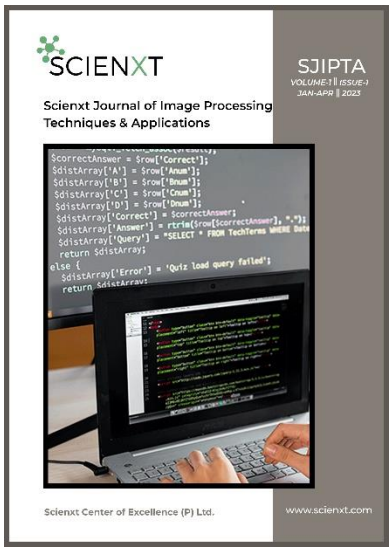

Working of smart helmet with alcohol sensing

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Abstract:

An unavoidable, unplanned external activity at a certain time and location is what we call an accident. The primary cause of vehicular mishaps is carelessness on the part of drivers. The authority has mandated that all riders must wear helmets and that motorists must not drink and ride. The bikers continue to disobey the regulations. Reckless on the part of the rider is to blame for these incidents. When a motorcyclist doesn't wear a helmet, they risk serious head trauma that might prove fatal. One proposed solution is a "smart helmet" that can detect both the wearer's head protection and the presence of alcohol on the rider's breath. The device consists of a wireless transmitter and receiver set, with the former located in the rider's helmet and the latter at the bike's key fob. Multiple sensors check that the helmet is indeed on the head. These vibratory detectors are installed in the helmet, just where it counts the most: in the event of a collision. A breathalyser is positioned close to the rider's lips. Breath alcohol content is measured using an alcohol sensor. Using an RF encoder, the results of the alcohol and helmet detectors are sent over radio. The information is transmitted to the bike, where it is received and processed by an RF decoder. The smart phone then evaluates the results of both the helmet recognition and the alcohol analysis. If one of these requirements is not met, the suggested solution will prevent the motorcycle from starting. If neither is met, the bike won't turn over. You can limit riders who have been drinking by making them wear this smart helmet. The engine is controlled by the MCU via a relay with relay interaction circuit, which regulates the relays on/off state and the ignition.

Keywords: Drunk driving, breathalyser, smart helmet, alcohol sensor

1. Introduction:

Any incident involving a car on a public road is considered a collision. Vehicle-animal crashes, vehicle-pedestrian collisions, and vehicle-fixed object crashes are all examples of this type of accident. According to statistics, over 550 people are killed and 1600 are injured every day in traffic accidents in India. Drunk driving and failing to wear safety gear are major contributors to vehicular mishaps. According the Motor Transport Act, helmet use by motorcyclists is mandated. Helmet use is mandated by law in the United States thanks to Section 129 of the Automobile Act of 1988. The rider's ability to focus is diminished after they've had a few drinks. The motion sickness impairs the rider's ability to see well. Intoxication dulls inhibitions and encourages risk-taking. There are serious repercussions for automobile crashes caused by the aforementioned causes. The situation is exacerbated since Indian traffic inspectors lack the requisite technology to conduct thorough checks. Laws prohibiting drunk driving and mandating the use of safety equipment have not been effectively enforced. According to the Automobile Act of 1939, a rider who gets behind the wheel after imbibing might face up to 2000 rupees (about $450) in fines and six months in jail for a first offence. If the legislation is enforced strictly, it has a high chance of succeeding, but it seldom does since the hands of the responsible officer are frequently greased by bribes. Drunk drivers are as dangerous as murderers because they put others in danger as they try to drive. These have been the two primary drivers for the Effective Helmet's development. Initially, we'll check for headgear and blood alcohol content. When these two things are verified, and only then, will the bike's ignition turn over? The function of the IR sensor, PIR sensor, & MQ3 alcohol gas sensor is equivalent. The smartphone will process the data collected by the sensors. This analysed data will be delivered to the appropriate department.

2. System Components:

2.1. Power Supply:

The purpose of these power supplies is to reduce the voltage of the AC mains energy so that it may be used by electronic circuits as well as other devices. Each component of a power supply serves a specific purpose and may be analysed independently. The regulated electrical supply takes in alternating current and outputs a stable direct current.

