Abstract

Tittle: Surveillance Robot controlled using an Android app

The robotics and automation industry which is ruled the sectors from manufacturing to household entertainments. It is widely used because of its simplicity and ability to modify to meet changes of needs. The project is designed to develop a robotic vehicle using android application for remote operation attached with wireless camera for monitoring purpose. The robot along with camera can wirelessly transmit real time video with night vision capabilities. This is kind of robot can be helpful for spying purpose in war fields. The Wi-Fi technology is relatively new as compared to other technologies and there is huge potential of its growth and practical application. The android application loaded on mobile devices, can connect with security system and easy to use GUI. The security system then acts on these command and responds to the user. The CMOS camera and the motion detector are attached with security system for remote surveillance. A robot is a machine capable of carrying out a complex series of actions automatically, especially one programmable by a computer. A robot can be controlled by a human operator, sometimes from a great distance. In such type of applications wireless communication is more important. This paper also shows general idea and design of the robot. Surveillance security robot provides safety like man. Automatic patrolling vehicle for periodic patrolling in defined or a restricted area, the patrolling vehicle can move automatically to monitor the dead zones and capture the images by using the camera.

Keywords and Glossary

Keywords:

Android, Robot, Bluetooth, Robotic control, Wi-Fi, Surveillance, Artificial Intelligence, Arduino

Glossary:

A

Artificial intelligence

Artificial intelligence (AI) is the intelligence exhibited by machines or software. It is an academic field of study which generally studies the goal of emulating human-like intelligence, though other variations of AI such as strong-AI and weak-AI are also studied. Major AI researchers and textbooks define this field as "the study and design of intelligent agents", where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success.

Arduino

Arduino is an open-source computer hardware and software company, project and user community that designs and manufactures kits for building digital devices and interactive objects that can sense and control the physical world.[1] Arduino boards may be purchased preassembled, or as do-it-yourself kits; at the same time, the hardware design information is available for those who would like to assemble an Arduino from scratch.

ATMEGA 328

The ATmega328 is a single chip micro-controller created by Atmel and belongs to the megaAVR series. The Atmel 8-bit AVR RISC-based microcontroller combines 32Â KB ISP flash memory with read-while-write capabilities, 1Â KB EEPROM, 2Â KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughputs approaching 1 MIPS per Mhz.

B

BLUETOOTH

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485Â GHz[4]) from fixed and mobile devices, and building personal area networks (PANs). Invented by telecom vendor Ericsson in 1994,[5] it was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization.

CCTV

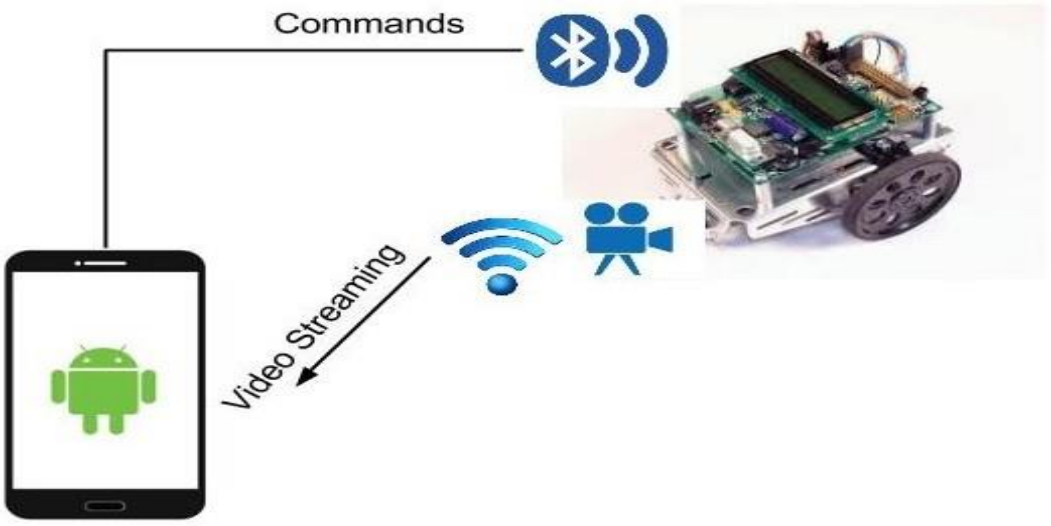
Closed-circuit television (CCTV), also known as video surveillance, is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors. It differs from broadcast television in that the signal is not openly transmitted, though it may employ point to point (P2P), point to multipoint, or mesh wireless links. Though almost all video cameras fit this definition, the term is most often applied to those used for surveillance in areas that may need monitoring such as banks, casinos, airports, military installations, and convenience stores. Video telephonyis seldom called "CCTV" but the use of video in distance education, where it is an important tool, is often so called.

