

Metal Detection Robot

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Abstract— This paper presents design and development of National Security Guard Defence Surveillance Robot for defence purpose that has metal and magnetic field detection sensor, fire detection sensor with pump motor to extinguish fire. This study represents the design of a fully automated firefighting robot and includes various modules such as temperature sensor LM35 Arduino Uno, 16*2 LCD and RF module at 433 MHz a 12V dc motor is used to derive movement. When fire in particular zone gets detected by the robot then it automatically reach to that zone with the help of robot.

Keyword:- Arduino Uno controller, Metal detection sensor.

I. INTRODUCTION

The main objective of the “Metal detection Robot” is, it play a major role in industry and are extensively used in the areas of defense, medical and home applications. It can carry out different risky jobs that cannot handle by human. This paper presents Defence Surveillance robot (DSR) for defence purpose that has metal detection sensor, LDR sensor for night vision, fire detection sensor to detect fire, IR sensors for path finding and obstacle avoidance, moisture sensor. A robotic arm is interfaced for explosive placement and diffusion. The system provides continuous visual monitoring through the wireless camera attached to the robot and sends continuous data to the control unit.

II. BLOCK DIAGRAM

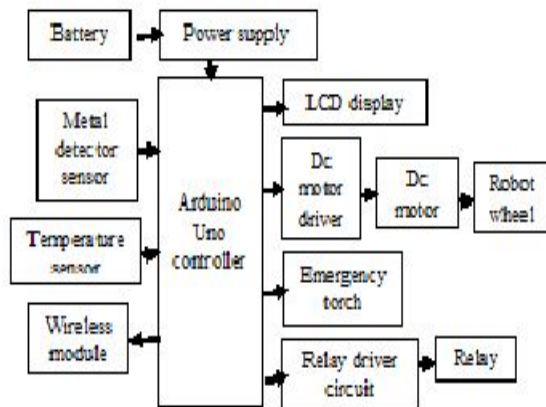


Fig.1 Block diagram of National Security Guard Defence Surveillance Robot

Fig.1 shows the Block diagram of National Security Guard Defence Surveillance Robot Using Arduino Uno controller. The sensed temperature is fed to controller. To take corrective action to overcome detected fire. Power supply section is used for required power to working of robot. LCD as the output interface for the controller. By providing the input through sensor.

A. DC motor



Fig.2 DC motor

The working principle of a DC motor. When armature windings are connected to a DC supply, current sets up in the winding. Magnetic field may be provided by field winding (electromagnetism) or by using permanent magnets. In this case, current carrying armature conductors experience force due to the magnetic field, according to the principle stated above.

B. Metal Detection Sensor

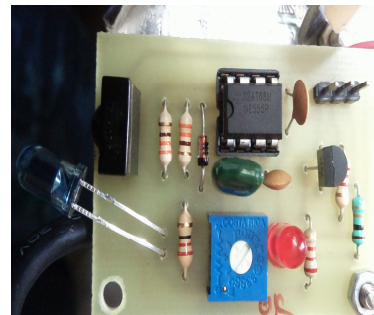


Fig.3 Metal Detection Sensor.

Metal detectors are useful for finding metal enclosure hidden within the object or metal objects buried underground. Metal detector is used here as a bomb detector. Inductively coupled coil is used to find out the metal present inside the ground. It absorbs the magnetic field comes out from the metal and gives the acknowledgement to the control unit. Metal Detector consists of an oscillator producing an alternating current that passes through a coil producing an alternating magnetic field. If the current carrying metal is close to it, eddy currents will be induced in the metal and this produces a magnetic field

C. Temperature sensor

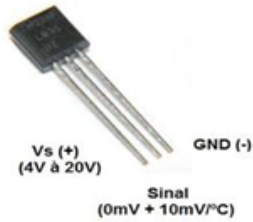


Fig.4 Temperature sensor.

Fire detector sensor makes the use of a thermistor (heat sensitive resistors), so output is produced when the fire is detected in the region.

D. Liquid Crystal Display (LCD)

A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals (LCs). LCs does not emit light directly. It is helpful for displaying attenuation.

E. Arduino Uno controller



Fig.5 Arduino Uno controller.

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins they operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor of 20-50 kohms. 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller's

Device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM of 8 kB up to 40 kB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power.

FUTURE SCOPE

By using same concept we can detect toxic gas with the help of toxic gas detection sensor. We can also detect live human by using human detection sensor. With the help of gun we protect our self.

CONCLUSION

A defence surveillance robot was designed in the project. Using sensors to sense the path and obstacles, controller program was designed so as to enable the controller to control robot, using RF remote and movement of the robot and move when there is no obstacle in the following path. The motor drivers are used to drive the motor. Obstacle sensors are used

to change the movement of robot when the robot faces an obstacle on the path.

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