Surveillance Robot Car

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***Abstract*—Developing surveillance and monitoring systemscan be quite challenging at times since the systems should be designed with consideration of the environment to be monitored. Good surveillance systems need to have dynamic features, e.g., monitoring cameras that are mobile can move around the area being monitored. Monitoring a large area would also be a challenge for the security officers, as they willneed to spend too much time to patrol covering all places. Other scenarios that require dynamic surveillance systems include dangerous areas, e.g., areas with explosion and fire risk, or those contaminated with toxic gases. Another use caseincludes areas that cannot be accessed by humans. To addressthese challenges, we propose a dynamic monitoring system based on a Wi-Fi remote controlled car. Users can be in the next room, the next building, or even in another country whilecontrolling the movement of the car via the Internet. Some sensing mechanism is needed to help the user to locate the current location of the car and effectively navigate. This system is using Wi-Fi as the only communication medium to connect the car to the server.**

I. INTRODUCTION

With the rapid growth of information technology, a range of video surveillance systems have become commonplace in daily life for surveillance and security purposes. Closed- circuit television (CCTV), often known as video surveillance, is an example of how video cameras send video signals to a limited number of monitors. When CCTV was initially introduced, its low quality and high installationcosts restricted its use. Another common example is the dashboard camera. In the event of a car accident or vandalism, dashboard cameras can provide video proof. A CCTV is typically installed for surveillance in areas that require monitoring, such as banks and hospitals or areas where security is required. Therefore, its coverage is limited. On the other hand, as a car dashboard camera is installed inside a car, it can record while the car is moving.To perform car tracking efficiently, these two types of devices should be considered together. In the case of CCTV, as its location is fixed and its hardware performance is superb, it is highly effective for the monitoring of carmovements in a predefined area.

To have the ability of both, our system is proposed in such a way that it can be used effectively to handle traditional surveillance tasks that are typically both time-consuming and labor intensive. For instance, one of the typical steps for the police to determine the movement of a stolen vehicle is to startwith the CCTV and dashboard cameras in the vicinity and gradually expand to a greater area. Investigating all the CCTV records and dashboard cameras involved would require significant amounts of human labor and time. In the case of our system, based on the car number, time of the crime, and place, we can easily formulate a query to determine the detailed trackof the stolen car. In addition, our system can be highly effective for other popular applications such as traffic congestion analysis by region, searching for optimal driving routes, access points and evacuation exits during accidents and planning newroad construction.

Based on our findings, we propose a spy camera car system (integrated video-based automobile tracking system) that can collect video and display the user's real-time environment. To make the robot a surveillance robot vehicle, we propose combining a camera with the robot using the ESP32-CAM module. Apart from the ESP32-Camera module, we will buildthis Robotic car with two DC motors, a robot chassis, and an L293D motor driver module.

II.LITERATURE SURVEY

V SHANKAR Intelligent combat robot 2015: It has been described as developing a robotic vehicle for remote operation using RF technology and a wireless camera for monitoring purposes. The robot and camera can send real-time footage with night visioncapabilities through a wireless network. This type of robot could be

useful in war zones for spying purposes. In this technology, a robot can only be operated from a distance of tenmeters. Robot with Bluetooth control: With the increased speed, a new classification technique was presented to improvethe robot's range. The camera's link was frequently lost with this technology.

Jovita Serrao and Awab Fakih - mobile operated vehicle: It's anotion in which a human can operate a vehicle remotely or wirelessly using an Android app without having to sit inside it.A car powered by a battery and a controller with Bluetooth connectivity is included in the project. The system is made up of a controller with a Bluetooth communication IC that will be connected to the vehicle's motors and other components. When an android app that is connected to this system via Bluetooth isturned on, the vehicle can be controlled via wireless orders from the app. Bluetooth's range of operation is around 10 meters or 33 feet.

Dr. S. Bhargavi and S. Manjunath Electronics and Communication: The goal of this research is to reduce human casualties in terrorist attacks like the one on September 11, 2001. The combat robot was created to deal with such heinousterror acts. This robot is radio-controlled, self-powered, and equipped with all of the controls found in a typical car. It's been outfitted with a wireless camera so that it can keep an eye on the adversary from afar if necessary. It has the ability to enter enemy territory invisibly and transmit all information to us viaits small camera eyes. This spy robot can be deployed at high-end hotels, shopping malls, and jewelry showrooms, among other places where intruders or terrorists may pose a threat. Hebah H.O.Nasereddin and Amjad Abdullah Abdelkarim ,they have used the Bluetooth technology to control robot using Smartphone. In this proposed experiment robot is controlled using Bluetooth which has two modes: The first mode DDM called direct drive mode, in this case robot moves in all directions as per the user requirement the other mode is MBMcalled map-based mode, in which MBA allows user to draw initial point and end point and obstacle, in order to calculate shortest path. so, user can choose or use one of two modes to control robot using wireless communication