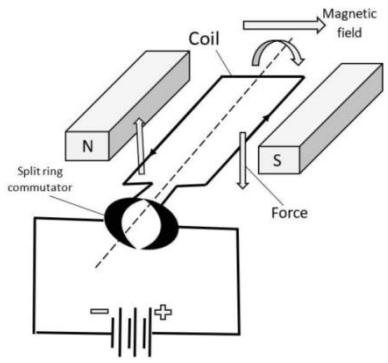
2.2. Push Button:

A switch is a piece of electrical equipment used to sever a power circuit and switch the flow of electricity from a certain conductor to other. The most common kind of toggle is an electromechanical in nature unit having electrical contacts that is actuated by hand. Each pair of contacts has two possible states: "closed," where electricity flows among them, and "open," where they are physically parted and do not.

2.3. Mq3 Alcohol gas sensor module:

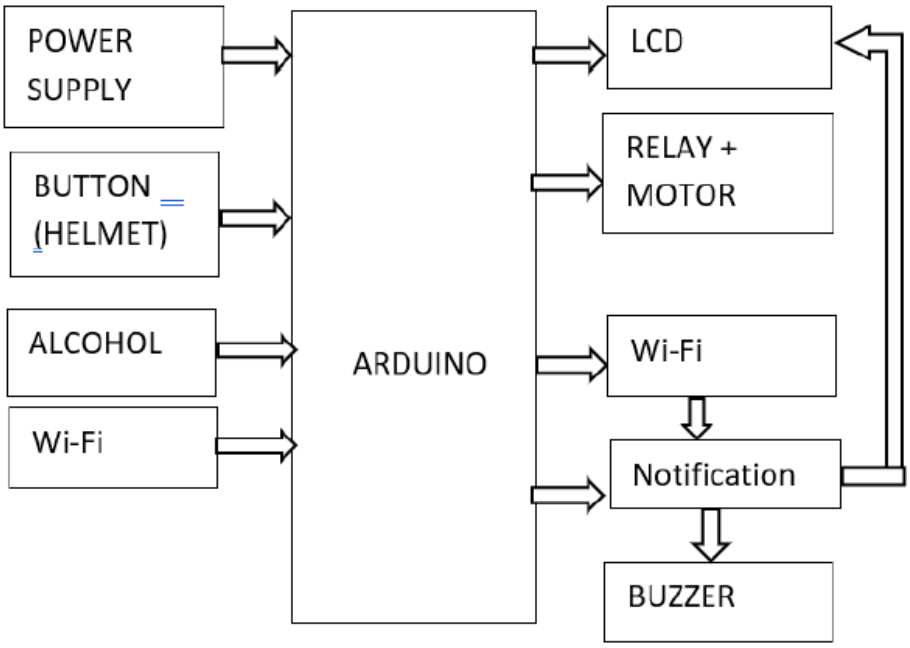
The MQ3 Alcohol Gas Sensor was used to create this component. It's a cheap electronic sensor that can pick up alcoholic gas levels between 0.05 and 10 mg/L. SnO2, employed in making this sensor, has a lower conductivity in clean air than it does in stale air. As the percentage of alcohol gas in it rises, so does its conductivity. It is very sensitive to alcoholic beverages but is mostly unaffected by smoke, vapour, or gas line disruptions. Both electronic & analogue outputs are available from this unit. Interaction via Microcontrollers, Uno Boards, Raspberry Pi, etc. is a breeze with the MQ3 alcohol sensor module. This alcohol sensor can be used in place of a standard breathalyser to measure the amount of alcohol in the user's system. It responds quickly and possesses a high degree of sensitivity.

2.4. Dc Motor:



A DC motor requires DC electricity in order to function properly. The ball-bearing motor, which is still relatively new, & Michael Faraday's homopolar drive are two instances of pure DC designs. The two most prevalent forms of DC motors, brushed and brushless, convert the DC power they receive from an external or internal commutator to an alternating current (AC), making them not, strictly speaking, and DC machines.

