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Multiple Functional Robot for Defence

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ABSTRACT

A modern approach for surveillance at remote and border areas using multifunctional robot based on IOT used in surveillance, defence and military applications. It is designed to replace human beings in various hazardous areas. It is widely used because of However,the high power consumption of the AES algorithm is a major concern in battery-operated devices. Therefore,in this paper, we propose an energy-efficient AES mix column using Quantum-dot Cellular Automata (QCA) technology.

KEYWORDS: Wireless Camera,Metal Detector,Gas Sensor,Buzzer,Motion Detector,IOT.

1.INTRODUCTION

The Robotics has been a staple of advanced manufacturing for over half a century.A remote controlled surveillance robot is defined as robot that is remotely controlled to capture images/video for specific purposes.The main aim of this project is to implement a Wireless Multifunctional Defense Robot which can be controlled through computer or laptop using WiFi Module.It has built in with Proximity metal sensor for detecting metal.

2. LITERATURE SURVEY

The field of robotics has changed dramatically during the past 30 years. While the first programmable articulated arms for industrial automation were developed by George Devol and made into commercial products by Joseph Engleberger in the 1960s and 1970s, mobile robots with various degrees of autonomy did not receive much attention until the 1970s and 1980s. The first true mobile robots arguably were Elmer and Elsie, the electromechanical 'tortoises' made by W. Grey Walter, a physiologist, in 1950. These remarkable little wheeled machines had many of the features of contemporary robots: sensors (photocells for seeking light and bumpers for obstacle detection), a motor drive and built-in behaviours that enabled them to seek (or avoid) light, wander, avoid obstacles and recharge their batteries. Since those early developments, there have been major strides in mobile robots—made possible by new materials, faster, smaller and cheaper computers (Moore's law) and major advances in software. At present, robots move on land, in the water, in the air, and in space. Some vehicles capable of moving in more than one medium or terrain have been built. During the past 20 years, military robotic vehicles have been built using all the modes of locomotion described above and making use of the new software paradigms [US Dept. Of Defence, 2007]. Military robots find major applications in surveillance, reconnaissance, location and destruction of mines and IEDs, as well as for offense or attack. The

latter class of vehicles is equipped with weapons, which at the present time are fired by remote human controllers. In the following sections of our paper, we seek to complement this work by exploring and proposing the implementation of such military robots for defence applications.

3. EXISTING SYSTEM

- Already existing systems use robots that have limited range of communication as they are based on RF Technology,Zigbee and Bluetooth.
- Some existing projects use short range wireless camera.
- Some existing robots can only be controlled with a manual mode which needs human supervision throughout the whole surveillance process.

4. PROPOSAL METHOD

process Nowadays as there are technological advancements these advancements are used by the military forces for reducing the risk of their casualties and to defeat their enemies. With the development of sophisticated technology, it mostly relies on the hightech weapons or machinery being used. Robotics is one of the hot fields of modern age in which the nations are concentrating upon for military purposes in the state of war and peace. They have been in use for some time for demining and rescue operations but now they are propelled by using them for combat and spy missions. Modern military forces are using different kinds of robots for different applications ranging from mine detection to rescue operations. In future, they will be used for reconnaissance and surveillance, logistics and support, communications infrastructure, forward-deployed offensive operations, and as tactical decoys to conceal maneuver by manned assets. In order to make robots efficient for the unpredicted cluttered environment of the battlefield, research on different aspects of robots are under examination in laboratories to be able to do its job autonomously, as efficiently as a human operated machine can do. Latest technologies, software and hardware are being investigated to have advanced and intelligent robots for different operations on the war field. This paper presents robotic technologies being used in war spying. These robots are under examination for autonomous, co-operative and controlled environment. Our major focus is on the uses of robots in war, peace and as well as their impact on society.

The spy robot can easily move, capture images and wirelessly transmit them, thus giving the soldiers an intimation about the dangers and situations in the war field. The robot will move depending on the motor direction based upon the input we give through transmitter (remote) section. RF signals are used as control signals. By using these signals encoding is done & signal is sent through the transmitter. At the receiver end,these decoded signal are given as input to drive the motor. The robot is used for short distance surveillance thus ensuring the security of the region.

