

A RESEARCH ON ROBOTIC APPLICATION OF EMBEDDED SYSTEMS FOR ENHANCED SECURITY

***Dr. S.R.BOSELIN PRABHU, ** Dr. E.GAJENDRAN, ***N. BALAKUMAR**

**Assistant Professor, Department of Electronics and Communication Engineering,
SVS College of Engineering, Coimbatore, India.*

***Professor, Department of Information Technology,
St.Martin''s Engineering College, Hyderabad.*

**** Assistant Professor, Department of Electrical and Electronics Engineering,
Tamilnadu College of Engineering, Coimbatore, Tamilnadu, India.*

ABSTRACT

The project is designed to develop a robotic vehicle that can sense metals ahead of it on its path similar to sensing land mines. Surveillance robot is rectangular shape and it has three wheels. This spy robot detect and alerting the metal whereas down of the robot flows. It communicates with device through wireless medium such as ZIGBEE. Robot has some sensors like Humidity, Temperature, Ultra sonic and PIR. Humidity sensor senses the Humidity around the robot. While Temp sensor senses the climate changes based on the numerical temperature value. Ultra-sonic sensor senses the object present in the way in which the robot has to go. PIR sensor senses the presence of human near the robot. These sensor notations and the information can be received in the transmitter and receiver with the use of a ZIGBEE. Each and every change can be sensed and the changes can be seen in a television by a camera. The wireless charging system charges the battery in a robot and it gives the power to all the other modules.

1. INTRODUCTION

While Temperature sensor senses the climate changes based on the numerical temperature value. Ultra-sonic sensor senses the object present in the way in which the robot has to go. PIR sensor senses the presence of human near the robot. Embedded system is a combination of hardware and software that performs a specific task. An embedded can also defined as a single purpose computer [1-7]. Embedded system include navigation system, alarm system and monitor. A microcontroller is essentially a CPU, central processing unit or processor with integrated memory or peripheral devices. As fewer external components or needed embedded system using microcontroller tend to be more widely used. Microcontrollers are used in automatically controlled produces and devices. Most microcontroller at this time had two variants. One had an erasable EPROM program memory. The other was a PROM variant which was only programmable once. For some microcontrollers may use four-bit words and operate at clock rate frequencies at low as 4KHZ, for low power consumption.

2. EXISTING METHODOLOGIES

Modern industrial arm has increased in capability and performance through controller and language development,

Improved mechanisms, sensing, and drive systems. In the early to middle 80s the robot industry grew very fast.

In addition, the robot can automatically detect potential objects of interest. The objects are automatically recognized by the object recognition system using Neural Networks. If the robot cannot recognize an object, it asks the user to identify it. The user can ask the robot to navigate back autonomously to an object recognized or identified before.

A home monitoring robot with PIR sensor and camera on the door is designed. This ensnares the image when a person arrives near the door [8-18].

The movement of this robot is wirelessly controlled by a hand held RF transmitter to send commands to the RF receiver mounted on the moving robot. Since human life is always valuable, these robots are the substitution of soldiers in war.

3. PROPOSED SYSTEM ANALYSIS

3.1. User control mode: User control mode is controlling the system with wireless connectivity. The wireless connectivity is established by the Bluetooth. Bluetooth connection can be established and robot is controlled by a smart phone with Android OS.

3.2. Autonomous control mode: Autonomous control mode is established by compiling the preloaded program. Autonomous mode doesn't need. Instructions at instant to move a robot. Microcontroller controls the robot with a delay to charge the battery.

3.3. AT Mega Microcontroller: Microcontroller AT Mega has AT Mega-8, AT Mega-16, AT Mega- 88, AT Mega- 32, AT Mega-64 and AT Mega-32a. Microcontroller used here is AT mega-8 it has three ports. Main core board has the AT mega-8 micro controller and motor driving IC for the control of two motors. With the help of these two motors the robot can be moved in all the four directions. The signals given by the micro controller to the motor driving IC is in digital form. For 00 it will give forward move, for 11 it will give backward movement, for 10 it will give left movement, for 01 it will give right movement. Board has triggering circuit as inbuilt circuit [19-27].

