ISSN: 2395-7852

International Journal of Advanced Research in Arts, Science, Engineering & Management

Volume 10, Issue 3, May 2023

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 6.551

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International Journal of Advanced Research in Arts, Science, Engineering & Management (IJARASEM)

| ISSN: 2395-7852 | www.ijarasem.com | Impact Factor: 6.551| Peer Reviewed & Referred Journal |

| Volume 10, Issue 3, May 2023 |

HOME SURVEILLANCE ROBOT

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ABSTRACT : The main goal behind this project is to create a robot that will perform indoor surveillance. Today, robots play an important role in our daily life, reducing manual labour and human error. Robots can be controlled manually or cut if necessary. The purpose of the robot is to walk around, collect audio and visual information from the environment and transmit the received information to the user. In this project, people can control the robot via Internet of Things (IoT) with the help of mobile devices or laptops and use a wireless camera for the robot to receive Streaming video day and night.

KEYWORDS: Home Security, home surveillance , Internet of things, Arduino, Bluetooth, mobile

I. INTRODUCTION

The emergence of new technologies and increased computing capabilities have provided real opportunities for the use of new robots and new controls. This technological advancement and the need for high performance robots have created faster, more accurate and smarter robots using new robot controllers, new drivers and advanced management systems.

This project describes a new financial system for robotic systems. The robot is controlled by a wired network. Programming the robot takes time and needs to be reprogrammed in case of changes in the project.

Therefore, they are not user friendly and work with user preferences. It is designed to perform the tasks commanded by the user in order to make the robot user-friendly and to have a say in the control of the robot. To do this, modern technology must be used. To use today's technology, every user must know how to use it. To achieve and meet all these needs, we use Android phone as a multimedia, user-friendly device to control the robot.

The application controls the movement of the robot. The embedded device is designed by an 8051 microcontroller and controlled by a smartphone based on the Android platform. The 8051 controller is form receiving AT commands from the smartphone and data from the L293D motor driver and controlling the motor of the robot. The robot can move forward, backward, left and right. The smartphone connects to the device via Bluetooth. A bluetooth HC-05 module will be added to the 8051 microcontrollers to receive commands from the smartphone. A wireless camera is attached to the robot and can be monitored with infrared light even in pitch dark.

II. RELATED WORK

Kaijian Yin et.al presents an economical yet effective robot using an Arduino microcontroller and Android Smartphone. The robot can be controlled remotely using Internet from a laptop or tablet. The live video feedback is obtained from the camera of Smartphone. Data from the sensors of a Smart phone such as geographic location, etc is sent by the Smartphone to the user. The robot should be able to provide live video of the situation, detect human presence and other environmental related information such as humidity, temperature, presence of smoke, geographic location in terms of latitude and longitude. At the same time the user should be able to control and view information remotely[1].
Ren C. Luo et.al presents security system of home and building is an important issue to human daily life. The multiple remote interface security system can detect abnormal and dangerous situation and notify us through Internet, or send the message to cellular phone through GSM module [2].

Anas f. Ahmed et.al illustrates traditional home robots have always had problems with stairs, doorsills and other obstacles that humans cross with ease in cluttered indoor environments. Home automation is an up-and-coming trend that the public looks for in residential houses, apartments, and commercial businesses. In remote control mode, the surveillance robot will be guided to the region of interest under control of a remote user. Users can access the home security system through various terminals such as PCs, PDAs and mobile phones[3].

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Madhavi Shinde et.al with the growing number of technologies, there is more demand for security and safety. We have made use of Temperature sensor, IR sensors and Gas sensor for the home surveillance system. The IR sensors are placed on the windows for detecting the intrusion. On intrusion, the buzzer is activated and SMS is sent to the user via Internet based services. The designing section of the project includes the placing of sensors such as Temperature, Gas and IR. Camera can be either placed on the robot. The live video feedback is given to the user using the Android application [4].

Puja Lakare et.al shows that project is achieved using a Servo motor,ESP-32 camera module, L298N motor drive module, Battery to build this surveillance robot . The ESP-32 camera which we used over wife and internet provides us a live feedback. The amazing part is here that, we can control the whole setup from an android device. By using this data, the user gives further commands to the robot. The robot has 4 main controls forward, backward, turn left, turn right. The data captured through camera module is sent to the operating device. The speciality about this camera is that it can capture anything from bottom to top[5].

