

ACCIDENT TERMINATING GLASSES

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Abstract

Drowsy driving is a major problem in India. The risk, danger, and often tragic results of drowsy driving are alarming. It is the dangerous combination of driving and sleepiness or fatigue. For this problem, there are several existing solutions like – Anti sleep headset, Heart rate monitoring system and Facial recognition camera system. But they have drawbacks like – the Anti sleep headset might wear off while sleeping, the heart rate monitoring system does not reliably predict when a user may be about to fall asleep and also does not help the user maintain concentration and awareness and the facial recognition camera system might give too many false alerts generated from the user's normal head movements. To overcome this, we have come up with Accident Terminating Glasses. These glasses alert the driver whenever he is getting into sleep while driving the vehicle. Since sleeping on wheels is dangerous and sometimes it may convert into fettle accidents and can lead to death. So, to prevent such consequences of accident we can use this gadget to alert the driver when he feels drowsiness. For this we require – Arduino Pro Mini, IR Sensor, Vibrator, Buzzer, 3.7V battery and Glass frame. Here's how it works – while driving when the user feels drowsy and doze off, the IR Sensor will sense the closure of the eye and produces a beep as an alert along with vibration thereby awakening him. Therefore, with our project we will be able to solve the problem and prevent any accidents or deaths ahead.

1. INTRODUCTION

In 2015, there were about five lakh road accidents in India, which killed about 1.5 lakh people and injured about five lakh people. India, as a signatory to the Brasilia declaration, intends to reduce road accidents and traffic fatalities by 50% by 2022. The Motor Vehicles (Amendment) Bill, 2016 has been listed for consideration and passage in the current Budget Session

of Parliament. It seeks to address issues related to road accidents, third party insurance and road safety measures. Drowsy driving is a major problem in India. The risk, danger, and often tragic results of drowsy driving are alarming. It is the dangerous combination of driving and sleepiness or fatigue. Fatigued drivers are prone to dozing off at the wheels at night, according to them. Sleep-deprived

drivers remain responsible for about 40% of the road accidents, according to enforcement officers patrolling the highways and major roads here. Each year, drowsy driving accounts for about 100,000 crashes, 71,000 injuries, and 1,550 fatalities, according to the National Safety Council (NSC). Drowsy driving contributes to an estimated 9.5% of all crashes, according to AAA.

2. RELATED WORK

Sleepiness is a major cause of traffic accidents. Our purpose was to review determinants of accidents related to sleepiness and measures to prevent them. We performed a systematic literature review on the topic and studied official accident statistics and legislation regarding medical driving ability in Switzerland. In 1997, 79,178 road traffic accidents, each causing bodily injury or property damage in excess of 500 Swiss francs, occurred in Switzerland. According to official statistics, sleepiness accounted for only 1% of identified causes. However, scientific studies performed in other countries suggest that sleepiness is a contributing factor in up to 30% of traffic accidents. Causes of hypersomnolence are sleep restriction, sleep disturbance by external environmental factors, inappropriate sleep hygiene, and sleep disorders. Several reports suggest an increased crash rate in patients with obstructive sleep apnoea

syndrome. At our clinic, every sixth sleep apnea patient reports sleepiness-related driving problems which resulted in traffic accidents in one third of them. Long monotonous motorway drives, late night, early morning and late afternoon hours are associated with an increased crash rate. Drivers with excessive sleepiness should not drive until the cause of hypersomnolence is determined and treated appropriately. Medical assessment of driving ability in patients with sleep disorders involves a specific history including standardized questionnaires, sleep studies and vigilance tests. Swiss legislation authorizes physicians to report sleepy drivers to the authorities if they are thought to represent an accident risk for themselves or others. We conclude that sleepiness is a common but under-recognized cause of traffic accidents. Enhancing awareness of the problem in the public, early recognition and treatment of sleep disorders, and counselling of drivers with excessive sleepiness may contribute to prevention.

3. IMPLEMENTATION

We came up with the Accident Prevention Glasses. These glasses alert the driver whenever he is getting into sleep while driving the vehicle. Here, we have used an IR sensor and Arduino Pro Mini connected together. Whenever the driver falls asleep, the blink of his eyelid will be sensed by

the IR sensor and produces an alarm as an alert along with vibration. We connected both buzzer and vibrator motor in parallel and used a general purpose NPN Transistor (BC547) to drive them. We made a buzzer unit, in which the vibrator, buzzer and transistor is included and mounted on the left stick of glasses near the ear. Also, we stuck the battery on the same stick and mounted an on/off button near to the left eye. We stuck the sensor to the frame such as it will close to the eye. The distance between the eye and the sensor will not be more than 15 to 20mm. Fatigued drivers are prone to dozing off at the wheels at night, according to them. Sleep-deprived drivers remain responsible for about 40% of the road accidents, according to enforcement officers patrolling the highways and major roads here. This is particularly applicable to fatigued drivers, who doze off at the wheels between midnight and 5 am on our highways. These glasses alert the driver whenever he is getting into sleep while driving the vehicle. Since sleeping on wheels is dangerous and sometimes it may convert into fatal accidents, and can lead to death. So, to prevent such consequences of an accident we can use this gadget to alert the driver when he feels drowsiness. For this we require – Arduino Pro Mini, IR Sensor, Vibrator, Buzzer, 3.7V battery and Glass frame. Here's how it works – while driving

when the user feels drowsy and dozes off, the IR Sensor will sense the closure of the eye and produces a beep as an alert along with vibration thereby awakening him. Therefore, with our project we will be able to solve the problem and prevent any accidents or deaths ahead.

