ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

A Review on Artificial Intelligence System for Detection and Monitoring of Victims Trapped In Collapsed Building.

Shibu Prasath S V, Karthikeyan S, and Karthick C*.

Department of ECE, Sathyabama University, Chennai, India.

ABSTRACT

In this paper, a new approach for monitoring alive human beings in natural and human-made disasters. Every year, different collapses of human made structures such as bridges, buildings and natural collapse like earth quakes occur in varies parts of the world. Such cases, humans are being trapped in the cavities from the collapsed building may be in normal or abnormal state. In JULY-2014 at MOULIVAKKAM building made by human got collapsed nearly 60 lives were detected from the cavities as per BBC News. Also major natural disasters held at NEPAL in APRIL-2015 more than 8,500 human beings were died. Mostly trained dogs and humans perform those tasks. Lot peoples died due to these natural and human made disasters when they hit a region. Many people's get under debris for days and hours because do know where the peoples presence the deduction is not easy manner. The peoples die a painful death because we could not find them on time. Alive human detection intelligence system proposed in this paper is highly reliable. For detection purpose used multiple sensors. The data's and information we required for rescue teams save the peoples, so the Intelligence System is used which moves in the disaster area for searching alive humans in devasting environments. It helps the rescue teams to identify the live peoples.

Keywords: Human, Intelligence System, collapsed building, Passive Infrared.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

An intelligence system which is used to detect the alive human beings from the disaster area without help of any humans. Here we used multiple PIR (passive infrared) sensors to cover large areas of disaster area. This artificial intelligence system moves on all direction to find the alive humans totally from the collapsed buildings, to save peoples life.

This system saves the human life by thermal radiation emits from human body can be manipulated by PIR sensor. They absorb the variations in the heat and it can be used to detect movement of peoples. The out from the PIR sensor is digital (0 and 1). So it can be directly fed to the digital pins. Here no need for Analog to digital converter, which operates at 5v DC. The PIR sensor is a pyroelectric device which detects motion by measuring changes in the heat (-20 to 80°c) levels.

RELATED WORK

Human Infrared Signal Recognition Using Single PIR Detector

"Linhong Wang" [1],Here they used PIR detectors are widely used in public security and family theft-proof system, But the existing PIR detectors are susceptible to be explore to be interfered by non-human infrared sources and the false rate is high which limit their application, it's a new method of recognizing PIR signals of different infrared sources, so that false alarm can be greatly reduced. Spectrum of the output signal is used as feature and principle components regression is used to cluster data with different registered objects at different speed levels, to improve the performance of the system. Here they used single PIR it is unidirectional, which detects only one direction.

A Modern Microwave Life Detection System for Human Being Buried Under Rubble

"ZadeGauri N, Badnerker S" [2],in this paper, we proposed Detect the humanon under trapped building using microwave frequency. Produced microwave frequency using Phase locked loop and Transmit through antenna. Transmitted signal hit on the human and reflected. This can be received by the receiver and monitored. The L bandfrequency will penetrate over 10 layers of bricks but it is unable to penetrate more than 10 layers or metal like structure. The involvementof clutter signal may destroy the vital information of life signs. It can penetrate maximum 3feets only (L-Band).

A Review on Ground Penetrating Radar Technology For The Detection of Buried or Trapped Victims

"Lorenzo Crocco, Vincenzo Ferrara" [3],in this system they used GPR, it transmits the signal to the human and reflected signal from (Heart beat & breathe) received by GPR to receiver. Antenna designing is complicated. The signals from the GPR do not penetrate through the concretes.

A Victim and Rescuer Communication Model Collapsed Buildings/Structures

"TanapatAnusas-amornkul" [4],here they used Wi-Fi to communicate between the rescuer and Victims, by using Smart phones; here the victims can communicate with anyone in the Disaster area. This system is only used for communication purpose. And it cannot save the victims. If the person is under the rubble means, unable to operate the phone.

Change Detection in Constellations Of Buried Objects Extracted from Ground-Penetrating Radar Data

"David WPaglieroni, Christian T Pechard, and N Reginald Beer" [5], Here the GPR is used to find the Object, the GPR is placed in the moving vehicle and it deducts the object and the captured object can be converted into 3D image by Digital image processing. In this system they are finding only the objects, if we use this system in collapsed buildings means, it denotes the objects and gives intimation to us. So this is difficult to save the human's life.