Mohammad Shoed Shah et.al explains process of deploying human near sensitive regions is called human surveillance. This type of surveillance is limited, because the human cannot deploy in risky and inaccessible locations. proposed a surveillance robot using Arduino Uno microcontroller and a Smartphone. The proposed system consists of a video camera, GPS module, and GSM radios. The Robot can be controlled by using PC through the internet. The body of the tanked robot is made of steel metal. It contains wheel driver, wheel, DC motors to control the movement directions, and rechargeable battery, also it includes holes to install DC motors, the robotic arm, camera, microcontroller and the electronic circuits such as DC motor driver, servo motor driver, and Wi-Fi module. The brain of the control system is the ATmega328 microcontroller. The DC motors control the movement directions of the tank, while the servo motors control the movement of the camera[6].

III.METHODOLOGY OF PROPOSED SURVEY

Arduino is an electronic board, which is a type of microcontroller 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 [7].
On the robot side, we use an Arduino microcontroller placed on the robot body or chassis, which is an important part of the robot car. Under the chassis, the wheels are connected to DC motors at 30 rpm each. All motors require 12v power from an external battery. The motor interfaces with the Arduino via a relay driver. Four relay drivers are used for two motors and they are used for power generation[8].

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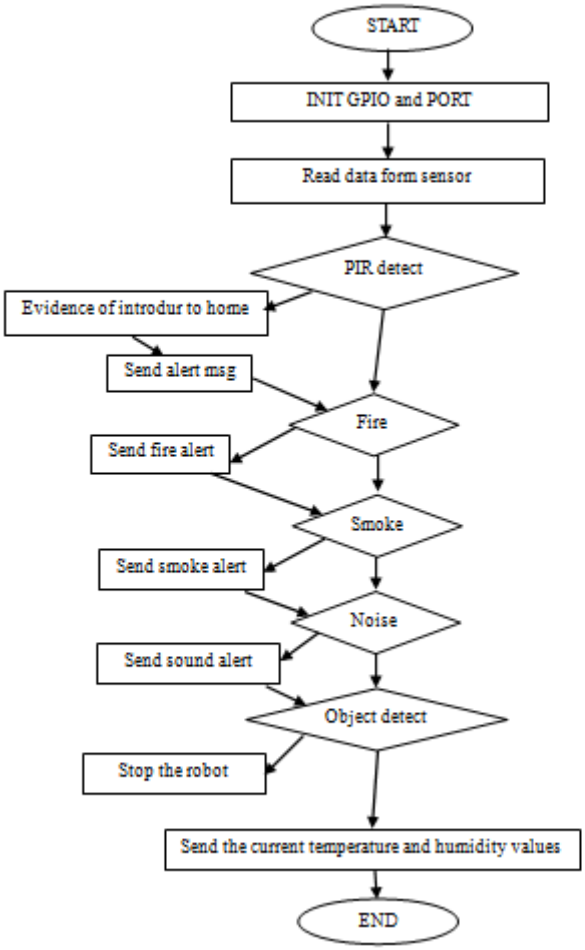

Fig 3.1 Flowchart of the Project

IV. EXPERIMENTAL RESULTS

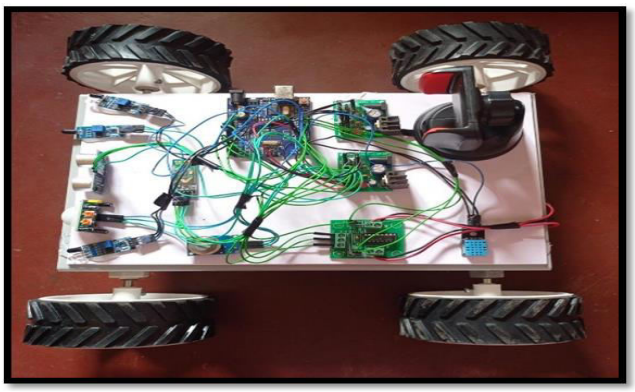

Fig 4.1 Top view of The Home Surveillance Robot

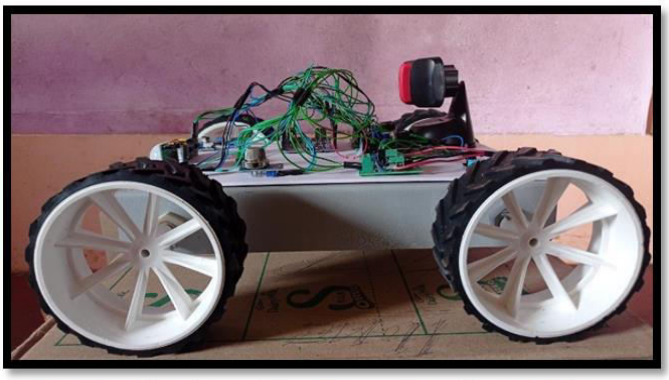

Fig 4.2 Side view of The Home Surveillance Robot

As shown in Fig 4.2,the base of the robot is built with DC motors. The motors are connected to a rubber sprocket which can help move the robot through difficult terrains. The motors are controlled by PC via Bluetooth communication using the camera to view the path in front of the robot.

