SLEEP SENSING AND ALERTING SYSTEM FOR DRIVERS

[1]Ms.A.Srividya,[2]B.Vinay Kumar,[3]A.Aravind Reddy,[4]G.Manish Kumar

[1] Assistant Professor, [2,3,4] UG students, Department of Electronics and Communication Engineering,
St.Peter's Engineering College,
Hyderabad, Telangana

ABSTRACT

One of the most important qualities of a good driver is that he should be skilled enough to handle any situation on the road. But at sometimes may be due to long journeys the driver may feel drowsy and sleepy. This leads to a lot of accidents on the highways. Our project helps to find a solution to this problem. The objective of this project is to ensure safety while driving.

Keywords: sensing, alerting, eye-blink-sensor, safety, buzzer ,IR transmitter ,IR receiver, LED, Arduino nano microcontroller

I. 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 through a buzzer if he/she falls asleep to 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 main controlling device of the whole system is an Arduino nano Microcontroller. Eye blink sensor and Buzzer and RF transmitter are connected to Microcontroller. This sensor data continuously monitors by the arduino nano microcontroller. If the sensor detects drowsiness, it will process to the microcontroller then microcontroller active the Buzzer and transmits this to the vehicle section through RF transmitter. This data received by RF receiver and stop the vehicle ignition automatically. To perform
the task, Microcontroller is loaded with an intelligent program written in embedded 'C' language.

II. EXISTING SYSTEM

The sleep detecting and the alerting method in use today has the following drawbacks. The system primarily employs two cameras, one for tracking head movement and the other for detecting facial expressions. The other drawback is that since all of the sensors are attached to the driver's body, their ageing may have an impact on the driver. In order to address all of these drawbacks, we developed a system that uses a live camera to detect driver drowsiness and alert the driver, thereby reducing traffic accidents.

III. PROPOSED SYSTEM

In order to overcome the disadvantages faced in the existing project, we are using two new techniques to improve performance and efficiency in the system. Two new technologies are:

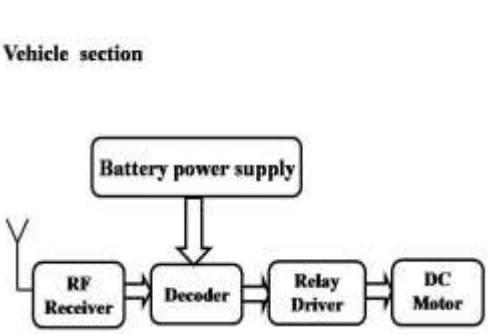
1.Eye blink sensor technology

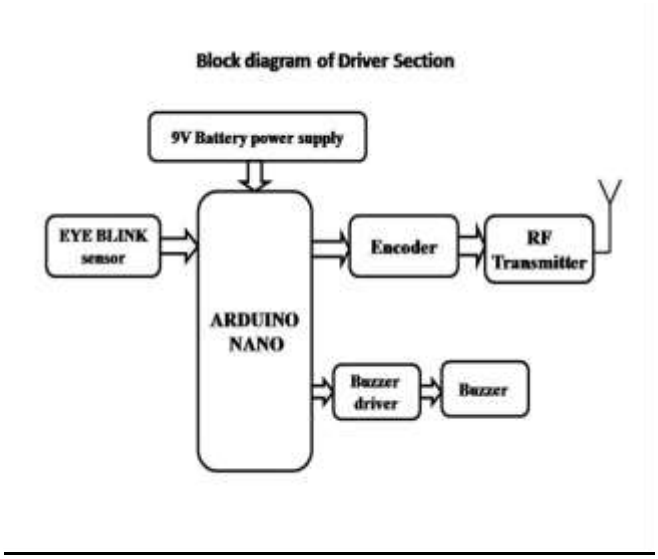
2.Interfacing the buzzer with microcontroller

