Android & Wi-Fi Controlled Intelligent Robot With Video Surveillance

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Abstract: **The project aims at designing a Robot which is controlled through Android phone over Wi-Fi technology. The Robot can be controlled in all the four directions (front, back, left and right). It can also monitor sensor parameters such as temperature, distance of an obstacle etc. It can be monitored through predefined buttons assigned in the android application.**

Keywords: **Robot; Android App; Surveillance; Wireless Communication; Navigation; Sensor Monitoring;**

I. INTRODUCTION

The advent of new high-speed technology and the growing computer Capacity provided realistic opportunity for new robot controls and realization of new methods of control theory. This technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robots control devices, new drivers and advanced control algorithms. This project describes a new economical solution of robot control systems.

Wi-Fi (Short for **Wi**reless **Fi**delity) is a wireless technology that uses radio frequency to transmit data through the air. Wi-Fi has initial speeds of 1mbps to 2mbps. Wi-Fi transmits data in the frequency band of 2.4 GHz. It implements the concept of frequency division multiplexing technology. Range of Wi-Fi technology is 30-100 meters.

II. LITERATURE REVIEW

Surveillance system is a type of system that has been used to observe specific activities or areas in term of managing, directing or protecting purpose. By monitoring the certain activities or areas every time using the surveillance system, the users are able to know if something abnormal happens and further action can be taken after that. Robots are able to execute the task that is sometimes impossible or beyond capability of human beings. It can give many advantages in term of safety, ease and efficiency. Surveillance system and robots are two different systems that carry out their own task respectively. The main inspiration for this project is to combine these two systems to produce a mobile robot equipped with a camera as an intelligence surveillance system.

III. PROPOSED SYSTEM

This project is to design and build android phone based manually controlled surveillance robot.The controlling of a robot in the project is done by Atmega2560 Microcontroller which belongs to AVR family and communication link is using wi-fi technology. The data sent from Android mobile phone over Wi-Fi will be received by Wi-Fi module connected to Microcontroller. Microcontroller processes the data and and controls the dc motors connected to it accordingly. The LM35 temperature sensor, HC-SR04 ultrasonic sensor for monitoring distance of an obstacle is used. The project can be thus used for security and surveillance in many application areas.

Software:

1. Arduino IDE
2. Embedded CPP Code
3. Proteus Simulator

Hardware Components:

1. ATMEGA2560 Microcontroller
2. Ultrasonic Sensor HC-05
3. LM35 Temp Sensor
4. Wi-Fi Module ESP01
5. 16X2 LCD Display
6. DC motors and L293D Motor Driver.
7. 12V Rechargeable Battery
8. Regulated Power Supply

Working Description :

There are two gear DC Motors which are interfaced with microcontroller through L293d motor driver IC. It works on the concept of H-bridge. In a single L293D chip there are two h-Bridge circuit inside the IC which can rotate two dc motor independently in either clockwise or anti-clockwise direction. Thus we can control robot movements.
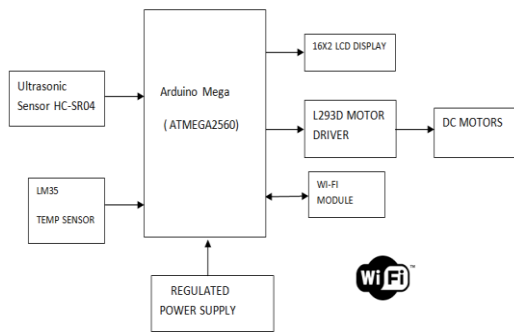
Robot CommandMotor Movement

Forward	M1 & M2 Clockwise
Backward	M1 & M2 Anti-Clockwise
Left	M1 Clockwise & M2 Stops
Right	M2 Clockwise & M1 Stops
Stop	Both M1 & M2 Stop

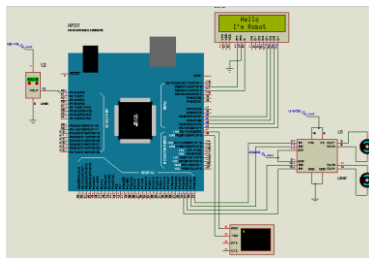**Basic Schematic of L293d Motor Driver :**
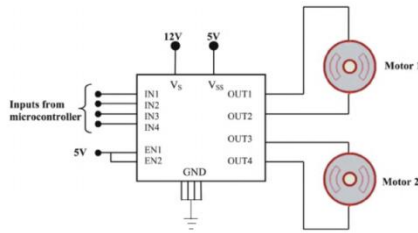
IV.   BLOCK DIAGRAM