3. Proposed System:

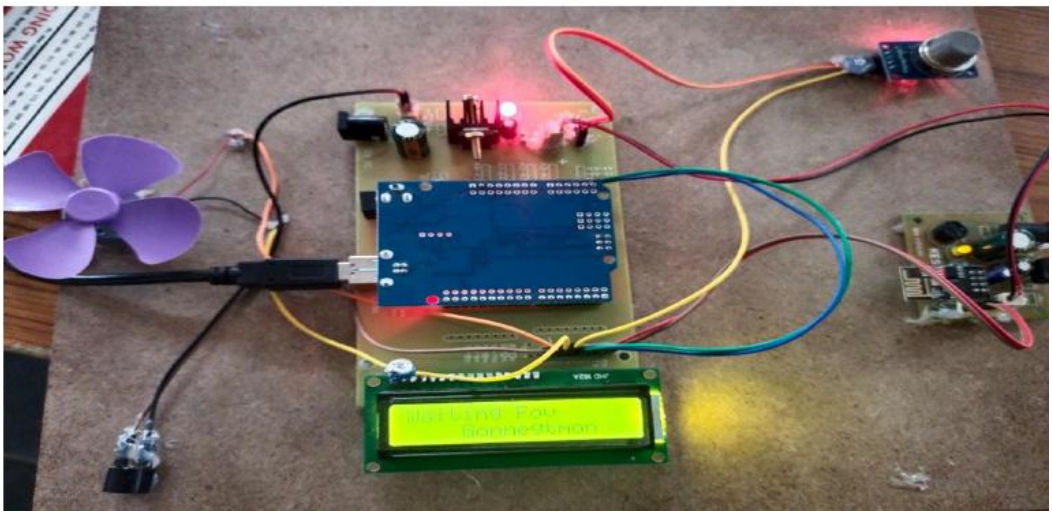


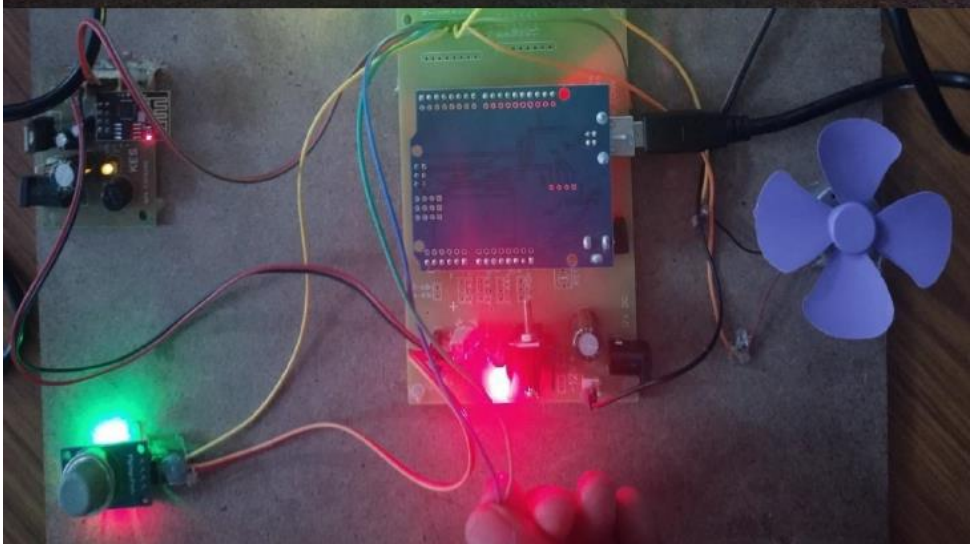
The device includes an MCU encoder, an RF transmitter, including a switch for a helmet-mounted infrared sensor. The helmet itself doubles as a switch and alcohol switch. The MCU collects information from the detectors, which then report back to the MCU. Only the RF encoder receives the relevant digital signal if the driver has sober breath while the helmet button is closed. The encoder unit will determine if the requirements have been met. It will produce an encrypted binary output based on the currently active inputs. This encoded binary data from