1.1 Proposed System Architecture

Arduino mega 2560 board is used for the robot. A Bluetooth module is connected to the Arduino board. The android application establishes a connection with the Bluetooth module on the Arduino board.

Once connection is successfully established, the user can send controlling commands throughthe GUI of the android application. The command sent from the mobile application is receivedby the Bluetooth module which transmits it through serial communication to the Arduino board.

System architecture is shown in fig



It consists of following blocks

- Blue-tooth module- HC-05
- Micro-Controller -ATMEGA 328
- DC motors
- Motor Driver H-Bridge
- 9v Dc battery‘

The robot in the project is made to move in all the four directions using the Android phone.

The circuit is built around ATMEGA 328 controller board, Blue-tooth module HC-05, motor driver L293D (IC1), DC motors M1 and M2, and a few common components. The circuit uses two 9V batteries. First battery is used to power the ATMEGA 328 controller board and the other is used to power the motors. The regulated 5V supply for the rest of the circuit is provided by the ATMEGA 328 controller board itself. LED on the board indicates presence of power supply. Motor Driver H-Bridge is used to drive two motors which work on 9v DC batteries. DC

motors are interfaced to the Micro controller. The data received by the Blue-tooth module from Android smart phone is fed as input to the controller.

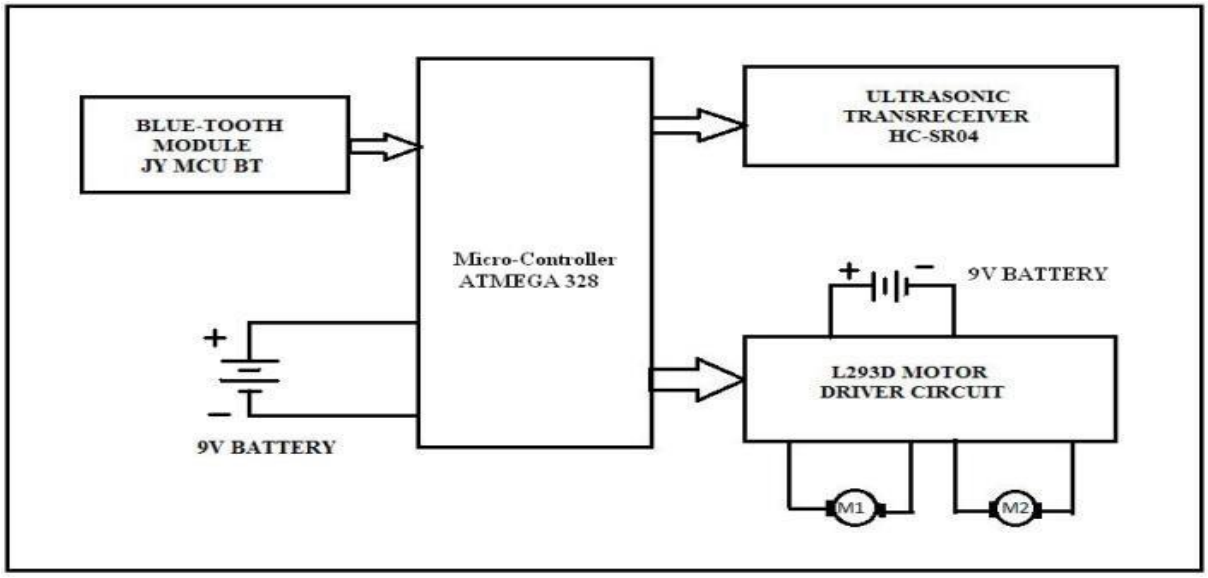


Figure 1.2: Block Diagram

9.1 Future Scope

Surveillance is needed in almost every field. It could be a great solution to various problems or situation where wireless Surveillance is needed our project has tremendous scope as it uses the latest technology in the market.Our application uses the android OS which is currently the most used OS and also has a great future scope. The Surveillance robot can be controlled remotely using the android application;this gives it a huge scope for future application.

Conclusion

We have successfully implemented the working of the wireless video surveillance robot con- trolled using android mobile device. The robot is successfully controlled using the android application through the wireless Bluetooth technology. Even the real time video feel is success-fully achieved using the Wi-Fi technology on our designed android application.

