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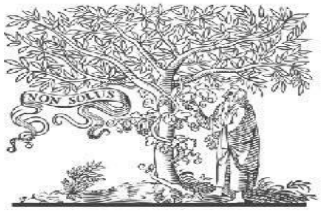

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Smart Ignition System Rider's Safety Consideration of Two-Wheeler

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Abstract

The objective of this project is to develop a smart ignition system for two wheeler that ensures the rider's safety by incorporating two important features, helmet detection and alcohol detection.

The system utilizes a micro controller and sensors to detect the presence of helmet on rider's head and to detect the alcohol level in their breathe. The ignition system will only let the engine start if both the conditions are met i.e., The rider is wearing a helmet and is not under the influence of alcohol.

The smart ignition system is designed to be highly reliable and efficient, ensuring that it operates seamlessly and accurately. The system is designed to work in all weather conditions and is resistant to environmental factors such as dust, water, and vibration. This feature ensures that the system is durable and can withstand rough usage.

Furthermore, the project also aims to create awareness among riders about the importance of road safety and the consequences of irresponsible riding. By promoting responsible behavior and compliance with traffic laws, the project can help to reduce accidents and save lives.

Overall, the smart ignition system is an innovative and effective solution to promote road safety and prevent accidents. The project has the potential to create a positive impact on the community by reducing accidents and promoting responsible riding, thereby making roads safer for everyone.

Introduction

The development of this project was inspired by the pressing need to improve road safety in our society. It is an unfortunate reality that we witness a high number of accidents every day, resulting in the loss of precious lives. According to recent statistics, India records approximately 400 bike crashes per day, and the leading causes of these accidents

are reckless riding, drunk driving, and lack of helmet usage. The consequences of these accidents are dire, with fatalities and injuries causing immense pain and suffering for individuals and their families.

In response to this critical issue, we have designed a smart helmet system that aims to tackle the root causes of these accidents. Our system ensures rider safety by incorporating two critical features: helmet detection and alcohol detection. The helmet detection feature ensures that the rider is wearing a helmet before starting the bike, reducing the risk of head injuries in the event of an accident. The alcohol detection feature prevents the rider from starting the bike if they are under the influence of alcohol, which is a leading cause of road accidents. The system includes an indication system with LED and buzzer, which alerts the rider if they are not wearing a helmet or if they are under the influence of alcohol, further promoting safety.

The development of this smart helmet system is a significant step towards reducing road accidents and promoting safe riding practices. It not only improves rider safety but also creates awareness among riders about the importance of responsible riding behavior. The system is reliable, efficient, and durable, ensuring seamless operation in all weather conditions. The system is also adaptable, compatible with different types of helmets and vehicles, and can be customized to meet the unique needs of riders. With its potential to revolutionize road safety, we believe that this smart helmet system can make a significant contribution to society and create a safer environment for all road users.

Components Used

1. **HT12D Decoder IC**

HT12D is a popular decoder IC (Integrated Circuit) that is widely used in remote control applications. It is a 12-bit decoder that is compatible with various RF (Radio Frequency) transmitters, making it a suitable choice for wireless communication applications. The HT12D decoder IC receives serial data transmitted from the RF transmitter module and decodes it into parallel data.

2. **L293D Motor Driver Module**

The L293D is a popular motor driver IC (Integrated Circuit) that is commonly used in robotics and other electronic projects to control the direction and speed of DC motors. The L293D motor driver module is a breakout board that contains the L293D IC along with other components such as capacitors and diodes, which make it easier to use in a project.

3. **RF Transmitter**

An RF (Radio Frequency) transmitter is a device that generates and sends electromagnetic waves carrying information or data over the airwaves to a receiver. RF transmitters are used in a wide range of applications such as remote control systems, wireless communication, and telemetry systems.

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4. Receiver Modules

A receiver module is a device that receives and demodulates electromagnetic waves carrying information or data transmitted by an RF transmitter. Receiver modules are commonly used in wireless communication systems, remote control systems, and telemetry systems.

