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Spy Robot for Video Surveillance and Metal Detection

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***Abstract:** This paper proposes a method for controlling a wireless robot for surveillance using MQTT protocol. The MQTT protocol will open a web page which has video screen for surveillance and buttons to control robot. Android smart phone and raspberry pi is connected to Wi-Fi. An Android smart phone sends wireless command through MQTT protocol to raspberry pi board. Robot moves according to command. Metallic objects detected by using metal detector. The video streaming is done using MJPG streamer program. The raspberry pi programming is done in python language.*
***Keywords:** Raspberry Pi, Robot, surveillances, Metal detector, MQTT Protocol.*

I. INTRODUCTION

For secretly spying or keeping surveillance over a desired target location this project helps in satisfying the functional needs. Not only this but also, we aim to achieve one more additional comprehensive need such as detection of metal, displacing any suspected object from its original position, could work as a rescue operator on to a desired location.

The most eye-catching feature of our robot along with the sensor is that it marks the point where the metal like bombs, land mines gets detected.

We have leveraged our robot with an advantage of monitoring both audio and video parameters. We have achieved our main goal by aggregating individual robotic functions in a single robotic package.

This robot can either be used for keeping an eye or a supervisory control on intrusion making it function like a spy robot or with the additional features as that we have added to this robot could serve as an important unmanned vehicle which could actually combat with the opponents or enemies in the war fields.

By this way instead of risking the life of soldier for everything we can avoid few situations where an activity performed without a real soldier.

II. PURPOSE

The main purpose behind making this project deals out with satisfying various functional needs such as secretly spying or keeping surveillance over a desired target location.

As the evolution of miniaturization of electronic components leads to development of electronic industry, it gives rise to the idea of creating a machine which is capable of tons of activities on the place of human being more accurately and efficiently also consuming lesser time. Though life of soldier is very valuable,a real soldier can replaced by an artificial robot.

III.PROJECT SCOPE

We can use this system for military applications installing suitable sensors. Just by changing the robotic unit design we can use it in hospitals for patient monitoring.

Using some chemical sensors we can detect harmful gas leakage in the chamber the time delay which occurs in the execution of commands can be reduced and thus we can have more real time access to the robot. With reduced time delay we can have faster operation and quick response to any illegal activities in the monitored area. Also it can be used as a spy robot. The robot is very economical.

IV.LITERATURE SURVEY

The literature survey is done by us by referring some IEEE papers and some journal papers. The papers surveyed are represented in the table below.

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TABLE 1 - LITERATURE SURVEY

Year	Author	Paper	Objective	Methodology
2016	Prof. I.Y.Sheikh , Harshal C. Chavan, Jaya S. Vyawhare, Sampada B. Mahajan, Rahul S. Raut	Wi-Fi Surveillance Robot Using Raspberry Pi	The proposed robotic unit is used for video surveillance of remote place as well as remotely control of the unit using Wi-Fi as medium.	Raspberry Pi to control and monitor Robotic unit
2015	Rupali Ikhankar , Sarang Ulabhaje , Mahendra Dhadwe , Varun Kuthe , Shruti Balpande	Pibot: The Raspberry Pi Controlled Multi-Environment Robot For Surveillance & Live Streaming	In this project raspberry pi is used to make a robot which in turn is used to make a real time surveillance system possible within a local network. The live streaming is accomplished by using the mjpeg streamer and the server-client model is made using java.	Mjpeg streamer is used for live streaming
2016	Ashish U. Bokade and V. R. Ratnaparkhe	Video Surveillance Robot Control using Smartphone and Raspberry Pi	This method for controlling a wireless robot for surveillance using an application built on Android platform. The Android application will open a web-page which has video screen for surveillance and buttons to control robot and camera. Android Smartphone and Raspberry pi board is connected to Wi-Fi. An Android Smartphone sends a wireless command which is received by Raspberry pi board and accordingly robot moves. The Video Streaming is done using MJPG streamer program that gets mjpeg data and sends it through a HTTP session. The Raspberry pi programming is done in python language. The experimental result shows that the video streamed up to 15 frames per second.	Android application
2017	Ghanem Osman Elhaj Abdalla, T. Veeramanikandasamy	Implementation of Spy Robot for A Surveillance System using Internet Protocol of Raspberry Pi	In this present work, a Raspbian operating system based spy robot platform with remote monitoring and control algorithm through Internet of Things (IoT) has been developed which will save human live, reduces manual error and protect the country from enemies. The spy robot system comprises the Raspberry Pi (small single-board computer), night vision pi camera and sensors. The information regarding the detection of living objects by PIR sensor is sent to the users through the web server and pi camera capture the moving object which is posted inside the webpage simultaneously.	Monitoring and control algorithm through Internet of Things(IOT).

