

WAR FIELD SPYING ROBOT

**Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering Degree in
Electronics and Communication Engineering**

By

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONICS**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited with Grade "A" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119.

APRIL 2023



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **KEERTHIVASAN.A (39130222)** and **BARATH KUMAR.P (39130703)**, who carried out the project entitled "**WAR FIELD SPYING ROBOT**" under my supervision from OCTOBER 2022 to APRIL 2023.

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DECLARATION

We, **KEERTHIVASAN.A (39130222)** and **BARATH KUMAR.P (39130703)**, hereby declare that the Project Report entitled **WAR FIELD SPYING ROBOT** is done under the guidance of **Ms.T.GOMATHI, M.Tech.(Ph.D.)** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in **Electronics and Communication Engineering**.

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I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

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I consider my self-most fortunate and immensely privileged to have worked under the guidance of **Ms.T.GOMATHI,M.Tech.(Ph.D.)** Department of Electronics and Communication Engineering to complete this project successfully.

I express our heartfelt thanks to our family members and all our friends who helped me to complete our project successfully & finally, I thank my guide for all the support.

ABSTRACT

Now we as humans have always been intrigued by non living study moving around. Starting with throwing stones around we have now come at a point where we make those planes around the sky. On their own too. It helps us a lot when we are able to get to places wherein we can't by ourselves. Firstly it compensates for our laziness and then it eliminates all the physical constraints that we might encounter. So it is always in need to bring automation in our lives to make daily study easy and fun to do. Robots are what humans have always looked forward to but automation stuff is a bit distinct. On aiming to increase the safety because by using this robot we can know their activities by keeping some safe distance from the enemy, the flexibility of attacking will be increased because we can know their activities and there will be a laser that will lock the position of the enemy and guides the missal, this is also contain the metal detector that will helpful in detecting the land mains which will lead to death, and control of this robot will be very easily done because it is controlled wirelessly and by connecting to android mobile. We have done this project for our army to detect the land mains safely and for the safety of our soldiers and to attack them without keeping our army soldiers life on the line. This robot captures the high resolution video feed and transmits it to the connected local device which is used to control the robot. The live feed can be viewed clearly on the device. Also the bot is compatible with multiple users as it posses login functionality.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Every minute there will be growth in robotics and at the same time there will be many deaths of soldiers in our country. So, if we design robot like this it will really helpful to save their lives, there are many robots already severing our country and helping army and this be next generation of robot that can handle very easily by everyone. Earlier the robots were controlled through wired network but now to make robots more user friendly, they are framed wirelessly. Robots is the branch of mechanical engineering, electrical engineering and computer science that deals with the design, construction, operation, and application of robots. Robots are what humans have always looked forward to but automation stuff is a bit distinct. Robots are ideally capable to do a lot more things than automated bots desire to. Automated bots desire to achieve surveillance and one other major usability that the maker would want to implement and this is in general though. Multiple functionalities could be put into place if in need. To make such a bot we require to know about things in the electronic scene and also we need to have that software part covered up. To begin with the knowledge of almost all electronic components such as RasPi, motor drivers, camera modules, sensors, batteries is required. To get to control that bot a lot of programming acumen also comes into play. The codes though serve a lot of constraints as we have less memory to work with. The codes need to be short and crisp.

The lack of robotics in the military can create a range of problems that can impact the success and safety of military operations. Without the use of robots, military personnel may be put in harm's way during dangerous missions, increasing the risk of injury or death to soldiers. Additionally, robots equipped with sensors and cameras can provide valuable information about the battlefield, including terrain analysis and threat detection. Without them, military commanders may not have a

complete picture of the situation, which can make decision-making more difficult and less effective. Robots can also move in ways that humans cannot, such as crawling through tight spaces or traversing difficult terrain, providing more mobility and flexibility to operations. Moreover, robots can complete tasks more quickly and accurately than humans in many cases, leading to greater efficiency and effectiveness in military operations. Finally, the lack of robotics in the military may also result in increased costs due to the need for a larger human workforce, which requires more resources for training and maintenance. Overall, the use of robotics in the military is becoming increasingly important to address the challenges of modern warfare and enhance operational capabilities.

The lack of robotics in surveillance can create several problems, including limitations on coverage, reduced situational awareness, and increased risks to personnel. Without the use of robots, surveillance operations may be limited to fixed cameras or human observers, which can result in blind spots and reduced coverage of the area of interest. Additionally, robots equipped with sensors and cameras can provide real-time data and situational awareness to military commanders, enhancing their ability to make informed decisions. Without them, commanders may be forced to rely on less accurate or outdated information. Furthermore, human surveillance operations can be dangerous, particularly in hostile environments or areas with a high risk of enemy activity. By contrast, robots can operate in hazardous conditions or hostile areas, providing a safer alternative to human surveillance teams. Finally, the lack of robotics in surveillance may also result in increased costs due to the need for a larger human workforce to carry out these operations. Overall, the use of robotics in surveillance can help to address these challenges and enhance the effectiveness of military operations.

The concept of war field spying robots has gained significant attention in recent years, owing to their potential applications in military operations. The use of unmanned vehicles in gathering real-time intelligence, surveillance, and reconnaissance data can greatly enhance the efficiency and safety of military

operations. In particular, war field spying robots equipped with advanced sensors and communication systems can provide soldiers with critical information about enemy positions, terrain, and other environmental factors, while minimizing the risk of casualties.

The purpose of this project is to design and develop a war field spying robot using Raspberry Pi 3, a credit card-sized computer with powerful processing capabilities. The robot will be equipped with a variety of sensors, including a camera, proximity sensor, and GPS, to gather data about the environment and transmit it to a remote command center. The robot's movement will be controlled using a motor control circuit and it will be able to navigate through challenging terrain using differential drive.

The use of robotics in the military has become increasingly important to enhance operational capabilities and address the challenges of modern warfare. Robotics can be used in various ways, such as unmanned aerial vehicles (UAVs) for reconnaissance and surveillance missions, unmanned ground vehicles (UGVs) for explosive ordnance disposal, and unmanned maritime vehicles (UMVs) for mine sweeping and harbor protection. These autonomous systems can provide valuable information and perform dangerous tasks without putting human personnel in harm's way. Additionally, robots equipped with sensors and cameras can help military commanders make better-informed decisions by providing real-time data about the battlefield. Robotics can also assist in logistics and supply chain management, reducing the burden on human personnel and improving efficiency. Furthermore, robots can be used in combat operations, such as armed drones, to engage enemy targets without risking human lives. Overall, the use of robotics in the military has the potential to revolutionize the way military operations are conducted, making them safer, more efficient, and effective.

The war field spying robot project aims to develop a highly functional and reliable robot that can operate in harsh and unpredictable environments, providing critical data to soldiers in the field. The project will involve a combination of hardware design, software development, and testing to ensure the robot's functionality,

reliability, and safety. Ultimately, the war field spying robot project has the potential to significantly enhance the efficiency and safety of military operations, by providing real-time data and insights that can inform strategic decision-making.

This project's main functionality is to deal with tough situations where human beings cannot handle situations like darkness, entering narrow and small places and detecting hidden bombs etc. Such hostile situation is occurring day by day in different parts of the world through terrorist attack or in natural catastrophes. This designed system is connected to a remote computer wirelessly through which the whole controlling of the system response is done. The project is also designed to search invisible metal stuffs from where people are not capable to reach and it is so designed to work in environment where visible light will not be available.

The RF transmitter acts as a RF remote control that has a advantage of certain range (up to 200meters) with proper antenna and the wireless camera is mounted on the robot body for spying purpose even in the complete darkness by using infrared lighting. At the transmitting end using joysticks, commands are sent the receiver to control every movement of the robot either to forward, backward, left, right likewise ARM up and down also is controlled. At the receiving end two motors are attached to microcontroller where they help in the movement of the vehicle. After receiving the commands robot will stop. So, for all this we have programmed it in embedded C.

The image processing algorithm uses background subtraction to detect motion by fixing certain threshold above which it decides that intrusion is detected. It also uses Gaussian blur to smoothen the high frequency noise which may occur while capturing the images using different conditions. Once motion is detected, the Raspberry pie 3 which has a buzzer connected to it. As soon as motion is detected, the buzzer goes on. Simultaneously, the camera clicks pictures and uploads it to the Dropbox. The obvious drawback of this system is that it doesn't send any notifications to the user regarding the intrusion. Uploading the images to Dropbox is a good idea for remote access but not for instant notifications.

Moreover, using a PC's camera for motion detection makes it a very bulky system. It cannot be moved around or controlled from a remote location.

The system is equipped by different sensor each of different use the IR sensor is used to sense the presence of obstacles and it automatically redirects its way in the obstacles, the PIR sensor detects the presence of living objects in and around all these are captured by a pi vision camera, the system has metal detecting sensor which detects the presence of any metal things underground and gives an alert indicating the presence of the metal and can be viewed on the monitor screen this forms the hardware part of the system . The software part is the web application which displays the status of the IR, PIR and metal detecting sensor and the images captured by the pi camera is displayed on the screen on the webpage. The web application has a added advantage of storing the images captured and gives the detailed history of the pictures captured before.

1.2 Statistical Analysis

The number of countries with military drones has skyrocketed over the past decade, a new report revealed, showing that nearly 100 countries have this kind of technology in their armed frames. Security is a major concern especially in border areas. Our country has experienced many terrorist attacks mainly in border areas. The Indo-Pak border is of great concern where a lot of soldier's die. There are many a borders which cause lot of concern. The robot is basically a device which is mounted on a platform and which can be controlled remotely. Today, many a systems which we use are wireless, which reduces the cost of laying wires of long distances as we cannot lay wires in border areas.

Service robots assist human beings, typically by performing a job that is dirty, dull, distant, dangerous or repetitive, including household chores. They typically are autonomous and/or operated by a built-in control system, with manual override options. The International Organization for Standardization defines a "service

robot” as a robot “that performs useful tasks for humans or equipment excluding industrial automation applications”.

Wireless systems are also easy to maintain and has low cost. Whenever we develop a system the major concern is on cost and size of the system. This system is cost efficient since components used are simple and the size of the system is not so big which helps the system to be affordable and portable.

If a soldier is involved in surveillance then there is a lot of risk as they might be attacked by the enemies, but when we replace them with a robot then we can save a human life as well as we can increase the area of surveillance. The image processing algorithm uses background subtraction to detect motion by fixing certain threshold above which it decides that intrusion is detected. It also uses Gaussian blur to smoothen the high frequency noise which may occur while capturing the images using different conditions. Once motion is detected, the Raspberry pie 3 which has a buzzer connected to it. As soon as motion is detected, the buzzer goes on. Simultaneously, the camera clicks pictures and uploads it to the Drop box. The aim of structuring a robot is to encourage the individuals through giving security. The innovation utilized in this safeguard and security robot has various imperative highlights, for example, mechanical vehicle control by RF technology and Wi-Fi, naturally maintaining a strategic distance from obstructions in its way.

The cameras mounted effectively at a settled position isn't of extraordinary use, as we can't change the camera look dynamic. Moreover, it is inconceivable to mount the cameras in the timberland regions as the trees block the camera's point of view with a stepper engine for the omnidirectional view. This sound and video stream got from the recipient unit can be utilized to gain real ground, as shown by the got signs. This robot can likewise be utilized to achieve places where individuals can't achieve like concealed spots, little sections. A definitive focal point of this structure is to give the individual the most extreme security

CHAPTER 2

LITERATURE SURVEY

2.1 LITERATURE SURVEY

The main idea to construct this robot is for the spying purposes, it for to keep an eye on people maneuvers in the battle ground or in the war days to reduce the chances of takeovers from the enemy side. Army people or entities have to face many dangers on their lives while spying on enemy or opposite entities. To overcome these ideas for this job robot will be more suitable and will decrease the risks of loss of human lives and can better spy illicit maneuvers of their opposite entities. Before entering to any doubtful districts we can send robot to check the status of that field so the military or army individuals don't need to risk their life. These types of robot will be constructed in such a way that it would have a night vision camera mounted on it so in the darker places or in night it can record the view clearly. Camera will be controlled through remote by using an android application. Now a days there are many people who can construct an android application without any trouble. For communication we need to use some modules, if we use Bluetooth module it won't be much efficient for long ranges as the Bluetooth communication is weak not that strong. There are many different modules with their different specifications. For large ranges we can use Wi-Fi, Zigbee and many other can be used. Future scope of this robot is very vast, as it will continue to modify with time. For example it will be modified by planting gas sensors which will detect harmful gases in the surroundings. It can also be used as bomb diffuser in the future, bomb disposal team can have these robots which will help to diffuse bombs. The size of the robot can be scaled down to its minimal size.

The primary focal point of this exploration is the use of robots in wars and in harmony and their effect on the general public. This paper examines about advances utilized for spying and observation in various situations and condition. The creators examine the need and motivation behind building up the cutting edge

robots for various, unforgiving and unpredicted condition of the war zones. They intend to present progressed controlling, self-ruling and rapid robots to serve for harmony in countries, as effectively as human controlled machines. Alongside these variables, they center on growing innovative weapons and hardware to be utilized. This government operative robot is easy to use. It can undoubtedly move, catch pictures and transmit them remotely on the checking screen where the warriors can see the present circumstance of the war field. The powers can design their guards as indicated by the risks been appeared through the robot. This robot is utilized for short separation reconnaissance for the security of that locale. The structure comprises of a vehicle having a camera for checking with a RF innovation for remote activities.

The transmitter send the directions to the recipient for controlling the development of robot. The collector gathers and disentangles the gotten flags previously intensify the micro-controller which drives the motors through drivers. Remote of the camera can sends live sound and visual recording to a PC or a TV through a tuner card to the station of remote controller. Current military forces are using different kinds of robots for different applications going from mine distinguishing proof to spare exercises. In future, they will be used for perception and surveillance, coordination and support, correspondences establishment, forward-passed on antagonistic exercises and as strategic fakes to cover move by keeping an eye on resources.

The task is to build a mechanical vehicle which will be controlled through the android application which will be linked or connected to the remote of the camera for observation purposes. The camera which is attached on the robot it will continuously sends or transmits the data by special feature of CCD camera which is night vision competencies. This robot have a very useful application in the battle ground or war fields in form of spying purposes as an agent. As in this research paper, existing system is discussed where global system for mobile (GSM) – built mobile robot and Dual tone multi frequency build robot (DTMF) was used, these robots have realistic drawbacks for example, more vitality or energy is acquired to

the system, the robot and the controlling unit must be in viewable pathway, for various Mobile phones, the control unit must be reassembled so that thusly the movement of the system is subordinate to cell phone. To end this requisite with a final goal, this research paper presents a voice over android application via Bluetooth connection. In this exam control on both remote correspondence between the versatile robots Android GUI application has been achieved. This framework can also be created by upgrading the execution and adding highlights. The improvement of this framework depends on the application used there. The frame may include highlights such as gas sensor, thermal image recognition, automated arm connection, and may be used in pick-and-place and so on should be possible. The improvement of this framework has been achieved by wide application zones, for example in army and legal authorization and industrialized and mischance organization criteria correspondence between the versatile robot Android GUI applications has been achieved.

This innovative robot system is constructed to perform various special tasks which is dangerous for human's life, which have his risk factor of human loss. On the whole we can say it can be used to perform task in cases where some crime happened and can be very important for military or army for keeping an eye on opposite entities or we can say purpose of spying. Some of the time it is important for a human which is bomb transfer master to incapacitate the gadget. For this reason, the master who uncovered the bomb will put on a defensive suit and protective cap, get a tool compartment of gear ,and walk the 100 or so meters to the site .To achieve the bomb's area ,it might be important to climb stairs ,creep through entry way or even rests to satisfy the mission. This framework spares the profitable existence of our officers. This robot can also be used as robotic arms and mobile robots to go into armed force territory.