5. Arduino NANO

Arduino Nano is a small, flexible, and easy-to-use microcontroller board that is based on the ATmega328P microcontroller. It is designed for use in small projects where space is at a premium and can be used for a wide range of applications, from robotics to home automation.

6. IDE

IDE (Integrated Development Environment) is a software application that provides a complete programming environment for creating, debugging, and uploading code to the Arduino Nano microcontroller. It is an open-source software tool that is freely available for download and is supported by a large community of developers and enthusiasts.

The Arduino IDE provides a user-friendly interface for writing and uploading code to the Nano board. It includes a code editor with features such as syntax highlighting, auto-completion, and error checking. The IDE also includes a serial monitor that allows users to view the output of their code on the computer screen and a library manager that makes it easy to add new libraries to their project.

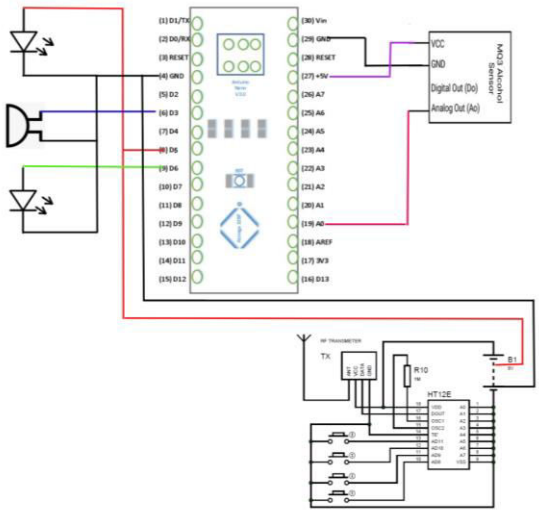
7. Alcohol Sensor

An alcohol sensor is a device that is used to detect the presence of alcohol in the breath or blood of an individual. It works by measuring the concentration of alcohol molecules present in the air or blood sample and converting it into an electrical signal that can be analyzed by a microcontroller.

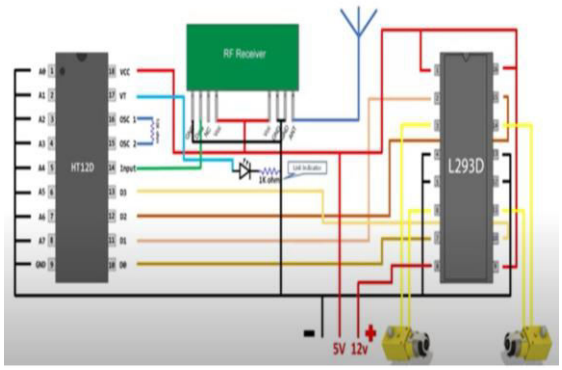
Alcohol sensors typically use a technology called gas sensing, where the alcohol molecules in the breath or blood sample react with a chemical in the sensor and produce an electrical signal.

Circuit Diagram

Transmitter Circuit (Helmet Section)



Receiver Circuit (Bike Section)



Working

The working of this project is based on the generation of radio frequency signals. A flat switch is placed inside the helmet, which works like a push button and is connected to a conductor and transmitter. The transmitter is powered by a battery and is also connected to the alcohol detection system. This ensures that the transmitter will not send any RF signals when the rider is under the influence of alcohol.

On the bike end, a receiver module is set up with the same address as the transmitter placed inside the helmet. The receiver receives the signals transmitted by the helmet's transmitter. The microcontroller on the bike end then verifies if the signals are coming from the authorized transmitter and if the rider is wearing a helmet. If both conditions are met, the microcontroller sends a signal to the motor driver module to start the engine.

In case the rider is not wearing a helmet, the microcontroller will not send a signal to the motor driver module, and the engine will not start. Similarly, if the rider is under the influence of alcohol, the transmitter will not send any RF signals, and the microcontroller will not send a signal to the motor driver module, preventing the engine from starting.