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V. SYSTEM ARCHITECTURE

This is the proposed block diagram. The Raspberry Pi being the centre and core of this for making robot and is its control unit. The Pi is placed on robot chassis which is connected by DC motors. The DC motor connected to the raspberry Pi via L293D motor driver. This allows to control the speed and direction of the DC motor. The metal detector connected to R Pi which detects metal at the range of 1cm to 3cm.Robot is controlled by mobile with use of wifi as well as internet. MQTT app is made for giving command to robot from mobile. This app will send command left, right, forward, backward, stop to the robot. Robot will move according to command.

USB camera is used for live streaming of video via motion software .This video is processed by R Pi. This complete model of robot will be connected to the local network and can be controlled via anyone, anytime and anywhere.

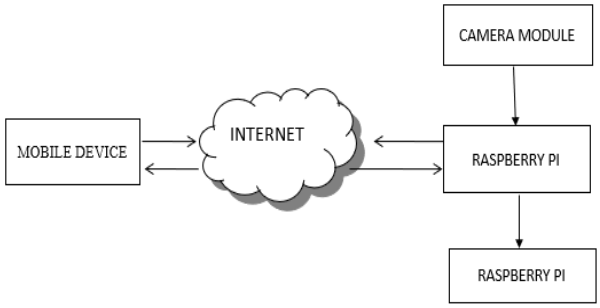


FIG. 1 .SYSTEM ASSEMBLY

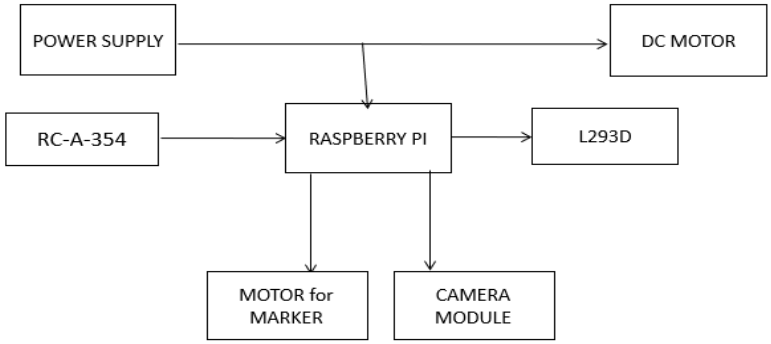


Fig.2.Robot Hardware

A. Raspberry pi 3 model B

1) SOC: Broadcom BCM2837 (approx.50% faster than raspberry pi 2)
2) CPU: 1.2 GHZ quad-core ARM Cortex A53
3) GPU: Broadcom Video Core IV @ 400 MHz
4) Memory: 1 GB LPDDR2-900 SDRAM.
5) USB ports: 4.
6) Network: 10/100 MBPS Ethernet , Bluetooth 4.0,802.11n Wireless LAN
7) 40 GPIO pins
8) Full High Definition Multimedia Interface port, composite video and combined 3.5mm audio jack

B. Camera

1) 25 MP
2) Inbuilt microphone
3) Image sensor
4) High quality

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C. Motor driver IC L293D:

1) Voltage range 4.5V to 36V
2) Separate Input-Logic Supply
3) Current range 600mA to 1.2A

D. Metal Detector RC-A-354

1) VCC 9V Battery (From 9V Battery And Not Adapter)
2) Logic High Out Put With Common Ground
3) Can Detect Any Metal At The Range Of 1Cm To 3Cm

