

Detecting and Tracking Fire Remotely



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Abstract This project aims to develop a system that detects and tracks fires remotely, using sensors and a water pump to help extinguish the fire. The system is built around an Arduino UNO microcontroller and includes a DC motor with a rigid chain for movement and a Bluetooth-enabled phone application for control. It also includes a flame sensor and flammable gas sensor for accurate fire detection, as well as a water pump and tank for spraying water. To enhance the system, a camera connected to an ESP32 microcontroller has been added, allowing remote monitoring of the robot and its surroundings via WIFI. Overall, this project offers a promising solution for detecting and extinguishing fires in challenging environments.

Keywords Detecting fire · ESP32 microcontroller · Arduino UNO

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1 Introduction

With the development of technology to facilitate human life and the emergence of many technologies that give greater possibilities than the former in the control and linkage between man and technology, and with the advent of automated control systems emerged the idea of detecting and Extinguishing fire remotely that made More prepared to deal with emergencies and thus become more interactive with technology [1].

In fact, the emergence of advanced controllers is easy for developers to harness technologies to meet the requirements of human rights, especially controllers integrated with interactive technologies such as Bluetooth and WIFI network, which can create a wireless communication channel between humans and applications [2].

Our research objectives revolve around developing a smart car system that is easy to use, comfortable, safe, and environmentally friendly. We aim to save energy, money, and time for the users while providing them with full control over all electrical systems within the car. We want to ensure that all members of society can use the system without difficulties, regardless of age or forgetfulness. The system should be adaptable to different operating environments and require simple maintenance. We also strive to create a flexible system that allows access to intelligent control through wireless communication, even without pre-establishment of a smart system. To achieve these goals, we utilize advanced microcontrollers such as Arduino, which facilitates human life and provides significant benefits to users.

2 Methodology

We have conducted a comprehensive study on the intelligent systems in the market and how they work and the electronic parts used to build this system.

After a long study of the previous systems, a new system was obtained which contains the best techniques and pieces that have been used thus guaranteeing the efficiency of the system and the quality of its work in the long term the objectives and features sought by the intelligent system.

Then he took the results obtained in the application of the practical part, including the installation of the movement mechanism, and the purchase of the component parts of the system from the Chinese market with good quality and cost, including DC motors, flame sensor, temperature sensor and motor voltage controllers.

Drawing a complete connection diagram as it will be clarified and explained later, which helps to facilitate the process of connecting the electronic parts with each other within a network that is easy to maintain and install.

In the end, the system was monitored for a period of time and its effectiveness under several environmental conditions to ensure that the desired objectives are achieved.

Figures 1 and 2 discuss the sequence of operations in microcontroller Arduino, this helps developers to understand how the code works.

The circuit diagram of the system is shown in Fig. 3.