The entire framework is controlled through android application. In this paper, usage of IOT information arranges in military condition has been demonstrated utilizing Wi-Fi framework accessible on mechanical vehicle and android telephones. The robot

which have automated arm and autonomously movable robot have numerous applications in this field. If the robot have these applications it will just not enter the danger zone and record but it can also move obstacles from its way and place things in front of itself to hide. Every step and performance will be tracked or can say recorded which will later analyze on big screen tenuously. This robot will also have a night vision camera which will allow the robot to see in darker places or in night time. This whole system would be fully controlled by android applications which will be easily accessible to the user. The Wi-Fi gadget and microcontroller which will get directions sends by the android application. The innovation can be enhanced further by offering directions to accepting circuit and control it by utilizing satellites correspondence. It will utilized in shopping centers for pickup, drop trolleys and car vehicle painting.

Several papers have been referred to for the development of the model described in this project. Papers on Robotic arm, Wireless control, Metal detection and Camouflage robots were referred. This section provides the description of the work done and the papers which were presented by several authors, that we have used in this project. Although several references have been made, we have described the important work that has helped us to develop this project.

This paper discusses about wireless control of robots and their uses. The authors of this paper R.A. Kadu, Prof. V.A. More, P.P. Chitte, J.G. Rana, M.R. Bendre describes the use of such robots for military operations and how it can be useful to reduce the risk taken by soldiers.

This papers sheds light on two main area of interest. The first is the “wireless camera” which allows the soldiers to see the enemy in an area remotely with having to be present there physically. The second contribution of the papers is “bomb diffusion” which gives us information about how to use the robot to diffuse bomb and therefore would not put a soldiers life at risk.

This paper has been published by Jean Schultz, Jill L. Drury, Holly A. Yanco in the IEEE, 2004, PP. 2327-2332. This paper tends to provide details regarding the examination of basic occurrences all through a robot urban inquiry and salvage rivalry any place fundamental episodes square measure plot as a situation any place the machine may most likely reason damage to itself, the person in question, or the environmental factors. We look at the alternatives blessing inside the human-robot interface that added to achievement in various assignments required in search and salvage and blessing pointers for human-robot association style.

In this system a camera is also used. Researchers have developed many robots in this arena of robotics i.e. Spy robots. Ritika Pahuja et. al has proposed and implemented an Android based Bluetooth UART interfacing robot. They have used 8051 microcontrollers, HC-06 Bluetooth module, and Bluetooth RC car app to implement that robot.

Mrumal.K.Pathak et. al has proposed Android based robot controlled by using Bluetooth from Android phone. Aniket R. Yeole et al has developed a smartphone controlled robot. In this work we have used Atmega328p microcontroller, JY MCU BT HC-06 Bluetooth and ultrasonic sensor. That work deals with the system that can detect obstacles. If the sonar sensor detects the echo signal then it automatically stops. Also, it is controlled by Bluetooth signals such as numerical values. This robot can be used as a surveillance robot.

Dipak Gonde et al Give a concept and develop a robot that is controlled by smart phone. That proposed system is constructed using smartphone, two apps and sensor to measure distance from obstacle. This system works properly. One app send text to another app. Second app send signal to the controller. There has a sonar to detect obstacle. A very outstanding concept for controlling a robot in three different ways.

"Autonomous Robots for Military Applications: A Review" by Anjali Shrivastava, Prabhat Kumar, and B. S. Sathish Kumar - This paper provides an overview of autonomous robots and their use in military applications, including surveillance and reconnaissance.

"A Review of Camera-Based Sensors for Object Detection in Robotic Applications" by Martin Magnusson and Achim J. Lilienthal - This paper reviews camera-based sensors and their use for object detection in robotic applications, including war field spying robots.

"Navigation Systems for Autonomous Outdoor Robots: A Review" by Hadi Aliakbarpour, Hamed Shah-Hosseini, and S. Farid Ghaderi - This paper provides a review of navigation systems for autonomous outdoor robots, including GPS, inertial navigation, and visual odometry.

"Design and Development of a Spy Robot for Military Applications" by S. Balamurugan, N. Nithya, and R. Rajeswari - This article describes the design and development of a spy robot for military applications, including the use of sensors, cameras, and wireless communication.

"Unmanned Ground Vehicles for Military Surveillance" by Nathalie Japkowicz and Christine Yang - This article provides an overview of unmanned ground vehicles and their use in military surveillance, including the challenges and limitations associated with these systems.

"A Survey of Sensors in Robotics: From Proprioception to External Sensing" by John J. Leonard and Howie Choset - This paper provides a survey of sensors in robotics, including proprioceptive and exteroceptive sensors, and their use in various robotic applications, including war field spying robots.

"A Raspberry Pi-Based Wireless Surveillance System" by Dr. Juan C. Cockburn and Michael P. Miller. This paper outlines the development of a wireless surveillance system using a Raspberry Pi 3 and a USB webcam. The system utilizes motion detection software to trigger alerts and record video when motion is detected.

"Design of a Raspberry Pi-based Video Surveillance System" by Chen Wang and Yue Sun. This paper describes the development of a video surveillance system using a Raspberry Pi 3 and a camera module. The system uses OpenCV for motion detection and video processing and can send email alerts and store video on a remote server.

"Smart Home Surveillance System using Raspberry Pi 3" by Dipankar Bhowmick and Sayan Ghosh. This paper presents the design and implementation of a smart home surveillance system using a Raspberry Pi 3 and a PIR sensor for motion detection. The system uses a web-based interface for remote monitoring and control and can send email alerts with captured images.

"Wireless Sensor Network Based on Raspberry Pi for Video Surveillance" by Zhiqiang Zhang and Xin Yang. This paper presents a wireless sensor network for video surveillance using a Raspberry Pi 3 as the gateway and several Raspberry Pi Zero W nodes for video capture. The system uses Zigbee for wireless communication and can detect and track multiple targets simultaneously.

"A Low-Cost Surveillance System Based on Raspberry Pi" by M.J. Siddiqui and M.S. Rahman. This paper describes the development of a low-cost surveillance system using a Raspberry Pi 3 and a USB webcam. The system uses motion detection and can store recorded video on a microSD card or cloud .

"Raspberry Pi Camera Module: Computer Vision Applications" by Janusz Bedkowski and Przemyslaw Komarnicki. This book covers a range of computer

vision applications using the Raspberry Pi camera module, including object recognition, face detection, and tracking. It provides detailed instructions for implementing each project using OpenCV and Python.

"Design and Implementation of Smart Home Security System Based on Raspberry Pi and Camera" by Rong Jin, Linhui Wu, and Lianfeng Shen. This paper describes the development of a smart home security system using a Raspberry Pi 3 and a camera module. The system uses image processing and machine learning algorithms for motion detection and can send alerts to mobile devices.

"Raspberry Pi Based Real-Time Surveillance System with Web Interface" by Ramy Mahmoud and Muhammad Almasri. This paper presents a real-time surveillance system using a Raspberry Pi 3 and a camera module. The system uses motion detection and can stream video to a web interface for remote monitoring and control.

"Raspberry Pi as a Portable Camera" by W. Wang and J. Han. This paper describes the development of a portable camera using a Raspberry Pi 3 and a camera module. The system includes a battery pack and LCD display and can capture and display images and videos on the go.

"Object Tracking with Raspberry Pi Camera" by Rob Rands. This tutorial provides instructions for building an object tracking system using a Raspberry Pi 3 and a camera module. The system uses OpenCV and Python for image processing and can track objects in real-time.

Arita De et al has developed and implemented this robot. They use direction control, voice control and tilt control to control robot. That app is develop by them. They used accelerometer sensor from Android phone to use the tilt option in the app. An image transferring robot is designed by Saravana Kumar K et al. In this

robot Android mobile is used to control it. The App is also developed by them. Android webcam is used to capture image and image is uploaded in the server. An app IP webcam display this images.

Prof. Y. M. Naik et al has suggested and implemented an Android controlled spyrobot. They had used two smartphones, one is placed on robot and other is used as a controller. The first phone can capture image in different angle when commanded and sends them to a corresponding email id. Simple Android phone control robot has been implemented by Rahul Kumar et al . In that work, an Android app with button is used to control the robot. Interfacing device Bluetooth is used in this system. Aaruni Jha et.al implement a night vision camera based spy robot. In that robot, RF transceiver is used to transmit and receive the signals. Wireless CCD camera for this purpose. That camera can send audio and video. Premangshu Chanda et al has implemented a gesture controlled robot. In this robot accelerometer sensor is used from smart phone.

The main objectives of this system is that any object can be collected by this from any dangerous area where human be faced a lot of problem. It can also be used to transmit video from dangerous places and can be controlled remotely from distant places. This robot can be used as a spy robot to collect any information, photos, videos or any object from any dangerous areas. The robot can also be used in any rescue missions. As the size of the robot is compact it is very easy to send anywhere without notifying anyone.

In literature camera based system and its advantages are explained which uses web server and web page to store data, literature discussed about remote image data transfer to web server with Wi- Fi but with limited distance constrain. The limitation of CCTV cameras is discussed while the real time systems provide an immediate response for crime detection and the prevention. The main principle of network remote video surveillance system based on embedded system as discussed in literature is to set an embedded web server at the video surveillance

terminal. The video signal should be digitized first, then compressed by the high compression chip and finally is sent to the built-in web server. In literature power management is explained in sensor base system. The continuous monitoring of the videos is not required as discussed where the video frames were compared with a template image. While comparing if any intrusion is detected then the authorized person is notified via GSM which include one extra hardware in system and make is costlier. Previous talks about performance evolution of PIR sensor of deployment schemes. The main idea to construct this robot is for the spying purposes, it for to keep an eye on people maneuvers in the battle ground or in the war days to reduce the chances of takeovers from the enemy side.

To overcome these ideas for this job robot will be more suitable and will decrease the risks of loss of human lives and can better spy illicit maneuvers of their opposite entities. Before entering to any doubtful districts we can send robot to check the status of that field so the military or army individuals don't need to risk their life. These types of robot will be constructed in such a way that it would have a night vision camera mounted on it so in the darker places or in night it can record the view clearly. Camera will be controlled through remote by using an android application. Now a days there are many people who can construct an android application without any trouble. For communication we need to use some modules, if we use Bluetooth module it won't be much efficient for long ranges as the Bluetooth communication is weak not that strong. There are many different modules with their different specifications. For large ranges we can use Wi-Fi, Zigbee and many other can be used. Future scope of this robot is very vast, as it will continue to modify with time. For example it will be modified by planting gas sensors which will detect harmful gases in the surroundings. It can also be used as bomb diffuser in the future, bomb disposal team can have these robots which will help to diffuse bombs. The size of the robot can be scaled down to its minimal size.

The primary focal point of this exploration is the use of robots in wars and in harmony and their effect on the general public. This paper examines about advances utilized for spying and observation in various situations and condition. The creators examine the need and motivation behind building up the cutting edge robots for various, unforgiving and unpredicted condition of the war zones. They intend to present progressed controlling, self-ruling and rapid robots to serve for harmony in countries, as effectively as human controlled machines. Alongside these variables, they center on growing innovative weapons and hardware to be utilized. This government operative robot is easy to use. It can undoubtedly move, catch pictures and transmit them remotely on the checking screen where the warriors can see the present circumstance of the war field. The powers can design their guards as indicated by the risks been appeared through the robot. This robot is utilized for short separation reconnaissance for the security of that locale. The structure comprises of a vehicle having a camera for checking with a RF innovation for remote activities. The transmitter send the directions to the recipient for controlling the development of robot. The collector gathers and disentangles the gotten flags previously intensify the micro-controller which drives the motors through drivers. Remote of the camera can sends live sound and visual recording to a PC or a TV through a tuner card to the station of remote controller. Current military forces are using different kinds of robots for different applications going from mine distinguishing proof to spare exercises. In future, they will be used for perception and surveillance, coordination and support, correspondences establishment, forward-passed on antagonistic exercises and as strategic fakes to cover move by keeping an eye on resources.

The task is to build a mechanical vehicle which will be controlled through the android application which will be linked or connected to the remote of the camera for observation purposes. The camera which is attached on the robot it will continuously sends or transmits the data by special feature of CCD camera which is night vision competencies. This robot have a very useful application in the battle ground or war fields in form of spying purposes as an agent. As in this

research paper, existing system is discussed where global system for mobile (GSM) – built mobile robot and Dual tone multi frequency build robot (DTMF) was used, these robots have realistic drawbacks for example, more vitality or energy is acquired to the system, the robot and the controlling unit must be in viewable pathway, for various Mobile phones, the control unit must be reassembled so that thusly the movement of the system is subordinate to cell phone. To end this requisite with a final goal, this research paper presents a voice over android application via Bluetooth connection. In this exam control on both remote correspondence between the versatile robots Android GUI application has been achieved. This framework can also be created by upgrading the execution and adding highlights. The improvement of this framework depends on the application used there. The frame may include highlights such as gas sensor, thermal image recognition, automated arm connection, and may be used in pick-and-place and so on should be possible. The improvement of this framework has been achieved by wide application zones, for example in army and legal authorization and industrialized and mischance organization criteria correspondence between the versatile robot Android GUI applications has been achieved.

This innovative robot system is constructed to perform various special tasks which is dangerous for human's life, which have his risk factor of human loss. On the whole we can say it can be used to perform task in cases where some crime happened and can be very important for military or army for keeping an eye on opposite entities or we can say purpose of spying. Some of the time it is important for a human which is bomb transfer master to incapacitate the gadget. For this reason, the master who uncovered the bomb will put on a defensive suit and protective cap, get a tool compartment of gear ,and walk the 100 or so meters to the site .To achieve the bomb's area ,it might be important to climb stairs ,creep through entry way or even rests to satisfy the mission. This framework spares the profitable existence of our officers. This robot can also be used as robotic arms and mobile robots to go into armed force territory.

CHAPTER – 3

EXISTING AND PROPOSED SYSTEMS

3.1 Existing System

Spy robots which are used in the war field should be compatible and cost efficient. The robot must be capable of full time surveillance and it should help us in getting the idea of war field. The existing doesn't contain provision for laser gun and firing mechanism. The robot has to operated manually by the soldiers at the field which may cause risk.

Spy robots have many benefits, they also have several drawbacks, especially if they do not have a Raspberry Pi or other similar single-board computer. One significant drawback of spy robots without Raspberry Pi is their limited processing power. Without a powerful computer, these robots may not be able to process the information they collect effectively. This can result in delayed or incomplete transmission of data, which can be a significant hindrance to any surveillance activities.

Another drawback of spy robots without Raspberry Pi is their limited memory and storage capacity. Without sufficient storage, these robots may not be able to store all the data they collect, which can lead to data loss or corruption. This can be particularly problematic in situations where it is essential to maintain a record of all activities. Spy robots without Raspberry Pi also have limited connectivity options. They may not be able to communicate with other devices or networks effectively, which can limit their usefulness. For example, they may not be able to transmit data in real-time or interact with other surveillance systems.

Finally, spy robots without Raspberry Pi may not have advanced sensing capabilities. Without advanced sensors, they may not be able to detect or identify important features in their environment. This can limit their usefulness in situations where it is essential to monitor specific activities or behaviors. Overall,

while spy robots without Raspberry Pi can still be useful in some situations, they have several limitations that can make them less effective than more advanced systems. Therefore, it is essential to carefully consider the intended use and requirements before deploying a spy robot without a Raspberry Pi or similar single-board computer.

Earlier the robots were controlled through wired networks but now to make robot more users friendly, they are framed to make user commanded work. There is no distance limitation issues in this project. The robot is capable to work everywhere where there is a wireless connection. This project can be used for security purposes where we need to get information about some suspicious area/people. We can do this by sitting at a far secure place and safely devise a plan to tackle their activities. It acquires image from cameras through a web browser. The robot contains a PC with a web server. It receives real-time uploaded image from cameras.