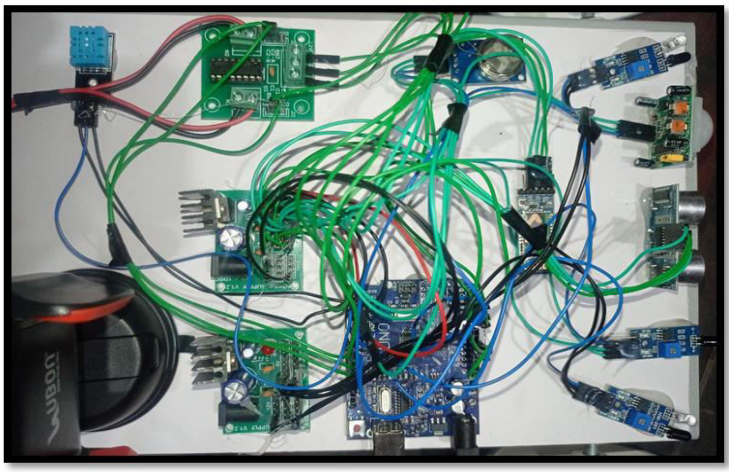

Fig 4.3 Sensor circuit for the robot.

As shown in Fig 4.3 The sensor circuitry consists of gas sensors, humidity sensor, temperature Sensor, humitidy Sensor, IR Sensor, fire Sensor, Arduino, bluetooth. The data information from the sensors are coded to be displayed on the GUI on the PC at base. The data is received by the Arduino mega where the information is coded to be displayed on the PC and smart phones. The sensor circuitry collects the data to display it on the Smart phone, which is present on the body of the robot and transmits the data to the PC at base via bluetooth communication.

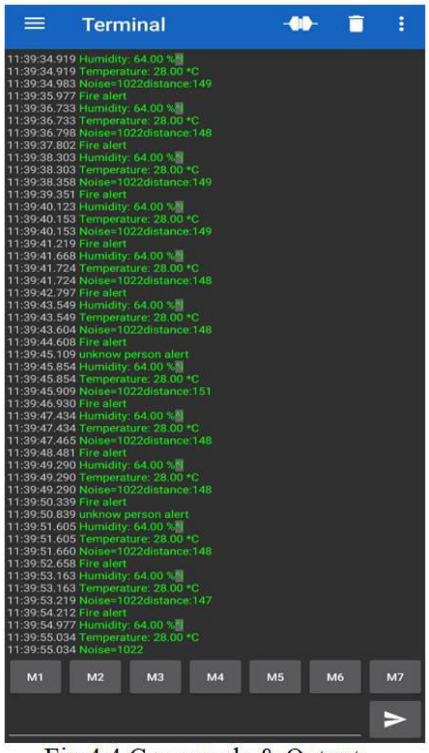

Fig 4.4 Commends & Output.

As shown in Fig 4.4As explained earlier, the coding had been done such that, by using the commands, ‘8’, ‘2’, ‘4’, ‘6’, the Moving system moves in the predefined directions Forward, Backward, Left and Right directions respectively. To

stop the Moving system the command '5' is used. The sensor circuitry built in the home surveillance robot helps in finding the environmental composition of air. The Arduino mega collects all the data which is then coded to be display the data on the pc and smart phone. The segment of the code is shown in Fig 4.4 with comments.

IV. CONCLUSION

In conclusion, the prototype home surveillance robot project has the potential to provide significant advantages in terms of home security, convenience, and peace of mind. Through the development and testing of a working prototype, the project has demonstrated the feasibility and functionality of a home surveillance robot that can perform tasks such as remote monitoring, video surveillance, intrusion detection, and automation features.

The advantages of the home surveillance robot prototype may include increased home security through real-time monitoring, early detection of intrusions, and remote communication with homeowners or authorities. The convenience of remote monitoring and control, as well as automation features, can provide homeowners with peace of mind, knowing that their homes are being monitored even when they are not physically present

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