Project Based Learning Report

On

"Anti-Sleep Glasses"

Academic Year 2021-22

(Savitribai Phule Pune University)

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CERTIFICATE

This is to certify that **Miss. Uzma Nadkar (2234), Miss. Komal Nikam (2236), Mr. Ankit Prajapati (2244), Miss. Harshal Shravgee (2250), Mr. Mohit Sonawane (2251).** The students of SE Electronics & Telecommunication Engineering, JSCOE, Hadapsar have submitted their project entitled "**Anti Sleep Glasses**" under the supervision and guidance of Prof. S. M. Pange for the partial fulfillment of the requirement for the mini project Under Project Based Learning.

Date: / /2022

Place: Pune.

Project Guide	HOD
Prof. S.M.Pange	Dr. C. A. Manjare

ACKNOWLEDGEMENT

We take this opportunity to present our Project on "**Anti Sleep Glasses**" We express our sincere thanks to our project guide **Prof. S. M. Pange** for her valuable help, guidance and the confidence, which she gave us at all stages of the project work.

We also express our gratitude to **Dr. C. A. Manjare**, Head of the E&TC Dept. for providing us the necessary facilities in the laboratory as well as her kind support.

Finally, we are grateful to all faculty members of our department for their co-operation and valuable help.

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ABSTRACT

This system presents Anti Sleep Glasses using Arduino A device for keeping awake a person that is about to fall asleep is proposed, comprising a pair of glasses with a frame that has two arms, at least one sensor for detecting the movements of an eye blink, at least one battery, and at least one electrode for issuing an electric pulse. Over here the proposed prototype is simulated on PROTEUS 8 professional software. The transmitter and receiver sections contain Arduino UNO which is programmed by using Arduino IDE. Further, we have used IR Sensor which Consist of transmitter and Receiver.

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CHAPTER NO. 1

1. INTRODUCTION

In modern times, owing to hectic schedules it becomes very difficult to remain active all the time. Imagine a situation where a person is driving home from work, dead tired after facing all the challenges of the day. His hands are on the wheel and foot on the pedal but suddenly he starts feeling drowsy, his eyes start shutting and his vision blurs and before he knows it, he's asleep. Falling asleep on the wheel can lead to serious consequences, there may be accidents and people may even lose their lives. This situation is much more common than we notice and hence, it is very important to counter this problem.

So, to address this issue, we have come up with a Driver Anti-sleep Device. This system alerts the user if he/she falls asleep at the wheel thereby, avoiding accidents and saving lives. This system is useful especially for people who travel long distances and people who are driving late at night. The circuit is built using 555 timer IC as switch, transistor, a relay and a tilt sensor. Whenever the driver feels sleepy and bends his neck down the tilt sensor detects and transistor drive the buzzer to sound an intermediate beep... and LED start glowing. When driver comes back to his normal position tilt sensor senses that and buzzer and LED gets switch off.

CHAPTER NO. 2

2. LITERATURE SURVEY

Traffic accidents are a serious global problem. “Global status report on road safety 2013” (WHO, 2013) indicates that worldwide the total number of road traffic deaths decreased from 1.3 million per year in 2009 to 1.24 million per year. This number remains unacceptably high. Moreover, on the local level, traffic accidents rank fifth among the leading cause of deaths in Malaysia (Nurulhuda et al., 2010). Studies show that for personal injury accidents, estimates of sleep and fatigue involvement are in the range of 10 to 30 percent of accidents (Sagberg et al., 2004).