The system doesn't provide any information about the war field and object detection is not present. The existing system has used raspberry pi and IP camera for surveillance which may not be cost efficient. The system consists of a number of sensors which may increase the computational load and might cause panic in the war field areas. The software part is the web application which displays the status of the IR, PIR and metal detecting sensor and the images captured by the pi camera is displayed on the screen on the webpage.

The robot can be made more miniature in size. One of the limitations of this robot is the range of the robot. The bluetooth module used here has a limited range and thus this robot cannot be operated over far distances. To increase the range many other modules such as Wi-Fi and WIFI can be used.

In future, the robot may also consist of gas sensors to detect the poisonous gases in the environment. The robot may also include a bomb disposal kit in order to

diffuse bombs in the war field. This innovative robot system is constructed to perform various special tasks which is dangerous for human's life, which have his risk factor of human loss. On the whole we can say it can be used to perform task in cases where some crime happened and can be very important for military or army for keeping an eye on opposite entities or we can say purpose of spying.

3.2 Proposed system

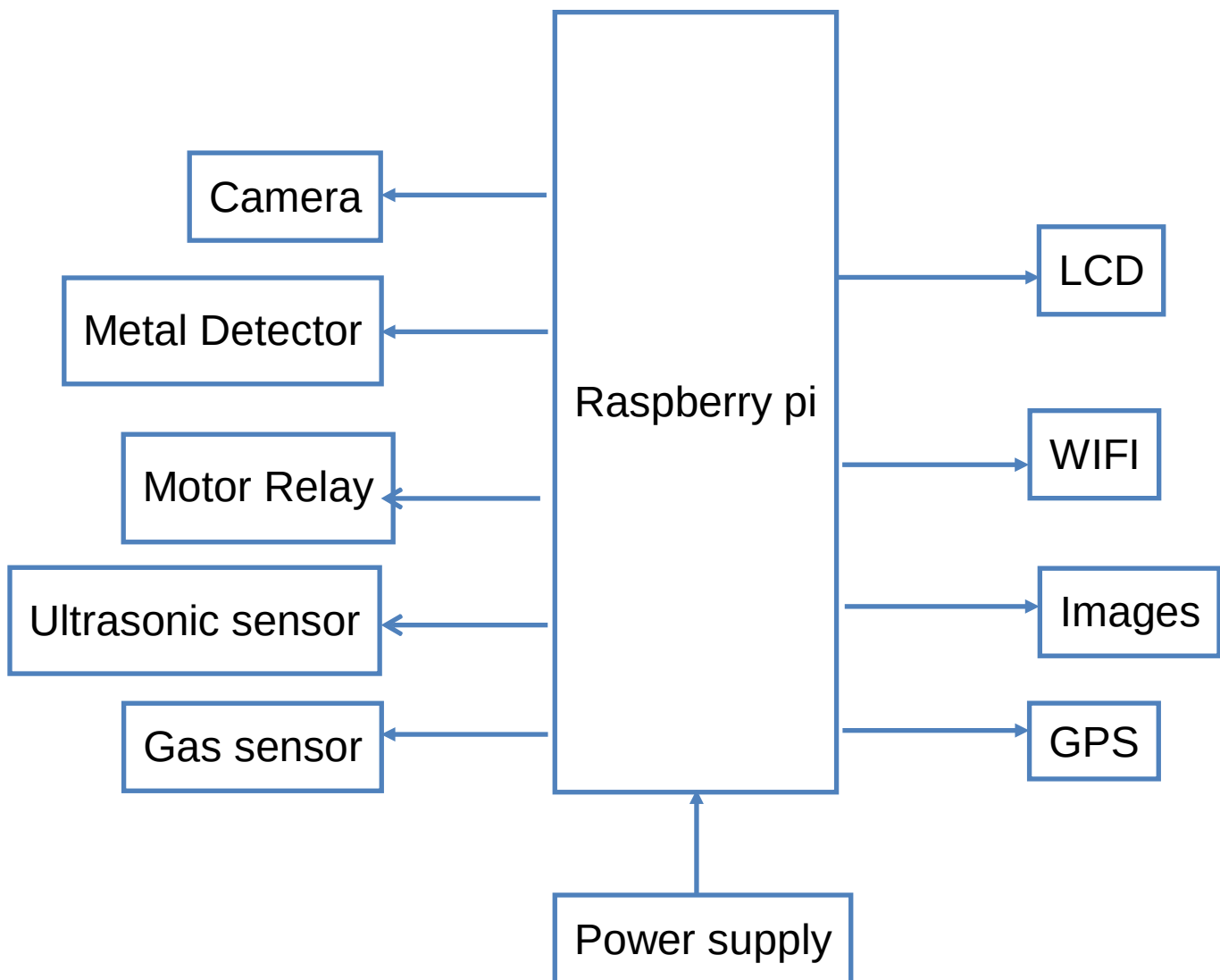
The proposed system overcomes the human intervention in dangerous areas. In the existing system, the surveillance has to be done by the soldier themselves. This contain the metal detector that will helpful in detecting the land mains which will lead to death. WIFI helps to communicate between the transmitter and receiver, controlled by PC. Mobile phone attached to the system can help in live streaming of video. The robots movement is decided by the microcontroller. In this system contains microcontroller named Raspberry pie 3 .The microcontroller will be programmed with the help of the Embedded C programming.

Raspberry pie 3 has its own programming environment through which the microcontroller can be programed. For travelling purpose this system uses DC motor. It generates high amount of power and torque. In this proposed system, a rechargeable battery is used to supply power to the electronic components of the system. Mainly the microcontroller and DC motor will be in need of power supply. The proposed system overcomes the human intervention in dangerous areas. In the existing system, the surveillance has to be done by the soldier themselves. The laser gun is used to point at the enemy and the gun can be used to attack the enemy. WIFI helps to communicate between the transmitter and receiver, controlled by PC. Mobile phone attached to the system can help in live streaming of video. The robot can be made more enhanced by adding features like gas sensors and bomb defuse kit.

Connects Raspberry pie 3 using Raspberry pie 3 Ethernet-compatible shields including the Ethernet Shield and WiFi Shield. You can use this library to connect

your Raspberry pie 3 project directly to a IOT server without using an intermediate computer or a web- or cloud-based service. Having direct access to a database server means you can store data acquired from your project as well as check values stored in tables on the server. This also means you can setup your own, local IOT server to store your data further removing the need for Internet connectivity. If that is not an issue, you can still connect to and store data on a IOT server via your network, Internet, or even in the cloud.

3.3 BLOCK DIAGRAM



CHAPTER- 4

COMPONENTS

4.1 Hardware Components

4.1.1 Raspberry pie 3

The Raspberry Pi 3 (as shown in Fig:1) is a single-board computer developed by the Raspberry Pi Foundation. It is a credit-card-sized computer that runs on a Broadcom BCM2837 SoC (System on a Chip) with a 1.2GHz 64-bit quad-core ARM Cortex-A53 CPU and 1GB of RAM. It also includes integrated Wi-Fi and Bluetooth connectivity, HDMI output, four USB ports, an Ethernet port, a 3.5mm audio jack, and a microSD card slot for storage.

The Raspberry Pi 3 is a versatile device with many uses, including:

Learning to code: The Raspberry Pi 3 is a popular tool for learning programming and electronics, as it is affordable and accessible for beginners.

Media center: The device can be used to create a media center for streaming movies, TV shows, and music.

- Retro gaming console: With the addition of retro gaming software, the Raspberry Pi 3 can be turned into a retro gaming console, allowing users to play classic video games.
- Home automation: The Raspberry Pi 3 can be used as a hub for home automation, controlling lights, temperature, and other smart devices.
- Robotics: The device can be used to power robotics projects, providing a small and affordable computer for controlling robots and other electronics.

Overall, the Raspberry Pi 3 is a versatile and affordable device that can be used for a wide range of projects and applications.

Here are the specifications of the Raspberry Pi 3:

- Processor: Broadcom BCM2837 64-bit ARMv8 quad-core Cortex-A53 CPU running at 1.2GHz
- RAM: 1GB LPDDR2 SDRAM
- Connectivity: 10/100 Ethernet, 802.11n Wireless LAN, Bluetooth 4.1 Classic, Bluetooth Low Energy (BLE)
- Storage: microSD card slot for loading operating system and data storage
- Video and Audio: HDMI output, 3.5mm audio jack, and composite video output
- GPIO: 40-pin GPIO header, which includes UART, SPI, I2C, and GPIO pins
- USB: 4 x USB 2.0 ports
- Power: 5V/2.5A DC via microUSB port
- Dimensions: 85 x 56 x 17mm
- Weight: 42g

These specifications make the Raspberry Pi 3 a powerful and versatile device for a wide range of applications. The quad-core processor and 1GB of RAM provide enough processing power to run various software and applications, while the integrated wireless and Bluetooth connectivity make it easy to connect to other devices and networks. The GPIO header also allows for easy interfacing with external devices and sensors, making it a popular choice for electronics and robotics projects.

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- USB: 4 x USB 2.0 ports
- Power: 5V/2.5A DC via microUSB port
- Dimensions: 85 x 56 x 17mm
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The Raspberry Pi 3 comes with a 40-pin GPIO header that provides access to various hardware interfaces and communication buses. Here is a brief description of each pin on the header:

1. 3.3V Power: Provides 3.3V of power to connected devices.
2. 5V Power: Provides 5V of power to connected devices.
3. GPIO 2 (SDA): I2C data line for connecting to I2C devices.
4. 5V Power: Provides 5V of power to connected devices.
5. GPIO 3 (SCL): I2C clock line for connecting to I2C devices.
6. Ground: Ground pin for connecting to devices.
7. GPIO 4: General-purpose input/output pin.
8. GPIO 14 (TXD): Transmit pin for serial communication.

9. Ground: Ground pin for connecting to devices.
10. GPIO 15 (RXD): Receive pin for serial communication.
11. GPIO 17: General-purpose input/output pin.
12. GPIO 18 (PWM0): Pulse-width modulation output for controlling devices like LEDs.
13. GPIO 27: General-purpose input/output pin.
14. Ground: Ground pin for connecting to devices.
15. GPIO 22: General-purpose input/output pin.
16. GPIO 23: General-purpose input/output pin.
17. 3.3V Power: Provides 3.3V of power to connected devices.
18. GPIO 24: General-purpose input/output pin.
19. GPIO 10 (MOSI): Master-out, slave-in pin for SPI communication.
20. Ground: Ground pin for connecting to devices.
21. GPIO 9 (MISO): Master-in, slave-out pin for SPI communication.
22. GPIO 25: General-purpose input/output pin.
23. GPIO 11 (SCLK): Clock pin for SPI communication.
24. GPIO 8 (CE0): Chip select 0 pin for SPI communication.
25. Ground: Ground pin for connecting to devices.
26. GPIO 7 (CE1): Chip select 1 pin for SPI communication.
27. GPIO 0 (ID_SD): ID EEPROM for HAT (Hardware Attached on Top) devices.
28. GPIO 1 (ID_SC): ID EEPROM for HAT devices.
29. GPIO 5: General-purpose input/output pin.
30. Ground: Ground pin for connecting to devices.
31. GPIO 6: General-purpose input/output pin.
32. GPIO 12: General-purpose input/output pin.
33. GPIO 13: General-purpose input/output pin.
34. Ground: Ground pin for connecting to devices.
35. GPIO 19 (MISO): Master-in, slave-out pin for SPI communication.

- 36. GPIO 16: General-purpose input/output pin.
- 37. GPIO 26: General-purpose input/output pin.
- 38. GPIO 20 (MOSI): Master-out, slave-in pin for SPI communication.
- 39. Ground: Ground pin for connecting to devices.
- 40. GPIO 21 (SCLK): Clock pin for SPI communication.

These pins provide access to various hardware interfaces and communication buses, allowing users to interface with external devices and sensors for a wide range of applications

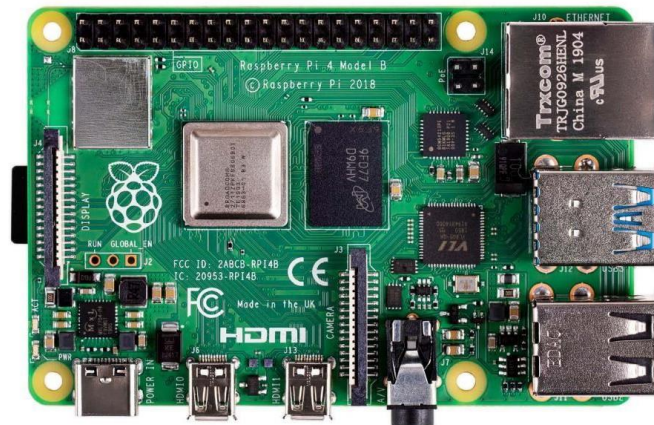


Fig 1 : Raspberry pie 3

4.1.2 Liquid Crystal Display

LCD(as shown in Fig:2) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs.The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters,animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD(as shown in Fig:2) has two registers, namely, Command and Data.The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a

predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD.

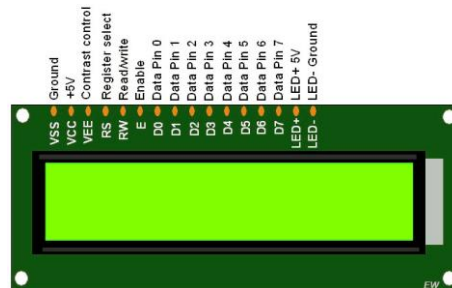


Fig 2 :LCD

4.1.3 Camera

Active PI Cam(as shown in Fig:3) captures images up to 30 frames per second from any video device including USB cameras, Analog cameras connected to capture card, TV-boards, camcorders with FireWire (IEEE 1394) interface and from Network cameras. A camera module is an essential component in most surveillance projects. It is responsible for capturing video or images that can be used for security purposes, such as monitoring an area for suspicious activity. Camera modules come in different shapes and sizes, and they can be either analog or digital. One advantage of camera modules in surveillance projects is their flexibility. They can be used in various environments and scenarios, including indoor and outdoor surveillance, and they can capture footage in different lighting conditions. Additionally, some camera modules have advanced features such as infrared imaging and motion detection, which can enhance their effectiveness.

Another advantage of camera modules is their ease of integration with other surveillance systems. They can be connected to other devices, such as digital video recorders (DVRs) or network video recorders (NVRs), to store and manage the captured footage. They can also be integrated with software systems, such as video analytics tools, to analyze the captured footage for specific events or behaviors. However, there are also some challenges associated with using

camera modules in surveillance projects. One challenge is the cost of installing and maintaining camera systems, especially if multiple cameras are required to monitor a large area. Additionally, camera modules require a reliable power source and network connectivity to transmit footage, which can be difficult to achieve in certain environments.

Another challenge is privacy concerns. The use of surveillance cameras can raise privacy concerns, especially if they are used in public areas or where individuals have an expectation of privacy. Therefore, it is important to carefully consider the ethical and legal implications of using camera modules in surveillance projects and to ensure that they are used responsibly and within the limits of the law. When the program detects motion in the monitored area, it can sound an alarm, e-mail you the captured images, and start broadcasting or record a video. The program has features to add text captions and image logos to the images, to place a date/time stamp on each video frame, and to adjust the frame rate, picture size, and quality.

In addition to the official camera module, Raspberry Pi 3 also supports various USB cameras and webcams, which can be connected to the USB ports on the Raspberry Pi board. These cameras can be used for various applications, such as video conferencing, live streaming, and surveillance. To use a camera with Raspberry Pi 3, you will need to install the required software and drivers, which are available in the Raspberry Pi operating system (Raspbian) or can be downloaded from third-party sources. Once the camera is connected and the software is installed, you can use programming languages such as Python to access and control the camera and perform various image and video processing tasks.