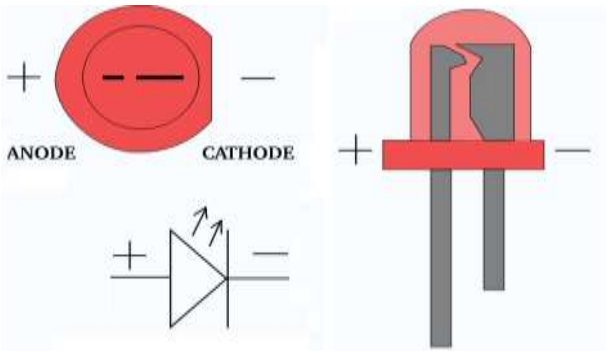
IV. OPERATION

When a diode is forward biased (turned on), the device's internal electrons and holes can combine once more to produce photons, which are a source of energy. Electroluminescence is the name given to this phenomenon, and the semiconductor's energy gap determines the color of the light (which corresponds to the photon's energy). An LED's radiation pattern and aid in reflection are shaped by integrated optical components because they typically have a limited surface area (less than 1 mm2). In comparison to incandescent light sources, LEDs provide a number of benefits, such as lower energy consumption, a longer lifespan, increased resilience, smaller size, quicker switching, and increased dependability. They are more expensive than conventional light sources and necessitate more careful current and heat management .current general illumination LED products are more expensive to buy than fluorescent lamp sources of the

comparable output. They are also used in a variety of applications including traffic signals and the substitution of conventional light sources in car lights (especially indicators). New text and video displays, as well as sensors, have been made possible by LEDs' small size, and their fast switching rates are helpful in cutting-edge communications technology..



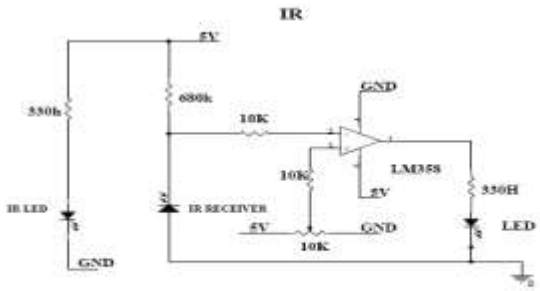




Electrical Symbols & Polarities have LED

EYE BLINK SENSOR:

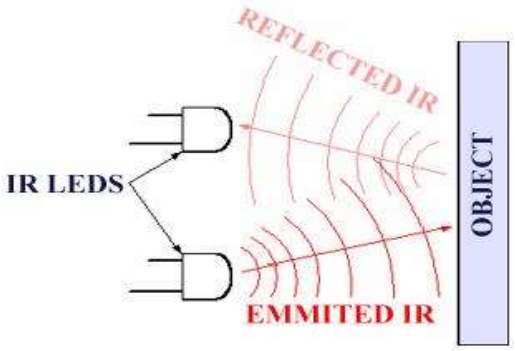
This IR-based eye blink sensor measures variations across the pupil when the eye blinks. If the eye is closed, then there is a high output; otherwise, there is a low output. To determine if the eye is closing or opening, do this. The logic circuit receives this output to signal the alert.This can be applied to a project that involves preventing accidents brought on by unconsciousness by using eye blinks.
Senses eye blink using IR sensor, comparator and potentiometer. Location of the iris is detected by one IR sensor and output is given to one comparator.



.

One particular kind of LED that generates infrared rays is known as an IR transmitter. The IR transmitter transmits IR rays, which are picked up by an IR receiver. One crucial aspect is that the IR transmitter and receiver need to be positioned in a straight line.
When the signal is strong, the transmitted signal is delivered to the IR transmitter, and when the IR transmitter LED is conducting, it sends the IR rays to the receiver. A comparator is attached to the IR receiver. The operational amplifier LM 358 is used to build the

comparator. The reference voltage is applied to the inverting input terminal of the comparator circuit. The IR receiver is attached to the non-inverting input terminal. The IR receiver is not conducting when the IR rays between the IR transmitter and receiver are interrupted. The non-inverting input terminal voltage of the comparator is therefore greater than the inverting input. The comparator output is currently inside the +5V range. A microcontroller or computer receives this voltage, causing the LED to illuminate. Since the non-inverting input voltage is lower than the inverting input voltage, the IR receiver conducts when the IR transmitter sends the rays to the receiver. As the comparator's output is currently GND, a microcontroller or computer receives the signal. This circuit is mostly employed in applications such as intruder detection and counting. The eye-blink sensor operates by shining infrared light into the eye and eyelid region, then utilising a phototransistor and differentiator circuit to detect variations in the reflected light. The exact functionality substantially depends on where and how the emitter and detector are pointed in relation to the eye.Another interesting method involves shining infrared light on the eye and/or eyelid region, then using a phototransistor to track changes in the reflected light.



