An Integrated Approach for prototype design of a Surveillance Bot

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***Abstract*—Closed Circuit Television system (CCTV) is a very popular device, not only in office but also in home surveillance applications. As CCTV systems have blind spot, so CCTV systems cannot give 100% surveillance alone. For these problems, we need a machine or a tool that can be used for surveillance and don't have any kind of blind spot and can be controlled manually as well as automatically using a smart phone. To overcome these problems, we make a surveillance Bot that can be controlled via smart phone. As an additional feature it can be also controlled via voice command as well as it can move automatically also by detecting obstacle. The robot hardware based on Atmega 328P contains motor servo to actuate robotic head.The Robotic movement is controlled by Nodemcu microcontroller board and is wirelessly connected to controlling person`s smartphone via inbuilt WI-FI modules of these two devices. The controller person can control the robot via a Nodemcu controller Application. The surveillance part is done by using Pi Camera Module and Raspberry Pi and the live footage can be seen remotely in any smartphone as well as in Computers.**

Index Terms—**Bot; CCTV; Raspberry Pi; Surveillance.**

I. INTRODUCTION

This paper presents a surveillance robot using Raspberry Pi, NodeMCU and Arduino UNO that may be used for surveillance and its motion may be effortlessly managed via way of means of the use of Wi-Fi robotic controller software through your Smartphones[1]. Hence, we will say that Android smartphones will serve an awesome gain for commercial, business and different general-motive packages. The DC motors are broadly used for imparting variable pace pressure machine in commercial packages comparable to automation, electric traction, navy instrumentality, constant disk drives, way to their excessive potency, noise-unfastened operation, compactness, dependability, and occasional preservation and cost. Many connections technology is used in recent times together with GSM, GPRS, Wi-Fi, WLANs and Bluetooth[2]. Every approach has its very own exclusive traits and packages. Among those wi-fi connections,

Bluetooth and Wi-Fi era is commonly used[3]. The machine hardware includes a controller geared up with Wi-Fi communiqué module built in within side the NodeMCU microcontroller[11][12]. It'll be related to the automobiles and different opportunity additives of robotic[7]. When the robotic app is grown to become on and is attached with the modern machine through Wi-Fi, one will perform the auto via way of means of giving Wi-Fi instructions from the app the use of the capabilities already programmed within side the app[6]. The automobile will flow all four informed directions left, right, front and back. For forward motion, motion of each motor can be within side the equal path and for backward motion, motion of the motors can be in contrary paths. For left and right movements both of the motors will rotate and to prevent each the automobiles. Instructions are given to the automobiles through the smartphones app via way of means of the users.

II. METHODOLOGY

A. Block Diagram of Movement Part of the Robot:

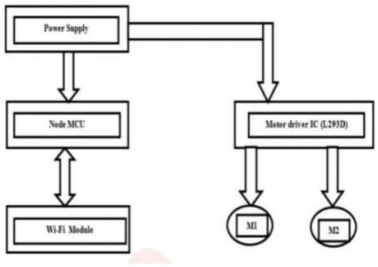

Fig. 1. Block Diagram of Robot Movement

Figure 1 shows block diagram for this Wi-Fi controlled car using ESP 8266.The Project is designed using Arduino

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IDLE Software. Two DC Motors are controlled L298N Motor driver
IC. If the Wi-Fi module inside the NodeMCU gets data, the NodeMCU processes and gives the voltage to motor driver pins and through the motor driver gets power and moves as per instruction[8][10].

B. Block Diagram of Surveillance Part of the Robot:

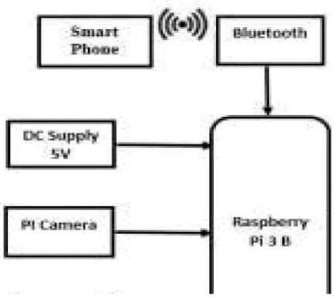

Fig. 2. Block Diagram of Surveillance Part of the Robot

From the above figure we can see, when the program starts the run timer starts and records video via camera and shows live video footage via device or if it does not get instructions it checks for instruction.