The most recent literature revision we found is (Williamson & Chamberlain, 2005). A newer revision is needed to cover the gap since the last revision. Driver fatigue has been intensively studied during the last two decades. Few commercial products are already available in markets. For example, Lumeway Product: Eye Alert (Eye Alert, 2015) uses infrared camera/sensors to monitor driver’s eye closure rate and duration. When the driver starts exhibiting unsafe patterns, it sounds an alarm. Driver Attention Monitor is a vehicle safety system first introduced by Toyota in 2006 for Toyota and Lexus latest models with closed-eye detection (Wikipedia, 2015a; Lexus, 2015). The system is designed to detect if the driver is not looking forward and will signal an alert if it detects an object ahead. SMI’s Insight system (Insight, 2015) has been conceived to detect driver fatigue and inattention using cameras monitoring the driver’s face. DADSTM (Driver Alertness Detection System TM) (DADS, 2015) is a cloud-based service that monitors a driver’s state of alertness in real-time to reduce the risk of road accidents caused by drowsiness and fatigue.

Other in-vehicle integrated products such as Volvo’s Driver Alert Control system (M. V. Car, 2015), Ford’s Driver Alert (F. D. Alert, 2015), Volkswagen’s Fatigue Detection system (Volkswagen, 2015) and Subaru Eyesight Driver Assist (Wikipedia, 2015b), are based on road monitoring and steering wheel movements to detect fatigue. “Vigo” is another similar fatigue system (Wikipedia, 2015b). It is a smart Bluetooth headset that detects signs of drowsiness through the eyes and head motion, and uses a combination of light, sound and vibration to alert the user. In 2009, Mercedes-Benz unveiled a system called “Attention Assist” (Wikipedia, 2015). The system monitors the driver's fatigue level and issues a visual and audible alarm. The significant feature in this system is the linking with the car's navigation system. This allows the system to tell the driver where coffee is available. The practical use and efficiency of these devices in preventing accidents are still under inspection. UK Royal society for the prevention of accidents published a literature review on driver fatigue and road accidents (RoSPA, 2001). The study investigated number of technical devices to detect when drivers are feeling sleepy and provide warnings to them, or even to take control of the vehicle. The study concluded that such devices may prove beneficial, but there are concerns that drivers would rely on them instead of managing themselves for **safety.**

The study raised the question: “Drivers are normally well aware that they are sleepy, so why is a device necessary to tell them so?” As a conclusion, more efficient actions should take place to achieve the main goal of preventing and reducing accidents.

Author	Publication	Methodology
P. Chaudhary, Rahul Sharma	A Survey Paper on Drowsiness Detection System.	Reports say that there is a huge increment in the road accidents in our country since last few years. The main reason occurring from the highway accidents is the drowsiness and sleepiness of driver while driving. It is a necessary step to come with an efficient technique to detect drowsiness as soon as driver feels sleepy. We conduct the survey on various designs on drowsiness detection methods to reduce the accidents.
Chenyang Xu,Xiangyu Chen	Driver Sleep Detection and Alarming System	The algorithm aims to accurately detect the sleepiness of the driver by open eye and close eye recognition. The sleepy detection algorithm is built on C++ and OpenCV library. The test was first implemented and tested on the computer, then on the Beagle board. The algorithm includes two parts: daytime detection and night detection. First and foremost, based on the average intensity of pixels, the algorithm classifies the environment as daytime or night. For daytime, the image quality is good enough, therefore no image enhancement is required; for night, because the poor contrast of the images, histogram equalization, a method to expand the color range of the image from 0 to 255, is

		implemented. In this case, we need a light the slightly illuminate the driver.
Shubham Suresh	Anti-Sleep Glasses	Hardware and Simulation
D.Mohan Kumar	Anti-Sleep Alarm	This circuit keeps you vigilant by sounding intermittent beeps and emitting flashing light so as to remind you that you are not on the bed but driving a vehicle
Debasis parida	Arduino Based Driver Drowsiness Detection and Alerting System	Study Of Arduino