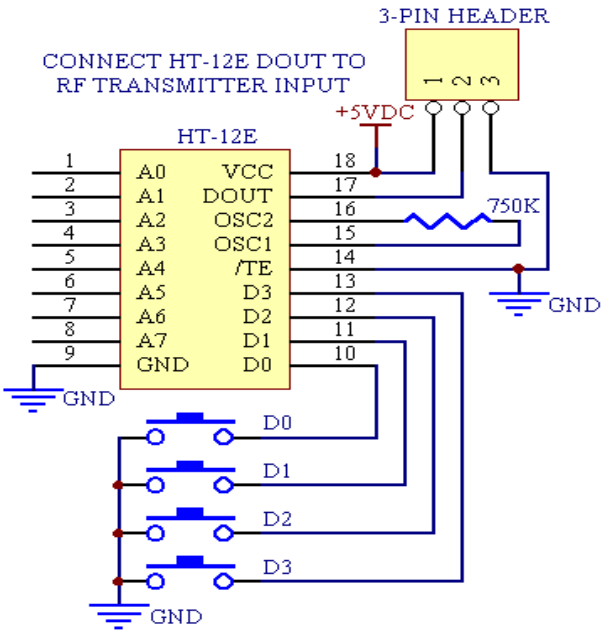


Diagram of HT12A/HT12E encoders:

Pin Description:

1.A0–A7: Address A0–A7 configuring input pins. These pins can either be left open or externally set to VSS.

2. D0–D3: Transmission enable and data D0–D3 setting input pins, active low. These pins ought to either be left open or externally set to VSS.

3. DOUT: Serial transfer of encoder data

4. OSC1 Oscillator input pin number one

5. Oscillator output pin for OSC2 OSCILLATOR 1

6.VCC Positive power source

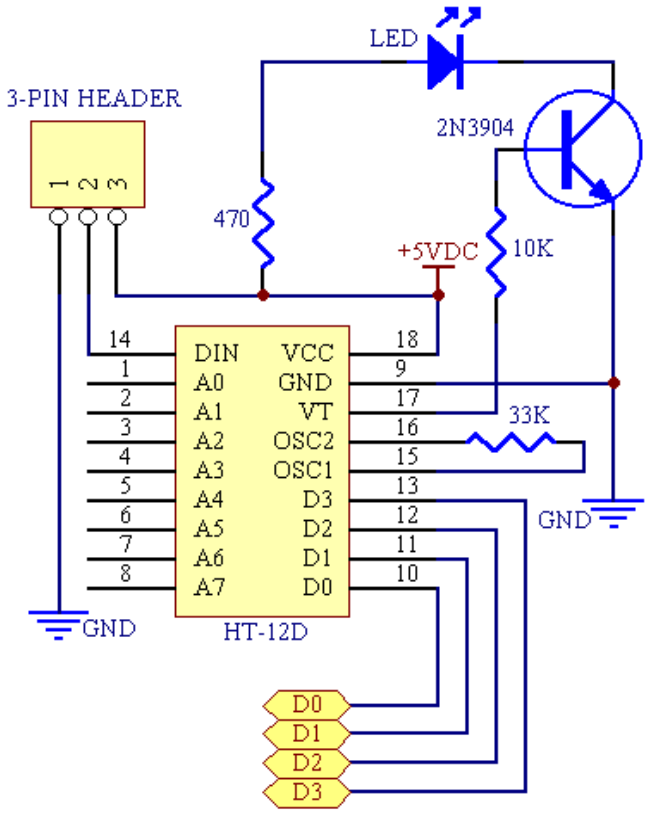
7. The HT12E's TE gearbox enabling pin.

Operation:

When the 212 series encoders receive a transmission enable (TE for the HT12E or D0–D3 for the HT12A, active low), a 4-word transmission cycle is started. As long as the gearbox enable (TE or D0D3) is kept low, this cycle will continue. As soon as the transmission enable goes back to being high, the encoder output stops after completing its final cycle.

The HT12E encoders' TE pin must have a low signal applied to it in order to enable transmission. Applying a low signal to one of the data pins D0—D3 for the HT12A encoders activates transmission.

