

# International Journal of Innovative Research in Science, Engineering and Technology

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## Robot for Military Disaster Control System

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**ABSTRACT:** Nowadays disaster in military are increased and due to this we are losing many soldiers in borders. To avoid this, we introduce robots for saving lives. Robotics are used in search and rescue missions to shorten the time as well as to reduce the danger for soldiers. This project proposes the robot for military disaster control. This robot helps to find the land mines and hidden weapons in the borders. It can also sense the fire accidents, gas leakage and the abnormal activities with the help of sensors and intimate to the authorized persons. The sensor value will be monitored continuously by micro controller and information is send to the authorized person using Wi-Fi module and safety measures can be taken.

**KEYWORDS:** Arduino, weapon detection, flame and gas leakage detection, robot

### I. INTRODUCTION

Robot technology has been widely developed for many functions such as for defense, transportation, health and rescue. With the development of artificial intelligence technology, robot gradually come into view, especially in rescue operation, and the rescue robot has been paid more and more attention. They are used more and more in search and rescue mission to shorten the time as well as reduce the danger for human. This robot is mainly used for safety purpose and reduces man power. It is used check the presence of landmines, weapons, fire and abnormal activities in unmanned areas. It moves from one place to another place with the help of motor rotation with respect to forward, reverse, and the data can be received by the controller using sensors. The sensor value will be monitored continuously by using microcontroller and send the information quickly and alert the authority persons. Wi-Fi Module is used to transmit the value of the sensor to the webpage. Ultrasonic sensor, Proximity sensor, PIR used to move the robot and detect the obstacles. In the existing model, the usage of sensors to check the gas level and temperature level are high, because all sensors attached every place without using movable robot. The sensors which is placed in flat areas can sense only in particular places which is not comfortable for dangerous place. But this robot can move in all directions and all surfaces irrespective of the condition of the surface.

### II. MODULES AND METHODS

G. Sheela, Dr. S. Priya Prof/EEE and Dr. A. Suresh Prof/EEE [1] research titled “Arduino Controlled Hanging Robot for Industry Monitoring Using Wireless System” is a research for detecting the leakage of Gas using sensors and gives an alert using Buzzer for safety purpose. It automatically sends the sensor information to number of places using ZigBee mesh network. The movement of the robot is controlled without human work using wireless ZigBee. It also measures the light intensity using the LDR sensor in case of fires. It is mainly designed for the usage in gas and petroleum industries.

Megha Kanwar, Agilandeewari L [3] designed an IOT Based Fire Fighting Robot. The aim of their project is to detect fires and protect human lives, wealth, and surroundings from the fire mis happenings. After being informed the authorities can start visualizing the fire location and can communicate with people stuck with a help of an

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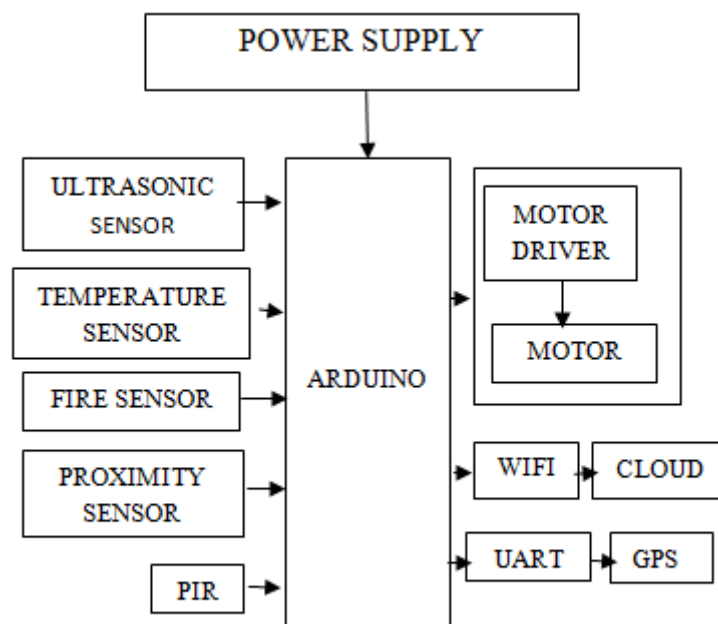
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automatic receiver installed. Instructions will be given to the robot about its movement, by turning on its water pump or carbon-dioxide pump depending on fire type through long distances. The fire type and carbon-monoxide level are known using the sensors installed which will provide graph to make the analysis.

Bhawana D Parate and Jagruthi J Shah [2] research titled “Design and Development of Multifunctional Robot for Military Purpose Applications” is a research for detecting the obstacle using the robot and shoot the obstacle using missile, guns, etc.

