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VIDEO SURVEILLANCE ROBOT USING WI-FI MODULE, ARDUINO AND ANDROID APIS

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ABSTRACT

We propose a surveillance robotic with the usage of an Arduino UNO microcontroller and a smart smartphone strolling the Android operating gadget. Surveillance robots typically encompass a video digicam, a GPS module, and GSM radios. Pleasant the above needs can be fulfilled with android phones. This can be leveraged and APIs can be used for operation. Also, the cost for manufacturing stated robot with the use of a android phone is reduced to a high-quality volume [4]. The robot can be managed remotely from a computer with the use of the internet and a microcontroller-clever smartphone interface residing at the robot. To capture the inbuilt digital camera is utilized to access the actual real time video from the robot. Visual feedback can be used to drive robot from the remote area [4]. The stepper motor is connected to camera which is used to give 360 degree visual which makes it viable to capture any object. Our robot not only can be managed with android platform however it can also be controlled with the help of PC.

KEYWORDS - ARDUINO, ESP8266 module, Android APIs, Android Platform, L293D motor driver, IP Webcam app, ATC Lite app.

INTRODUCTION

The procedure of monitoring a situation, an area or a person is surveillance. It is mainly important from military perspective in which surveillance of borderlines and enemy territory is important to a country's protection. For continuous monitoring human surveillance is carried out. But people do have their boundaries and deployment in inaccessible places isn't always constantly possible. There is also hike in increasing risk of losing personnel within the occasion of getting caught or killed by the enemy. With techno advancements in recent years, but, it's possible to remotely display areas of importance by means of the use of robots as a substitute of people. Other than the security of personnel, terrestrial and aerial robots can also pick up information that are not obvious to people. By equipping them with appropriate tools, camera and numerous sensors, it is possible to acquire statistics approximately of the unique area remotely. Real-time audio-visual communication is feasible because of verbal exchange between Satellite TV for PC [1].As a result, surveillance era has end up a place of brilliant research field.

Basically a security robot is equipped with GPS module excessive decision cameras, and radios for satellite connection and remote operability. Each of those components are quite high-priced and piecing them together for the cause of a robot is a completely highly-priced and time investing affair. Furthermore, a amount of time is wasted in writing driver code to interface these kinds of components. The solution to this predicament is quite easy [4]. Within the previous few years, feature-rich clever smartphones emerge which phones come ready with the desired functions along with a GPS module, an excessive decision camera and net connectivity. Application Programmer Interfaces (APIs) can be easily accessible on running system for the usage of the various sensors without problems. Through the usage of the APIs, without delay connectivity may be provided and can be without difficulty operated.

WORKING PRINCIPLE

The working principle of the video surveillance robot using Wi-Fi module is very simple. IP webcam can provide real time video surveillance at receiver segment, Wi-Fi module is connected to smart cell phone, which creates an open loop connection. With proper coding, Android API can be applied to manual robotic from any faraway vicinity. From remote location this robot can be easily accessible utilizing visual footprints [5].

SYSTEM DESCRIPTION

For many years, the video surveillance has played ultimate role within the research .The application has huge range of purposes like traffic monitoring, remote operability. Offering here's a "Video Surveillance using wireless managed robot'' the use of ATMEGA328, one of the basic microcontroller. The robot may be guided in any route from far flung area using Android mobile App named "ATC LITE". ESP8266 wireless module is at the core of this project. The consumer controls the robot via sending manipulate signals to the Android phone [5]. The cell phone then forwards those indicators to the Arduino Microcontroller, which then control the movements of the robot in the required course. The digicam on the Android smartphone is used to ship video feedback to the faraway user concurrently over the internet. This permits the person to access the robot remotely. On the video feed additional processing may be carried out on PC. A visible representation is shown beneath [9].
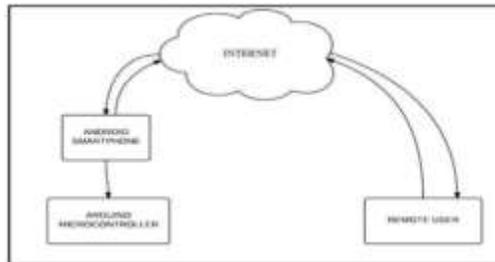

Fig. 1: Basic overview of the system.