CHAPTER NO. 3

3. BLOCK DIAGRAM AND DESCRIPTION

3.1)Block Diagram of Anti-Sleep Glasses

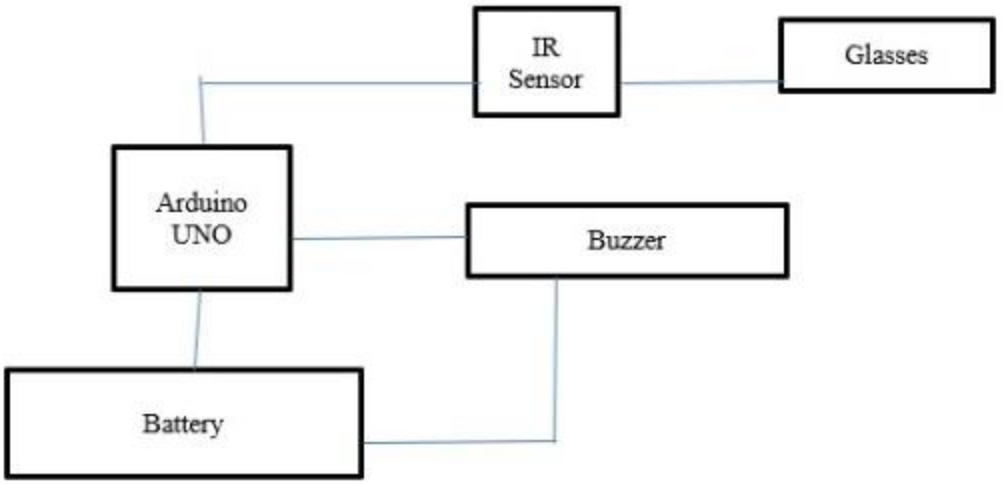


Fig (3.1):Block Diagram Of Anti Sleep Glasses

3.2)Description Of Block Diagram:

Block diagram of the system is as shown above. The VCC of the sensor is connected to the vcc of the Arduino Uno Board, ground to the ground and the output of the sensor to the analog pin one (A1) Arduino Uno. The 5v buzzer is used to alert and a general purpose NPN Transistor (BC547) is used to drive it. Transistor's emitter connected to the ground and collector connected to the negative pin of the buzzer. Positive terminal of buzzer is further connected to the V of the Arduino Uno. Base of the transistor connected to the pin D3 of the Arduino Uno through the 4.7 kilo ohm resistor. When the glasses are worn, the IR sensor continuously senses the blinking of the eye. If the eye is closed for 1sec, the infrared LED detect it, then the reflected light from the thing will activate a small current that will supply throughout the IR LED detector. This will activate the NPN transistor; therefore, the Buzzer will be activated. Effective distance range of the IR sensor is 2cm to 80cm.The system's working is 3.3-5v.We can change the time as per user need through program.

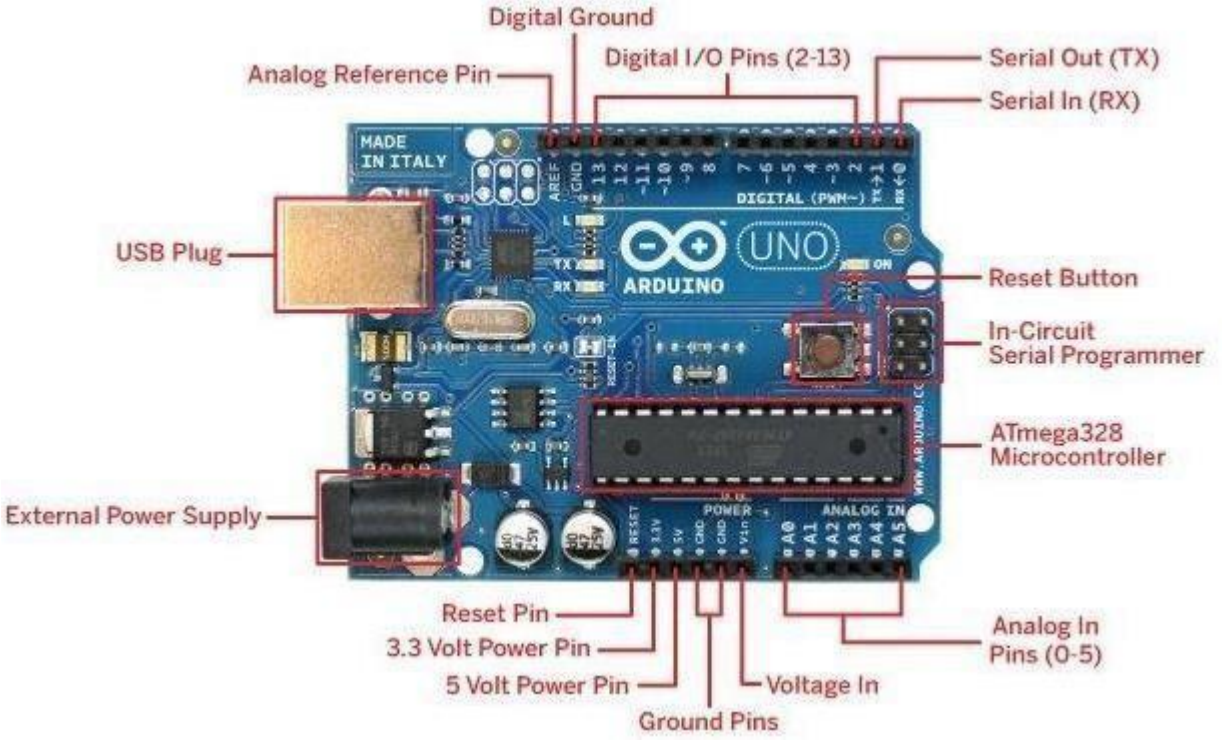
The Block Diagram Consists Of:

- Arduino UNO
- IR Sensor
- Transistor BC547
- Vibrator
- 5 Volt Buzzer
- Resistors 4.7K
- 3.7V Battery
- Glasses Frame

Components Description

1. Arduino UNO R3: -

Figure: Layout of Arduino Microcontroller

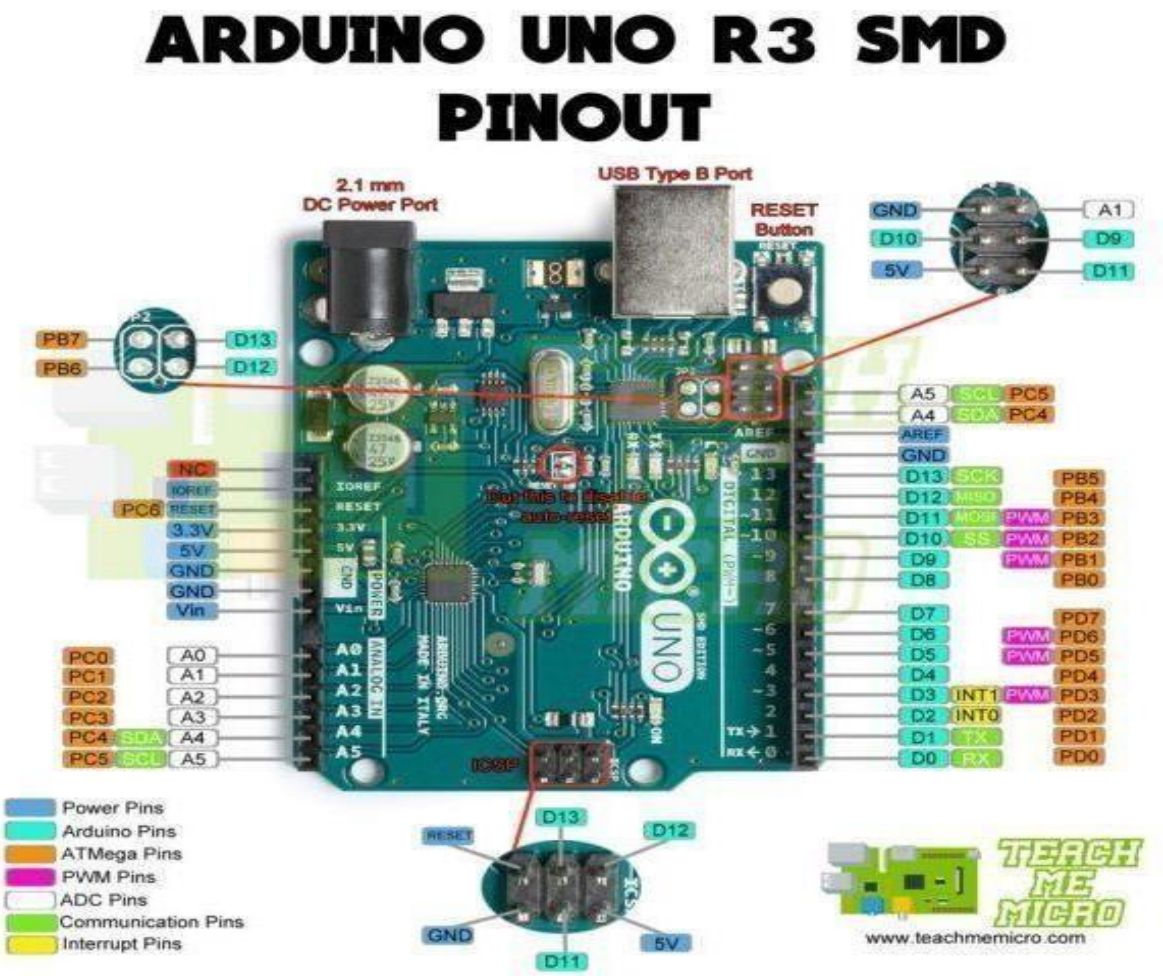


The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.

Features:

- Real-time Counter with Separate Oscillator
- Programmable Watchdog Timer with Separate On-chip Oscillator
- On-chip Analog Comparator
- Interrupt and Wake-up on Pin Charge
- Power-on Reset and Programmable Brown-out Detection
- Internal Calibrated Oscillator
- External and Internal Interrupt Source

Arduino UNO pinout Diagram:



Each pin comes with a specific function associated with it. All analog pins can be used as digital I/O pins. Designing of a project using Arduino Uno gives you the flexibility of working with more memory space and processing power that allows you to work with a number of sensors at once. This board is physically larger than other Arduino board.

There are 16 digital I/O pins and 6 analog pins incorporated on the board that make this device unique and stand out from others. A crystal oscillator of 16MHz frequency is added on the board.