ISSN: 0975-8585

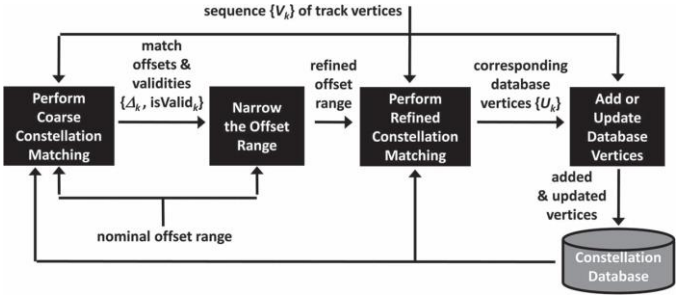

Figure 1: High level block diagram for updating a constellation database with a sequence of track vertices [5].

Life Human Deducting Robot for Earthquake Rescue Operation

"Vijayaragavan S P, Hardeeppaulsharma, Gunasekar C H,AdithyakumarS" [6], here says that The human deducting Robot for Earthquake Rescue Operation, by using Wireless Camera, sensing the affected area, and gives information to Zigbee(Transceiver) PIR is used to deduct the human and passes the signal to control room. In this system they are focusing only the surface and do not deduct the persons in depth. Here they using Camera for deduction purpose by Battery, it should not support for long time.

An Embedded Autonomous Robot System for Alive Human Body Detection and Rescue Operation

"Rajeev Joshi, Pratap Chandra Poudel, PankajBhandari" in this system they using moving Robot, it consist of PIR, Temperature sensor, buzzer, Infrared Ray, wireless camera. This system can be run on the affected area it captures the current situation and detect the human and transmit the signal to the control room. The camera cannot feed in to the in depth of the collapsed building. To find the human detection to using the camera robotic system is not accuracy.

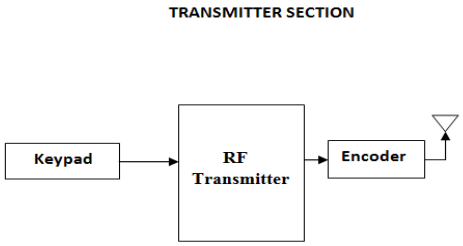

Figure 2: RF transmitter and Encoder [7]

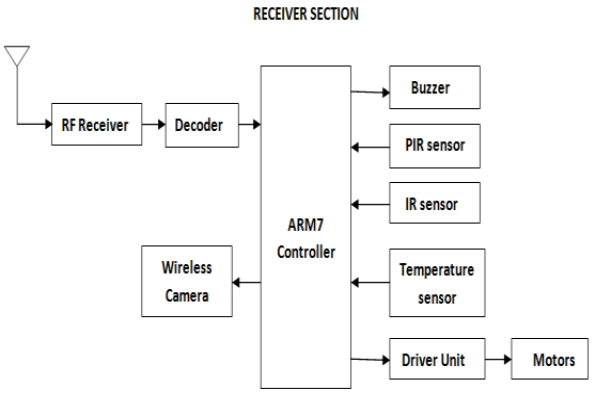

Figure 3: RF receiver and Decoder [7]

A New Revolutionary Infrared Life Detection System Using ATMEGA168

"Ashutosh Gupta, Besty Thomas" [8],suggests that a Infrared ray is used to detect the human body, it emits the ray to human and reflected temperature from the human can be deducted by the IR. No accurate detection results with transparent or bright colored materials.IR distance detection sensor for solid-state and gas are two different units. Detection accuracy loss with increasing the reflection distance. Due to the differences in weather conditions the detection results may change. Decreased the sensing reliability with moisture and humidity. The non-linearity of analog output voltage vs. reflective object distance curve can be converted by heavy processor.