References

[1] Stigler, G. *The Economics of Information, Journal of Political Economy, Vol. 69, pp.213-225, Iss.* Jan-Feb, (1961).

[2] Robot-Neil MacMillan, River Allen, DimitriMarinakis, Sue Whitesides,*Range-based navi-gation system for a mobile* IEEE 2010.

[3] Nolan Hergert, William Keyes, and Chao Wang ,*Smartphone-based Mobile Robot Naviga-tion* spring 2012.

[4] Phey Sia Kwek, Zhan Wei Siew, Chen How Wong, BihLiiChua, Kenneth Tze Kin Teo ,*De-velopment Of A Wireless Device Control Based Mobile Robot Navigation System.* IEEE 2012.

[5] Sebastian van Delden and Andrew Whigham , *A Bluetooth-based Architecture for AndroidCommunication with an Articulated Robot* IEEE 2013.

[6] T. Maria Jenifer, T. S. Vasumathi Priyadharshini, Raja Lavanya S. Raj Pandian, *Mobile Robot Temperature Monitoring System Controlled by Android Application via Bluetooth* IJACTE2013.

[7] Article ID 197105 *Indoor Surveillance Security Robot with a Self-Propelled Patrolling Vehi-cle* Volume 2011.

[8] Shingo Ito and Andrew A. Goldenberg ,*A mobile robot with autonomous climbing and de-scending of stairs*

[9] Phey Sia Kwek, Zhan Wei Siew, Chen How Wong, Bih Lii Chua and Kenneth Tze Kin Teo *Development Of A Wireless Device Control Based Mobile Robot Navigation System* 2012 IEEEGlobal High Tech Congress on Electronics.

[10] Pavan.C, Dr. B. Sivakumar *Wi-Fi Robot For Video Monitoring Surveillance System Inter-national Journal of Scientific Engineering Research Volume 3, Issue 8,* August-2012.

[11] A.Sivasoundari, S.Kalaimani, M.Balamurugan *Wireless Surveillance Robot With Motion Detection And Live Video Transmission International Journal of Emerging Science and Engi- neering (IJESE) ISSN: 2319â“6378, Volume-I,*

Issue-6 April 2013.

[12] Saliyah Kahar, Riza Sulaiman, Anton Satria Prabuwono,Mohd Fahmi Mohamad Amran, Suziyanti Marjudi *Data Transferring Technique for Mobile Robot Controller via Mobile Tech- nology* 2011 International Conference on Pattern Analysis and Intelligent Robotics 28-29 June2011.

[13] Kaur, I., *Microcontroller based home automation system with security International Jour- nal of Advanced Computer Science and Applications* vol. 1, no. 6, pp. 60-65, 2010.

[14] Wong, E.M.C.,*A phone-based remote controller for home and office automation* ,IEEE Transactions on Cons.