C. Circuit Diagram of Movement Part of Robot

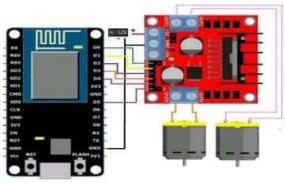

Fig. 3. Block Diagram of Movement Part of Robot

The figure3 shows the schematic diagram of Wi-Fi Controlled Car part of the mechanism. Two DC motors are controlled by L1298 Motor Driver IC, which is a high power motor driver capable of running 5V to 35V DC Motor of 25W. 500 RPM DC motors are used in this application. ESP8266 Board connects and controls the complete circuit and equipment.

D. Circuit Diagram of Surveillance part of Robot

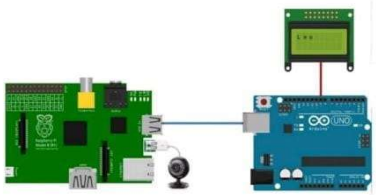

Fig. 4. Block Diagram of Surveillance part of Robot

To develop the surveillance part, we have used a motor servo to move the neck and face of the robot. We have used Pi camera as visual sensor, Microphone as the sound sensor and Arduino Uno Microcontroller as controller of the actuator and this whole circuit is connected to Raspberry Pi 3B Microcomputer where the database is stored and processing of the images and other surveillance operations are done. Raspberry Pi 3B is connected to a power bank to power the whole circuit.

III. RESULTS

The project has been finished with success with the utmost satisfaction. The constraints square measure met and triumphs over with achievement. The system styled is meant is intended as find it irresistible was set within the layout section. The project gives clever plan on growing a full-fledged utility fulfilling the person needs. The device is extremely versatile. This code encompasses an easy display screen that lets in the person to apply without any inconvenience. Validation assessments iatrogenic have substantially decreased errors. Provisions are created to improve the code. It has been examined with live records and has supplied a prosperous result. Thence the code has tested to determine expeditiously. The device created met its objectives, with the aid of using being truthful to apply. This code is advanced with measurability in mind. Further modules can't be really different as soon as necessary. The code is advanced with popular approach. All modules inside the device are examined with legitimate records and invalid records and the entirety paintings with achievement. However, there is nonetheless plenty of scope for future development and accessories in practicality. A wide variety of the most ones being cell utility improvement for extraordinary cell software program package. It is displaying live video footage to the controlling person's device and the motion of the Robot is likewise great.

Fig. 5. Prototype

IV. OBSERVATION

TABLE I

Port	Command (Node MCU)	Motor Output			
		Without Command		With Command	
		V_{in}	V_{out}	V_{in}	V_{out}
3	RIGHT REVERSE	0.01 V	0.01 V	9.89 V	9.76 V
4	RIGHT FORWARD	0.01 V	0.01 V	9.79 V	9.70 V
7	LEFT REVERSE	1.01 V	0.01 V	9.95 V	9.91 V
8	LEFT FORWARD	0.01 V	0.01 V	9.88 V	9.76 V

V. APPLICATIONS AND FUTURE SCOPE

The Robot can be used as a surveillance equipment.

2. The Robot can be used to film videos of something.

3. Robot cars also getting used for military weapon to destroy enemy territories.

4. Robot cars are also getting used for stealth purposes.

5. Engineers are trying to convert these robot cars to a full-blown War- machine.

VI. CONCLUSION

To develop this project, we have learnt Python language and its OpenCV library which are one of the most important and trending parts of modern coding. With the success of this project. we would like to continue our research work in this field and develop much more advanced robots which can solve real life problems. In the end we would like to thank our mentor Mrs. Sanghamitra Layek Madam for her great contribution in our project, without her this project wouldn't become a success.

VII. REFERENCES

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VIII. BIOGRAPHIES

Raktim Dutta was born in Madhyamgram in India on November 27,2002. He passed 10th examination from Madhyamgram Acharya Prafulla Chandra Vidyayatan in 2018, and passed 12th Examination from Madhyamgram Acharya Prafulla Chandra Vidyayatan. He us currently pursuing his BTech degree in Electronics and instrumentation engineering department at Narula Institute of Technology, Agarpara.

Sayan Mondal was born in Chittaranjan, Paschim Bardhaman of India on April 24, 2000.He passed his secondary education from Burnpur Riverside School, Chittaranjan in 2016. He went to many places for higher studies and currently pursuing his Bachelor's Degree in Electronics and Instrumentation from Narula Institute of Technology, Agarpara

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