1. IR Sensor: -

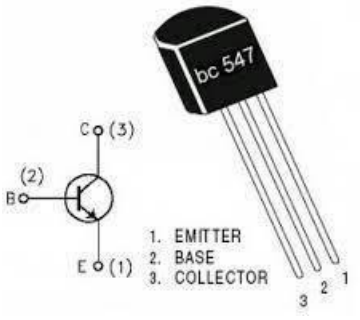
An infrared sensor (IR sensor) is **a radiation-sensitive optoelectronic component with a spectral sensitivity in the infrared wavelength range 780 nm** … 50 μm. Effective distance range of IR sensor is 2cm to 80cm. The working voltage of 3.3V – 5V. IR sensors are now widely used in motion detectors, which are used in building services to switch on lamps or in alarm systems to detect unwelcome guests.

2. Jumper Cables: -

Jumper wires are used for making connections between items on your breadboard and your Arduino's header pins.

3. Transistor BC547: -

BC547 is usually used for **current amplifier, quick switching and pulse-width modulation (PWM)**. Therefore, if you need to control the speed of a motor or actuator in some of your projects, you can simply use this transistor to achieve it.



4. 5 Volt Buzzer: -

This buzzer is an **active buzzer**, which basically means that it will buzz at a predefined frequency (2300 ±300 Hz) on its own even when you just apply steady DC power.