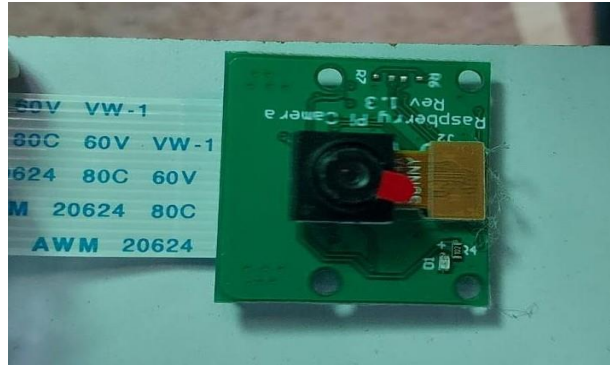


Fig 3 : Camera

Inbuilt sensitive microphone and Image Sensor High Quality CMOS Sensor. Image Resolution 16 Mega Pixels (Interpolated); Light sensor to switch on 6 lights automatically when in dark.

Image Control Color saturation, brightness, sharpness and brightness is adjustable; Snap shot switch for taking still pictures

Anti-flicker 50Hz, 60Hz or outdoor;

Resolution Hardware: 500K pixels; Image Quality: RGB24 or I420

Exposure: Auto or manual and Angle of view: 58 Degree;

Interface: USB2.0; Frame Rate: 30 fps (MAX).

4.1.4 Proximity sensor

A proximity(as shown in Fig:4) sensor is a type of sensor that can detect the presence or absence of nearby objects without physical contact. It can detect the distance between the sensor and an object and can trigger an action when the object is within a certain range. Proximity sensors are commonly used in electronic devices to detect the presence of nearby objects without physical contact. These sensors emit an electromagnetic field or beam of radiation and measure the reflection or absorption of the emitted energy to detect the presence and distance of an object. Proximity sensors can be found in a variety of technologies, including infrared, ultrasonic, and capacitive sensors. They are used in many applications, such as industrial automation, robotics, automotive safety systems, and mobile devices. In Raspberry Pi projects, proximity sensors are often used to detect

motion or the presence of an object in a specific area, such as a door or a conveyor belt, and trigger an action, such as turning on a light or activating an alarm.

There are several types of proximity sensors available, including:

1. Infrared (IR) sensors: These sensors emit infrared radiation and detect the reflected radiation from nearby objects. They are commonly used in proximity sensing applications.
2. Ultrasonic sensors: These sensors emit high-frequency sound waves and detect the reflected sound waves from nearby objects.
3. Capacitive sensors: These sensors detect changes in electrical capacitance when an object is nearby.
4. Magnetic sensors: These sensors detect changes in the magnetic field when an object is nearby.

To use a proximity sensor in a project, connect it to a microcontroller, such as the Raspberry Pi, and write a program to read the sensor data and trigger an action when an object is detected within the specified range.

Here are the basic steps to use a proximity sensor with a Raspberry Pi:

1. Connect the proximity sensor to the Raspberry Pi GPIO pins.
2. Install the necessary software libraries and drivers for the proximity sensor.
3. Write a Python program to read the sensor data and trigger an action when an object is detected within the specified range.
4. Test the program with different objects and adjust the range as necessary.

Proximity sensors can be used as metal detectors in various applications.

Metal detectors using proximity sensors can detect metallic objects without the need for physical contact, making them ideal for security applications. A capacitive proximity sensor is an example of a sensor that can detect metal objects. When a metallic object comes within the sensor's detection range, it causes a change in the sensor's capacitance. The change in capacitance is detected by the sensor's electronic circuitry, which then triggers an alarm or other

output signal. Metal detectors using proximity sensors are commonly used in airports, museums, and other public places for security purposes. In Raspberry Pi projects, proximity sensors can be used as metal detectors to detect metallic objects in a specific area, such as a door or a conveyor belt, and trigger an action, such as sounding an alarm or sending a notification. The use of proximity sensors as metal detectors offers a reliable and efficient means of detecting metallic objects in various applications.



Fig 4 : Proximity sensor(Metal Detector)

4.1.5 Ultrasonic Sensor

Ultrasonic detection is most commonly used in industrial applications to detect hidden tracks, discontinuities in metals, composites, plastics, ceramics, and for water level detection. For this purpose the laws of physics which are indicating the propagation of sound waves through solid materials have been used since ultrasonic sensors using sound instead of light for detection. Lets user adjust detection range. The Ultrasonic(as shown in Fig:5)sensor has very good and stable response even in ambient light or in complete darkness. The sensor module can be interfaced with Arduino, Raspberry Pi or any microcontroller having IO voltage level of 3.3V to 5V.



Fig 5 : Ultrasonic sensor

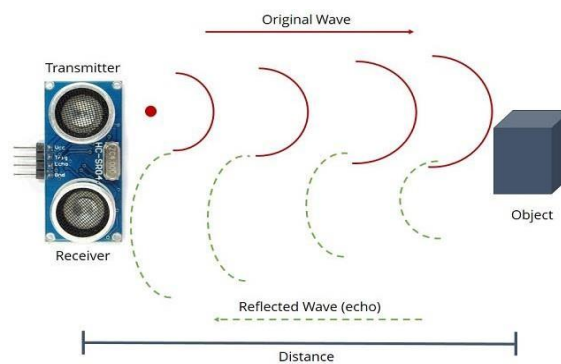


Fig 6 : Ultrasonic sensor working

An ultrasonic sensor(as shown in fig:5 and 6) is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about objec .

Table 1: HC-SR04 Pin Configuration and Function

PIN	PIN NAME	FUNCTION
VCC	Power supply	Positive supply input (+5v)
GND	Ground	Ground reference
TRIG	Trigger	Receives input signal from microcontroller to activate sensor
ECH	Echo	Sends output signal to microcontroller

Table 1 :HC-SR04 Pin Configuration and function

4.1.6 HC-SR04 Sensor Features

Operating voltage: +5V.

Theoretical Measuring Distance: 2cm to 450cm

Practical Measuring Distance: 2cm to 80cm.

Accuracy: 3mm.

Measuring angle covered: <15°.

Operating Current: <15Ma.

Operating Frequency: 40Hz.

It all starts when the trigger pin is set HIGH for 10 μ s. In response, the sensor transmits an ultrasonic burst of eight pulses at 40 kHz. This 8-pulse pattern is specially designed so that the receiver can distinguish the transmitted pulses from ambient ultrasonic noise. These eight ultrasonic pulses travel through the air away from the transmitter. Meanwhile the echo pin goes HIGH to initiate the echo-back signal. If those pulses are not reflected back, the echo signal times out and goes low after 38ms (38 milliseconds). Thus a pulse of 38ms indicates no obstruction within the range of the sensor. If those pulses are reflected back, the echo pin goes low as soon as the signal is received. This generates a pulse on the echo pin whose width varies from 150 μ s to 25 ms depending on the time taken to receive the signal.

4.1.6.1Wiring an HC-SR04 Sensor to an Raspberry pie 3

Connecting the HC-SR04 to Raspberry pie 3(as shown in Fig:7) is very easy. Start by placing the sensor on your breadboard. Connect the VCC pin to the 5V pin on the Raspberry pie 3 and the GND pin to the ground pin. Now connect the trig and echo pins to digital pins #9 and #10 respectively.

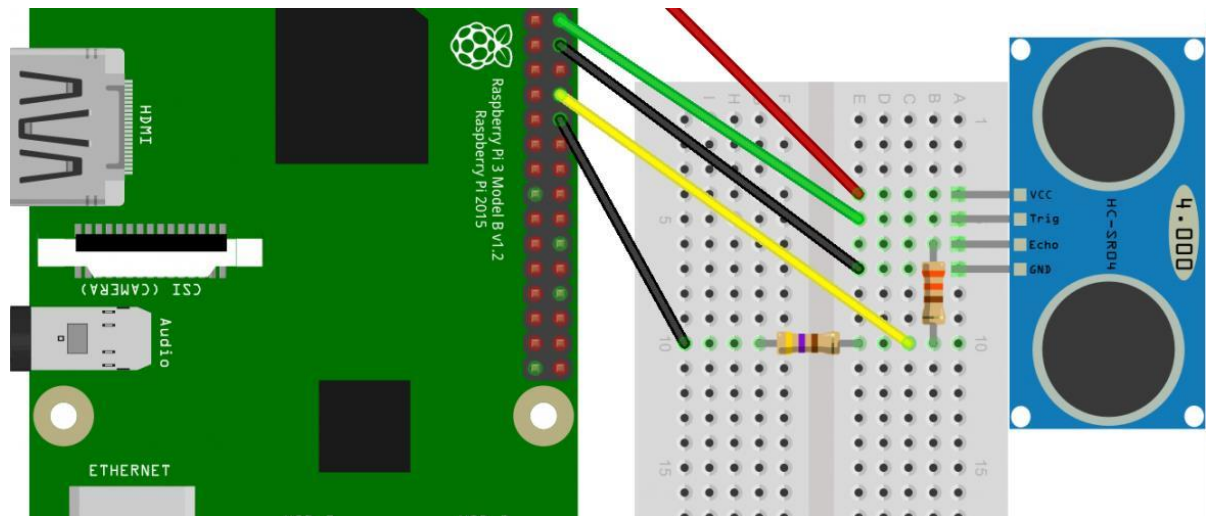


Fig 7: Wiring HC-SR04 Ultrasonic Sensor to Raspberry pie 3

4.1.7 Relay

A relay(as shown in Fig:8) is an electronic switch that can be used to control high voltage or high current devices using a low voltage signal. In Raspberry Pi projects, relays can be used to switch on and off external devices such as lights, motors, and appliances. Since the Raspberry Pi's GPIO pins can only provide a limited amount of current, relays act as an intermediary between the Pi and the high voltage or high current device. When a signal is sent to the relay from the Pi, the relay switches the external device on or off. Relays can be connected to the Pi using jumper wires and can be controlled using Python code. Relays are commonly used in home automation projects, such as controlling lights or opening and closing doors, and can be a useful tool for interfacing with the physical world using a Raspberry Pi.

When a current flows through the coil, the resulting magnetic field attracts an armature that is mechanically linked to a moving contact. The movement either makes or breaks a connection with a fixed contact. When the Pi sends a signal to the relay, the switch closes or opens, allowing or interrupting the flow of electricity to the connected device. This enables the Pi to control a wide range of devices, such as lights, motors, heaters, and pumps, for various projects. Relay modules

designed for use with Raspberry Pi are readily available and can be easily connected to the GPIO pins. Using a relay in Raspberry Pi projects ensures safe and efficient control of high-power devices, allowing for greater versatility and functionality.

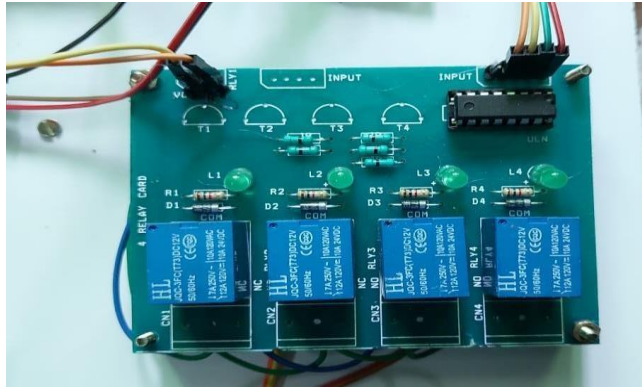


Fig : 8 Relay

4.1.8 Servo Motors

A Servo Motor(as shown in fig:9) is a small device that has an output shaft. This shaft can be positioned to specific angular positions by sending the servo a coded signal. A servomotor is a linear actuator or rotary actuator that allows for precise control of linear or angular position, acceleration, and velocity. It consists of a motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors.



Fig 9 : Servo Motor

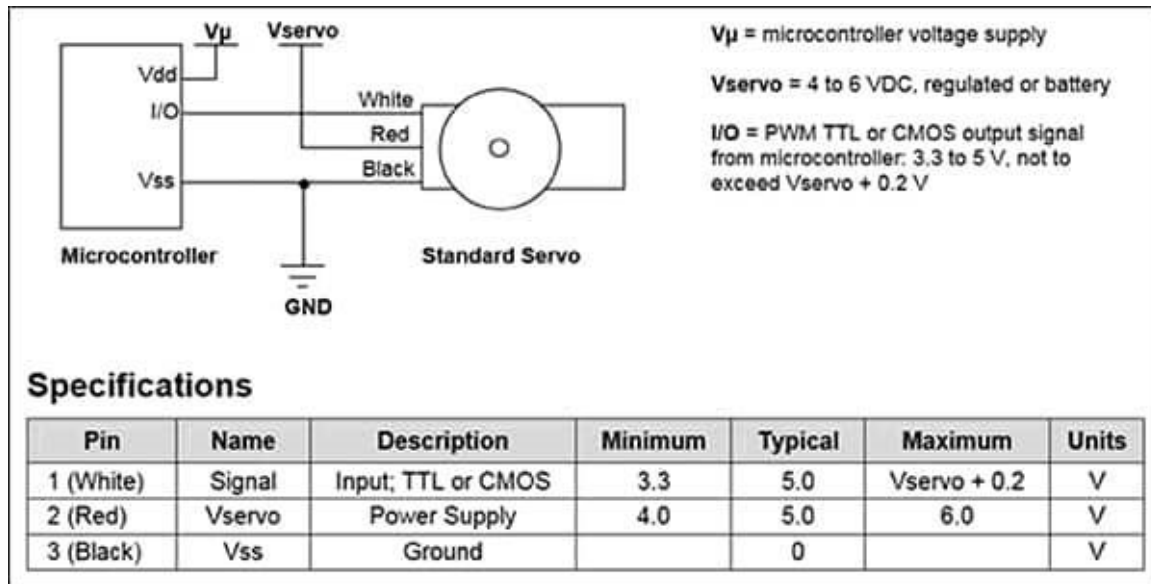


Table 2 :Servo motor pin configuration

Servo motors have three wires: power, ground, and signal. The power wire is typically red, and should be connected to the 5V pin on the Raspberry pie 3 board. The ground wire is typically black or brown and should be connected to a ground pin on the board. The signal pin is typically yellow or orange and should be connected to PWM pin on the board (as shown in Table 2) .As long as the coded signal exists on the input line, the servo will maintain the angular position of the shaft. If the coded signal changes, the angular position of the shaft changes. In practice, servos are used in radio-controlled airplanes to position control surfaces like the elevators and rudders. They are also used in radio-controlled cars, puppets, and of course, robots.

4.1.9 DC Motor

A DC motor(as shown in Fig:10) is an electric motor that runs on direct current power. In any electric motor, operation is dependent upon simple electromagnetism. A current carrying conductor generates a magnetic field, when this is then placed in an external magnetic field, it will encounter a force proportional to the current in the conductor and to the strength of the external magnetic field. It is a device which

converts electrical energy to mechanical energy. It works on the fact that a current carrying conductor placed in a magnetic field experiences a force which causes it to rotate with respect to its original position.

DC (Direct Current) motors can be controlled using Raspberry Pi, but it requires additional components such as a motor driver board or an H-bridge circuit to convert the low-power signal output from the Raspberry Pi into the high-power signals needed to control the motor. The GPIO (General Purpose Input Output) pins on the Raspberry Pi can be used to send control signals to the motor driver board, which in turn controls the direction and speed of the DC motor. There are several motor driver boards available that can be used with Raspberry Pi, such as the L298N or the TB6612FNG. To use DC motors with Raspberry Pi, you would need to connect the motor driver board to the GPIO pins on the Raspberry Pi, and then connect the DC motor to the motor driver board. The software for controlling the motor can be written in programming languages such as Python or C++ and can utilize libraries such as the RPi.GPIO library to interact with the GPIO pins. It is important to note that the current draw of the DC motor should be considered when selecting a motor driver board, as the GPIO pins on Raspberry Pi are not designed to provide high current output. Additionally, the use of a motor driver board can introduce electrical noise that can affect other components on the Raspberry Pi board. Therefore, it is recommended to follow best practices for motor control and use proper shielding and grounding techniques to minimize the risk of interference.