Diagram of HT12D/HT12F decoders:-



Pin Description:

1.A0A7 (HT12D): Address A0A7 configuring input pins

2. These pins can be left open or externally set to VSS.

3. D0D (HT12D): Power-on status is low for the output data pins.

4. Serial data input pin (DIN)

5. VT: Acceptable transmission, high activity

6. Oscillator input pin OSC1

7. Oscillator output pin (OSC2)

8. VCC: A reliable power source

Description:

In order to link with the 212 series of encoders, the 212 series of decoders offers various combinations of addresses and data pins in various packages. The last 12_N bits of the code period, where N is the address code number, are interpreted by the decoders as data when they receive data that has been broadcast by an encoder. The oscillator is activated by a signal on the DIN pin, which then decodes the incoming address and data. Then, the decoders will repeatedly check the received address three times. The 12_N bits of data are decoded to activate the output pins if all of the received address codes match the information in the decoder's local address, and the VT pin is set high to signal this valid transmission. This will last unless the address code is incorrect or no signal is received.

Only when the gearbox is legitimate does the VT pin's output go high. If not, it is constantly low. The 212 series of decoders' output type, the HT12F, lacks a data output pin, but can function as a temporary data output through its VT pin. On the other hand, the HT12D offers 4 latch-type data pins, whose contents are retained until new data are received.

D.C. Motor:

A D.C. motor converts electrical energy into mechanical energy by interacting magnetic fields with current-carrying conductors, which is normally how it works. An alternator, generator, or dynamo performs the opposite operation, creating electrical energy from mechanical

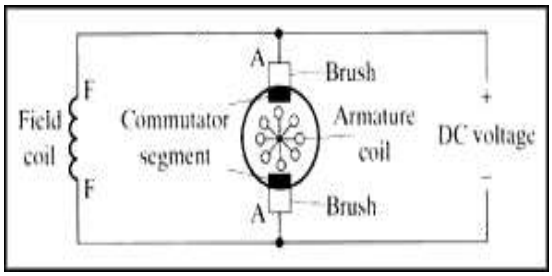
energy. The use of electric motors as generators and vice versa is common. A DC motor receives current and voltage as inputs, and produces torque (speed) as an output.

DC Motor

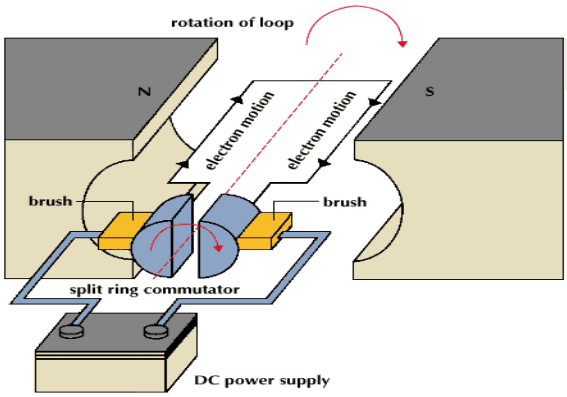
Operation:

The simple DC motor described earlier in this chapter behaves quite similarly to the DC motor you will find in modern industrial applications. A straightforward DC motor's electrical diagram is shown in Figure 12-9. Keep in mind that the field winding and the brushes are immediately exposed to the DC voltage. Both the armature and the field are depicted as wire coils. A field resistor will be placed in a series with the field in later schematics to control the motor speed.

Current starts to flow through the field coil from the negative terminal to the positive terminal when voltage is applied to the motor. A powerful magnetic field is created in the field winding as a result. Additionally, current starts to pass via the brushes, a commutator segment, and eventually an armature coil. The coil's brush is connected to its opposite end, and the current continues to flow through the coil back to the DC power source.A powerful magnetic field is created in the armature by the current flowing in the armature coil.