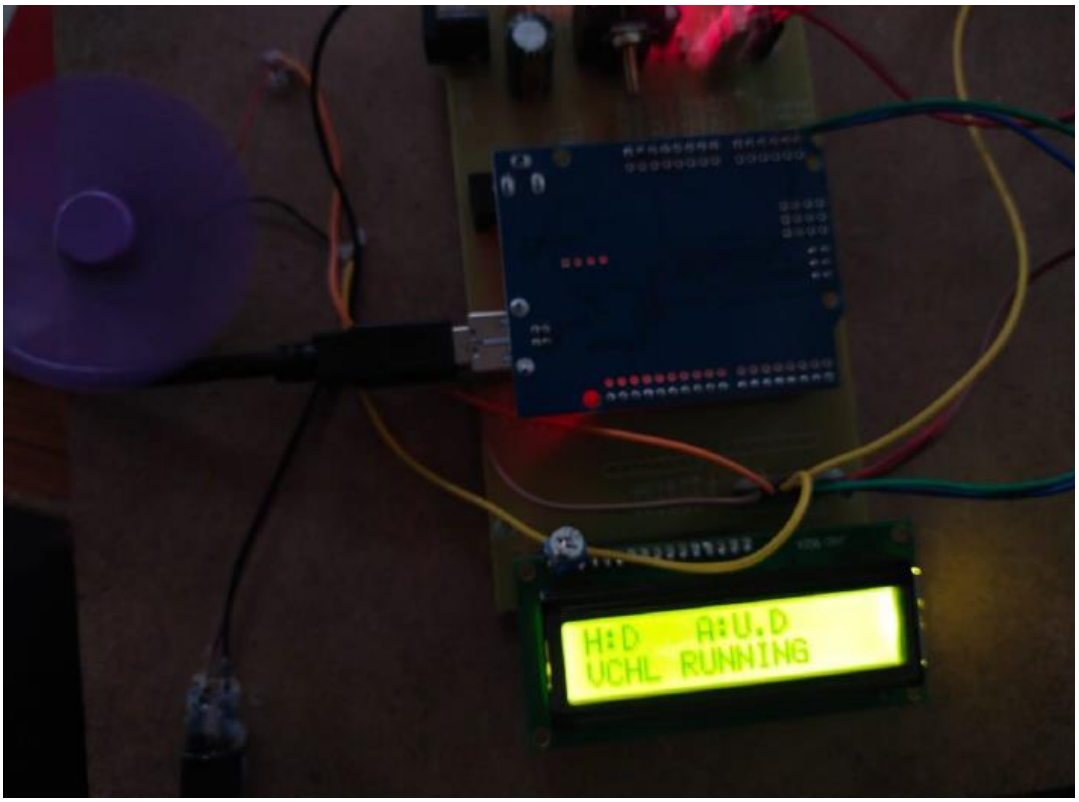
the RF encoder block will be sent via the RF transmitter. The ASK Modulation method is used in this system. Amplitude shift keying (ASK) modulation is used in RF transmitter systems to encode digital data as fluctuations in the magnitude of the carrier wave. Both the RF Receiver and RF Decoder, as well as the MCU, are part of the vehicle unit. The RF decoder receives the binary data that has been encoded by the RF transmitter & passes it on to the next block in the transmission chain, the receiver. if the location bit of the RF encoder & RF decoder match will the RF transmitter send the input to the RF decoder, which will decode the input and provide the four-bit electronic data to the MCU. The RF transmitter block sends the digital data to the MCU block. After that it controls the vehicle's engine, which it does via a relay circuit as it lacks the ability to directly control the relay itself. That's why a relay interface is employed as well.

4. Results:

In order to prevent mishaps brought on by rule-breaking and negligence, this real-time embedded system employs a simple and inexpensive approach. There are two subsystems in the device: an alcohol detector that prevents the car from starting if the driver has been drinking, and a safety system that contacts emergency services through GSM if a vibration sensor detects a crash.







5. Conclusion:

The progress made towards creating safer roads by creating biker helmets with identification and alcohol detection technology is encouraging. Deaths caused by intoxicated drivers or by other people using the rider's helmet without permission can be avoided with the use of these devices. By limiting usage of the helmet to authorised personnel, identity equipment has the potential to significantly cut down on theft and abuse. At this point, alcohol monitoring devices can determine whether the rider is intoxicated and warn them to stay off the road. This helps to cut down on injuries that arise from drunk drivers. In conclusion, it is promising that bike helmets are now being equipped with identification and alcohol detection technology, which might greatly minimise the amount of road accidents. It is critical to keep looking for and executing novel approaches like this that can make driving safer for all.

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