Design and Implementation of Fire Fighting Robot using IOT

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Abstract- *T The robot aims at designing a vehicle pertaining to the importance of security without the use of fire engines in order to reduce the human efforts to save their lives in extreme conditions. The main role of this robot is to fight against fire and fight with fire and provides the user with wireless monitoring and controlling of the robot. The robot is designed in such way that it provides high level of surveillance using IOT.*

Keywords- Node M C U, TUNIOT, ESP8266.

I. INTRODUCTION

The main aspect of this multitasking robot is to decrease the life risk of the human being. They are capable of performing repetitive tasks more quickly, cheaply and accurately than humans. Robotics has gained popularity due to the advancement of many technologies of computing and non technology making humanoid is easier and comfortable. The fire fighting robot is designed to search for a fire in a small floor plan house of a specific dimension.

In this one of the application is fire fighting i.e. Reduces the severity of the situation. The next application is fire generation using a spray mechanism. This application is specially employed in Military Applications. These type of robots help the rescue person to enter into the scenario and minimize the destruction to a level.

II. BLOCK DIAGRAM OF PROPOSED SYSTEM

The above diagram illustrates the block diagram of the proposed system:

- Node M C U is the heart of the project. It has got a in-built Wi-Fi module.
- IR sensor: An infrared sensor is an electronic device used as temperature sensor as well as proximity sensor.
- Host system: This is used to monitor the robot.
- Relay: This is used in order to switch the circuit from one phase to the other.
- Wi-Fi module: This is used to provide serial communication between node M C U and other peripherals. it receives command from an android application and passes it to the node M C U.
- DC motor: This system a 12volt motor is used for the moment of the robot in a specific direction according to the given commands.
- Power supply: The power supply to the robot is through a 12volt from host system.

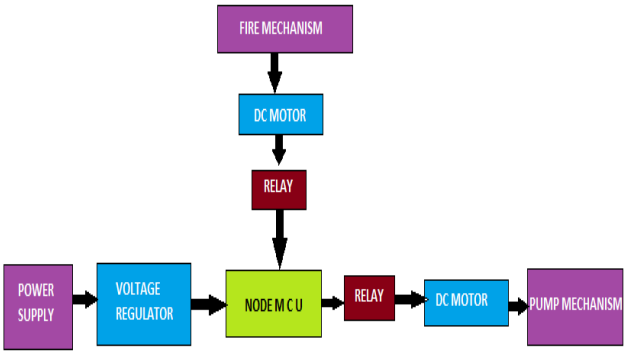

Figure 1. Block Diagram

III. DESIGN AND IMPLEMENTATION

A. DESIGN:

1. **Node M C U:** Node MCU is an open source IOT platform. It includes firmware which runs on the ESP8266 Wi-Fi SOC from Es press Systems, and hardware which is based on the ESP-12 module. The term "Node MCU" by default refers to the firmware rather than the dev kits. The firmware uses the L u a scripting language. It is based on the e L u a project, and built on the Es press if Non-OS SDK for ESP8266. It uses many open source project.