3.2) Components Cost

Sr. no.	Required Component	Quantity	Price
1.	Arduino UNO	1	750 Rs
2.	IR Sensor	1	100 Rs
3.	Transistor BC547	1	10 Rs
4.	Vibrator	1	150 Rs
5.	5 Volt Buzzer	1	40 Rs
6.	Resistors 4.7K, 3.7V Battery, Glasses Frame	1	150 Rs --- **Total Price=1200/-**

CHAPTER NO. 4

4. CIRCUIT DIAGRAM

4.1) Circuit Diagram Anti Sleep Glasses

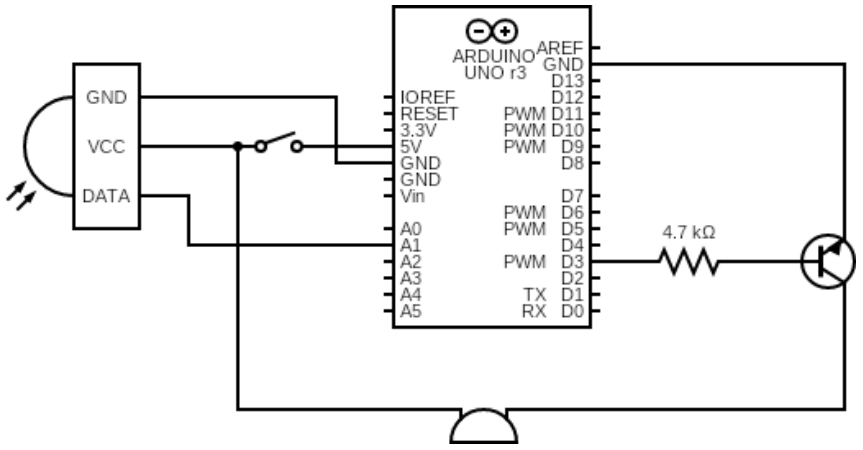


Fig (4.1):Circuit Diagram Of Anti Sleep Glasses

4.2) Working

We connected an IR sensor to the Arduino UNO board as Vcc of the sensor to the Vcc of the Arduino uno, Ground to the ground and the output of the sensor to the Analog pin one (A1) of the Arduino uno. I used a 5-volt buzzer and a vibrator motor from the old cellphone 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 uno. Base of the transistor connected to the pin D3 of the Arduino uno through the 4.7 kilo ohm resistor.

CHAPTER NO.5

5. RESULT

5.1) Simulation Result

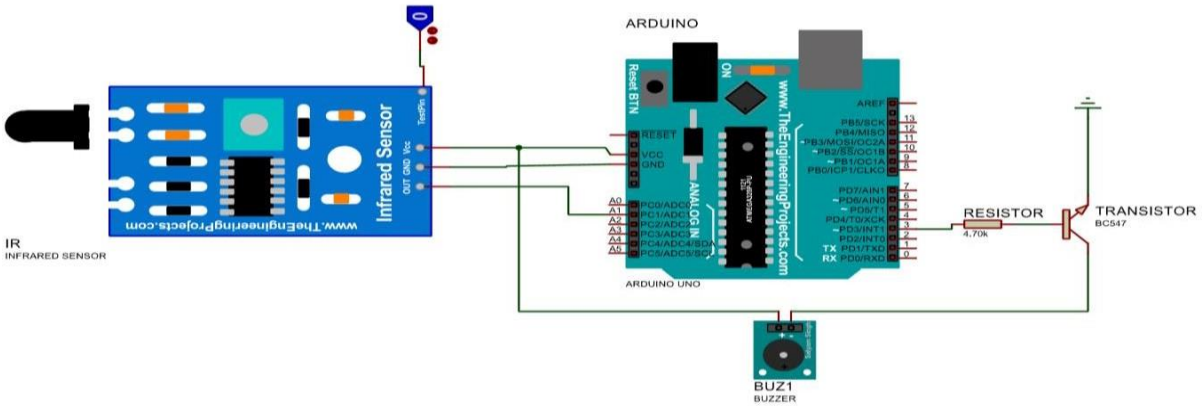


Fig (5.1):Simulation Of Anti Sleep Glasses

We Have stimulated this project on proteus software by using Arduino UNO, IR Sensor, Buzzer, Transistor and Resistor. The working of this simulation is that if any object comes in front of it the IR Sensor sends the output signal to the analog pin A1 of the Arduino Uno and then the Buzzer is triggered and it starts beeping until object is present in front of the IR Sensor.

