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Design and Fabrication of Robot for Surveillance using Arduino

N.Pugazhenthi , K.VinuLakshmi, V.Preneeth, K.Shrivani

Abstract: ***The World Is Full Of Surveillance, Which Was monitored by enemy countries. Especially, the border region of any country was controlled and monitored by the own country for their safety purpose, for that many technology was used to monitor the region. Earlier, the surveillance was done by human, which causes many deaths by enemy country. To overcome the problem, the technology was introduced for surveillance with the help of robot. But now, the technology was upgraded, which made us to make a new robot for surveillance, bomb detector with automated gun. In this project, this was controlled using arduino with Wi-Fi module. The camera was fixed and captures the video and monitored through it. The robot can move ups and downs of any place for surveillance with the help of motors. This was one of the multipurpose robots for military use.***

Keywords: surveillance, security, monitor, Arduino, Wi-Fi

I. INTROUCTION

Surveillance is the method for observing a location, an area or a person for protection and security purpose. This activity always happens in a military, police, public places and even in houses nowadays for monitoring and to control the illegal activities. Especially, the surveillance activity is used mainly for human because the people were doing all illegal work against the government and at the same time to protect them from those activities. The advent of technology has brought a revolutionary change in the field of robotics, especially in the automation sector. The usage of robotics is increasing day by day, which reduces the human work but the efficiency of work increases in all department from military to our home and even in hotels. Today's life has changed a lot in every activity due to usage of Smartphone. The people can do all works using smart phone and they can operate any system by developing an application, which can be installed in the smart and providing numerous applications on different operating systems. Especially, the Android OS is one of the important sources, which is available in open and helps in building the application for many activities for people in their day today life. Even the people with minimum knowledge can able to make a small robot for protective purpose. There were numerous work carried out for surveillance recently.

II. LITERATURE REVIEW

Priyanka D.Balapure et.al has described the working of robot for surveillance through zigbee module. In this, the function of various sensors and weapon were controlled using embedded software code. The main drawback of this robot was the high range of data was not utilized for this technology.

B.Subrahmanyeswara Rao et.al has done a work on robot for bomb detection and diffusion through zigbee module. Here, the metal detector was fixed in the system, which was used to detects the bomb and diffused using robotic arm. This was controlled by wireless embedded software coding.

Radhika.P et.al has described the work on robot for surveillance and detecting landmine using labview. In this, the author has designed the robot in manual mode an automatic mode, which helps to detect the guns and bombs. The IR led was used to in automatic mode for tracing movable and immovable objects.

Jonathan Garcia et.al has done a work on robot for security patrolling assistance. Here, to control the usage of security guard, the robot was designed with flipper arm mechanism, camera, Wi-Fi module and some sensors like ultrasonic, thermal and sound. This robot can be operated through Arduino UNO.

Widodo Budiharto et.al have done a work on designing a surveillance robot using neural network. Here, the author has done experimental work on robot with shaft encoder, which is used for odomentry measurement and also used ultrasonic sensor for detecting the obstacle through the algorithms in neural network.

S.Witwicki et.al has done a model of surveillance robot autonomously. This can do the activities of surveillance in real time based on uncertain conditions and it also serves as decision making to a robotic problem in research platform.

Tarunpreet Kaur et.al have done a wireless robot for military application. In this, the robot can be operated using Dual Tone Multi Frequency, which can be controlled by mobile and the range has maximum level to operate the robot.

Anas f. Ahmed et.al have done a work on a robot for surveillance using ATmega328. Here, the connection between the GUI and controller is due to using the MT7620 integrated circuit, which helps to monitor the location.

III. COMPONENTS USED

Arduino:

Arduino is an electronic board, which is a type of micro controller that can control both physically and digitally. Arduino board is embedded with a chip and compiler that can be programmed by c-language. It helps in receiving the input from the user and control the movement of robot. It has 54 digital input/output pins. It contains 16 analogue inputs,16MHz crystal oscillator. DC current for 3.3volts pin-50mA. DC current for I/O pin-40mA.

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***Correspondence Author(s)**
N.Pugazhenthi, Assistant Professor, Department of Mechanical Engineering
K.VinuLakshmi, Assistant Professor, Department of Electronics and Communication Engineering
V.Preneeth, Student, Department of Computer Science Engineering
K.Shrivani, VelTech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Avadi, Chennai

Figure 1: Arduino board

Wi-Fi Module:
It helps in the network access by guiding the microcontroller to indicate the direction of movement of robot by the corresponding commands given by the user. It requires logic level converter and it is not capable of 5-3v logic shifting.