It is possible to control DC motors with a Raspberry Pi using a motor driver board or an H-bridge circuit. A motor driver board is an electronic module that can control the speed and direction of DC motors. It typically has input pins that are connected to the Raspberry Pi's GPIO pins and output pins that are connected to the motor. Alternatively, an H-bridge circuit can also be used to control DC motors. An H-bridge is a circuit that allows you to control the direction of the motor by reversing the polarity of the voltage applied to it. However, building an H-bridge circuit requires a bit more technical knowledge and experience with electronics. It is important to note that DC motors

require a significant amount of power, so you should make sure that your motor driver board or H-bridge circuit can handle the voltage and current requirements of your motor. Additionally, it is important to take appropriate safety precautions when working with motors and electronics, such as wearing protective gear and ensuring that your circuit is properly wired and grounded.



Fig 10 : DC motor

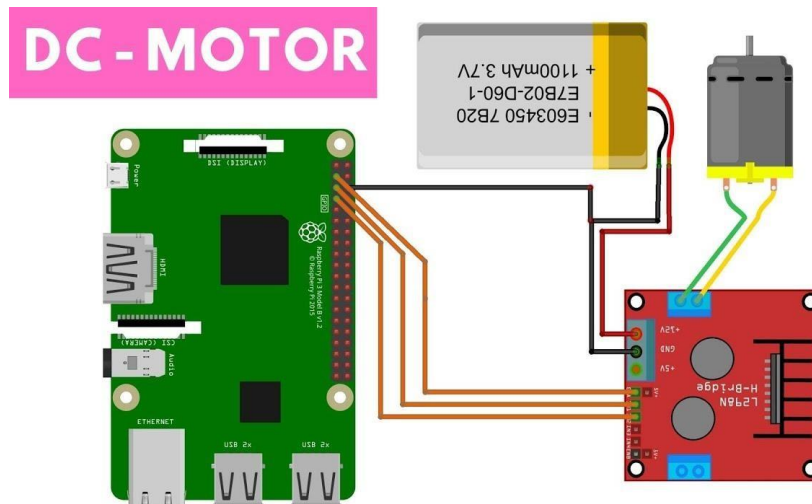


Fig 11 :DC motor connected to Raspberry pie 3

4.1.10 Motor Driver

In the field of Robotics, we have different types of motors such as DC motors, Servo motors, stepper motors etc. Selection of motors depends on your application and there are various ways to operate them. Some motors can be controlled directly by various methods such as connecting the power supply directly to them and make it work. But what if we want to control these motors using other controller devices such as Wireless systems, microcontroller, etc. we need something known as Motor drivers. The L293D is a popular 16-Pin Motor Driver IC (as shown in fig:12). As the name suggests it is mainly used to drive motors. A single L293D IC is capable of running two DC motors at the same time; also the direction of these two motors can be controlled independently. It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction

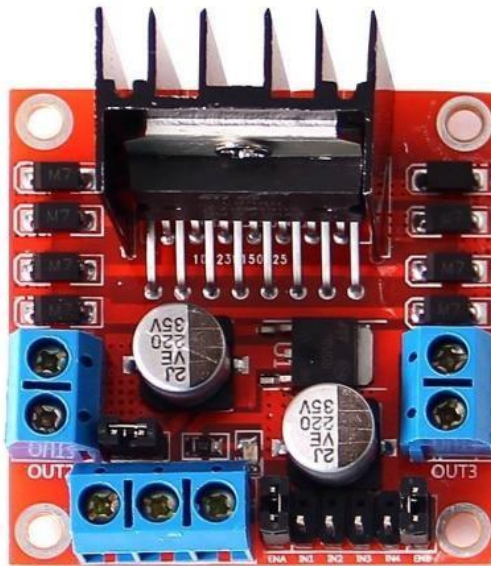


Fig 12 : Motor Driver

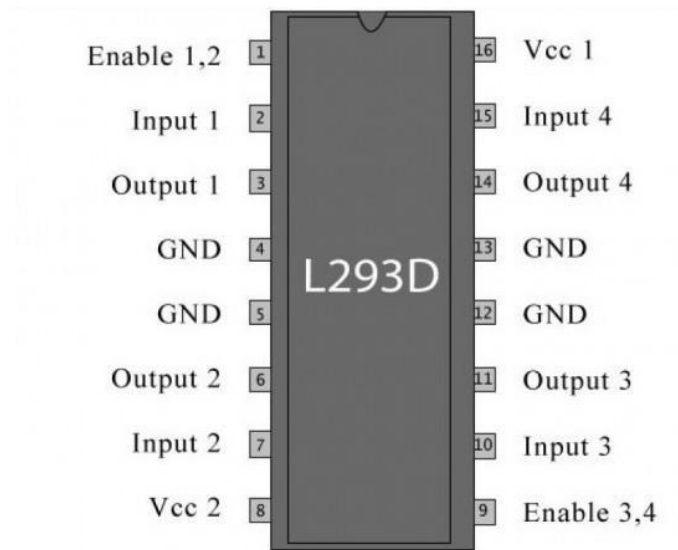


Fig 13 : L293D

The L293D(as shown in fig:13) is a **16-pin Motor Driver IC which can control a set of two DC motors simultaneously in any direction**. The L293D is designed to provide bidirectional drive currents of up to 600 mA (per channel) at voltages from 4.5 V to 36 V.

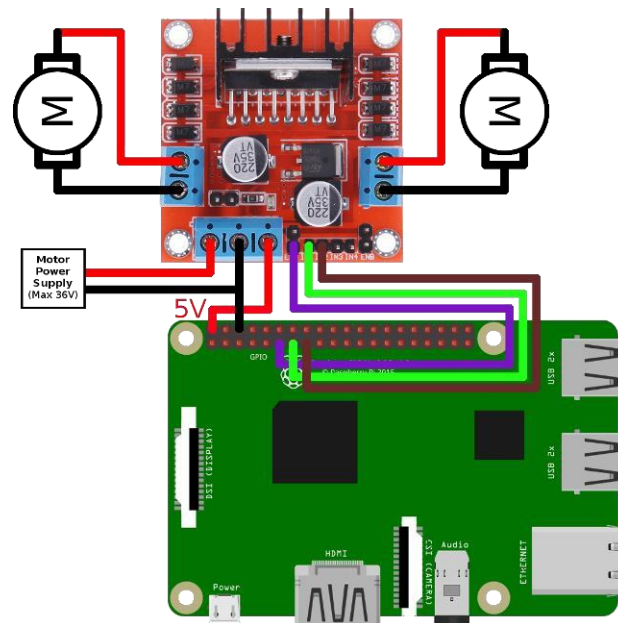


Fig :14 Motor Driver Connected to Raspberry pie

4.1.11 WIFI module

The ESP8266 12e module(as shown in Fig:15) which is low cost, selfcontained chip consists of TCP/IP protocol stack that is used to provide network access to any microcontroller. It is highly compact in size and is easily a portable one and thus this is interfaced with the arduino to provide the robot with Wi-Fi facility.



Fig : 15 WIFI module

4.1.12 GAS SENSOR MQ-2

In current technology scenario, monitoring of gases produced is very important. From home appliances such as air conditioners to electric chimneys and safety systems at industries monitoring of gases is very crucial. Gas sensors spontaneously react to the gas present, thus keeping the system updated about any alterations that occur in the concentration of molecules at gaseous state.

The gas sensor module consists of a steel exoskeleton under which a sensing element is housed. This sensing element is subjected to current through connecting leads. This current is known as heating current through it, the gases coming close to the sensing element get ionized and are absorbed by the sensing element. This changes the resistance of the sensing element which alters the value of the current going out of it. The connecting leads of the sensor are thick so that sensor can be connected firmly to the circuit and sufficient amount of heat gets conducted to the inside part. They are casted from copper and have tin plating over them.

MQ-2(as shown in Fig:16) gas sensor is designed with sensitive material of SnO_2 , which with lower conductivity in clean air. When the target combustible gas exists, the sensor's conductivity is higher. Signal conditioning circuit is used to convert the change of conductivity to correspond output signal with the input gas concentration. MQ-2 gas sensor has high sensitivity to LPG, Propane and Hydrogen, also could be used to Methane and other combustible steam, it is with low cost and suitable for different application. The MQ-2 gas module is mounted on a pcb board which has an operating voltage of 5VDC. The sensor output values can be get by means of both analog and digital.

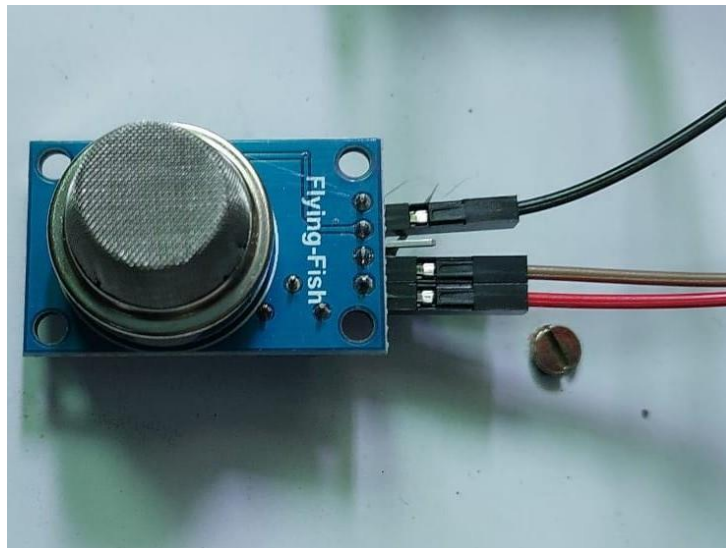


FIG 16 : GAS SENSOR MQ-2

FEATURES

- Analog and Digital output
- Good sensitivity to Combustible gas in wide range
- High sensitivity to LPG, Propane and Hydrogen
- Operation voltage: 5VDC
- Simple drive circuit
- Long life and low cost

APPLICATIONS

- Domestic gas leakage detector
- Industrial Combustible gas detector
- Portable gas detector

4.1.13.GPS

GPS (Global Positioning System)(as shown in fig:17) can be a valuable addition to surveillance projects that utilize Raspberry Pi 3. Raspberry Pi 3 is a small, low-cost computer that can be used to build various electronic projects, including surveillance systems. GPS allows the system to track the location of the Raspberry Pi device, which can be used to monitor the movement of objects or individuals in the area of interest.

One advantage of using GPS in surveillance projects using Raspberry Pi 3 is that it can provide real-time location information. This information can be used to trigger alerts when the device moves outside a predefined area, or when it approaches a particular location. This can be particularly useful in tracking the movement of vehicles or people. Another advantage of GPS in surveillance projects using Raspberry Pi 3 is that it can provide accurate time and location data for recorded footage. This can be useful in analyzing and interpreting the captured footage, especially when it is necessary to determine the exact time and location of specific events. Additionally, GPS can be used to synchronize multiple surveillance devices that are operating in different locations. This can be accomplished by using the GPS signal to synchronize the clocks of the different devices, which can ensure that the captured footage is correctly time stamped. However, there are also some challenges associated with using GPS in surveillance projects using Raspberry Pi 3. One challenge is the need for an unobstructed view of the sky to obtain a GPS signal. This can be difficult to achieve in certain environments, such as indoor locations or areas with tall buildings or trees.

Another challenge is the need for a reliable power source and network connectivity. GPS can consume a significant amount of power, which can reduce the battery life of the Raspberry Pi device. Additionally, GPS data needs to be transmitted over a network, which can be challenging in areas with limited network coverage. Overall, GPS can be a useful addition to surveillance projects using Raspberry Pi 3, but it is important to carefully consider the requirements and challenges associated with its use.

If you are wandering to navigate the distance with a drone then this GPS Module is needed for you. GPS drones are equipped with a GPS module that allows them to know their location relative to a network of orbiting satellites. Connecting to signals from these satellites allows the drone to perform functions such as position hold, autonomous flight, return to home, and waypoint navigation.

This is a complete GPS module that is based on the NEO 6M GPS. This unit uses the latest technology to give the best possible positioning information and includes a larger built-in 25 x 25mm active GPS antenna with a UART TTL socket. A battery is also included so that you can obtain a GPS lock faster. This is an updated GPS module that can be used with ardupilot mega v2.

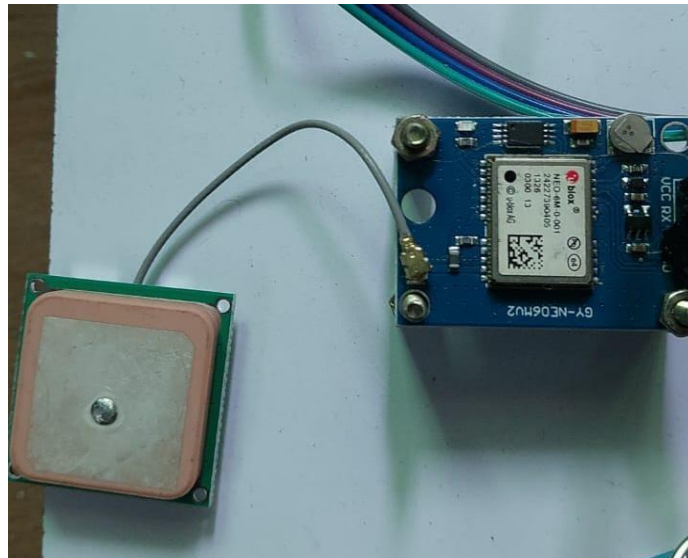


Fig :17 GPS

4.2 Software

4.2.1 LINUX

Linux is a free and open-source operating system based on the Unix operating system. It was created by Linus Torvalds in 1991 and is now widely used in servers, desktops, and other devices, including smartphones, tablets, and embedded systems. Linux is known for its stability, security, and flexibility, as well as its support for a wide range of hardware and software applications. Linux is available in various distributions or "distros", each with its own package manager, desktop environment, and other features. Some popular Linux distributions include Ubuntu, Debian, Fedora, CentOS, and Arch Linux. Linux is used by millions of users worldwide, ranging from individual hobbyists to large enterprises and organizations, and is considered a key technology in the world of open-source software.

Linux has several advantages that make it a popular choice for users and organizations:

1. **Cost:** Linux is free and open-source, which means that users can download, use, and modify it without any licensing fees. This makes Linux a cost-effective alternative to proprietary operating systems such as Windows or macOS.
2. **Stability and reliability:** Linux is known for its stability and reliability, with many users reporting that it runs for months or years without needing to be rebooted. This makes it a popular choice for servers and other critical systems.
3. **Security:** Linux is less susceptible to viruses and malware than other operating systems, partly because it is less widely used and partly because of its built-in security features.
4. **Customization:** Linux is highly customizable, with users able to choose from a variety of desktop environments, software packages, and other options to create a system that meets their needs.
5. **Compatibility:** Linux is compatible with a wide range of hardware, including older or more obscure devices that may not be supported by other operating

systems.

6. Community support: Linux has a large and active community of users and developers who provide support, documentation, and troubleshooting help.
7. Open-source: Linux is open-source software, which means that users have access to the source code and can modify it as needed. This allows for greater transparency and accountability in software development.

Overall, Linux's advantages make it a popular choice for users who value cost-effectiveness, stability, security, customization, and compatibility.

4.2.2 Raspbian OS (Operating System)

Implementation of this gesture recognition system is carried out using Open CV and Python on the Intel core TM i5 Processor. Raspbian OS is needed. Programs needed for the system are summarized as follows: 5.2.1. Raspbian OS (Operating System) Raspbian OS has been developed for Raspberry Pi. This system has over 35000 packages, which are all set to backup the Raspberry pi environment. It is free and can be downloaded from the internet (known as NOOPS) and then copy it into a 16GB (or more) RAM stick.