MODULES AND INTERFACES

The mission is divided into three modules, each of which might be explained in detail below.
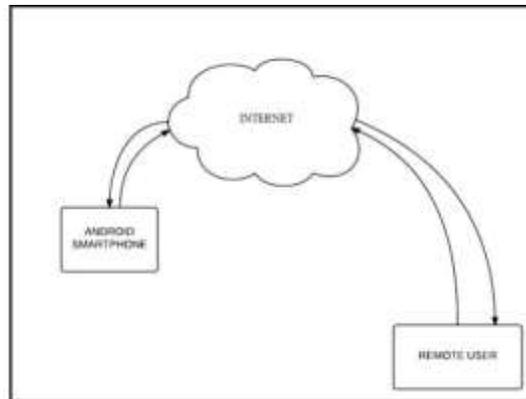
A. Android to user Communication

Fig. 2: Android to user interface.

IP Webcam app is used to offer stay video visual at remote vicinity. The Android smartphone on the robot writes the video feed to a particular IP address which is ready by means of the consumer [3].

Fig 3: IP Webcam GUI on the remote computer

B. User to Robot (Arduino) Communication

Android cellular App named "ATC LITE" is used to govern the robot in any direction from faraway region.
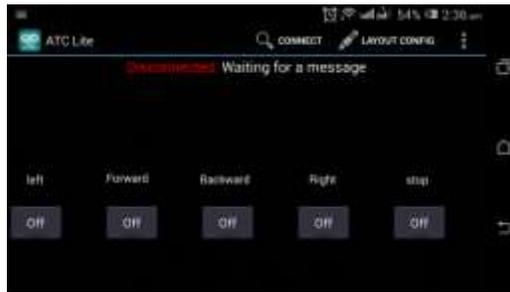

Fig 4: A screenshot of the Android app running on the phone

C. Arduino Implementation

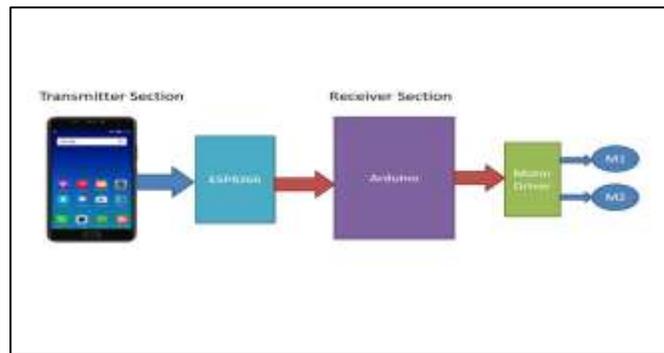In our device, we have used an Arduino Uno is a microcontroller board primarily based on the ATmega328

Fig. 5: Block diagram of video surveillance robot using Wi-Fi module

A. Esp8266 Wi-Fi Module

The ESP8266 is a low-value Wi-Fi microchip with full TCP/IP stack and microcontroller capability [6].
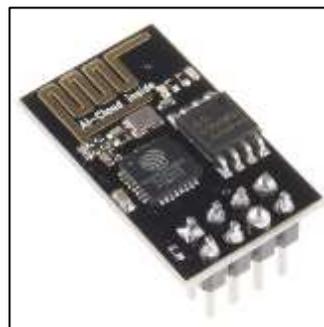