4. DESCRIPTION OF THE PROPOSED SYSTEM

4.1 Transmitter Section

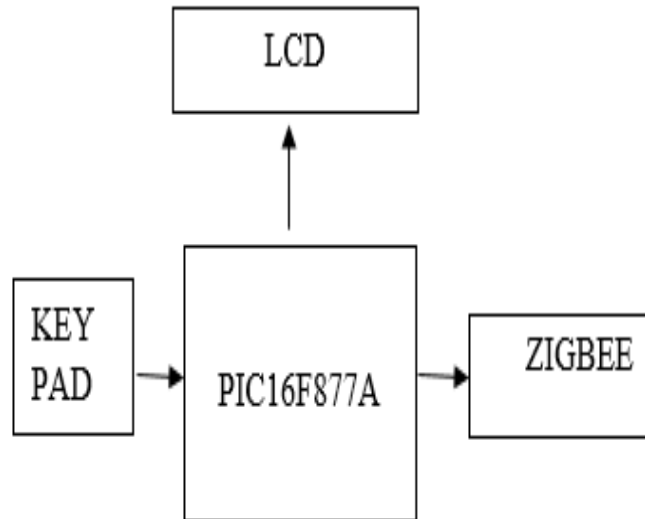


Figure 1: Transmitter

4.2 Receiver Section

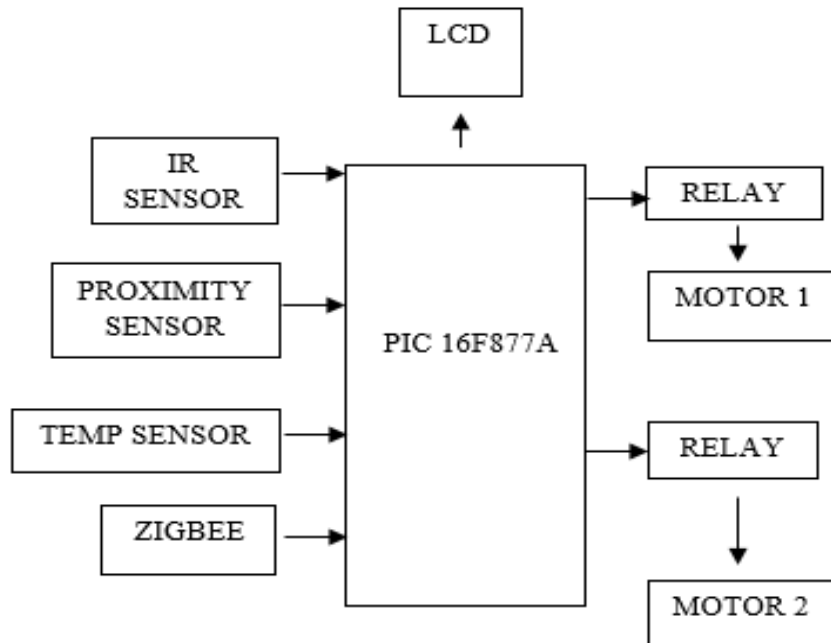


Figure 2: Receiver

4.3. IR Sensor: An infrared detector is a detector that reacts to infrared (IR) radiation. The two main types of detectors are thermal and photonic (photo detectors). The thermal effects of the incident IR radiation can be followed through many temperature dependent phenomena. Bolometers and micro bolometers are based on changes in resistance. Thermocouples and thermopiles use the thermoelectric effect. Golay cells follow thermal expansion. In IR spectrometers the pyro electric are the most widespread. The response time and sensitivity of photonic detectors can be much higher, but usually these have to be cooled to cut thermal noise. The materials in these are semiconductors with narrow band gaps. Incident IR photons can cause electronic excitations. In photoconductive detectors, the resistivity of the detector element is monitored. Photovoltaic detectors contain a p-n junction on which photoelectric current appears upon illumination.

4.4. Temperature Sensor: You can measure temperature more accurately than a using a thermistor. The sensor circuitry is sealed and not subject to oxidation, etc. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified

4.5. Proximity Sensor: A proximity sensor detects the presence of objects that are nearly placed without any point of contact. Since there is no contact between the sensors and sensed object and lack of mechanical parts, these sensors have long functional life and high reliability. The different types of proximity sensors are Inductive Proximity sensors, Capacitive Proximity sensors, Ultrasonic proximity sensors, photoelectric sensors, Hall-effect sensors, etc. A proximity sensor emits an electromagnetic or electrostatic field or a beam of electromagnetic radiation (such as infrared), and waits for the return signal or changes in the field. The object which is being sensed is known as the proximity sensor's target.