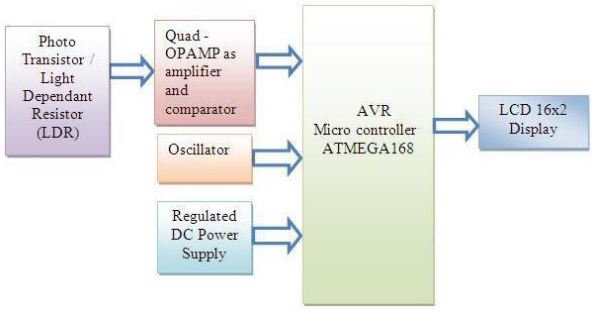

Figure 4: Block Diagram of the system [8]

A Surveillance Robot for Disaster Sites

"Sreejith K G, Raja L" [9], proposes the Robot car, it consists of LDR, PIR, Microphone, LPG sensor, ultrasonic, temperature sensor. This car can be run in the affected area using Visual Basic and the signals from the Robot car can be transmit to Laptop or Pc through Wi-Fi and these signals can be recorded and controlled by Visual Basic. Ultrasonic sensors have a minimum sensing distance. The environment Changes, such as temperature, pressure, humidity, air turbulence, and airborne particles affect ultrasonic response. Ultrasonic sensor sense only minimum distance Targets of low density, like foam and cloth, tend to absorb sound energy, these materials may be difficult to sense at long range. In Smooth surfaces reflect sound energy is more efficient and inrough surfaces the reflected sound is less efficient.

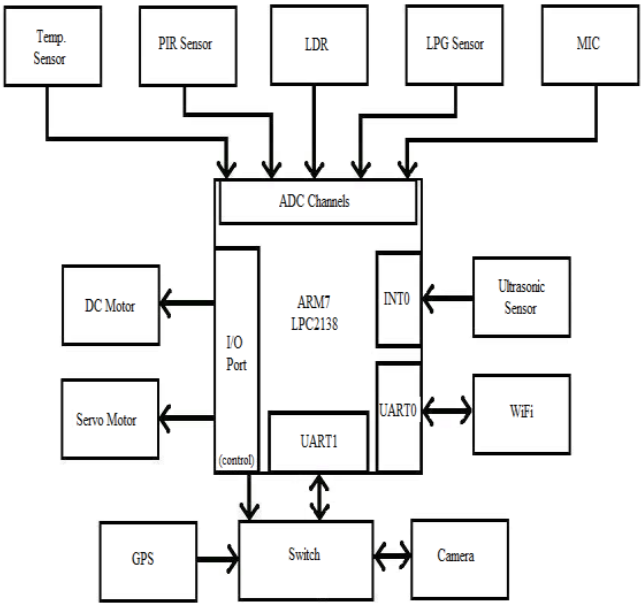

Figure 5: Robot Section [9]

Design of User Friendly Human Alive Detection Robot to Avoid False Alarm and To Tackle Crisis Situation

"B Venkatadri , K. Aswini" [10],This system consists of Robot car, which contains Wireless Camera, PIR sensor, Fire sensor, obstacle sensor, LCD and motors. This moving Robot will deduct the human and saves his /her lives. In this project it covers only 5m of area. It deducts only surface area.

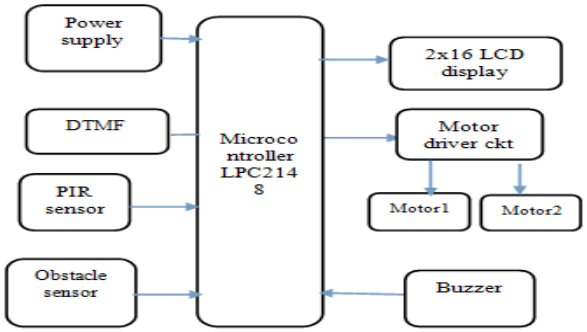

Figure 6: Block diagram of detection robot [10]

PROPOSED SYSTEM

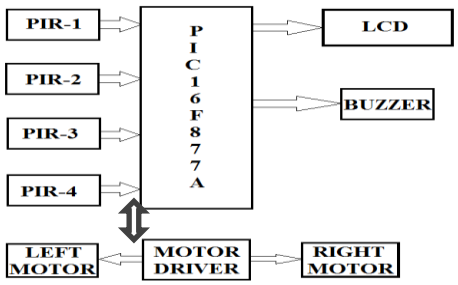

Figure 8: Block diagram of proposed system

The proposing system we used multiple PIR sensors which are controlled by PIC microcontroller. This intelligent system moves in all direction so it covers large areas.