The entire system is based on a Raspbian operating system like Linux platform. The Raspbian OS is based on Debian that optimizes the Raspberry Pi hardware. The programming language which is utilized for coding is Python. Python referred to as a widely used high-level programming language for general-purpose programming. It handles and controls the raspberry pi hardware performance.

4.2.3 Python

Python is a well-known and high-level programming language used for general purpose programming. It is created in 1991. It allows programmers to express concepts in fewer lines of code than possible in languages such as C or Java. Python is a dynamic system and supports automatic memory management system and multi-programming style is supported including object-oriented, functional

programming, and also procedural programming. Besides that, it has large and comprehensive standard libraries, Python interpreters are available for many operating systems, allowing Python code to run on a wide variety of systems.

Python is a popular programming language that is widely used with the Raspberry Pi 3. Raspberry Pi 3 comes with Python pre-installed, making it easy to get started with programming. Here are some ways Python can be used with Raspberry Pi 3:

1. Scripting: Python can be used to write scripts that automate tasks on the Raspberry Pi 3, such as controlling GPIO pins, reading sensor data, or running programs at startup.
2. Web development: Python can be used to develop web applications that run on the Raspberry Pi 3, using frameworks such as Flask or Django.
3. Data analysis: Python can be used for data analysis and visualization on the Raspberry Pi 3, using libraries such as NumPy, Pandas, and Matplotlib.
4. Machine learning: Python can be used for machine learning on the Raspberry Pi 3, using libraries such as Scikit-learn, TensorFlow, or Keras.
5. Robotics: Python can be used to program robots or other hardware projects that run on the Raspberry Pi 3, using libraries such as PyRobot or ROS (Robot Operating System).

4.2.4 Virtual Computing Network

VNC (Virtual Network Computing) is a software that allows you to remotely access and control a computer or device over a network connection. It is a popular tool for managing and controlling a Raspberry Pi remotely. Here are the steps to set up VNC on a Raspberry Pi:

1. Install VNC server on the Raspberry Pi: There are several VNC server options available for Raspberry Pi, including RealVNC and TightVNC. You can install the VNC server by following the instructions provided by the software provider.
2. Configure the VNC server: After installing the VNC server, you will need to configure it by setting up a password and selecting the resolution and display

options.

3. Enable VNC server: Next, you will need to enable the VNC server on the Raspberry Pi. This can be done by accessing the Raspberry Pi configuration menu and enabling VNC under the interfaces tab.
4. Install VNC client on your computer: In order to connect to the Raspberry Pi, you will need to install a VNC client on your computer. There are several VNC client options available for different operating systems, including RealVNC, TightVNC, and UltraVNC.
5. Connect to Raspberry Pi: Once the VNC client is installed, you can connect to the Raspberry Pi by entering its IP address and the VNC server password.
6. Remote control Raspberry Pi: After connecting to the Raspberry Pi, you can remotely control it using the VNC client. This includes accessing the desktop environment, running applications, and executing commands.

In summary, setting up VNC on a Raspberry Pi allows you to remotely access and control the device over a network connection, providing a convenient way to manage and control the Raspberry Pi from a different location.

4.2.5 IOTclouddata

IOT cloud is a term that refers to cloud-based platforms or services that enable the integration and management of Internet of Things (IOT) devices and data. IOT devices are typically small, low-power devices that are equipped with sensors, processors, and wireless communication capabilities, enabling them to collect and transmit data over the internet. IOT cloud platforms provide a way to manage and analyze the vast amounts of data generated by IOT devices, and to enable communication between different devices and systems. These platforms typically include features such as data storage, analytics, visualization tools, and APIs (Application Programming Interfaces) that enable developers to build custom applications and integrations.

CHAPTER- 5

RESULT AND OUTPUTS

5.1 RESULTS

The War Field Spying robot project using Raspberry Pi 3(as shown in Fig:18) was a highly effective and efficient solution for security and surveillance purposes. The robot was equipped with various sensors and cameras that allowed it to detect and track movements, identify objects and people, and navigate through challenging environments. Additionally, the robot was able to be controlled remotely, making it highly flexible and adaptable to different situations. The use of Raspberry Pi 3 in the development of the War Field Spying robot provided various benefits, such as low-cost, low power consumption, and high processing capabilities. These benefits made it ideal for use in the project and allowed for the development of a highly advanced solution for monitoring and surveillance tasks.

During testing, the War Field Spying robot was able to perform surveillance tasks effectively and efficiently. It was able to detect and track movements accurately and identify objects and people with a high level of accuracy. The robot was also able to navigate through challenging environments, such as tight spaces and obstacles, without any issues. Overall, the result of the War Field Spying robot project using Raspberry Pi 3 was a highly promising solution for security and surveillance purposes. The project provided opportunities for further advancements in the field of surveillance robots, such as the integration of artificial intelligence, machine learning, and cloud-based data storage and analysis. With further development and optimization, the surveillance robot using Raspberry Pi 3 has the potential to become a highly advanced and effective tool for monitoring and surveillance tasks. The implementation of a War Field spying robot using Raspberry Pi 3 is an exciting project that can provide significant benefits. The robot can be remotely controlled and monitored from a smartphone or computer, making it a convenient and effective tool for surveillance purposes. With its compact size and versatility, it can be used in various settings, including home security, industrial monitoring.

In terms of results, the Raspberry Pi 3 War Field spying robot project has been successful in providing a functional surveillance device that can capture video and images of its surroundings. The robot's control and monitoring can be done through a web interface, making it easy to operate and access remotely. The integration of sensors, like motion sensors and temperature sensors, can enhance the robot's surveillance capabilities further. Overall, the Raspberry Pi 3 War Field spying robot project has proven to be an excellent example of how modern technology can be used to build innovative and useful devices. Its open-source nature also makes it customizable and adaptable to specific needs and requirements. As technology continues to advance, we can expect to see more developments and improvements in this area, making the Raspberry Pi 3 War Field spying robot even more efficient and effective.

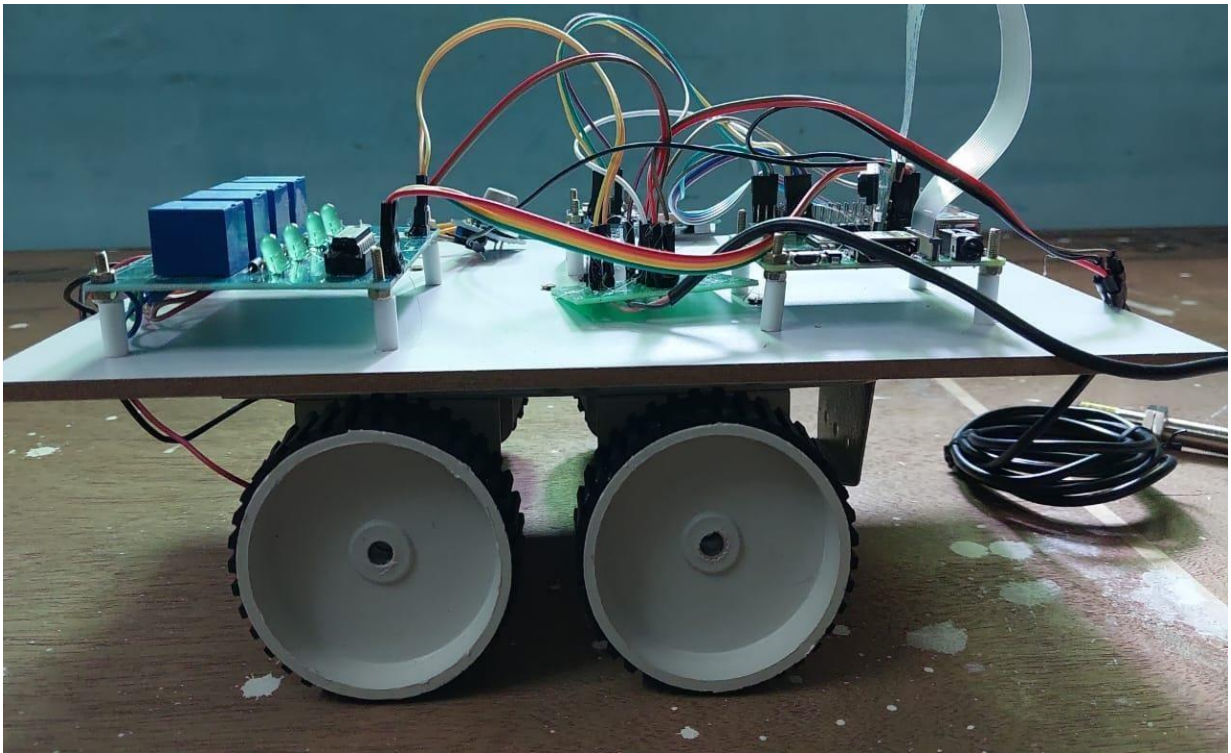


Fig 18: War Field Spying robot

5.2 OUTPUT

5.2.1 Live Feed

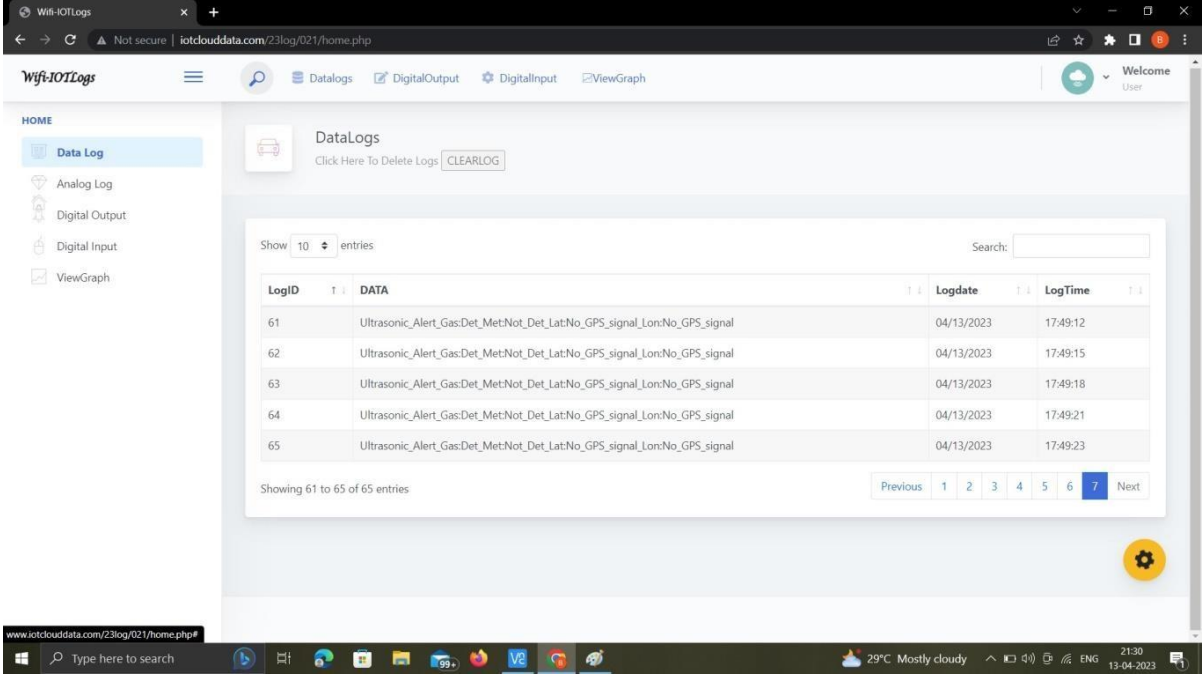


Fig 19 : Live video feed

The output of a War Field spying Robot can include live video streams(as shown in Fig 19), images, and sensor data. The camera module can capture high-quality images and video at various resolutions, depending on the settings configured in the software. The video output can be viewed on a connected monitor or streamed to a remote device, such as a smartphone or computer, over a network or the internet. The Raspberry Pi 3 can also be configured to store the video output and sensor data on its local storage or on a connected external storage device such as an external hard drive or a network-attached storage (NAS) device. This data can be accessed later for review or analysis.

The ability to access video feeds in real-time and receive motion detection alerts ensures that any potential security threats can be addressed quickly and effectively, helping to keep people and property safe.

5.2.2 Data logs



The screenshot shows a web browser window with the URL `iotclouddata.com/23log/021/home.php`. The page title is "Wifi-IOTLogs". On the left, there is a sidebar with a "HOME" section containing links for "Data Log", "Analog Log", "Digital Output", "Digital Input", and "ViewGraph". The main content area is titled "DataLogs" and includes a "Click Here To Delete Logs" button and a "CLEARLOG" button. Below this, there is a table of logs. The table has columns for "LogID", "DATA", "Logdate", and "LogTime". The table displays 5 logs, all with a "DATA" value of "Ultrasonic_Alert_GasDet_MetNot_Det_LatNo_GPS_signal_LonNo_GPS_signal" and a "Logdate" of "04/13/2023". The "LogTime" values are "17:49:12", "17:49:15", "17:49:18", "17:49:21", and "17:49:23". Below the table, it says "Showing 61 to 65 of 65 entries". At the bottom right of the table, there are navigation buttons: "Previous", "1", "2", "3", "4", "5", "6", "7", and "Next". The "7" button is highlighted. The browser's address bar shows the URL and a "Not secure" warning. The Windows taskbar at the bottom shows the time as "21:30" on "13-04-2023" and the weather as "29°C Mostly cloudy".

LogID	DATA	Logdate	LogTime
61	Ultrasonic_Alert_GasDet_MetNot_Det_LatNo_GPS_signal_LonNo_GPS_signal	04/13/2023	17:49:12
62	Ultrasonic_Alert_GasDet_MetNot_Det_LatNo_GPS_signal_LonNo_GPS_signal	04/13/2023	17:49:15
63	Ultrasonic_Alert_GasDet_MetNot_Det_LatNo_GPS_signal_LonNo_GPS_signal	04/13/2023	17:49:18
64	Ultrasonic_Alert_GasDet_MetNot_Det_LatNo_GPS_signal_LonNo_GPS_signal	04/13/2023	17:49:21
65	Ultrasonic_Alert_GasDet_MetNot_Det_LatNo_GPS_signal_LonNo_GPS_signal	04/13/2023	17:49:23

Fig 20 : Saved data

The War field spying Robot can be accessed remotely from a smartphone or computer, allowing you to monitor your property from anywhere. Additionally, the system can be configured to send alerts and notifications when motion is detected, providing an extra layer of security. A war field spying robot project is likely to involve a robot equipped with sensors and cameras to gather data about the war field environment. The data collected by the robot may include live video feeds, audio recordings, GPS coordinates, and other environmental data such as temperature, humidity, and atmospheric pressure. This data can be used to create a real-time map of the war field, helping commanders to make informed decisions about troop movements and tactics. The data(as shown in Fig 20) collected by the war field spying robot project can be stored in logs and databases, allowing for easy access and analysis. Advanced analytics tools can be used to identify patterns and trends in the data, providing valuable insights into the war field environment and enemy activities.

