a wider spectrum, using a variable voltage and converting winding current strength into its field. Small DC engines are used in cars, toys and electrical appliances. The universal motor is capable of running precise action, and with integrated power tools and devices, a lightweight brush engine. Large DC engines commonly used in electric vehicles, elevator and hoist propulsion, as well as rolling steel drivers. For practical reasons in this project we have used a DC motor instead of a car. The motor acts as a car axle, and rotates as electricity is fed to it. Arduino UNO is an open source MC board based on ATmega328P MC and developed by Arduino.cc. The merging process involves pre-processing the arduino system to convert the design into a C ++ system. It will then be sent to a moderator who provides readable human code into computer-readable commands. Start the integration and upload process by pressing the sub-project toolbar or in the "Visual Studio> Create & Upload menu.

IV. DESIGN ANALYSIS & RESULT

The system works with the goal of the eye twitch sensor that receives the driver's sleep. This effect is given to the buzzer. The rotation speed is reduced when the driver is sleep, while on the other hand the blink sensor receives the sensor stops the wheel. This program offers a new way to stop drowsy men. The device has an installed blink sensor. Once the driver has started the engine, the sensors automatically detect the blink of an eye and check the his or her breath. The process is depicted by the flow diagram shown in fig 7. On this device the sensor output is given to compare with ARDUINO. If the value exceeds the limit when the buzzer automatically generates vibration, the LED glows and the car stops automatically

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Procedural steps for implementation:

- Connect eye Blink sensor to Arduino pin D0 illustrated in fig 8.
- Connect Buzzer to Arduino pin D13.

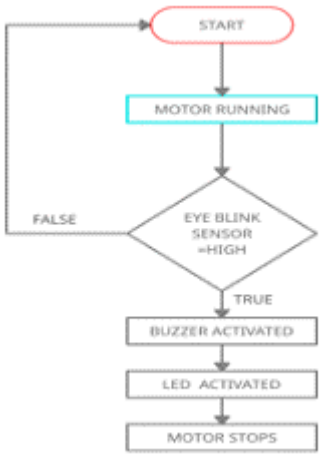

Figure 7: Flow Diagram

Methodical Steps for execution: Connect DC motor to relay and give relay connection to the Arduino pin A0. Now dump the code into Arduino using USB cable Connect USB cable to pc and open arduino software, enter the code and compile & run then select the arduino port and click upload button then your code will be uploaded into arduino. Now connect the batteries and check the output of eye blink sensor. If blink of eye is more than 2 seconds car (motor) will be stopped. The proposed work is completely illustrated in fig.8

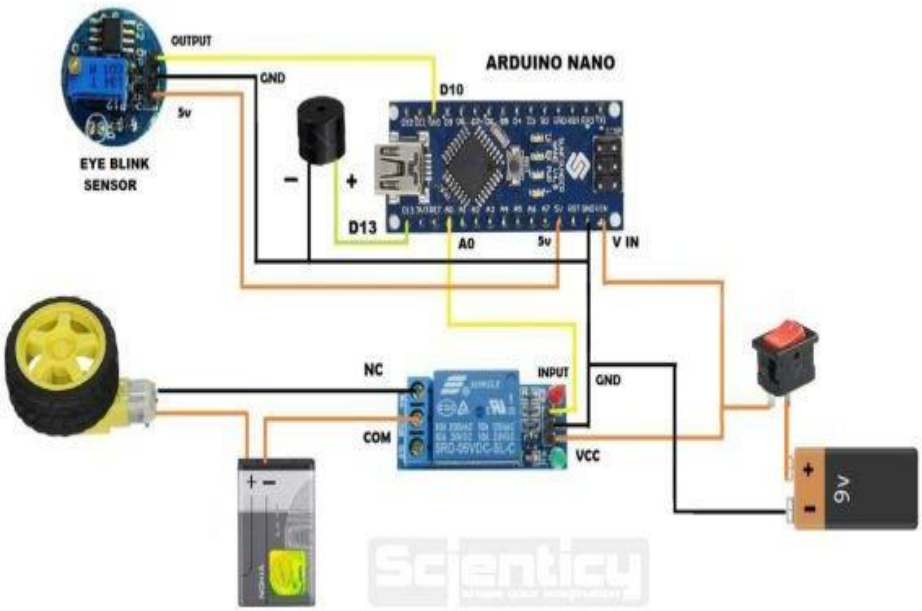

Figure 8: Final Connection of the Block

IV. CONCLUSION

People are increasingly exposed to dangers today. Therefore, we need to take action against this as an engineer and have the solution we need. Any automation is designed to protect a person. Such a model is tasked with developing a system for diagnosing and controlling the speed of vehicles to prevent accidents. To some extent, modern technology offers some

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hope of stopping these. This paper includes monitoring the blink of an eye with the help of an IR sensor. On this device the output of the sensor is provided for comparison with ARDUINO. When the value reaches the set level, the buzzer automatically vibrates, the LED glows, and the car stops automatically when the eye blink sensor receives a signal from the transmission component.

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