This sensors represents only digital (0 and 1) form. The PIR sensors sense the human from the body temperature; while it detects the human means the output is one. LCD displays human is present at the same time buzzer will be ON

SURVEY COMPARISON

TITLE	AUTHOR NAME	YEAR	CONTENTS
Human infrared signal recognition using single PIR Detector	Linhong Wang	2011	Here they used single PIR it is uni-directional. This detects only one direction.
A Modern Microwave Life Detection system for human being buried under rubble	1.Zade Gauri N 2. Badnerker S	2011	1. The L band frequency is unable to penetrate more metal like structure but it can penetrate over 10 layers of Bricks. 2. The involvement of clutter signal may destroy the vital information of life signs.
A Review on Ground Penetrating Radar technology for the detection of buried or trapped victims	1.Lorenzo Crocco 2.Vincenzo Ferrara	2014	1. Antenna designing is complicated. 2. The signals from the GPR do not penetrate through the concretes.

A Victim and Rescuer Communication Model Collapsed Buildings/structures	TanapatAnusas-amornkul	2014	Here they used Wi-fi function to connect to the internet. If the building collapsed means powers as well as all signals are terminated. So nothing can be detected.
Change Detection in Constellations of Buried Objects Extracted From Ground-Penetrating Radar Data	David W. Paglieroni, Christian \ T. Pechard, and N. Reginald Beer	2015	In this system they are finding only the objects, if we use this system in collapsed buildings means, it denotes the objects and gives intimation to us. So this is difficult to save the human's life.

From the above tabulation we sort out many problems and we solve those problems effectively and more accuracy at any crisis environment, by using artificial intelligent system.

CONCLUSION

By this project it will be a great help indeed to rescuers in detection of the human beings at the disaster sites. This is also user friendly, economical, semi-autonomous and efficient device by software programming interfacing for detection. Hence much life's can be saved. This proposed model system will be a combination of a stationary and a mobile robot system especially for the disaster affected chaotic areas. The first section is the Robot section, which moves into the debris and searches for the alive humans. The second section is the Control section, which is with the Rescue team and used to control the movement of Robot. Adding more number of PIR Sensor to the Robot can further enhance this, so that large area can be covered.

REFERENCES

[1] Linhong Wang "Human Infrared Signal Recognition Using Single PIR Detector" IEEE 4th International congress on Image and Signal Processing, pp.2664-2668, 2011.

[2] ZadeGauri N, Badnerker S. International Journal of Advanced Research and Studies 2011;1(1).

[3] Lorenzo Crocco, Vincenzo Ferrara "A Review on Ground Penetrating Radar Technology For The Detection of Buried or Trapped Victims" IEEE International Conference on Collaboration Technologies and Systems, ISBN:978-1-4799-5157-4 pp.535-540, 2014.

[4] Tanapat Anusas-amornkul. "A Victim and Rescuer Communication Model Collapsed Buildings/Structures" 20th IEEE International Conference on Parallel and Distributed Systems, pp.811-816, Acc. No.15092990, 2014

[5] David W. Paglieroni, Christian T.Pechard, and N. ReginaldBeer "Change Detection In Constellations Of Buried Objects Extracted from Ground-Penetrating Radar Data" IEEE Transactions On Geoscience and Remote Sensing,vol.53, No.5,May-2015.

[6] Vijayaragavan S P,Hardeeppaulsharma, Gunasekar C H, AdithyakumarS "Life Human Deducting Robot for Earthquake Rescue Operation" International Journal of Business Intelligence, Volume no: 2, Issue no: 1,June-2013.

[7] Rajeev Joshi, Pratap Chandra Poudel, PankajBhandari "An Embedded Autonomous Robot System for Alive Human Body Detection and Rescue Operation" International Journal of Scientific and Research Publications, Vol.no.4, Issue -5, ISSN 2250-3153, May-2014.

[8] Ashutosh Gupta, Besty Thomas "A New Revolutionary Infrared Life Detection System Using ATMEGA168" International Journal of Embedded systems and Applications, Vol.2, No.3, September-2014.

[9] Sreejith K G, Raja L "A Surveillance Robot for Disaster Sites" International Journal of Emerging Trends in Engineering and Development, ISSN No: 2249-6149, Issue 2, Vol.3, April-2012.

[10] B Venkatadri , K Aswini "Design of User Friendly Human Alive Detection Robot to Avoid False Alarm and To Tackle Crisis Situation" International Journal of Emerging Trends in Engineering Research (IJETER), Vol. 3 No.6, Pages: 186- 189, June-2015.