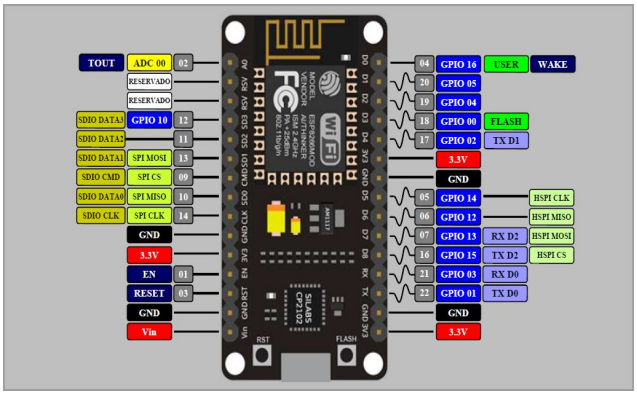

Figure 2. Node MCU

2. **I R Sensor:** An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion.
3. **D C Motor:** A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.
4. **Relay:** A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contractor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called "protective relays".
5. **IOT:** An IOT module is a small electronic device embedded in objects, machines and things that connect to wireless networks and sends and receives data. Sometimes referred to as a "radio chip", the IOT module contains the same technology and data circuits found in mobile phones but without features like a display or keypad. Another key differentiator of IOT modules is that they provide always addition, on connectivity. This is because IOT applications need to send data automatically, in real time without someone hitting a send button. In they are engineered for extreme durability and longevity and need to operate continuously for a decade or more to justify the business case and cost of the technology.
6. **Software used: TUNIOT:** TUNIOT is a code generator for the ESP8266\ESP32 boards. We do not need any coding skills to program it and make any IOT project. The tool is available in 4 languages and in active development and documentation is coming soon. There are several resources in different languages to learn ESP8266\ESP32 and program in blocks mode. This is a visual programming tool for the ESP8266 based boards like NODE M C U.

B. IMPLEMENTATION:

Commands for guiding the robot are written in TUNIOT and it is made as a application named NODE M C U. Accordingly, the movement of the robot is achieved through an I O T application which in turn accessed through mobile. The robot is equipped with a NODE M C U board having an I O T module in built, a 4-channel and 2-channel relay module, 7-dc motors and 4-wheels. The NODE M C U receives and commands from the application and thus passes the signals to the motors there by enabling the movement of the robot. This way the surroundings of the robot are brought under surveillance, the eliminating the human effort.

IV. FLOWCHART

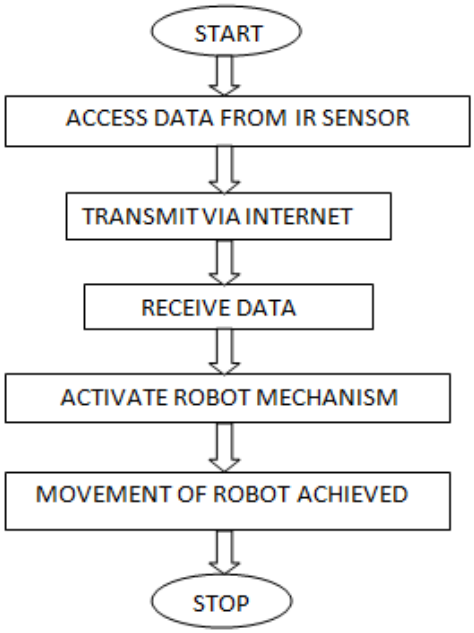

Figure 3.

V. RESULTS

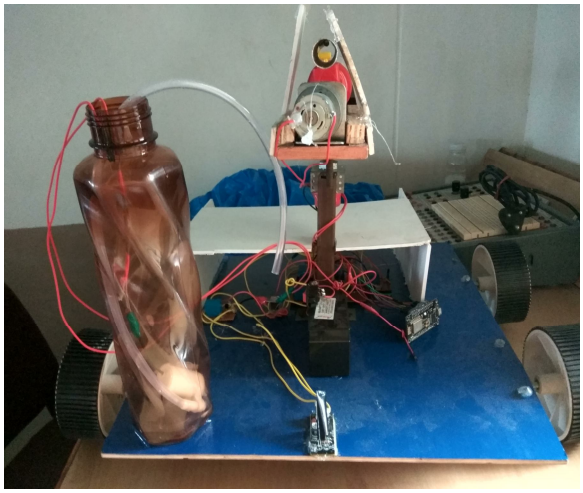

Figure 4. Proposed Robot Prototype

Figure 5. Monitoring Panel

Thus the implementation of the proposed project has been successfully carried out through the design of a wireless controlled surveillance Fire Fighting robot which works using IOT.

VI. APPLICATIONS

1. Industrial facilities
2. Warehouses
3. Parking lots
4. Chemical plants, oil & gas factories
5. Solar farms and photovoltaic power plants
6. Military Field.

VII. CONCLUSION

In this paper the video streaming and surveillance using awireless android based robot is implemented. The robot is successfully controlled using an android application through the wireless Bluetooth technology. Even the real time video feel is successfully achieved using the Wi-Fi technology on the designed android application.

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