II.METHODOLOGY WITH BLOCK DIAGRAM

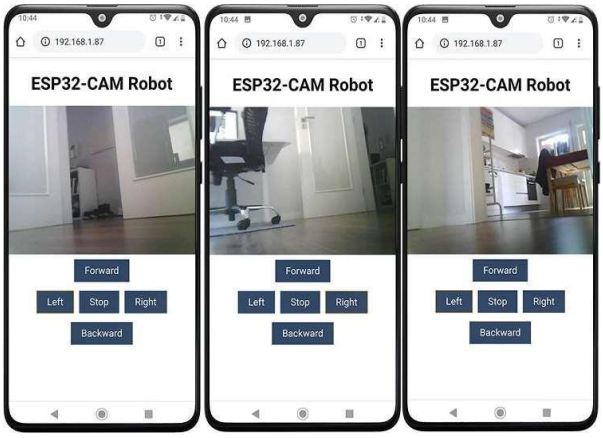
Any robot's structure, or body, on which its whole controlcircuits and actuators are to be attached, is a basic requirement.The fundamental goal of our design is to move the device inresponse to the button. As a result, we created a simple robotthat can go forward, backward, left, and right by simply pressing a button

Components used:

- ESP32-CAM
- Arduino Programmer
- DC Motors (4)
- Motor Driver (L293D)
- DC-DC buck converter

As the ESP32-CAM lacks a USB port, an Arduino board is required to upload the code. The ESP32's VCC and GND pins are wired to the ARDUINO board's VCC and GND pins. The ESP32's Tx and Rx are linked to the ARDUINO board's Rx and Tx.

Through the L293D module, two DC motors are connected toESP32. The IO4, IO2, IO14, and IO15 pins of the ESP32 are connected to the module pins.



The surveillance bot ESP32-CAM module has an ESP32-S processor, an OV2640 camera, and a microSD card slot. Images captured by the camera can be stored on a MicroSD card slot. The HTTP communication protocol will be utilized to receive video streaming from the OV2640 camera via a web browser in this case. As indicated in the image above, the webpage will also feature buttons to move the car in the Left, Right, Forward, and Reverse directions.

Disconnect GPIO 0 from GND after uploading the code. Use a baud rate of 115200, open the Serial Monitor. On the ESP32-CAM, press the RST button on the on-board RST button.

The IP address of the ESP32-CAM should be displayed in theSerial Monitor.

Remove the ARDUINO programmer from the ESP32-CAM. Connect the ESP32-CAM to the Pan/Tilt platform again, switch on the power, and hit the RST button on the ESP32CAM on-board.

You should open up your router settings. There you will find some settings, including something along the lines ofForwarding or Port Forwarding.
The important thing to note here is the "Port Range" and the "Device" or "IP address".
In "Port Range" you should type 80-81.
For "Device" you should select your ESP32-CAM device. In some routers you should put the IP address of your ESP32CAM instead of a device name.

The live video captured by the camera will be sent to the android application by which we will decide the movement ofour vehicle.

III.EXPECTED OUTCOMES

A. Although these robots simply offer us with the live footageof the scene, it can't engage or offer facts about different aspects. However, there are numerous uses of this bot foranalyzing diverse situations which might be dangerous or inaccessible to humans.

There are many situations, like mining accidents, urban disasters etc., that require the usage of remotely controlled surveillance robots for assessing the harm and developing the strategy, for viable access points and evacuation exits requiredto face the task and save lives.
Human surveillance is carried through skilled work forces in close sensitive regions of war area or adversary territory in order to constantly look for changes. Whereas there's usually added risks of losing work force in the time of getting caught by the adversary. With developed technology in pasted years, there it is possibility to keep the important regions under surveillance remotely by the use of robots instead of human. Some regions want to be positioned under video surveillance for a brief time, and consequently equipping them with desk bound CCTV systems isn't always viable. Such demanding situations regularly rise up in agricultural settings. For example, the fields may only need to be positioned under video surveillance whilst the vegetation are attaining maturity. Surveillance of pastures is effective only when farm animals are roaming round them. In addition, pastures, fields, and hillswhich can be most desirable for surveillance do now no longer, in maximum cases, have an energy supply. For the agriculturalsector, cellular video surveillance by the usage of the Surveillance Robot Car is a lot more helpful than opting for desk bound surveillance structures. Mobile robots do now no longer require setting up highly-priced infrastructure, setting up poles, or laying down cable and hence becomes much moreconvenient and economical.

B. APPLICATION WITH SCOPE

In any circumstance involving technology nowadays is a must, robots are one of the future necessity, virtual safety is arequirement.

- PATROLLING

Regularly Patrolling the streets to keep people safe and assist in notifying the authorities as soon as possible. There is a veryslim probability of receiving inaccurate or biased information. Identifying, collecting, and rapidly submitting information to authorities if it matches any person's criminal history in its criminal database.
For instance, if some criminal is on the run, the bot can send police a message with its last location.

- APPLICATION IN THE MILITARY

Certain places are only for gathering information and monitoring; thus, this surveillance car bot can surely be used; with advanced upgrades, we can provide data

instantly and carry out military action as needed.

- APPLICATIONS FOR TRAFFIC

It can be used to monitor traffic rules, persons wearing helmetsor not, and car seat-belts.
In covid circumstances, people wear masks and maintainsocial distance.

- CONCERNS ABOUT THE ENVIRONMENT

Cleanliness is encouraged, and online fines for not following standards and fouling the environment.
Playing brief voice notes to remind individuals to follow the rules and keep the area clean.

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