

REVIEW ON WEB CAM EMBEDDED ROBOT USING ZIGBEE

Shradha Khandekar¹, Sagar Mergal², Gita Lonkar³, Prof.A.S.Zadbuke⁴
^{1,2,3,4}*E&TC Dept of SBPCOE, Indapur*

Abstract -As technology becomes more advanced and modernized. Safety plays a major role in today's world and it is necessary that good safety system are to be implemented in places of education and work. This project based on embedded system for safety and security purpose robot using zigbee and web server. In this project, PIR sensors , MQ6 Gas sensor are used. MQ6 Gas sensor detects the dangerous gases like alcohol ,LNG , iso-butane ,propane, and LPG and the PIR sensor detects the Intruder. The sensed signals are first sent to the microcontroller LPC2148 which resides at the robotic side and then sent to the Computer or Laptop through ZIGBEE. The local system also provides an audio and visual alarm to alert about the critical situation for the safety and security purpose by using graphics created on local system. This robot also has a wireless AV camera which provides audio and video to the Local and remote system and performs the audio and video streaming through FTP server. The robotic movement is controlled remotely from the local system by using the VB 6.0 application software. This proposed system is used wherever people cannot go or where things doing too dangerous for humans to do safely.

Key words: *LPC2148(ARM7 Microcontroller), PIR sensor ,Gas sensor, Wireless camera (AV camera) ,Robot, FTP server.*

I. Introduction

The robot's design specifications vary according to the given application. An embedded system is designed to perform specific control functions in larger system. It is embedded as part of a complete device including hardware and software parts. Embedded systems contain processing cores such microprocessors, microcontrollers. The key characteristic is being dedicated to handle a particular task. The design engineers can optimize it to reduce the size and cost of the product and increase their reliability and performance .

Applications –

- 1) Industries
- 2) Resorts
- 3) Government and non government organizations.
- 4) This intelligent robot is mainly useful in rescue operations, which detects the alive human in disaster situations
- 5) In war fields,
- 6) Also used in intelligent security purposes.
- 7) Also in school, colleges.

Components

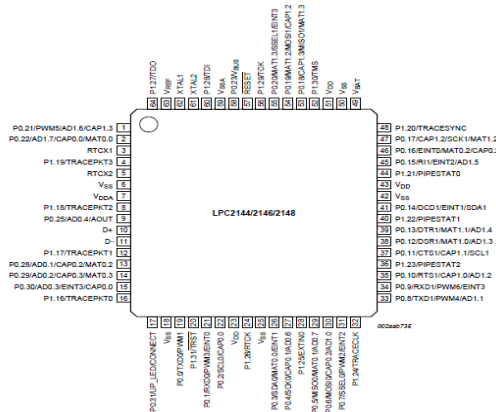
- Zigbee
- (LPC2148)ARM7 Micro controller
- PIR Sensor
- MQ6 Gas Sensor
- Wireless AV Camera
- DC Motors
- L293D(motor driver IC)

II. Zigbee Module



The zigbee module used in this work .It is a true system-on-chip solution tailored for IEEE 802.15.4 also it is suitable for the low power applications. The ZIGBEE module has range of 400M.

(LPC2148)ARM7 Microcontroller- Pin Diagram-



Feature-

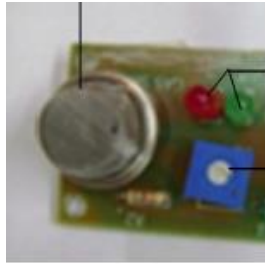
- 16/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.
- 8 to 40 kB of on-chip static RAM and 32 to 512 kB of on-chip flash program memory.128 bit wide interface/accelerator enables high speed 60 MHz operation.
- In-System/In-Application Programming (ISP/IAP) via on-chip boot-loader software. Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1ms.
- Embedded ICE RT and Embedded Trace interfaces offer real-time debugging with the on-chip Real Monitor software and high speed tracing of instruction execution.
- One or two (LPC2141/2 vs. LPC2144/6/8) 10-bit A/D converters provide a total of 6/14 analog inputs.
- Single 10-bit D/A converter provides variable analog output.
- Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM unit (six outputs) and watchdog.
- Multiple serial interfaces including two UARTs (16C550), two Fast I2C-bus(400 kbit/s), SPI and SSP with buffering and variable data length capabilities.

PIR Sensor-



PIR(Passive Infra Red sensor) is a device used to detect motion by receiving infrared radiation. The PIR detects the signal in range of 140o, means 5 to 7 meters from the centre of lens.

MQ6- Gas Sensor



The MQ6 Gas sensor module detect the presence of LPG gas also dangerous gases. Gas sensor detect the gases if the gas level is 200 to 10000ppm

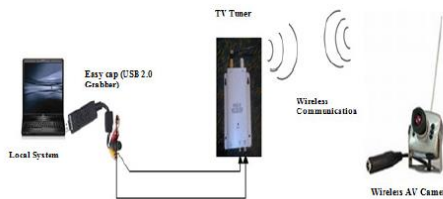
DC Motor



Features

- 30RPM 12V DC motors with Gearbox
- 6mm shaft diameter with internal hole
- 125gm weight

Wireless AV Camera-



It is a small camera which take picture and sound transmitting and receiving. It is supports of 100m transmission distance and can be used on TV, LCD, etc. The camera sent AV signal to the TV tuner which is connected to the computer or laptop through the easy cap (USB 2.0 Grabber). The Audio-Video streaming is done at the local and also at the remote system.