5.2) Final Hardware

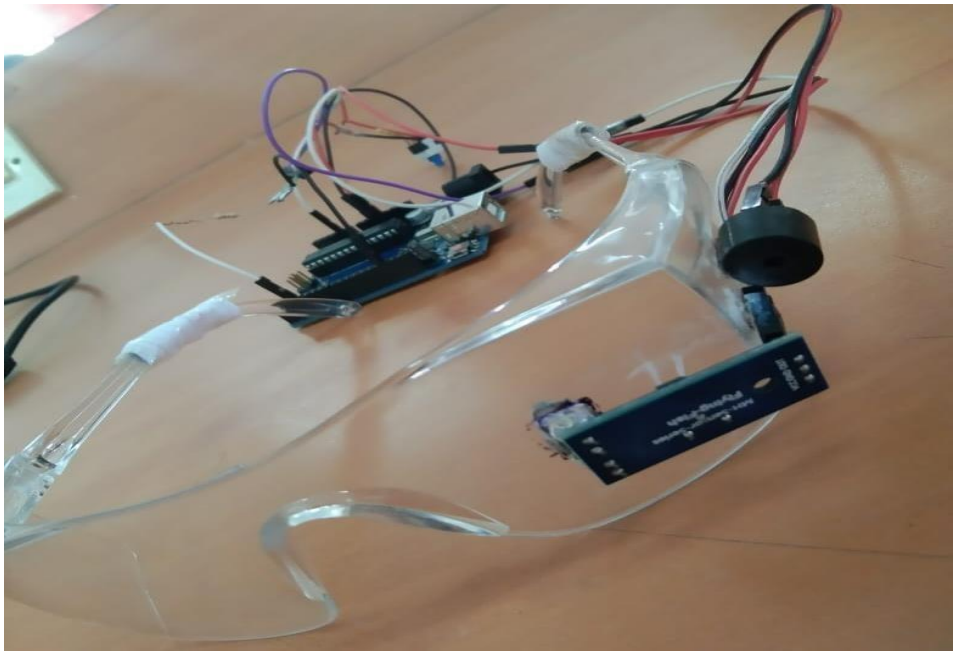


Fig (5.2):Hardware Result

CHAPTER NO.6

6. CONCLUSION AND FUTURE SCOPE

6.1) Conclusion

Many researchers have studied drowsiness detection. Even though a significant number of publications can be found in this field, fundamental problems still need to be solved. Few researches use methods depending on inputs from devices other than visual sensors. But most of the algorithms are depending on visual information. There are many drawbacks regarding these methods. For example, most of the algorithms are time-costing and are not fit for real-time applications. The false finding rate of drowsiness is still high in most of the researches. It is at the rate of 10% at minimum as far as we know according to our literature survey. The outcome of most of the systems is an audible alarm. There are worries about the efficiency of the alarm systems as they may negatively cause startle effects which can affect driver safety. Moreover, if drivers are normally aware that they are sleepy, why a device is necessary to tell them so?

Our future plan is to design a driver safety assistant system using an in-vehicle video camera. It is a real-time recognition system which uses vision sensors to detect passengers and driver fatigue conditions. The system assesses the ability of conducting safe driving and notifies the driver for any dangerous situation. Because one of the bottlenecks challenges of object recognition is finding efficient and discriminative descriptors that are invariant even in difficult illumination cases. And since the observation of human visual perception shows it is well-adapted to extracting local structural visual information. We plan to propose a new method to mimic the human vision system for artificial fatigue recognition system. Moreover, safety actions are to be performed by an embedded vehicle controlling system to give more efficiency for the system.

6.2) Future Scope

- Planning to make it wireless by using wireless IR Sensor.
- Also, we are working on making it IOT based by using ESP32 module.

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