5.2.3 Digital controller view

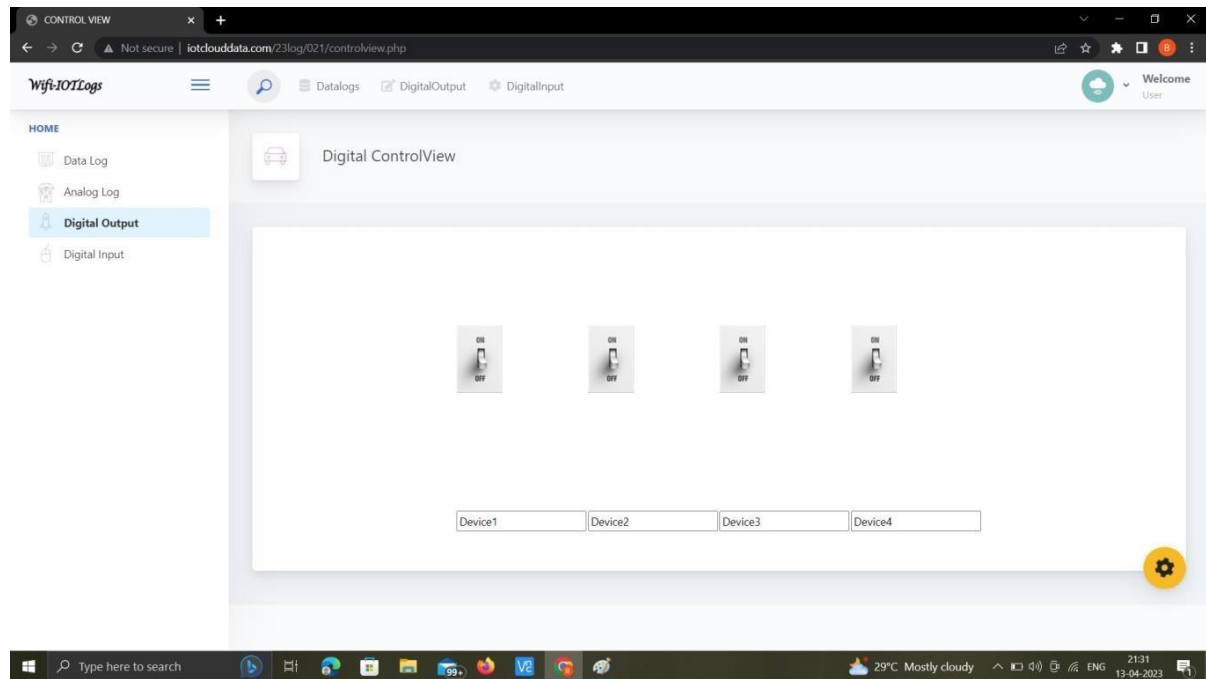


Fig 21: Digital Controller

The IOT platform (as shown in Fig 21) can be used to control the robot's movements, including starting and stopping it, changing its direction, and adjusting its speed. The platform can also be used to trigger actions based on sensor data, such as sounding an alarm or activating a warning light when motion is detected. In addition to controlling the robot, an IOT platform can also be used to store and analyze data collected by the robot's sensors. This data can be used to identify patterns and trends, and to make informed decisions about security measures based on the analysis. Live video feeds and other sensor data collected by the robot can be transmitted to the IOT platform, where it can be stored and analyzed in real-time. This data can be used to identify patterns and trends in enemy troop movements and activities, providing military leaders with valuable intelligence that can inform their tactics and strategies. Additionally, an IOT platform can be used to control multiple war field spying robots simultaneously, allowing for coordinated surveillance and reconnaissance operations across a wide area.

CHAPTER-6

CONCLUSION AND FUTURE WORKS

6.1 Conclusion

In conclusion, the use of Raspberry Pi 3 in the development of a surveillance robot is a highly effective and efficient solution for security and surveillance purposes. The Raspberry Pi 3 offers various benefits such as low-cost, low power consumption, and high processing capabilities, making it ideal for use in such projects. The surveillance robot developed using Raspberry Pi 3 provides a highly advanced solution for monitoring and surveillance tasks. It is equipped with various sensors and cameras that allow it to detect and track movements, identify objects and people, and even navigate through challenging environments. Additionally, the robot can be controlled remotely, making it highly flexible and adaptable to different situations. This project has many potential applications, from home security to industrial monitoring and surveillance. By using open-source software and hardware, the project can be customized and adapted to suit specific needs, making it a versatile and cost-effective solution.

In conclusion, the Raspberry Pi 3 surveillance robot project is an exciting and innovative project that combines the power of the Raspberry Pi with the versatility of a robot. With its advanced hardware and software capabilities, the Raspberry Pi 3 is a powerful tool that can be used to create a wide range of surveillance robots for different applications. This project has demonstrated the potential of the Raspberry Pi 3 as a platform for building surveillance robots. By integrating sensors and cameras with the Raspberry Pi, it is possible to create a robot that can navigate and monitor its surroundings autonomously. The project has also shown how to use the Raspberry Pi to control motors and other hardware components, making it an ideal platform for building robotics projects. The project provides a great starting point for those looking to get started with robotics and explore the possibilities.

6.2 Future works

Moreover, the project provides opportunities for further advancements in the field of surveillance robots. Future developments may involve the integration of artificial intelligence, machine learning, and cloud-based data storage and analysis to improve the surveillance capabilities of the robot even further. Overall, the development of a surveillance robot using Raspberry Pi 3 is a highly promising project that offers a wide range of benefits and has the potential for future advancements in the field of security and surveillance.

This paper presents an overview of the design, implementation, testing, and performance of an innovative robotic surveillance vehicle controlled wirelessly by a remote user, developed for the purpose of directing the movement and detection of the living, nonliving and metal objects and displaying status feedback to the operator through a web application. Since these robots are implemented at the border region they should be designed to be water proof and should be able to locomote in the rugged surface. As they replace humans at the battle region it is necessary that the robot will be defense himself and protect our nation from the enemy. To make robot self-defense they can be designed to be equipped with a robot laser gun. Being a bomb disposal robot, it requires very fast movement.

The Raspberry Pi 3 surveillance robot project has a lot of potential for future development and improvement. Here are some ideas for future scope and works that can be done to enhance the project:

1. Improved Image Recognition: One of the key aspects of a surveillance robot is its ability to identify and recognize objects or people. The Raspberry Pi can be paired with advanced image recognition algorithms to enable more accurate and reliable object detection.
2. Integration with Machine Learning: The use of machine learning algorithms can help the robot learn from its environment and make more accurate predictions. This could help improve its ability to detect and track objects or people, and ultimately make it more efficient and effective.

3. Enhanced Communication: The robot can be equipped with better communication systems, such as advanced audio and video capabilities, to improve its ability to transmit data in real-time.
4. Increased Mobility: The robot can be equipped with advanced sensors and components that enable it to move around more easily and efficiently, such as obstacle detection and avoidance systems.
5. Integration with Smart Home Systems: The robot can be integrated with smart home systems, such as Amazon Alexa or Google Assistant, to enable voice commands and control.
6. Energy Efficiency: The robot can be designed to operate for longer periods of time by optimizing its energy consumption, through the use of efficient batteries or solar panels.
7. Autonomous Navigation: Currently, the robot is controlled remotely. However, there is scope to develop it to have autonomous navigation capabilities by integrating sensors like LIDAR, SONAR, and IR sensors. This will allow it to navigate its surroundings independently.
8. Face Recognition: The addition of facial recognition technology would enable the robot to identify and track individuals, enhancing its surveillance capabilities.
9. Improved Video Quality: By using better quality cameras and implementing better compression algorithms, the video quality can be significantly improved, providing clearer and more detailed images.

In summary, the Raspberry Pi 3 surveillance robot project has great potential for future development and improvement, and can be enhanced in many ways to increase its functionality and effectiveness.

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APPENDIX

CODES

Robot

```
from time import sleep
import os
import RPi.GPIO as GPIO
from gpiozero import LED, Button
from time import sleep
import time
import requests
import pynmea2
import serial

motor1 = LED(26)
motor2 = LED(20)
motor3 = LED(21)
motor4 = LED(16)

gas=Button(19)
met=Button(13)

GPIO_TRIGGER = (17)
GPIO_ECHO = (27)
GPIO.setup(GPIO_TRIGGER, GPIO.OUT)
GPIO.setup(GPIO_ECHO, GPIO.IN)

motor1.off()
motor2.off()
motor3.off()
motor4.off()

ser = serial.Serial('/dev/ttyS0', baudrate=9600,
                    parity=serial.PARITY_NONE,
                    stopbits=serial.STOPBITS_ONE,
                    bytesize=serial.EIGHTBITS
                    )
```

```

df=1

i=0
j=0

def distance():
    # set Trigger to HIGH
    GPIO.output(GPIO_TRIGGER, True)

    # set Trigger after 0.01ms to LOW
    sleep(0.00001)
    GPIO.output(GPIO_TRIGGER, False)

    StartTime = time.time()
    StopTime = time.time()

    # save StartTime
    while GPIO.input(GPIO_ECHO) == 0:
        StartTime = time.time()

    # save time of arrival
    while GPIO.input(GPIO_ECHO) == 1:
        StopTime = time.time()

    # time difference between start and arrival
    TimeElapsed = StopTime - StartTime
    # multiply with the sonic speed (34300 cm/s)
    # and divide by 2, because there and back
    distance = (TimeElapsed * 34300) / 2

    return distance

while True:

    dataout =pynmea2.NMEAStreamReader()

    newdata=ser.readline()

    if newdata[0:6]=='$GPRMC':

```

```

newmsg=pynmea2.parse(newdata)

lat=newmsg.latitude

lng=newmsg.longitude

gps='Latitude=' +str(lat) + 'and Longitude=' +str(lng)

print(gps)

else:
    lat='No_GPS_signal'
    lng='No_GPS_signal'

r =requests.get('http://IOTclouddata.com/23log/021/getstatus.php')
print(r.text)
print(r.text[7])
print(r.text[8])
print(r.text[9])
print(r.text[10])

if r.text[10]=='1':
    print('Forward')
    motor1.on()
    motor3.on()
    motor2.off()
    motor4.off()
elif r.text[9]=='1':
    print('Reverse')
    motor1.off()
    motor3.off()
    motor2.on()
    motor4.on()
elif r.text[8]=='1':
    print('Right')
    motor1.on()
    motor3.off()
    motor2.off()
    motor4.off()

```

```

elif r.text[7]=='1':
    print('Left')
    motor1.off()
    motor3.off()
    motor2.on()
    motor4.off()
else:
    print('Stop')
    motor1.off()
    motor3.off()
    motor2.off()
    motor4.off()

if gas.is_pressed:
    lg='Not_det'
else:
    lg='Det'

if met.is_pressed:
    lm='Det'
else:
    lm='Not_Det'

dist = distance()
print ("Measured Distance = %.1f cm" % dist)

if dist<20 or lm=='Det':
    print ("Distance Alert")
    r
=requests.get('http://IOTclouddata.com/23log/021/IOT23.php?A=Ultrasonic_Alert
_Gas:'+lg+'_Met:'+lm+'_Lat:'+lat+'_Lon:'+lng)

sleep(1)

```

Camera

```
import io
import picamera
import logging
import socketserver
from threading import Condition
from http import server
```

```
PAGE="""\
<html>
<head>
<title>Raspberry Pi - Surveillance Camera</title>
</head>
<body>
<center><h1>Raspberry Pi - Surveillance Camera</h1></center>
<center></center>
</body>
</html>
"""
```

```
class StreamingOutput(object):
    def __init__(self):
        self.frame = None
        self.buffer = io.BytesIO()
        self.condition = Condition()

    def write(self, buf):
        if buf.startswith(b'\xff\xd8'):
            # New frame, copy the existing buffer's content and notify all
            # clients it's available
            self.buffer.truncate()
            with self.condition:
                self.frame = self.buffer.getvalue()
                self.condition.notify_all()
            self.buffer.seek(0)
        return self.buffer.write(buf)
```

```
class StreamingHandler(server.BaseHTTPRequestHandler):
    def do_GET(self):
```

```

if self.path == '/':
    self.send_response(301)
    self.send_header('Location', '/index.html')
    self.end_headers()
elif self.path == '/index.html':
    content = PAGE.encode('utf-8')
    self.send_response(200)
    self.send_header('Content-Type', 'text/html')
    self.send_header('Content-Length', len(content))
    self.end_headers()
    self.wfile.write(content)
elif self.path == '/stream.mjpg':
    self.send_response(200)
    self.send_header('Age', 0)
    self.send_header('Cache-Control', 'no-cache, private')
    self.send_header('Pragma', 'no-cache')
    self.send_header('Content-Type', 'multipart/x-mixed-replace;
boundary=FRAME')
    self.end_headers()
    try:
        while True:
            with output.condition:
                output.condition.wait()
                frame = output.frame
                self.wfile.write(b'--FRAME\r\n')
                self.send_header('Content-Type', 'image/jpeg')
                self.send_header('Content-Length', len(frame))
                self.end_headers()
                self.wfile.write(frame)
                self.wfile.write(b'\r\n')
            except Exception as e:
                logging.warning(
                    'Removed streaming client %s: %s',
                    self.client_address, str(e))
    else:
        self.send_error(404)
        self.end_headers()

class StreamingServer(socketserver.ThreadingMixIn, server.HTTPServer):
    allow_reuse_address = True

```

```
daemon_threads = True

with picamera.PiCamera(resolution='640x480', framerate=24) as camera:
    output = StreamingOutput()
    #Uncomment the next line to change your Pi's Camera rotation (in degrees)
    #camera.rotation = 90
    camera.start_recording(output, format='mjpeg')
    try:
        address = ("", 8000)
        server = StreamingServer(address, StreamingHandler)
        server.serve_forever()
    finally:
        camera.stop_recording()
```

WAR FIELD SPYING ROBOT

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Abstract:

The surveillance robot described in this study can scale both horizontal and vertical surfaces while automatically managing surface transitions, and it can also track its location for the user who is in charge. Unlike other wall-climbing robots that are now on the market that use magnetic prosthetics and vacuum suction technology. The suggested approach may also record real-time audio, video, and photos to offer surveillance for a particular individual or location. With a ZigBee network, a Raspberry Pi CPU is utilised to continuously process and transmit data while controlling the robot. This robot is appropriate for military uses such keeping an eye on a target or an area of interest, offering a tactical edge in difficult environments, or taking hostages. With the use of image processing, which can analyse and manipulate a digitised picture or video, it is capable of moving across any surface and giving monitoring over an area. A single unit that will monitor the environment for multiple dangerous situations and offer visual feedback makes up the suggested system.

I. INTRODUCTION:

Nowadays, surveillance is necessary in military zones, but the quality of that surveillance falls short of expectations. The soldier's life is in jeopardy. So, there should be some kind of supervision to raise the quality. There should be a mobile surveillance system that can operate anywhere. High quality video transmission can help the surveillance be more successful. The suggested system enhances the video quality. These ground robots can travel across a variety of terrain, including stairs and muddy regions. By the development of various types of closed-circuit

cameras, surveillance technology has advanced significantly over the last several years. Although helping to solve crime scenes, these have not resulted in a decrease in crime because of the surveillance equipment's inertia. Security cameras are the first items that surveillance tools target when hostages are being held hostage. The construction of a mobile robot that can record real-time photos and videos for surveillance is the subject of this research. As implied by its name, Snitch may penetrate enemy lines to learn the secrets and identities of the opposition, giving its operator an additional tactical edge. Snitch's main component is mobility, which must overcome the barriers that are now in the way of mobile robotics. Mobile robot development had a surge, and they are now capable of doing domestic tasks like vacuuming security door cameras and military tasks like detonating bombs. Other mobile robots created in the past ten years include BigDog Robot, AIBO ERS-7, and RoboSapien. While some of these robots are capable of doing certain tasks, most are restricted to regulated environments on horizontal surfaces. However, certain robots can scale vertical surfaces, like the Caterpillar Robot, City-Climber, and Gecko Inspired Surface Climbing Robots. They achieve the appropriate adhesive force to climb on vertical surfaces using the Bernoulli Effect, Tracked Wheel Mechanism, Electrically Controllable Adhesion technology, Electrostatic Adhesion Force, Aerodynamic Attraction, and Vacuum suction. Yet, the majority of robots are unable to effortlessly transition between dimensions. The robot that is presented in this study can easily move on both horizontal and vertical surfaces and transition between them without the aid of a person. to move about easily while carrying out the current responsibilities. One of the few wall-

climbing robots that can automatically switch between surfaces is the City Climber, although it employs a vacuum motor to provide aerodynamic attraction so that it can climb on walls. This generates a lot of unnecessary noise, which can let everyone know the robot is there. But, surveillance tools should be more covert or they will reveal their whereabouts to everyone. The innovative design of Snitch, which employs small suction Cups make it possible for this capability by offering the required adhesive strength that allows them to connect to surfaces and be withdrawn with ease. The consequence is that the robot barely produces any noise and virtually leaves no trace.