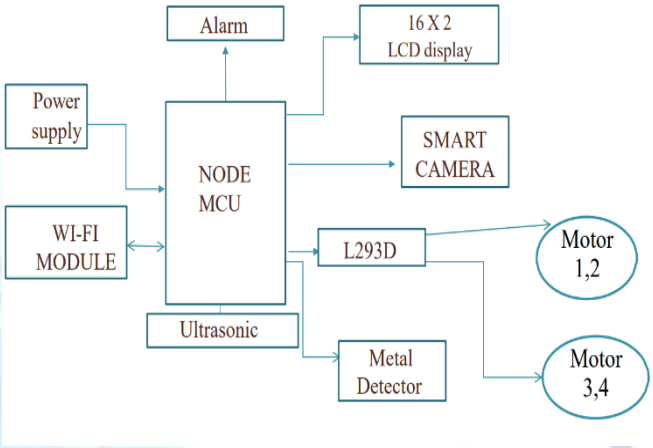


Figure.1 BLOCK DIAGRAM

5. SYSTEM DESIGN

The system consists of two major sections - one is the user section and other is the robot section. In that the user section can possess laptop or mobile for communicating with the robot end. Thus by using a laptop or a mobile the user section can be a portable one compared to those that uses a typical stationary computer system. The communication can be performed with RF technology or by using a Zigbee device or by using a Bluetooth technology, but that comes at the cost of limited range. Thus in order to implement the idea of increasing the range we can go connecting the user section with the internet which is the main concept of Internet of Things. For connecting the user system with the internet, the BLYNK software is used. BLYNK software is nothing but an object relational mapping (ORM) which is used to design prototypes and develop

IOT applications. Thus through this BLYNK software, we can send commands and can easily control the robotic vehicle. At the robot end, we are using an Arduino microcontroller placed on the body or the chassis of the robot, which is the integral part of the robotic vehicle. Below the chassis, the wheels are connected with DC motors that are of 30 rpm each. Each motor requires 12v supply, supplied by means of an external battery source. The motors are interfaced with the Arduino through relay driver. Four relay drivers are employed for two motors and they are used for amplification purpose. The microcontroller is coded with IDE software in order to operate the robot in appropriate directions. This is the manual mode operation associated with it. Several sensors such as ultrasonic sensor, infrared sensor are also used which are interfaced with the microcontroller in the respective I/O pins. Ultrasonic sensor operates by reflection principle, that is by transmission and reception of signals obstacles are detected. In short, it follows the principle of bats termed as echo location. Similarly, Infrared sensors are used to emit and detect infrared radiations, so that the surrounding temperature changes can be detected.

6. HARDWARE USED

This surveillance robot requires a lot of essential hardware components for proper functioning. Due to advancement in technology, these surveillance robots are used in remote as well as domestic areas. The main components used in our project and their specifications and functions are as follows

1.NODE MCU

The NODE MCU is an openSource Firmware and development kit that helps you to Prototype your IOT product within a few Lua script lines.

It includes firmware which runs on the ESP8266 Wi-Fi SOC from Express if Systems, and hardware which is based on the ESP-12E module.

2. ULTRASONIC SENSOR

The ultrasonic sensor is a transducer which converts electrical energy into sound waves and vice-versa.

Working current for this sensor is 15 mA.

The ultrasonic waves are 20kHz – 500kHz.

Sensing range 2 cm – 400 cm.

3.WiFi MODULE

11ESP8266EX offers a complete and self-contained Wi-Fi networking solution.

It can be used to host the application or to offload Wi-Fi networking function from another application processor.

When ESP8266EX hosts the application,It boots up directly from an external flash.

4.METAL DETECTOR

Metal detection sensors that use a linear variable differential transformer (LVDT) are widely used to detect foreign metal objects in food and in the security industry.

It can detect objects about 4cm – 8cm deep.

Its operating voltage is 5V DC.

5.LCD DISPLAY

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light- modulating properties of liquid crystals combined with polarizer's.

Liquid crystals do not emit light directly,instead using a backlight or reflector to produce images in color or monochrome.

6.SMART CAMERA

V380 Indoor Security IP Camera integrated with various features of HD 1080P 60fps, POE, etc.,it will be provided with cloud service.

Also built-in microphone and speaker.

7.BATTERY

It is the combination for cells which stores electrical energy in the form of chemical energy.

It is a double cell Li ion battery

Capacity is 2600 mAh

Output voltage is 7.4 volt

8.DC GEARED MOTORS

It is a electrical device which converts electrical energy to mechanical energy.

