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Smart Helmet for Safe Driving

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***Abstract*:-**

The impact once a traveller involves in a very high-speed accident while not carrying a helmet is extremely dangerous and might cause fatality. carrying a helmet will cut back shock from the impact and should save a life. There area unit several countries imposing a regulation that needs the bike's rider to wear a helmet once riding on their motorcycle, Arduino Uno may be a microcontroller to manage the whole part within the system. only the rider buckled the helmet then solely the motorcycle's engine can begin. Alcohol detection is additionally a condition to be happy for the engine to begin. Nowadays, heap of drunk and drive cases are rumoured. The police isn't able to concentrate to each vehicle and even though somebody is suspect, the police will be simply bribed. heap of accidents occur thanks to not carrying helmet.

The alcohol detection happens at frequent intervals and if the least bit detected, the engine stops. In our projected system, it's obligatory to wear helmet. We can save human life with the assistance of police work alcohol and if it's detected, the engine is turned off. we've provided a really effective answer to develop AN intelligent system for vehicles for alcohol detection. With the growing importance to road safety, this implementation will be of larger use. Future scope of the system resides within the addition of a lot of options that serves kind of functions.

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I.INTRODUCTION

Traffic accidents in Asian nation have enlarged year by year. the rise of road accidents is in link with the ascension in population, economic development, industrial enterprise and effectuation encountered by the country. the most purpose is for safety, that is to shield the rider's head from the impact throughout associate degree accident. It protects the rider's head because the helmet provides ventilation. rushing and not sporting a helmet area unit the most reasons of fatalities and injuries. it's tested that, because the speed of motorcycles enlarged, therefore did the amount of accident and fatalities. this is often once more thanks to the shock of a sway throughout the accident.

The objective of this project is to make a security system in an exceedingly helmet and speed alert for a more robust safety of motorcyclists. the security helmet that we have a tendency to created is embedded with sensors that act as detectors for rider's head and therefore the belt itself. The engine of the bike will begin provided that the rider has buckle up its helmet belt.

II. RELATED WORK

Today, several of those obstacles are solved . the dimensions and price of wireless radios has born staggeringly. IPv6 permits America to assign a communications address to billions of devices. physical science corporations square measure building Wi-Fi and cellular wireless property into a large vary of devices. ABI analysis estimates over 5 billion wireless chips can ship in 2013. Mobile knowledge coverage has improved considerably with several networks giving broadband speeds. whereas not good, battery technology has improved and star recharging has been engineered into various devices. there'll be billions of objects connecting to the network with ensuing many years. IOT describes a system wherever things within the physical world, and sensors among or connected to those things square measure connected to the net via wireless and wired net connections. These sensors will use numerous kinds of native space connections like RFID, NFC, Wi-Fi, Bluetooth, and Zigbee. Sensors may have wide space property like GSM, GPRS, 3G, and LTE. the net of Things will:

III. SYSTEM DESCRIPTION.

Road Safety becomes a significant issue of concern. so it becomes necessary to implement such a method that isn't simple to bypass the essential rule of sporting helmet and to avoid boozy driving. Here we have a tendency to designed a system that Checks the 2 conditions before turned ON the engine of the bike. Our system includes associate degree alcohol detector and a helmet sensing switch.

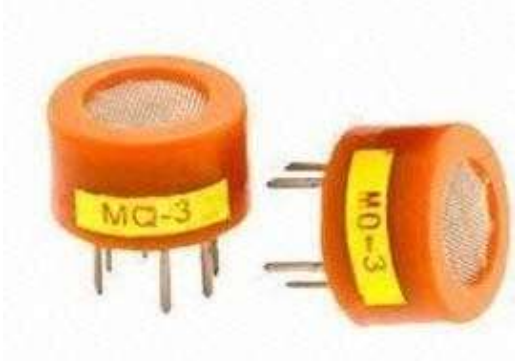
IV. HARDWARE ARCHITECTURE

This section describes the hardware utilized in this project. The alcohol sensing element and gas sensing element that is battery powered . Arduino Uno could be a microcontroller to manage the whole element within the system.

A. Alcohol Sensor

The MQ series of gas sensors utilizes a small heater inside with an electro chemical sensor these sensors are sensitive to a range of gasses are used at room temperature. MQ135 alcohol sensor is a Sno2 with a lower conductivity of clean air. When the target explosive gas exists, then the sensor's conductivity increases more increasing more along with the gas concentration rising levels. By using simple electronic circuits, it converts the charge of conductivity to correspond output signal of gas concentration.

The MQ135 gas sensor has high sensitivity in ammonia, sulfide, benzene steam, smoke and in other harm full gas. It is low cost and suitable for different applications. There are different types of alcohol sensors like MQ-2, MQ-3, MQ-4, MQ-5, MQ-6. n alcohol sensor detects the attentiveness of alcohol gas in the air and an analog voltage is an output reading. The sensor can activate at temperatures ranging from -10 to 50° C with a power supply is less than 150 Ma to 5V. The sensing range is from 0.04 mg/L to 4 mg/L, which is suitable for breathalyzers.