The system is also equipped with an indication system consisting of LEDs and buzzers, which alert the rider if there is any issue with the system or if they are not wearing a helmet. This smart ignition system with helmet and alcohol detection has the potential to significantly reduce the number of accidents caused by drunken riding and lack of helmet usage.

Source Code

```
#define gasSensor A0

        #define buzzer 3

        #define ledGreen 5

        #define ledRed 6

        #define HIGH 200

        void setup() {

          pinMode(gasSensor, INPUT);

          pinMode(buzzer, OUTPUT);

          pinMode(ledGreen, OUTPUT);
```

```
  pinMode(ledRed, OUTPUT);

 }

void loop() {

 int gas_value = analogRead(gasSensor);

if(gas_value > HIGH)

{

  tone(buzzer,300,100);

  digitalWrite(ledRed, HIGH);

  digitalWrite(ledGreen,LOW);

}

else

{

  noTone(buzzer);

  digitalWrite(ledGreen,HIGH);

  digitalWrite(ledRed, LOW);

}

delay(200);

 }
```

Advantages

1. **Enhanced rider safety**

The project is aimed at enhancing the safety of riders on the road by ensuring that they wear a helmet and are not under the influence of alcohol while riding a two-wheeler. This can significantly reduce the number of accidents and fatalities on the road.

2. **Easy to install**

The components used in the project are readily available and the system is easy to install in a two-wheeler, without requiring any major modifications.

3. **Ease of use:**

The smart ignition system developed in the project is easy to use and does not require any special skills or training. The rider simply needs to wear a helmet and be sober to start the bike.

4. **Customizable:**

The project can be customized to fit different types of two-wheelers, making it a versatile solution that can be widely adopted.

Disadvantages

1. **Cost**

The smart ignition system with helmet and alcohol detection requires additional components such as the HT12D decoder IC, L293D motor driver module, RF transmitter and receiver modules, and alcohol sensor, which can increase the overall cost of the project.

2. **Limitations**

The system only addresses two specific safety concerns (helmet usage and alcohol consumption), and may not address other factors that contribute to road accidents.

3. **Maintenance**

The system may require regular maintenance and calibration to ensure proper functioning, which can be time-consuming and costly.

Conclusion

In conclusion, the development of a smart ignition system for two-wheelers incorporating helmet detection and alcohol detection features can significantly contribute to road safety. The system utilizes a microcontroller, sensors, and RF modules to ensure that the engine starts only when the rider is wearing a helmet and is not under the influence of alcohol. This project has the potential to reduce the number of accidents caused by drunken driving and lack of helmet usage. However, the project also has some limitations such as the cost and complexity of the system. Nevertheless, the benefits of this system far outweigh the disadvantages. Overall, the project is a significant step towards promoting road safety and saving precious lives on the road.

Future Scope

The future scope of this project is extensive. With the advancements in technology, the integration of smart features in vehicles is becoming increasingly common. This project provides a foundation for the development of more advanced safety systems for two-wheelers. The helmet detection and alcohol detection features can be further enhanced to include other safety features, such as speed control and collision avoidance. Additionally, this project can be adapted for use in other types of vehicles, such as cars and trucks. As road safety continues to be a major concern, the potential impact of this project on reducing accidents and saving lives is immense. With further research and development, this project can be refined to become a widely adopted safety standard for vehicles.

References

1. Gopalakrishnan S. A public health perspective of road trafficaccidents. J Fam Med Prim Care. 2012;1(2):144–50.
2. The global impact - WHO / World Health Organization [Internet] July2021
3. Road traffic injuries - WHO /World Health Organization [Internet]July 2021.
4. Road traffic injuries - WHO /World Health Organization [Internet]July 2021.
5. Ankarath S, Giannoudis PV, Barlow I, Bellamy MC, Matthews SJ,Smith RM. Injury patterns associated with mortality followingmotorcycle crashes. Injury. 2002;33(6):473–7.