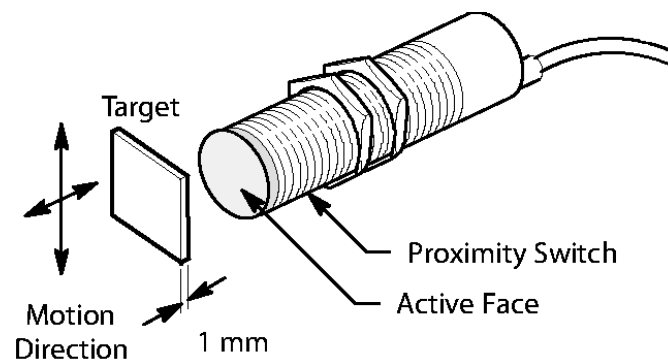


Figure 3: Proximity Sensor

4.6 Zigbee Module: The explosion in wireless technology has seen the emergence of many standards, especially in the industrial, scientific and medical (ISM) radio band. There have been a multitude of proprietary protocols for control applications, which bottlenecked interfacing.

Need for a widely accepted standard for communication between sensors in low data rate wireless networks was felt. As an answer to this dilemma, many companies forged an alliance to create a standard which would be accepted worldwide. It was this Zigbee Alliance that created Zigbee. Bluetooth and Wi-Fi should not be confused with Zigbee. Both Bluetooth and Wi-Fi have been developed for communication of large amount of data with complex structure like the media files, software etc. Zigbee on the other hand has been developed looking into the needs of communication of data with simple structure like the data from the sensors.

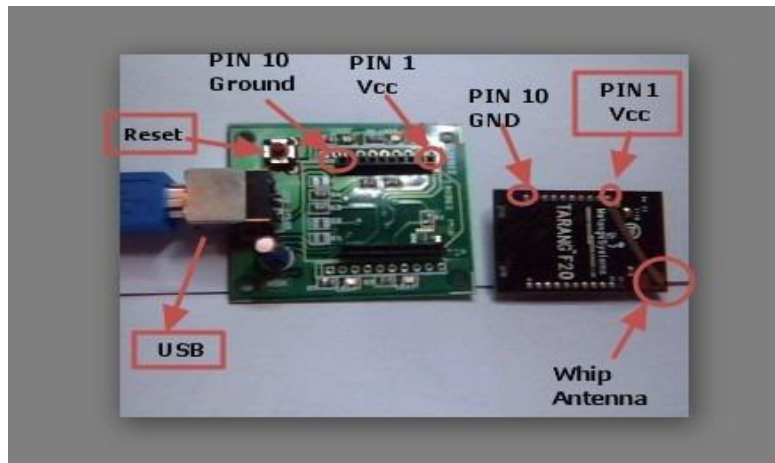


Figure 4: Zigbee Module

5. CONCLUSION

Robot has sensing devices such as humidity sensor, proximity sensor, IR sensor, temperature sensor. Proximity sensor sense the metal under the robot flows. That the robot acts as microprocessor controlled wireless robot. Humidity sensor senses the Humidity around the robot. While Temperature sensor senses the climate changes based on the numerical temperature value. IR sensor senses the object present in the way in which the robot has to go. So this robot is used for research and development department.

6. REFERENCES

- [1] N. Petrellis, N. Konofaos, G. Alexiou, "Target Localization Utilizing the success Rate in Infrared Pattern Recognition," *IEEE Sensor*, Vol. 6, no. 5, pp. 1355-1364, Oct. 2006.
- [2] Hamid Ali Abed Al-Asadi, "Temperature dependence of the lasing characteristics of vertical cavity surface emitting lasers," *Engineering Journal of Technology University*, Vol. 145, 1994.
- [3] Boselin Prabhu S.R. and Sophia S., "Environmental monitoring and greenhouse control by distributed sensor Network", *International Journal of Advanced Networking and Applications*, 5(5), 2014.

