

Mobile Rescue Robot

Jyoti Pathak¹, Neha Sakore², Rakesh Kapare³, Amey Kulkarni⁴, Prof. Yogesh Mali⁵

^{1,2,3,4}Student, Department of Computer Engineering, Dr. D. Y. Patil School of Engineering, Lohegoan, Savitribai Phule Pune University, Pune, Maharashtra, India

⁵Assistant Professor, Department of Computer Engineering, Dr. D. Y. Patil School of Engineering, Lohegoan, Savitribai Phule Pune University, Pune, Maharashtra, India

ABSTRACT

In this modern era, technological development lead the creation of sky scraper buildings and dwellings which increase risks of losing life due to natural and manmade disasters. Many humans died by trapping under debris as their presence cannot detect by the rescue team. Sometimes, it is impossible to reach at certain points of the disasters in such calamity hit zones. The situation is worst for developing country like Bangladesh because of low quality construction and design. Hence in this project, we focus on a system named as "Mobile Rescue Robot" which will work in disaster environments of manmade structures like war fields, collapsed buildings etc. It can be assisted for firemen, police, and disaster agencies with appropriate reconnaissance, human detection, site evaluation etc. In the existing technology, we have used a wireless Zigbee technology interfaced with micro controller 8051. The main aim of this project is to build the multipurpose Robot which can be controlled through computers by using Zigbee interface and navigates around the disaster areas and tries to find the humans who need help. This method is very cost effective. In the proposed technology a human body detection Embedded system using reliable specific set of sensors like IR, Fire and Ultrasonic sensor to know the distance between human and robot and a camera to acquire a video and image of scene of the environment in which the set of sensors trigger the camera to show live scene. The video is then displayed on pc or laptop which is enhanced by Android programming. This proposed system is less cost effective than the existing technology.

Keywords : Wireless Zigbee Technology, Android programming, PCA, RCNN

I. INTRODUCTION

Disaster sites may be hazardous and complex to be reached for rescue and there is a great risk and threat linked to rescue workers and survivors trapped in such accidental places. Natural disasters include storms, floods, cyclones, bush fire earthquakes etc. whereas human induced disasters includes industrial accidents, transportation accidents, major fires etc. Hence in this project, we focus on a system named as "human detection robot system" which will work for the purpose of rescuing people. Common situation that employ rescue robots are urban disasters, mining accidents, explosions, and hostage situation. In the existing technology a wireless Zigbee technology

interfaced with microcontroller 8051 is used. The main aim of this project is to track the victims in disaster and tries to find the humans who need help. This method is very cost effective. In the proposed technology a human body detection Embedded system using reliable specific set of sensors like IR, Fire and Ultrasonic sensor to know the distance between human and robot and a camera to acquire a video and image of scene of the environment in which the set of sensors trigger the camera to show live scene. The video is then displayed on pc or laptop which is enhanced by Android programming. This proposed system is less cost effective than the existing technology.

II. LITERATURE SURVEY

This paper, they have planned an edge matching algorithm for edge segmentation and human edge segmentation from 2D images by means of the histogram of oriented gradients technique and SVM classification. The algorithm having four steps, namely human detection, image sequence acquisition, human edge segmentation and edge segmentation, were carried out in this project. Data was collected from 710 full body human image [1].

In this context, they proposed a new method for human body detection using extended PCA namely bidirectional PCA. There are two advantages of bidirectional Principal component analysis. The first one is preserving the shape structure of objects and the second one is effective computation mechanism [2].

This study, human detection is generated by using Face Detection for the first mechanism and for the second mechanism is Head and Shoulders Detection. Both mechanisms are formed in master/slave. Thus, if the master function which is the Face Detection cannot recognize the object as a human, then the Head and Shoulders detection is going to be shown. To minimize the detection failure, the night vision feature is also presented in this study for the surveillance camera prototyping [3].

The main objective of this work is to compare the performance of two different human detection algorithms. One is the human detection based on shape and another one is human detection based on Daubechies wavelet Transform. The shape based detection uses the shape information of human body to classify the moving objects. Daubechies wavelet transform is shift invariant in nature. Thus, the algorithm is able to detect even small hand or head movements [4].

They proposed a human object identification by using a simplified fast region-based convolutional network (RCNN). Human identification is a problem of considerable practical movement. Human detection consists of the body part detectors which detect head and shoulder, torso, and pair of legs, with three, two and four different appearances respectively [5].

This describes, body parts detection for pose estimation is implemented. The proposed method have used segmentation techniques to obtained skin tone detection and salient region areas. After successful silhouettes extraction, body parts estimation is applied by using body parts model [6].

It presents a human detection method based on HOG features. The method uses a depth map instead of visible light image. We have additional information about the scene through the comprehensive distance information analysis. During the experiment, we used maps of depth received from the Kinect v2 visual sensor [7].

III. SYSTEM REQUIREMENT

- **Hardware Requirements:**

1. System : Intel I3 Processor and above.
2. Hard Disk : 200 GB.
3. Monitor : 15 VGA Color.
4. RAM : 4GB.
5. Mobile : Android

- **Software Requirements:**

1. Operating System: Windows 7 and above.
2. Coding Language : Java 1.8 Python, PHP
3. Tool Kit : Android 2.3 and above
4. IDE : Android Studio, Python

IV. CONCLUSION AND FUTURE SCOPE

This system can detect the existence of human, temperature, humidity, visibility in order to trace the location of victim in disaster areas. The application of wireless sensor network can realize the real time monitoring of affected areas by the natural calamities. For future work, by adding voice command it helps to communicate with receiver end designated officers with the field war troops.

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