### III. PROPOSED METHODOLOGY AND DISCUSSION

In this system, the Ultrasonic sensor, which is connected to the servo motor sense the distance from the obstacle and the value is sent to controller. The controller sends the signal to the motor driver and it will move the robot to the obstacle. Fire sensor, Proximity sensor, DHT 11 sensor, PIR senses the obstacles like fire, gas, IR and also metals like landmines and weapons. The data received from the sensor is send to the microcontroller using the Wi-Fi connection to the internet. The value obtained from the sensor is continuously updated in the cloud and the alert is immediately given to the authorised persons and the rescue team.



Architecture of the Proposed Model

### IV. MODULE DESCRIPTION

#### A. Module1-Monitoring

The system monitors the presence of weapons, landmines, fire, gas leakage with the sensors and the value is sent to the controller with Wi-Fi module.

#### B. Module2-Movement of robot

The motor is attached to its wheel and it is controlled by the motor driver.

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## C. Module3–Database and Alert message

The cloud storage is continuously updated with those values and the alert message is sent to the rescue team.

## V.EXPERIMENTAL SETUP

### A. ARDUINO ATMEGA 2560

The ATmega2560 is CMOS 8-bit microcontroller which produces very low power and it is based on the AVR enhanced RISC architecture. It is fully supported with a full suite of program and system development tools including C compilers, macro assemblers, program debugger or, in-circuit emulators, and evaluation kits.

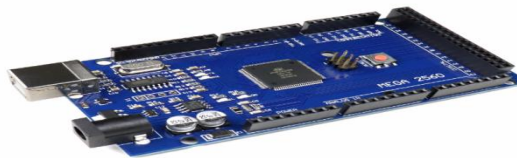


Fig: ATMEGA 2560

### B. Servo Motor SG90

A servo motor is a device which is used to push and object and it is also used to rotate an object. If we want to rotate an object at some specific angles or distance, then we use the servo motor. It is made up of simple motor which run through servo mechanism.



Fig: Servomotor SG90

### C. Proximity Sensor

A proximity sensor is a sensor which is used to detect the presence of nearby objects without any physical contact with the object. It will emit a beam of electromagnetic radiation like infrared rays, for instance, and looks for changes in the field.



Fig: Proximity sensor

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### D. Ultrasonic Sensor

An *ultrasonic sensor* is a sensor which is used to measure distance to an object using the *ultrasonic* sound waves. It uses a *transducer* to send and receive the *ultrasonic* pulses from the object which relay back information about an object's proximity.



Fig: Ultrasonic sensor

### E. PIR

A passive infrared sensor is a sensor which is used to measure the infrared light radiating from objects in its field of view. They are mostly used in the *PIR-based motion* detectors. These types of sensors are most commonly used in security alarms and automatic applications based on the lightening.



Fig: PIR sensor

### F. Fire and Temperature Sensor

A fire detector is used to detect the smoke or heat. These devices will respond only to the presence of smoke or extremely high temperatures that are present with fire. A temperature sensor is an electrical device which is used to collect the data about *temperature* from a particular source and then converts the data into form which is understandable for a device or user.



Fig: Temperature sensor



Fig: Fire sensor

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### G. Node MCU

Node MCU is an open source IoT platform with a low cost. A firmware was included initially which runs on the ESP8266 Wi-Fi SoC, and the hardware is based on the ESP-12 module. Then, support for the ESP32 32-bit MCU was added. The hardware which is used for prototyping is typically used is a circuit board functioning as a dual in-line package (DIP) which integrates a USB controller with a smaller surface-mounted board containing the MCU and antenna. The DIP format allows for easy prototyping on the breadboards. The design was initially based on the ESP-12 module of the ESP8266, which is a Wi-Fi SoC integrated with a Tensilica Xtensa LX106 core, which is widely used in IoT applications.



Fig: Node MCU

### H. Motor Driver L293D

L293D is a motor driver or motor driver IC which will allow the DC motor to drive on either direction. It is a 16 pin IC which has the capability to control a set of two DC motors simultaneously in any direction with a single IC.



Fig: L293D

### I. GPS

Global Positioning Satellite (GPS) are mostly used in smartphones and in the military to track the location. It uses satellites and the ground stations to find the position on earth. It is also called as navigation system.



Fig: GPS interfacing with Node MCU

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## J. SOFTWARE USED ARDUINO IDE

The Arduino IDE is a cross-platform application for Windows, macOS, Linux which is written in C and C++. It is used to write and upload programs to Arduino compatible boards. It supports the software library from the wiring projects. It includes code editor with the features like the syntax highlighting, brace matching, and automatic identification. It is also capable of uploading compiling the programs to the board.

## VI. RESULTS

The robot is capable of detecting weapons, fire and gas leakage. The hardware model of the robot is shown in figure 1. When the obstacle is detected, it sends an alert message to the base station as shown in figure 2.

Fig. 1: Hardware model of the robot



Fig. 2: Alert message is sent to the base station

## VII. CONCLUSION

A robot has been designed with an aim to prove the assistance and to save the life of the soldiers in the borders. It reduces man power in the restricted areas. This robot can be travelled with the help of motor through Arduino, which is controlled by the Wi-Fi module in the base station. It is designed simple with the low cost and high accuracy.

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