VI. RESULTS

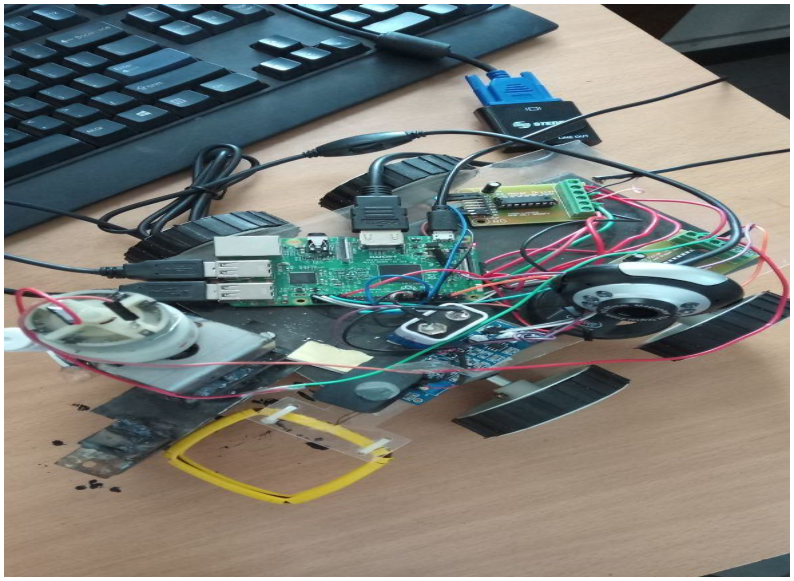


FIG.3.Final Project Model

VII. CONCLUSION

The Raspberry Pi is used to control robot using Smartphone from remote location. The time required for processing the commands from the smart phone and responding accordingly is negligible. The experimental result has proved that the fetching of a good quality video is quick and clear which is up to 15 frames per second. The use of Smartphone instead of Computer and Laptop make the system more reliable and easy to use.

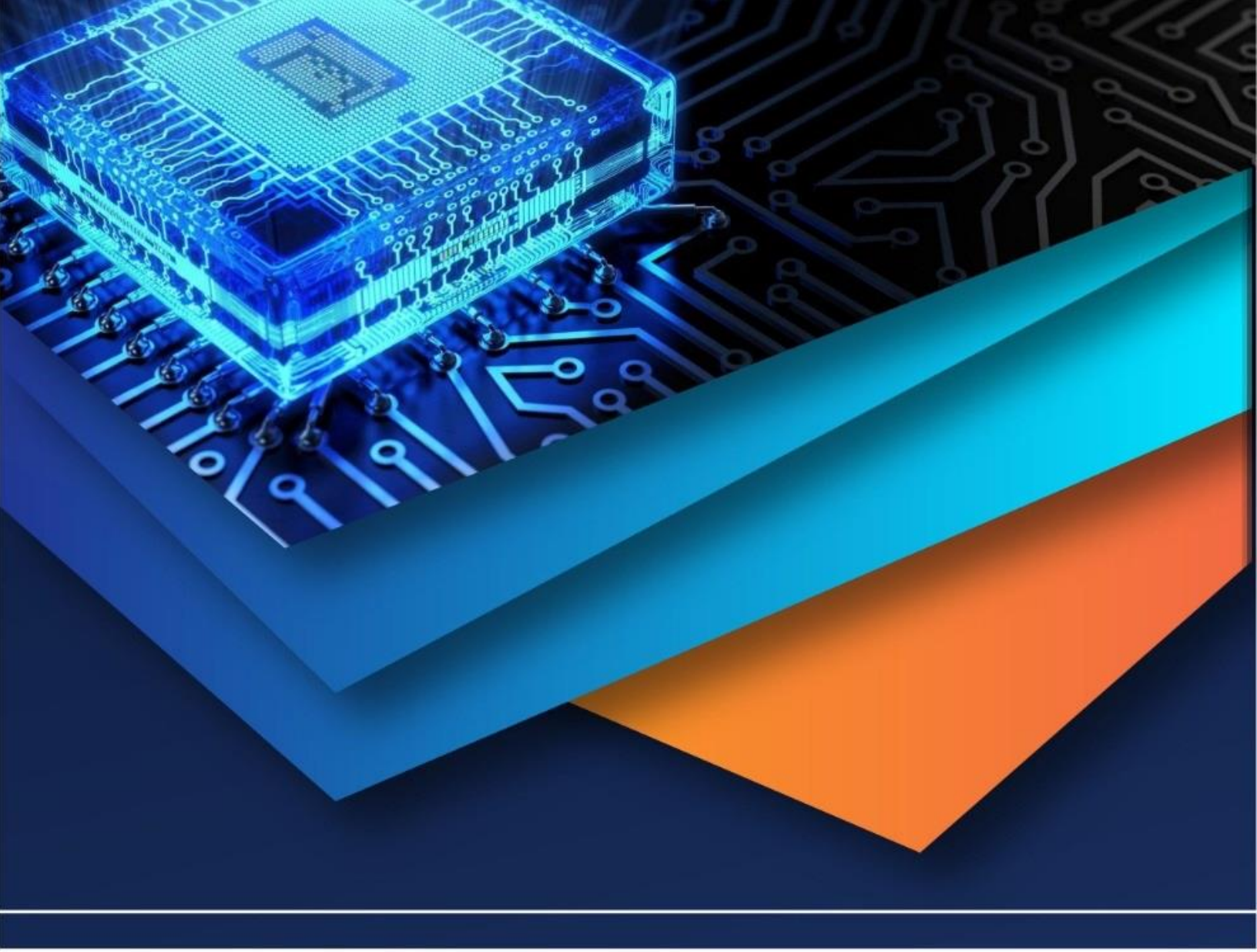
VIII. ACKNOWLEDGEMENT

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