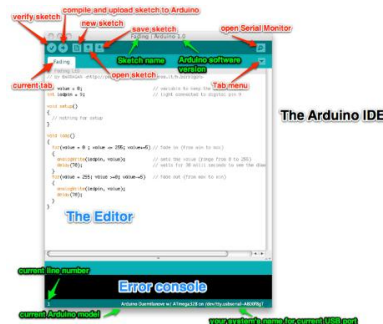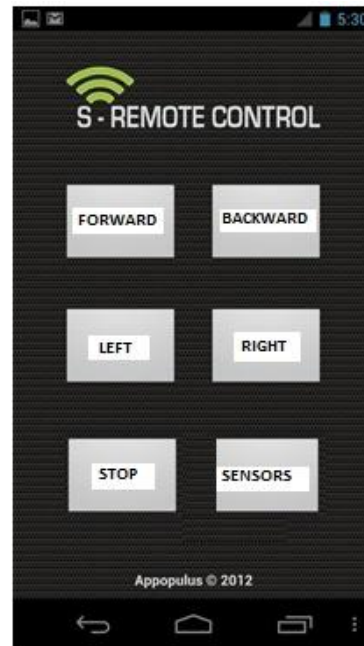

V.   PROTEUS SCHEMATIC DIAGRAM
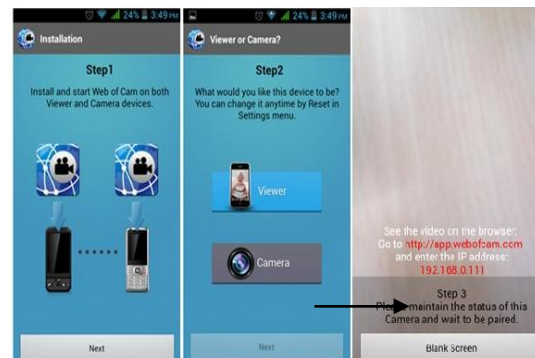

VI.   SCREENSHOT

6.1 Screenshot of Arduino IDE

We are using embedded cpp code and arduino IDE to compile the source code.

6.2 Screenshot of Android App


6.3 Screenshot of Web Of Cam Android App

Video Transmission: The Android APP 'Web Of Cam' is used to send live video over the internet to the server or another android enabled device such as android phone, tablet using wi-fi network.

All which is needed is android phone which has a working camera to capture the live feed and WIFI or 3G/2G connection ability to be able to send those signals over the internet. We can use two android phones , one can be made viewer and another camera or vice versa. It can also transmit video signals to laptop having common wifi network. We can enter specific IP address in browser and get live video.

VII. RESULTS

When robot is powered , it checks for wi-fi connectivity. If it is able to get wi-fi signal, it shows message on LCD "Wi-Fi Network Is Now Ready" we can then use different buttons to send different commands to robot using android app. It shows different movement names on LCD. It shows temperature value in degree celcius and distance of an obstacle in meters.
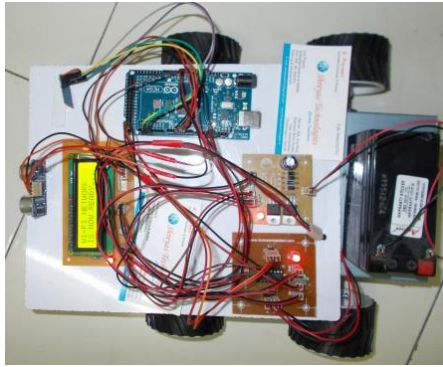
VIII. APPLICATIONS

- Health care: hospitals, patient-care, surgery, research

- Laboratories: science, engineering

- Law enforcement: surveillance, patrol

- Manufacturing

- Military: demining, surveillance, enemy attack

- Mining, excavation, and exploration

- Transportation: air, ground, rail, space

- Utilities: gas, water, and electric

IX. CONCLUSION

In the designing of the project ease of user interface is considered. The controlling of robot is easy as the different buttons are available on the android app for different actions. The Android device used here makes possible the fast and good quality of images and video transmission as well. The programming used is easy to understand and modify. The Controlled Wireless communication can be achieved using Wi-Fi network or internet. The future implications of the project can be GSM controlled robot to have global range. The robot has very robust design.

X. REFERENCES

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