Operating voltage 12V DC.

The Rpm of this motor is 100.

No-load current is 60 mA (Max).

Load current is 300 mA (Max).

9. MOTOR DRIVER MODULE

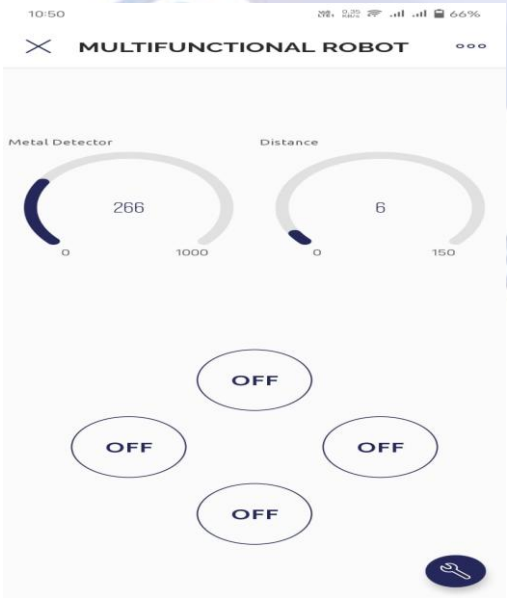
This L298N Motor Driver Module is a high power motor driver module for driving DC and Stepper Motors. This module consists of an L298 motor driver IC and a 78M05 5V regulator. L298N Module can control up to 4 DC motors, or 2 DC motors with directional and speed control.

- Driver Model: L298N 2A
- Driver Chip: Double H Bridge L298N
- Motor Supply Voltage (Maximum): 46V
- Motor Supply Current (Maximum): 2A
- Logic Voltage: 5V
- Driver Voltage: 5-35V
- Driver Current:2A
- Logical Current:0-36mA
- Maximum Power (W): 25W
- Current Sense for each motor
- Heatsink for better performance
- Power-On LED indicator

7. SOFTWARE USED

1.BLYNK SOFTWARE

It is an object relational mapping (ORM) framework. It allows a programmer to work with objects abstracted from databases. It is used to design prototypes and IOT based applications as it is a drag and drop project builder thus allowing devices to get easily connected to the internet. Through this software we can easily control the robot with the help of the buttons present in the software. Both manual and automatic mode can be performed with this software.



2. ARDUINO SOFTWARE (IDE)

It is open source software that is used to write codes and upload it to the Arduino board. The Arduino IDE contains a text editor for writing codes, a message area, a text console, a series of menus along with toolbar with buttons. The programming codes are known as sketch. The sketches are saved with the file extension .ino. It runs on Windows, MAC and LINUX. Thus through this software we can code for the robotic movements and also for the sensors interfaced with the arduino board.

8. APPLICATIONS

Following are the main applications of the solar powered multifunctional robot:

• By combining camera features with the robot we can easily monitor indoor as well as outdoor locations during daytime and at night.

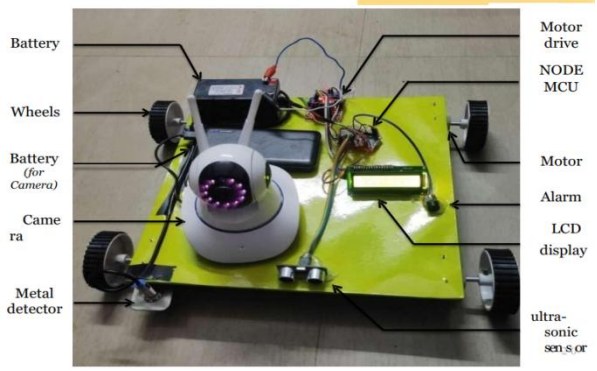
• Remote areas can also be explored.

• Used to record and send video output of the required environment.

9. CONCLUSION

In this paper, the framework for making a robot for surveillance purpose is proposed. It overcomes the problem of limited range surveillance by using the concept of IOT. We can control the robot with the help of laptop/mobile manually. Automatic monitoring can also be done. Our proposed robot is small in size thus maneuvering into area where human access is impossible.

Wireless technology is one of the most integral technologies in the electronics field. This technology is used to serve our project as a supreme part of surveillance act. This provides highly efficient and a cost effective robot that replaces human work and reduces human labor and performing monitoring works in a well effective manner.



Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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