II. LITERATURE SURVEY

S. Karthik, Prasanna Vishal, R. Karthikeyan, and S. Vignesh The paper shows a robot called Snitch that can climb walls using tiny suction cups. For better and more dependable data processing and transmission, the robot is controlled by a raspberry pi processor over a Wi-Fi network. The robot is suitable for use in military applications, such as monitoring a person or point of interest and providing a tactical edge in dangerous situations.

Houxiang Zhang and KunWang Zhiqiang Wang It validates our flexible wall-climbing caterpillar robot's locomotion system and gait. The genetics of the dependable caterpillar served as an inspiration for the adaptable wall-climbing caterpillar robot. Connecting modules and joining modules, two distinct types of modules, were developed. The motion of the caterpillar robot engages a shifting genetic set that goes from an open group to a closed group, and then back to an open group orderly due to the predetermined limits between the inhaling cups and wall.

Morris, W., Jizhong Xiao, and M. Elliott Each module moves quickly over unbroken surfaces thanks to the design, which also achieves fluid movement between the various surfaces. Also, the film shows the persuasive simulation outcomes of the aerodynamic tendency that aims to improve the design. Utilizing Raspberry Pi technology, a DSP-based control system is added to the surveillance robot, enabling it to function both manually and automatically.

15 commandable spy robots developed by Chandrakant Ojha, Tushar Maheshwaril, Upendra Kumar, Chaitanya Nagpae, and V. K. Mitta Wireless gadgets can be quite useful if they have long working ranges and can be controlled remotely. Its capabilities and the scope of

applications can be improved by the availability of numerous processes for their wireless control operation. The study embeds a prototype observer that may be managed remotely through a variety of methods. The spy robot may be controlled by DTMF on a smart phone, a remote control app, voice commands, and an ever-evolving gesture control function. DTMF utilises a mobile phone's alpha-numeric keypad. The remote feature was created for smart phones using the Android operating system.

Jin Zhang, Jifan Chen, Rong Liu, and Rui Chen The design, analysis, and fabrication of a quadruped wall-climbing robot are shown in the work. The robot's genetics are based on a gecko's climbing bearing, which served as its inspiration. The robot is based on electrostatic adhesion force created by a specifically constructed electrostatic sticky footpad, similar to how geckos attach to the surface of walls with force. The gecko's bionic bearing design and the electrostatic adhesion mechanism are added to the robot, which benefits from their light weight, low power consumption, flexible movement, and excellent adaptability to various wall surfaces. Practice climbing on a high-rise glass window is shown, and the robot is shown to be able to climb straight up and spin around with strength and agility.

II. Block Diagram

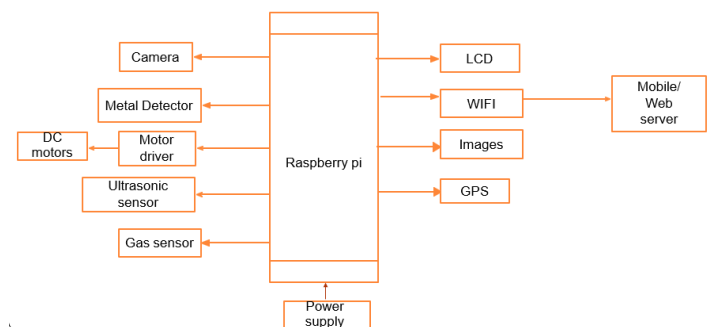


Figure 1 Block Diagram

Existing System:

- Object detection is not present. Bluetooth range is minimum.
- The existing system has used Arduino and IP camera for surveillance which may not be more efficient.
- Less number of sensors used.

Proposed System:

- The electronic components are powered by a rechargeable battery.
- This contain the metal detector that will helpful in detecting the land mains.

Hardwares Used :

- ☐ Raspberry pi
- ☐ Ultrasonic sensor
- ☐ Gas sensor MQ-2
- ☐ Metal detecting sensor
- ☐ Motor driver
- ☐ DC motor
- ☐ LCD
- ☐ WIFI Module
- ☐ GPS

Softwares Used :

- ☐ Raspbian OS
- ☐ Python

III. COMPONENT DESCRIPTION

Raspberry pi:

The Raspberry Pi is a series of small single-board computers developed by the Raspberry Pi Foundation in the UK. These devices have a variety of uses in education, personal computing, and business endeavours and are designed to be inexpensive, adaptable, and simple to use.

A CPU, memory, and a variety of input/output interfaces, including HDMI, USB, Ethernet, and GPIO pins, are all included in the tiny, credit card-sized Raspberry Pi boards. They support a number of operating systems, including Linux, Windows 10 IoT Core, and even Android.

The Raspberry Pi is one of the most widely used devices for electronics and computer education. The Raspberry Pi Foundation has created a variety of educational materials and initiatives that make use of the boards to instruct children of all ages in

coding, electronics, and robotics.



Figure 2 Raspberry Pi

In addition to these projects, Raspberry Pi may also be used to build media centres, gaming consoles, home automation systems, and even autonomous drones. The Raspberry Pi boards have grown in popularity as a tool for DIY enthusiasts and amateurs wishing to create their own unique electronics projects due to its compact size, low power consumption, and inexpensive cost.

Ultrasonic sensor:

A gadget called an ultrasonic sensor uses sound waves at a frequency higher than what the human ear can perceive to detect the presence or proximity of things. (usually over 20 kHz). The sensor produces a high-frequency sound wave, which is then used to time how long it takes the wave to return after hitting something. The distance between the sensor and the object may be determined using the speed of sound by measuring the time interval between the sound wave's emission and return to the sensor.

Many applications, including robotics, industrial automation, and parking sensors for automobiles, frequently employ ultrasonic sensors. They are chosen when other kinds of sensors would not work well, as in dusty or grimy conditions.

Ultrasonic sensors come in two varieties: proximity sensors and distance sensors. While proximity sensors are used to detect the presence of an object within a certain range, distance sensors can precisely measure the distance between the sensor and the object..



Figure 3 Ultrasonic Sensoru

In comparison to other types of sensors, ultrasonic sensors offer a number of benefits, including their high precision and ability to detect non-metallic items. They do, however, have certain drawbacks, such as their susceptibility to environmental variables like temperature and humidity, as well as their constrained use in specific circumstances.

Gas sensor MQ-2: Among the many combustible gases that the MQ-2 gas sensor is designed to detect are smoke, alcohol, hydrogen, LPG, propane, and methane. A small PCB board with an integrated heater, a comparator circuit, and a sensitive element made of a tin dioxide (SnO_2) sensing layer make up the sensor module.

The comparator circuit measures the change in resistance caused by the MQ-2 gas sensor module's detection of a gas. The fraction of this change in resistance to the gas concentration in the air is shown. An analogue voltage signal from the module's output may be read and understood by a microcontroller or computer.

The MQ-2 gas sensor module is a well-liked option for gas leakage detection in homes, companies, and autos due to its great sensitivity to dangerous gases. It is crucial to remember that the sensor module cannot detect gas concentrations in the air correctly and that other environmental variables like temperature and humidity may cause



Figure 4 Gas Sensor

The MQ-2 gas sensor module is often used in conjunction with an Arduino board or microcontroller, and the output signal is read and processed using the proper programming. When utilising gas sensors, it's crucial to take the appropriate safety precautions and to frequently calibrate and test the sensor to verify its accuracy.

Metal detecting sensor:

Electronic sensors called "metal detectors" are used to look for metallic materials or things. When

metallic items are present, these sensors generate a magnetic field and monitor changes in the field. The sensor generates a signal, usually in the form of an auditory beep or a visual indicator on a display, when it detects a metal item.



Figure 5 Metal Detector

There are several types of metal detecting sensors, including:

- The most popular sort of metal detectors are VLF (Very Low Frequency) detectors, which employ a wire coil to generate a magnetic field and identify metal particles. They are frequently employed in security screening, archaeological digs, and treasure seeking.
- PI (Pulse Induction) metal detectors: These detectors transmit and receive signals using a single coil. They are employed for deep metal detection, such as in the search for missing jewels or buried treasures, and are more sensitive than VLF detectors.

Metal detectors with beat frequency oscillation (BFO): These detectors employ two coils, one for signal transmission and the other for signal reception. They are not as precise as VLF or PI detectors, but they are reasonably simple and affordable.

Many uses for metal detecting sensors exist, such as metal detection in security screening, archaeological excavation, and treasure seeking. They are also used in the construction sector to find concealed metal pipes or cables in floors or walls, as well as in manufacturing to find metal contamination in food goods.

Motor driver:

A motor driver is a piece of technology that manages the power, direction, and speed of an electric motor. It transforms signals coming from a microcontroller or other control circuit into the signals needed to drive the motor.



Figure 6 Motor Driver

An electric motor's power, direction, and speed are managed by a motor driver, an electronic device. It transforms signals coming from a microcontroller or other control circuit into the signals needed to operate the motor.

There are several types of motor drivers available, including:

DC motor drivers: These drivers are employed to regulate the direction and speed of DC motors. They can be applied to many other things, including as robotics, automation, and motorized toys.

Stepper motor drivers: Stepper motor rotation is managed by use of these drivers. They are frequently utilized in precise applications including robots, CNC machines, and 3D printers.

Servo motor drivers: Servo motor positions are controlled by means of these drivers. They are frequently employed in automation, robotics, and craft projects.

Motor drivers can be controlled in several ways, including analog signals, digital signals, and pulse width modulation (PWM) signals. PWM signals are commonly used for controlling motor speed because they provide precise control over the duty cycle of the signal, which in turn controls the speed of the motor.

Motor drivers are important components in many electronic systems that require the control of electric motors. They offer a convenient and efficient way to control motor speed, direction, and power.

DC motor:

An electric motor that transforms electrical energy into mechanical energy is known as a DC (direct

current) motor. It functions according to the Lorentz force, which is the force felt by a conductor conducting current in a magnetic field.



Figure 7 DC Motor

A stator (stationary portion) and a rotor are the two major parts of a DC motor (rotating part). The rotor is made up of a coil of wire, commonly known as an armature, whereas the stator is made up of electromagnets or permanent magnets. When the armature receives current, the magnetic field it generates interacts with the magnetic field of the stator to cause the rotor to rotate.

Brushed DC motors and brushless DC motors are two of the several types of DC motors. Whereas brushless DC motors employ electronic controllers to manage the power supply to the motor, brushed DC motors use brushes to deliver electrical power to the armature.

DC motors have several advantages over other types of motors, including high torque at low speeds, simple construction, and easy speed control. They are commonly used in various applications such as electric vehicles, robotics, industrial automation, and more.

LCD:

Liquid Crystal Display is referred to as LCD. It is a kind of flat panel display that creates images by utilizing the characteristics of liquid crystals.



Figure 8 LCD

LCDs are made up of a number of layers, including two polarising layers with a liquid crystal layer sandwiched in between. Transparent electrodes are located on the inner sides of the two glass plates that the liquid crystals are sandwiched between. Liquid crystals position themselves to allow or block light from flowing through the layers when an electric current is given to the electrodes, creating an image.

In comparison to other display types, LCDs provide a number of benefits, such as low power consumption, excellent resolution, and good visibility in strong light. They are frequently found in a wide range of electronic products, including digital cameras, cellphones, televisions, computer displays, and more.

Vertical alignment (VA), in-plane switching (IPS), and twisted nematic (TN) LCDs are just a few of the various varieties of LCDs that are available. Each has pros and cons.

WIFI Module:

A WiFi module is a small electrical gadget that connects other devices to wireless networks. It is a hardware component that combines an antenna, a WiFi transceiver, and a microprocessor.

WiFi modules connect with other devices over a wireless network using IEEE 802.11 wireless standards. They make it possible for devices to connect to the internet, share data, and communicate with one another without the use of wired connections.



Figure 9 WiFi Module

Many equipment, including household appliances, smart home gadgets, systems for industrial automation, and more, can incorporate WiFi modules. They are frequently utilised in Internet of

Things (IoT) applications to facilitate device and cloud communication.

The ESP8266 and ESP32 from Espressif Systems are two well-known WiFi modules. IoT applications frequently employ these devices owing to their inexpensive price, low power consumption, and tiny size. Texas Instruments, Qualcomm, and Broadcom are a few more well-known producers of WiFi modules.

GPS:

Global Positioning System is known as GPS. When there is a clear line of sight to at least four GPS satellites, it is a satellite-based navigation system that can deliver position and time information anywhere on or near the surface of the Earth.

A network of 24 satellites in Earth orbit, ground control centres, and GPS receivers make up the GPS system. Each satellite continually broadcasts a radio signal that includes the time and its position. The location, speed, and direction of movement of GPS receivers on the ground are determined using signals from many satellites.

GPS technology has many applications, including navigation for vehicles, ships, and aircraft; surveying and mapping; search and rescue operations; and tracking and monitoring of assets and people. It has become an essential tool for many industries, including transportation, logistics, and agriculture.



Figure 10 GPS Module

Other satellite navigation systems, such as the Chinese BeiDou system, the European Galileo system, and the Russian GLONASS system, exist in addition to the original GPS system. These systems operate in a similar manner to GPS, but with different satellite constellations and signal frequencies.

Software Used:

Raspbian OS:

Raspbian is an open-source operating system based on Debian Linux and optimized for the Raspberry Pi single-board computer. It is the default and recommended operating system for Raspberry Pi devices.



Figure 11 Raspbian OS

Raspbian provides a full desktop environment and a wide range of pre-installed software, including the Chromium web browser, Python programming language, and LibreOffice suite. It also includes support for hardware interfaces such as GPIO pins, camera modules, and more.

Raspbian is constantly updated and maintained by the Raspberry Pi Foundation, with regular updates and security patches. It is available for free download from the Raspberry Pi website, and there are many resources and tutorials available online to help users get started with using Raspbian on their Raspberry Pi.

Raspbian has become popular among hobbyists, educators, and professionals who use Raspberry Pi for a variety of purposes, including education, robotics, home automation, and more.

Python:

A high-level, interpreted programming language called Python was originally made available in 1991. With a simple syntax and an emphasis on readability and simplicity, it is made to be simple to learn and read.

With a sizable and vibrant user and development community, Python has emerged as one of the most widely used programming languages in the world. Web development, data analysis, machine learning, scientific computing, automation, and other fields all use it.

Some key features of Python include:

Dynamically typed: A variable's data type need not be declared before use.

Python code is interpreted at runtime, so you don't need to build it first in order to use it.

Object-oriented programming is supported by Python, which also lets you create your own classes and objects.

Extensive standard library: Python has a sizable standard library that includes a number of helpful modules for projects like web development and data processing, among other things.

Additionally, Python is renowned for its rich third-party libraries and frameworks, including Django, Flask, NumPy, Pandas, and TensorFlow, which can assist programmers in creating complicated applications more efficiently.

Python is a freely usable and distributable open-source language that may be downloaded from the official.

IV . CONCLUSION:

The user-friendliness of the war spying robot was its primary goal. The spy robot can move around with ease, take pictures, and wirelessly transmit them, alerting the soldiers to dangers and conditions on the battlefield. Depending on the input we provide through the transmitter (remote) section, The robot will move in the direction that its motors indicate. As control signals, RF signals are employed. These signals are used for signal encoding and transmission through the transmitter. The motor driver at the receiving end is given access to these decoded signals as input. By performing close-range monitoring, the robot improves the security of the immediate region. This enables the forces to see what is happening in the immediate area clearly and make appropriate future plans.

V. REFERENCES:

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