Figure 2: Wi-Fi module

Relay Board:
It acts as a switch which is composed of many circuits connected by each other and a board is made up of electromagnetic material. It is energized when current flows through it and closes the circuit interfaced with it. When current doesn't flows through it, relay doesn't get energized so the circuit gets open which is connected to it.

Figure 3: Relay board

Camera:
It is a wireless security camera that helps to capture an image and records the video of the surrounding area. It is a 360 degrees rotating camera in both vertical and horizontal directions.

Figure 4: Camera

Metal Detector:
It works based on the principle of electromagnetic induction. It is made up of one or more inductor coils, interacts with metal placed on the ground and produce eddy currents which helps on the detection of the metal.

Figure 5: Metal Detector

Stepper Motor:
It is a DC step motor which divides a full rotation into a number of steps. It works based on the principle of electromagnetism. Step Angle: 1.8 degrees full step, 0.9degrees half step, Phase/Windings: 4/2, Voltage and current: 12volts at 400mA and Resistance per phase: 30ohms.

Figure 6: Stepper motor

Motor:

It is electric machine which helps in the transformation of energy from electrical energy into mechanical energy. Mechanical energy produced helps in the displacement of robot. It works under the principle of electromagnetic induction. Here, we preferred to use 60rpm motor.

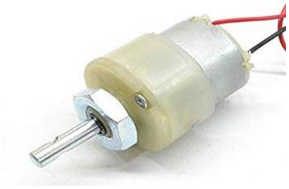

Figure 7: Motor

IV. RESULT AND DISCUSION

BLOCK DIAGRAM:

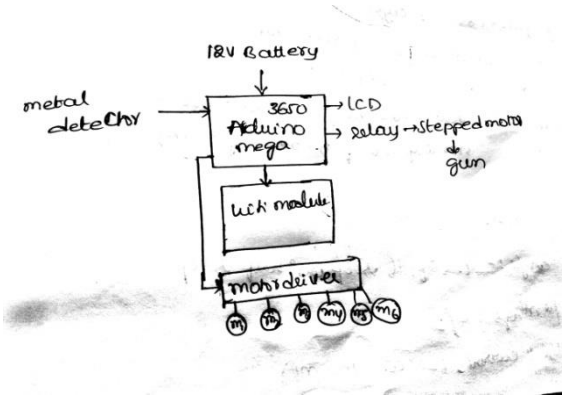

Figure 8: block diagram for a robot

In proposed system, 12v Battery is used as a source of power supply and communication can be done with the help of arduino mega2560 wireless communication network. In this system, the robot is monitored using camera. In addition to this, metal detection and automated gun are included. The control of the robot is done from remote location with an android application. The operator receives the video with the help of camera.

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Working:

This project aims at providing security for the people. The robot is designed in a peculiar manner. The camera mounted on it is a wireless security camera that helps to capture an image and records the video of the surrounding area. It is 360 degrees rotating camera in both vertical and horizontal directions and helps in capturing audio/video of whole location and transmits it to a corresponding operator through WIFI-Network technology/module .It helps in the network access by guiding the microcontroller to indicate the direction of movement of robot by the corresponding commands given by the user. It requires logic level converter and it is not capable of 5-3v logic shifting.

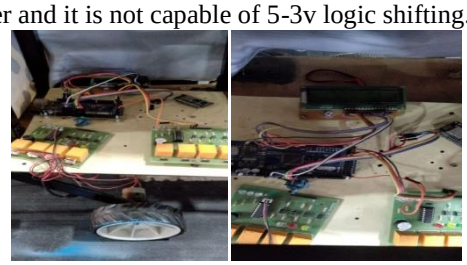

Figure 9 : Circuit Connection for a Robot

The Arduino containing micro controller helps in controlling the moment of robot according to the commands giving by operator. Arduino board is embedded with a chip and compiler that can be programmed by c-language. It helps in receiving the input from the user and controls the movement of robot.

Figure 10: Final model of surveillance robot

V. CONCLUSION

In this project, we have made the surveillance robot for the border enemies and soldiers protection to safeguard our nation from enemy country. As, there is a surveillance camera fixed it will be monitoring 24*7 and will send any information's even during the night hours. So the concerned person can monitor and take the necessary actions if any enemy soldiers are crossing our border. This can be operated easily and the surveillance is done clearly.

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AUTHORS PROFILE

N.PUGAZHENTHI, working as a Assistant Professor in VelTech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology for past 5 years from 2014. I completed my B.E in Sona College of Technology in the year 2011 and M.E in Adhiyamaan College of Engineering in the year 2013. I published 6 papers in scopus indexed journal, in which 5 papers related to composites and 1 paper related to robotics.