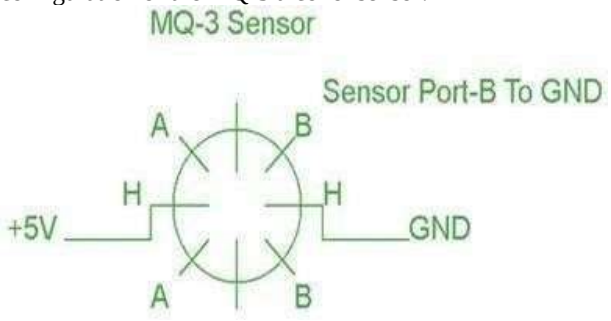
B. MQ-135 Gas Sensor

The MQ-135 gas sensor senses the gases like ammonia nitrogen, oxygen, alcohols, aromatic compounds, sulfide and smoke. The boost

Converter of the chip MQ-3 gas sensor is PT1301. The operating voltage of this gas sensor is from 2.5V to 5.0V. The MQ-3 gas sensor has a lower conductivity to clean the air as a gas sensing material. In the atmosphere we can find polluting gases, but the conductivity of gas sensor increases as the concentration of polluting gas increases. MQ-135 gas sensor can be implementation to detect the smoke, benzene, steam and other harmful gases. It has potential to detect different harmful gases. The MQ-135 gas sensor is low cost to purchase. The basic image of the MQ-135 sensor is shown in the below figure.

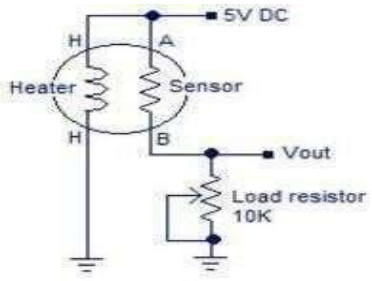
C. Basic Pin Configuration of gas Sensor

The MQ-3 alcohol gas sensor consists of total 6-pins including A, H, B and the other three pins are A, H, B out of the total 6-pins we use only 4 pins. The two pins A, H are used for the heating purpose and the other two pins are used for the ground and power. There is a heating system inside the sensor, which is made up of aluminum oxide, tin dioxide. It has heat coils to produce heat, and thus it is used as a heat sensor. The below diagram shows the pin diagram and the configuration of the MQ-3 alcohol sensor.



Working Principle and Circuit Diagram

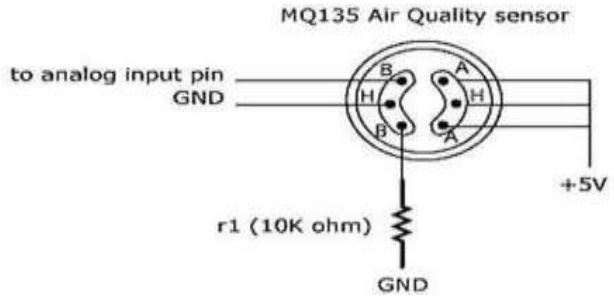
The MQ-135 alcohol sensor consists of a tin dioxide (SnO2), a perspective layer inside aluminum oxide micro tubes (measuring electrodes) and a heating element inside a tubular casing. The end face of the sensor is enclosed by a stainless steel net and the back side holds the connection terminals. Ethyl alcohol present in the breath is oxidized into acetic acid passing through the heat element. With the ethyl alcohol cascade on the tin dioxide sensing
layer, the resistance decreases. By using the external load resistance the resistance variation is converted into a suitable voltage variation. The circuit diagram and the connection arrangement of an MQ 135 alcohol is shown below



The MQ135 gas sensor has high sensitivity in ammonia, sulfide, benzene steam, smoke and in other harm full gas. It is low cost and suitable for different applications.

MQ – 135 Air Quality Sensor

The air quality sensor is also a MQ-135 sensor for detecting venomous gases that are present in the air in homes and offices. The gas sensor layer of the sensor unit is made up of tin dioxide (SnO2); it has lower conductivity compare to clean hair and due to air pollution the conductivity is increases. The air quality sensor detects ammonia, nitrogen oxide, smoke, CO2 and other harmful gases. The air quality sensor has a small potentiometer that permits the adjustment of the load resistance of the sensor circuit. The 5V power supply is used for air quality sensor.



The air quality sensor is a signal output indicator instruction. It has two outputs: analog output and TTL output. The TTL output is low signal light which can be accessed through the IO ports on the Microcontroller. The analog output is an concentration, i.e. increasing voltage is directly proportional to increasing concentration. This sensor has a long life and reliable stability as well.

IOT ESP8266:

The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi-ability as a Wi-Fi Shield offers (and that's just out of the box).

The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community. This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up- front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front- end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces; it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts.