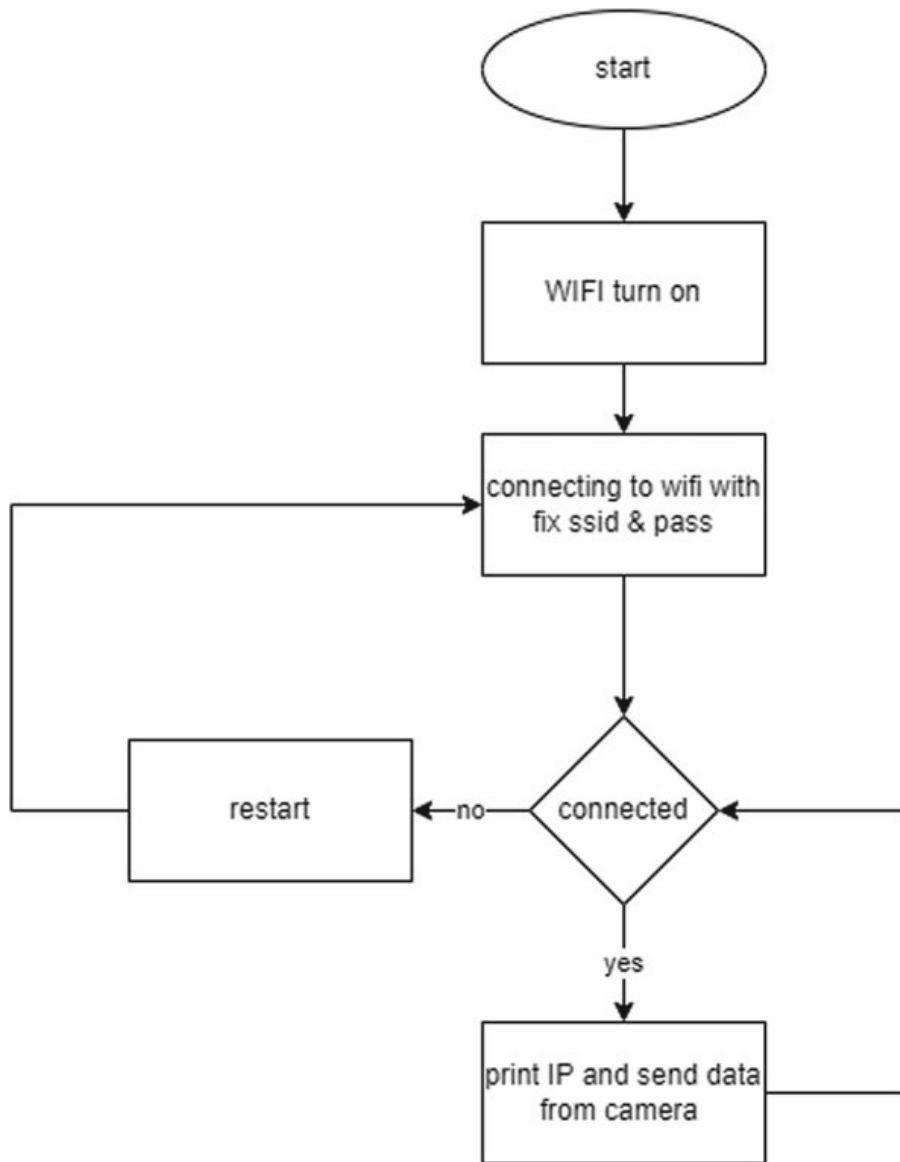
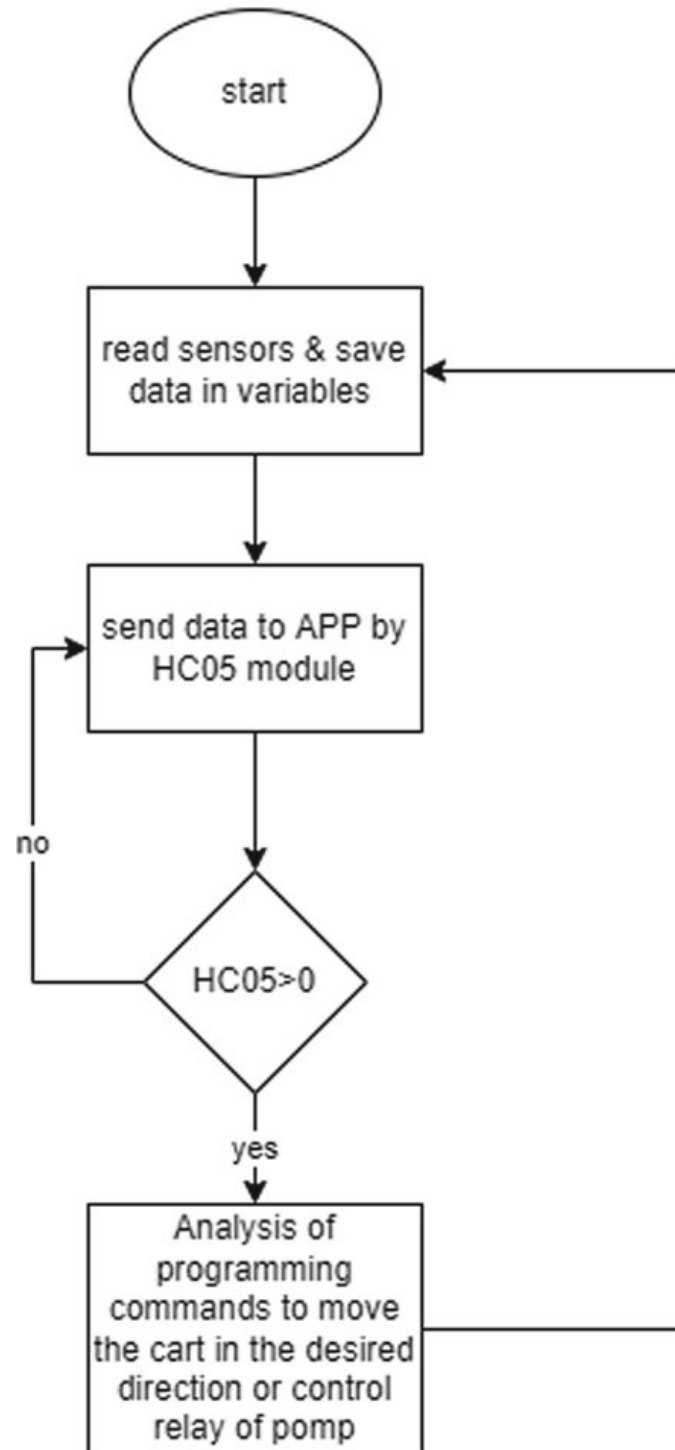