Fig 6: ESP8266 module

D. Microcontroller ATMEGA 328-PU

The ATmega328 is a single-chip microcontroller. The high performance eight bit AVR RISC- based totally microcontroller combines 32 kb ISP flash memory [9] 1 kb EEPROM, 2 kb SRAM, 23 well known reason I/O lines. It has 32 GPRs, 3 flexible timers/ counters, interrupts. 10 bit ADC, programmable watchdog timer with inner oscillator and electricity saving modes. Voltage compatibility is 5 volts. [7].
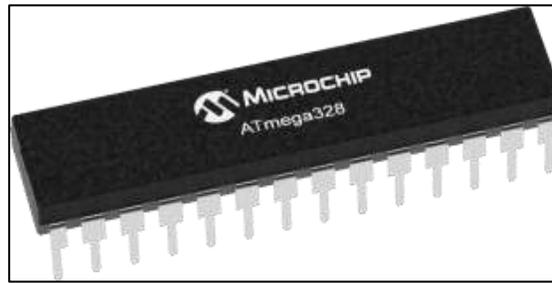
Fig. 7: Microcontroller ATMEGA 328-PU

E. L293D MOTOR DRIVER

L293D is a twin H-bridge motor driver incorporated circuit (IC). Motor drivers act as current amplifiers, as they govern by low voltage logic which is used to drive a higher-contemporary signal device. The motor operations of two vehicles may be managed by using enter logic at pins 2 & 7 and 10 & 15 [2]. Enter common sense 00 or 11 will forestall the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise guidelines. Allow pins 1 and 9 (similar to the two automobiles) ought to be excessive.
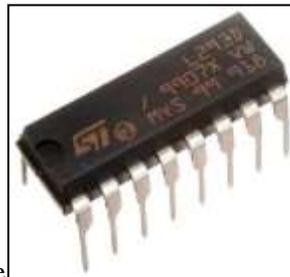

Fig. 8: L293D motor driver IC
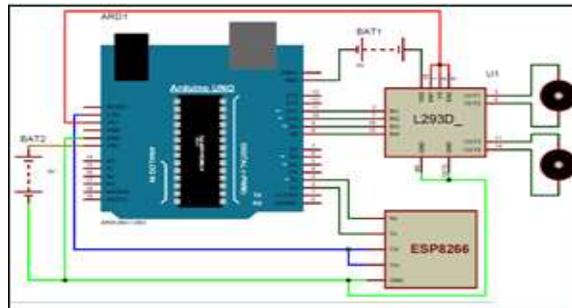
IV. CIRCUIT DIAGRAM

Fig. 9: Circuit Diagram of Wi-Fi controlled surveillance robot

The drivers and modules are linked with microcontroller (ATmega328) [9]. ESP8266 Wi-Fi module is attached with pin variety 2, 3. Rx of Wi-Fi module is attached with TX of microcontroller and TX of wireless module is connected with Rx of microcontroller. Motor driving force shield is hooked up to pin eight, 9, 10, and 11 of microcontroller, which drives left and proper motor in line with commands [6].
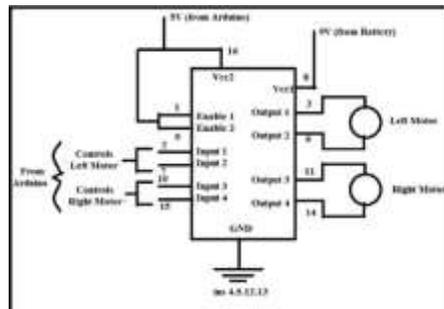

Figure 10: circuit diagram of the motor driver circuit

CONCLUSION AND FUTURE SCOPE

In this robot, to remotely access Arduino is used. Many secret spy applications is possible by utilizing this robot. This robot could enables to track down the person in the remote area without our presence. Consequently this project gives protection and far off running capability [9].This project offers facility for including more modern functions. We since all image processing is done remotely, hence it offers a great advantage of giving it artificial intelligence. As a result, we will make it absolutely self-sufficient. Also GPS navigation and mapping software, the robot can be tracked down deliberately and could find the shortest path to reach certain location on its own. [8]. we are able to installation a GUI platform with help of a development software along with a unique digital camera window and controlling toolbox and keys. Surveillance capabilities can be improved utilizing sound processing.

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