The Easy Cap USB 2.0 Grabber



The Easy Cap USB 2.0 Audio-Video adapter used to capture high-quality audio-video files. It is the solution for laptop; we have enclosed the professional video editing software Tin Cam which provides best editing function. Real-time performance ensures less waiting time and more time to create.

III. Software implementation-

1. Embedded C.
2. VB 6.0 use for graphical control pages.
3. Audio-Video Streaming on Tin Cam-This page shows the video and audio buffering on Tin Cam software.

IV. Conclusion

This system can be used where ever the safety and security are the major threat. In future this work may be enhanced in such a way that, whenever a picture is captured then a Tin Cam can immediately send an email about the picture. And also zigbee-pro may be used to increase the communication distance between the Robot and with the local system.

References

1. V. Ramya, B. Palaniappan, and Subash Prasad, "Embedded Controller for Radar based Robotic Security Monitoring and Alerting System", International Journal of Computer Applications (IJCA), Volume 47-No. 23, June 2012.
2. V.Ramya, B.Palaniappan, K.Karthick and Subash Prasad "Embedded System for vehicle cabin toxic gas detection and alerting", Journal of Elsevier Procedia Engineering, 30(2012).
3. V. Ramya, B. Palaniappan , "Embedded Technology for Vehicle cabin safety Monitoring and Alerting System", International Journal of Computer Science Engineering and Applications, Volume 2-No.2, April 2012.
4. V. Ramya, B. Palaniappan , "Embedded system for Hazardous Gas detection and Alerting", International Journal of Distributed and Parallel Systems (IJDPS) Vol.3, No.3, May 2012
5. Heng-Tze Cheng, Zheng, Pei Zhang, "Real-Time Imitative Robotic Arm Control for Home RobotApplications", Carnegie Mellon University, IEEE, March 2011.
6. Hsian-I Lin, Yu-Cheng Liu, "Evaluation of Human-Robot Arm Movement Imitation", Nat.Taipei muniversity of Technol., Taipei, Taiwan, IEEE, May 2011.
7. M.Gao, F.Zhang, andJ.Tian, "Environmental monitoring system with wireless mesh network based on embedded system,"inProc.5thIEEE Int. Symp. Embedded Computing, 2008, pp. 174-179.
8. Xia, F.; Sun, Y.X. Control and Scheduling Codesign: Flexible Resource Management in Real Time Control Systems; Springer: Heidelberg, Germany, 2008.
9. Ben Gaid, M.; Kocik, R.; Sorel, Y.; Hamouche, R. A methodology for improving software design lifecycle in embedded control systems. In Proc. of Design, Automation and Test in Europe (DATE), Munich, Germany, March 2008.
10. Ruijie Zhang Funjun He, Zhijiang Du and Lining Sun, "An Intelligent Home Environment Inspecting Robot," vol.42, pp. 140-169, 2007.
11. A.Cherubini, "Development of a multimode navigation system for an assistive robotics project", IEEE International Conference on Robotics and Automation, Rome, Italy, 10-14 April 2007.
12. L. Ma, C. Cao, N. Hovakimyan, C. Woolsey, V. Dobrokhodov, and I. Kaminer. Development of a vision-based guidance law for tracking a moving target. In *AIAA Guidance, Navigation and Control Conference and Exhibit*, August 2007.
13. K. Galatsis, W. Wlodarski, Y.x. Li and K. Kalantar-zadeh, "Vehicle cabin air quality monitor using gas sensors for improved safety," pp. 143-164, 2000.
14. G. Song, Z. Wei, W. Zhang and A. Song, "A hybrid sensor network system for home monitoring applications", *IEEE Trans Consum Electron*, Vol. 53, No. 4,pp. 1434-1439, 2007.
15. G. Song, Y. Zhou, Z. Wei and A. Song, "A smart node architecture for adding mobility to wireless sensor networks," *Sens Actuators A Phys*, vol. 147, no. 1,pp. 216– 221, 2008.
16. G. Song, K. Yin, Y. Zhou and X. Cheng, "A Surveillance Robot with Hopping Capabilities for Home Security," *IEEE Trans Consum Electron*, Vol. 55, No. 4, pp. 2034-2039, 2009.
17. C. D. Nugent, D. D. Finlay, P. Fiorini, Y. Tsumaki and E. Prassler, "Home automation as a means of independent living," *IEEE Trans. Autom. Sci. Eng.*, Vol. 5, No. 1, pp. 1-8, Jan 2008.
18. Yoo Oh, Jae Yoon, Ji Park, Mina Kim and Hong Kim, "A namerecognition based call-and-come service for home robots", *IEEE Trans Consum Electron*, Vol. 54, No. 2, pp. 247-253, 2008.
19. Y. W. Bai, L. S. Shen and Z. H. Li, "Design and implementation of an embedded home surveillance system by use of multiple ultrasonic sensors", *IEEE Trans Consum Electron*, Vol. 56, No. 1, pp. 119-124, 2010.
20. W. Lao, J. Han and Peter H.N. de With, "Automatic video-based human motion analyzer for consumer surveillance system", *IEEE Trans Consum Electron*, Vol. 55, No. 2, pp. 591-598, 2009.