Fig. 1 ESP32 sequence of operations

Fig. 2 Arduino sequence of operations



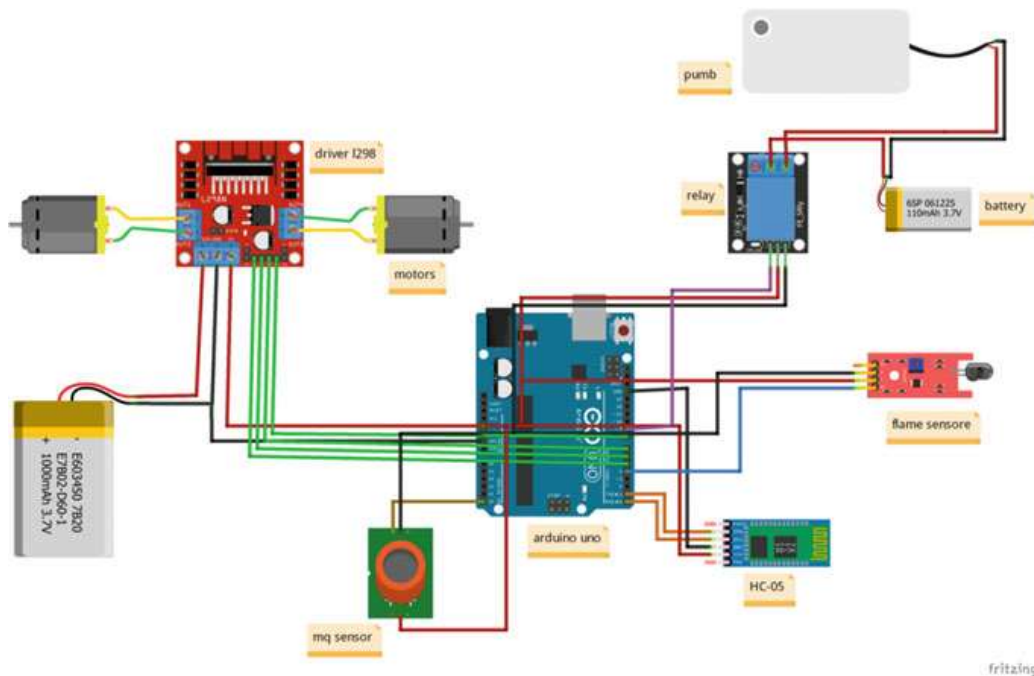


Fig. 3 Circuit diagram

3 Results

After the completion of the connections and project programming, after the practical experience of the project we monitored the results through the application we developed. We have obtained satisfactory results in terms of response and speed in performance also we have improved quality of life, car safety, security, using energy efficiently as planned.

4 Conclusion

In conclusion, the system for detecting and tracking fire remotely presented in this article is a promising solution to help control and extinguish fires. The use of an Arduino UNO microcontroller, along with sensors such as the flame and flammable gas sensors, enables accurate detection and monitoring of fire, while the water pump and tank provide a means of partial extinguishing. The addition of a camera connected to an ESP32 microcontroller enables remote monitoring of the system's environment through WIFI. As further development is possible, this system could be enhanced by adding automatic control features through the use of voice commands or artificial intelligence, to provide a more comprehensive and effective solution for fire control and safety.

5 Recommendations

To further improve the car of the future, the following recommendations are suggested:

- Adding sensors to enable automatic control of the car, including fire detection and gas leakage monitoring, as well as monitoring any movement when the user is outside the car, with alerts sent to the user through the phone application.
- Implementing voice control techniques to control the project application through voice commands using an Android application, for example, to enhance user convenience.
- Introducing artificial intelligence into the automotive industry, which can automatically detect, track, and extinguish fires, thereby enhancing safety and protection for users.

References

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