Our main motto of our project is that to prevent accidents due to drowsing.

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came up with the Accident Prevention Glasses. These glasses alert the driver whenever he is getting into sleep while driving the vehicle. Whenever the driver falls asleep, the blink of his eyelid will be sensed by the IR sensor and produces an alarm as an alert along with vibration.

The working of this project is based on an InfraRed Sensor, this sensor is the heart of this

project. Let's take a look to the IR Sensor. In picture I shown a typical IR Sensor, basically it has a transmitter IR LED, A photo Diode, Op-amp IC and a potentiometer. The photo diode is placed just next to the IR LED in such a way that it cannot receive IR rays directly. Photodiode is sensitive to the IR radiation. It is cathode connected to the positive

voltage i.e., 5volt and anode connected to the noninverting input of the Oppamplifier which also get pulled down through the 10Kilo ohm resistor. Potentiometer in IR sensor is use to set the sensitivity distance of the sensor, it connected to the inverting input of the Opp-amplifier. IR LED continuously transmit the infrared rays and if any object comes in front of it, IR rays get reflected back and it received by the photo diode due to this change in IR radiation the voltage at the anode get change, the change in anode voltage is depend on the IR radiation received by the photo diode. More the IR radiation received grater will be the change in anode voltage. The output of the IR Sensor taken from the output of the Opp-amplifier. We can adjust the sensitivity distance by rotating the potentiometer on the sensor, we rotate the potentiometer that means we set a threshold voltage for the noninverting input of the Opp-amplifier. Whenever the voltage on the noninverting input is greater than the threshold voltage, the voltage on the noninverting input i.e., +ve voltage from the photodiode get forwarded and get the positive pulse at the output of the Opp-amplifier i.e., output of the sensor.

A typical IR sensors circuit diagram is attached check it for reference. Let's see the main circuit diagram of the project. I connected a IR sensor to the Arduino Pro

Mini board as Vcc of the sensor to the vcc of the Arduino Pro Mini, Ground to the ground and the output of the sensor to the Analog pin one (A1) of the Arduino Pro Mini. I used a 5volt buzzer and a vibrator motor from the old cell phone for alerting. I connected both buzzer and vibrator motor in parallel and used a general purpose NPN Transistor (BC547) to drive them. Transistor's emitter connected to the ground and collector connected to the negative pin of the buzzer and vibrator motor. Positive terminal of vibrator motor and buzzer are further connected to the vcc of the Arduino Pro Mini. Base of the transistor connected to the pin D3 of the Arduino Pro Mini through the 4.7 kilo ohm resistor. Here I didn't used any PCB for making the circuit, since it is circuit is not that much complex. I stick the sensor over the Arduino pro mini board using hot glue and solder it with short flexible wires. After next to it, I made a buzzer unit, in which the vibrator, buzzer and transistor is include, which I mount on left stick of glasses near ear. Also stick the battery on the same stick and mount an on off button near to the left eye. stick the sensor to the frame such as it will close to eye. the distance between the eye and the sensor will not more than 15 to 20mm.

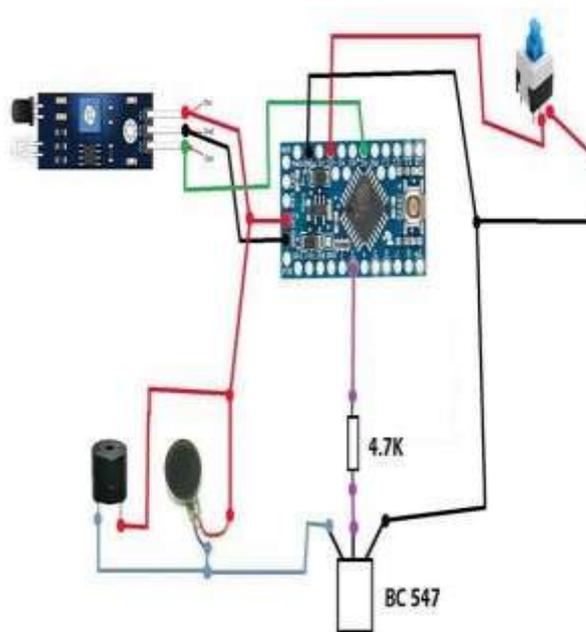
4. EXPERIMENTAL RESULTS

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Schematic Diagram



Prototype

5. CONCLUSION

Drowsy driving is a major problem in India. The risk, danger, and often tragic results of drowsy

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this problem, there are several existing solutions like – Anti sleep headset, Heart rate monitoring system and Facial recognition camera system. But they have drawbacks like – the Anti sleep headset might wear off while sleeping, the heart rate monitoring system does not reliably predict when a user may be about to fall asleep and also does not help the user maintain concentration and awareness and the facial recognition camera system might give too many false alerts generated from the user's normal head movements. To overcome this, we have come up with Accident Terminating Glasses. These

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6. REFERENCE

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