- [4] Boselin Prabhu S.R. and Sophia S., "Greenhouse control using wireless sensor network", *Scholars Journal of Engineering and Technology*, 2(4), 2014.
- [5] Hamid Ali Abed Al-Asadi, "Temperature dependence of the noise characteristics of Multiisecton semiconductor lasers," *Science Journal*, vol. 7, No. 3, 2001.
- [6] Hamid Ali Abed Al-Asadi, "Linewidth characteristics of vertical cavity surface emitting lasers due to external optical feedback," *Science Journal*, vol. 8, 2001.
- [7] Boselin Prabhu S.R. and Sophia S., 'Modern cluster integration of advanced weapon system and wireless sensor based combat system', *Scholars Journal of Engineering and Technology*, 2(6A), 2014.
- [8] Boselin Prabhu S.R. and Sophia S., 'A review of efficient information delivery and clustering for drip irrigation management using WSN', *International Journal of Computer Science and Business Informatics*, 14(3), 2014.
- [9] Hamid Ali Abed Al-Asadi, "Linewidth characteristics of vertical cavity surface emitting lasers due to external optical feedback," *Science Journal*, vol. 8, 2002.
- [10] Hamid Ali Abed Al-Asadi, "Theoretical investigation of spectral linewidth properties of double fused 1.3 um MQW-VCA in reflection and transition modes," *Tikrit Journal for Pure Science*, vol. 8, No. 2, 2002.
- [11] Boselin Prabhu S.R. and Sophia S., 'Mobility assisted dynamic routing for mobile wireless sensor networks', *International Journal of Advanced Information Technology*, 3(3), 2013.
- [12] Boselin Prabhu S.R. and Sophia S., 'A review of energy efficient clustering algorithm for connecting wireless sensor network fields', *International Journal of Engineering Research and Technology*, 2(4), 2013.
- [13] Hamid Ali Abed Al-Asadi, "Vertical cavity amplifiers and its cavity length dependence the saturation power and quantum efficiency," *Tikrit Journal of Pure Science*, vol. 9, No. 2, 2003.
- [14] Hamid Ali Abed Al-Asadi, "Effects of pump recycling technique on stimulated Brillouin scattering threshold: A theoretical model," *Optics. Express*, Vol. 18, No. 21, pp. 22339-22347 Impact factor: 3.88, 2010.
- [15] Boselin Prabhu S.R. and Sophia S., 'Variable power energy efficient clustering for wireless sensor networks', *Australian Journal of Basic and Applied Sciences*, 7(7), 2013.
- [16] Boselin Prabhu S.R. and Sophia S., 'Capacity based clustering model for dense wireless sensor networks', *International Journal of Computer Science and Business Informatics*, 5(1), 2013.

- [17] Hamid Ali Abed Al-Asadi, "Brillouin Linewidth Characterization in Single Mode Large Effective Area Fiber through the Co-Pumped Technique," *International Journal of Electronics, Computer and Communications Technologies (IJECCT)*, Vol. 1(1), pp. 16-20, 2010.
- [18] Boselin Prabhu S.R. and Sophia S., 'An integrated distributed clustering algorithm for dense WSNs', *International Journal of Computer Science and Business Informatics*, 8(1), 2013.
- [19] Boselin Prabhu S.R. and Sophia S., 'A research on decentralized clustering algorithms for dense wireless sensor networks', *International Journal of Computer Applications*, 57(20), 2012.
- [20] Hamid Ali Abed Al-Asadi, "Analytical study of nonlinear phase shift through stimulated Brillouin scattering in single mode fibre with pump power recycling technique," Volume 13 Number 10, *Journal of Optics*. Impact factor: 1.99, 2011.
- [21] Hamid Ali Abed Al-Asadi , "Architectural Analysis of Multi-Agents Educational Model in Web-Learning Environments," *Journal of Emerging Trends in Computing and Information Sciences*, Vol. 3, No. 6, June 2012.
- [22] Boselin Prabhu S.R. and Sophia S., 'Hierarchical distributed clustering algorithm for energy efficient wireless sensor networks', *International Journal of Research in Information Technology*, 1(12), 2013.
- [23] Boselin Prabhu S.R. and Sophia S., 'Real-world applications of distributed clustering mechanism in dense wireless sensor networks', *International Journal of Computing Communications and Networking*, 2(4), 2013.
- [24] Younis, O. and Fahmy, S., "HEED: A Hybrid Energy-Efficient Distributed Clustering Approach for Ad Hoc Sensor Networks," *IEEE Transactions on Mobile Computing*, 2004.
- [25] Chan, H. and Perrig, A., "ACE: An Emergent Algorithm for Highly Uniform Cluster Formation," *First European Workshop on Sensor Networks (EWSN)*, 2004, Germany.
- [26]. Liu, Y. Zhang, and F. Zhao, "Robust Distributed Node Localization with Error Management." *Proc. ACM* pp.
- [27] B. Liu, M. Adams, and J. Ibanez-Guzman, "Minima Controlled Recursive Averaging Noise Reduction for Multi-Aided Inertial Navigation of Ground Vehicles," *Pro. IEEE/RSJ Int'l Conf. Intelligent Robots and Systems(IROS'05)*, pp. 3408-3414, Aug. 2005.