ESP8266 FEATURES

1. Low cost, compact and powerful Wi-Fi Module
2. Power Supply: +3.3V only
3. Current Consumption: 100mA
4. I/O Voltage: 3.6V (max)
5. I/O source current: 12mA (max)
6. Built-in low power 32-bit MCU @ 80MHz
7. 512kB Flash Memory
8. Can be used as Station or Access Point or both combined
9. Supports Deep sleep (<10uA)
10. Supports serial communication hence compatible with many development platform like Arduino
11. Can be programmed using Arduino IDE or AT-commands.

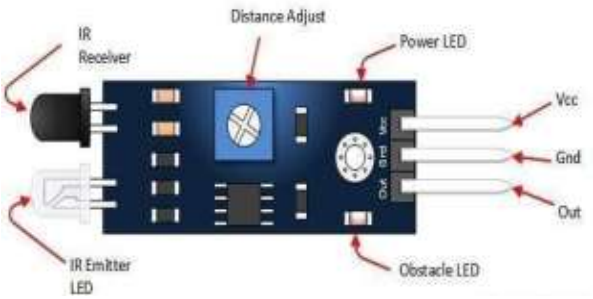
USES OF ESP8266

create hotspot) and as a station (can connect to Wi-Fi), hence it can easily fetch data and upload it to the internet making Internet of Things as easy as possible. It can also fetch data from internet using API's hence your project could access any information that is available in the internet, thus making it smarter. Another exciting feature of this module is that it can be programmed using the Arduino IDE which makes it a lot more user friendly. However this version of the module has only 2 GPIO pins (you can hack it to use up to 4) so you have to use it along with another microcontroller like Arduino, else you can look onto the more standalone ESP-12 or ESP-32 versions. So if you are looking for a module

MQ – 135 Air Quality S

IR SENSOR

The air quality sensor is also a MQ-135 sensor for detecting venomous gases that are present in the air in homes and offices. The gas sensor layer of the sensor unit is made up of tin dioxide (SnO2); it has lower conductivity compare to clean hair and due to air pollution the conductivity is increases. The air quality sensor detects ammonia, nitrogen oxide, smoke, CO2 and other harmful gases. The air quality sensor has a small potentiometer that permits the adjustment of the load resistance of the sensor circuit. The 5V power supply is used for air quality sensor.



Infrared sensors can be passive or active. Passive infrared sensors are basically Infrared detectors. Passive infrared sensors do not use any infrared source and detects energy emitted by obstacles in the field of view. They are of two types: quantum and thermal. Thermal infrared sensors use infrared energy as the source of heat and are independent of wavelength. Thermocouples, piezoelectric detectors and bolometer are the common types of thermal infrared detectors.

Quantum type infrared detectors offer higher detection performance and are faster than thermal type infrared detectors. The photosensitivity of quantum type detectors is wavelength dependent. Quantum type detectors are further classified into two types: intrinsic and extrinsic types. Intrinsic type quantum detectors are photoconductive cells and photovoltaic cells. Active infrared sensors consist of two elements: infrared source and infrared detector. Infrared sources include an LED or infrared laser diode. Infrared detectors include photodiodes or phototransistors. The energy emitted by the infrared source is reflected by an object and falls on the infrared detector.

PRINCIPLE OF WORKING

The principle of an IR sensor working as an Object Detection Sensor can be explained using the following figure. An IR sensor consists of an IR LED and an IR Photodiode; together they are called as Photo – Coupler. When the IR transmitter emits radiation, it reaches the object and some of the radiation reflects back to the IR receiver. Based on the intensity of the reception by the IR receiver, the output of the sensor is defined.

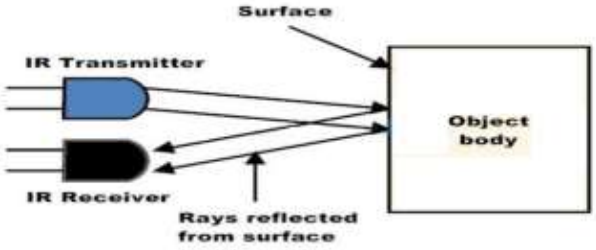


Fig 2.9: WORKING PRINCIPLE OF IR SENSOR

CONCLUSION

Currently we tend to square measure within the method of finding associate acceptable style for the helmet. The projected helmet ought to accommodate all the required facilities in a very compact manner. In parallel, the choice of microcontroller and sensors square measure being taken care.

The projected style can provides a resolution in terms of price effective and updated technology front for all types of helmets. The aim is to focus on the 2 wheelers phase so metal cycle users with lighter version. This price effective resolution are often integrated with engine begin and different required safety aspects. we've got provided a really effective resolution to develop associate intelligent system for vehicles for alcohol detection, whose core is Arduino. because the growing public perception is that vehicle safety is a lot of vital, advances publicly safety is gaining acceptance than within the past.

Future scope of the system is to manage the accidents causes because of alcohol consumption and conjointly for sporting of helmet. The system improves the security of person.

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