A Simple electrical diagram of DC



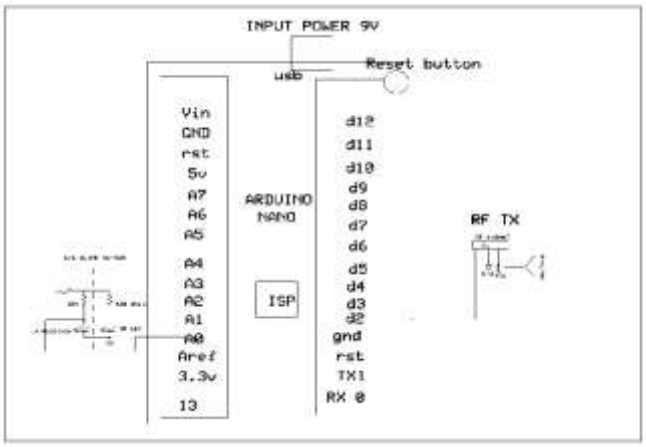
Operation of DC Motor

Buzzer:

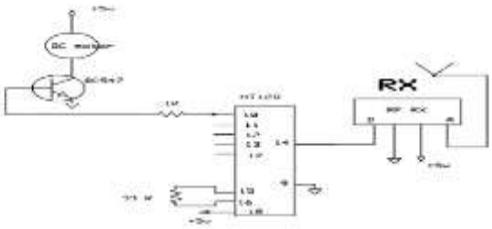
A piezoelectric diaphragm serves as the basic sound source of a piezoelectric sound component. A piezoelectric diaphragm is made up of a metal plate (such as brass or stainless steel) and a piezoelectric ceramic plate with electrodes on both sides. Adhesives are used to join a piezoelectric ceramic plate to a metal plate. The piezoelectric effect results in mechanical distortion when D.C. voltage is applied between the electrodes of a piezoelectric diaphragm. The distortion of a piezoelectric element with an improper form expands in a radial direction. And in that way, the piezoelectric diaphragm bends. There is no expansion of the metal plate attached to the piezoelectric element. The piezoelectric diaphragm bends in the opposite direction when the piezoelectric element contracts. Thus, when AC voltage is applied across electrodes, the bending is repeated, producing sound waves in the air.

This project is implemented using the following software:

- Arduino IDE Studio Compiler- for compilation part **Arduino IDE Compiler:**
- This instructible adds to any of the Arduino on a Breadboard instructables.



Arduino Nano Microcontroller pin diagram



SCHEMATIC DIAGRAM OF SLEEP SENSING AND ALERTING SYSTEM

VIII.REFERENCES

[1] Face Recognition: A Literature Survey, W. Zhao, R. Chellappa, P.J. Phillips, and A. Rosenfeld, ACM Computing Surveys, vol. 35, 2003, pp. 399–459.

[2] "Detecting faces in images: A survey," IEEE Trans. Pattern Anal. Mach. Intell., vol.24, no.1, Jan. 2002, pp. 34–58.

[3] "Towards Intelligent Driver-Assistance and Safety Warning Systems," Intelligent Transportation System, IEEE 2004, by Nan-Ning Zheng, Shuming Tang, Hong Cheng, Qing Li, Guanpi Lai, and Fei-Yue Wang.

[4] Christian Scharfenberger, Samarjit Chakraborty, John Zelek, and David Clausi, "Anti-Trap Protection for an Intelligent Car Door System," in the 15th International IEEE Conference on Intelligent Transportation Systems, Anchorage, Alaska, USA, September 16-19, 2012.

[5] R. Cipolla and K. C. Yowand, "Feature-based human face detection," Image Vision Comput., vol. 15, no. 9, 1997, pp. 713–735. [6] Yi-Quin Wang's 2014 article, An Analysis of Viola Jones Algorithm for Face Detection, published at the University of Malaysia Phang, has pages 15-20. Raj Kamal: System Design, Interfacing, Programming, and Architecture of Microcontrollers.

V.RESULTS

The project "**sleep sensing and alerting system for drivers**" was designed a drowsy detection system for people to avoid the accidents and give the audible alerts through the buzzer also stop the vehicle ignition automatically.

VI.CONCLUSION

It has been designed with integrating features for all the hardware elements used. Every module's presence has been thoughtfully considered and arranged, which helps the unit function as best it can. Second, using cutting-edge ICs, the project has been successfully carried out with the aid of developing technology. As a result, the project's design and testing were successful.

VII.FUTURE SCOPE

This system can be more effectively used for any kind of automobiles such as heavy vehicles etc. And we can modify the system with the help of additional components to identify the zones. In the upgraded version the modifier can attach camera with IOT to the existing system and capture images. We can extend this project by adding alcohol sensor to detect the alcohol and automatic cut of the vehicle ignition**.**