Women Security Using Wireless Sensor Networks

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Abstract- *In current scenario,women security is the burning issue in many parts of the world. Every time the police may not be available to rescue from the problems. So here we proposed a model 'Night vision patrolling robot using raspberry pi' so that we can overcome the problems.Here the robot is mounted with the night vision camera and a mice to capture and detect the sound. If the sound sensor detects any sound it sends an alert to the end user and the robot stops automatically. So that the user can control the robot by connecting it to the same WIFI as the robot has been connected. It establish a connection between robot and end user. The robot captures the details through camera and it provides the live streaming video by capturing image by images and form into a video by the use of MPEG streamer which is inbuilt in raspberry pi. The clear image is processed by image enhancement algorithm and it will transmit to the nearest police station. Here we can track the location of the robot by placing the latitude and longitude values in the goggle maps.*

Keywords- Raspberry pi, Night vision camera, Sound sensor, Image enhancement GPS(Global Positing System), Electric motors, Battery.

Softwares: HTML, C++, CGI(Common Gate Interface).

I. INTRODUCTION

Robotics is an advanced technology which is changing the human life, because the control and automation is the main and advanced part in robotics. Robots works like a computer and it can be operated on remote control.

The robot is playing important role in daily life. It can be used for security purpose, to reduce the time of work and increases the work efficiency. The security of road area, home, office and building is important aspect of human life.

The paper gives an idea of improving the patrolling ability of police in a local area. This system contains a night vision camera mounted on the robot which can capture the images, record it and then it will send it to the control station. With this system it has the ability to transmit real time video and location of the robot to the control station. This type of project can be used in the night time as well as in day time. It consists of a mice and a camera which will record a high quality video and send it to control station. The system will mainly be used to detect different activities in the outside area and report it to the control station. Many of the police departments now are using the different types of robots for performing different activities.

What is Patrolling? Patrolling is nothing but to keep monitoring over an area by regularly moving or travelling a route of the corresponding area. Robot patrolling continuously works in the area which is allocated to robot. The robot captures the images in certain area. These images are then sent towards the user in a real time, user will analyze it and if there is any problem observed then action will be taken. With the help of motors we can control the robot and camera we can collect the information from all sides of the outside area. We can control the robot in two ways, one with the wire and the second is with wireless. The wireless controlling helps us to control the robot from different locations.

In the current work, a night vision patrolling robot is developed that is to protect the women with security. Section II briefly reviews existing approaches while in section III, the proposed system is described. A brief discussion on the result obtained is presented in section IV.

II. EXISTING WORK

Much work has been carried out on this burning topic by incorporating the advancements in technology.

J. Ghanem Osman Elhaj Abdalla, implemented a surveillance system with a spy robot with the raspberry Pi using internet protocol. It gives various ideas about thesurveillance of border areas. The border armies need to patrols the border area cautiously, but even by working with high cautious it is not possible to locate every small incidents in the night every time. Therefore there is a need to design a system which can detect the activity in this region and provide a message to the nearby security control unit. In this system, they make a spy robot using Raspbian operating system with remote monitoring and control algorithm. The spy robot system is connected with three types of equipment's which is raspberry

pi module, a night vision camera and sensor. The collected information regarding the activities working on the front of the camera is sent to the users through the web server which can be posted on the webpage simultaneously.

Takato Saito and Yoji Kuroda implemented a Mobile Robot using GPS with place recognition system. The paper suggests a survey of a mobile robot with GPS observations. GPS technology makes it important considering the tracking of the robot. In this we face some of the critical issues such as to get high accuracy, stability and also needs to improve few restrictions that GPS observations face such as multiple path and loss of signal, especially in the congested area and out of coverage area. This method is used with positional using GPS to neglect the errors. We use two types of observations derived from global positioning system and placerecognition on appearance based system to mobile robot localization. This robot can be continuously monitored and the fear of loss of robot can be minimized.

In 2013, Cheng Tang, Qunqun Xie, Guolai Jiang, Yongsheng Ou, make a road night based on a planar reflection model. It has given various ideas of road detection and different concepts of monitoring the monitor. Roads and street monitoring is always very important for performing different activities such as pedestrian detection, any questionable activity, etc. This method classifies the image pixels of the road. Till now, different designs are designed for daytime activities but for night there is no such kind of research is made. This development focuses the any unused activity detection at night. Since this system is vision based and can distinguish the road depending on the image, it may face difficulty when any other image such as bird or vehicle comes into the picture. Here a planar reflection model is functional to get the intensity distribution of different pixels with an infrared camera. With that, a pixel-based classification is used to check the different pixels belong to the road or not. If only it determines road surface then the further process gets started.

In 2017, Kirk Mac Tavish, Michael Paton, and Timothy D. Barfoot, made night rider: visual odometry using headlights. This technology estimates relative motion with a sequence of camera images for mobile robotic system. A camera canbe used for getting large amount of input data and are comparatively inexpensive sensors, which will make it as the highly usable sensors in moveable robots. However, since it is a passive component, it will be depend on external power supply, which can reduce their availability. Many of the other sources available for lightning purpose we can use such as headlights. Headlights can be used as an alternate light source, with this; the paper investigates the outdoor stereo VO performance with the conditions in lightning for mostly 10 km

of driving area for 30 hrs. In this various challenges include the visibility range, a dynamic light source, intensity hotspots, etc.

III. PROPOSED SYSTEM

The current work aimed for the women security purpose and it is implemented on Raspberry Pi based system. The reason for going to this system to protect the women in critical situations and it can be provided as a evidence to the court as a proof. The block diagram of proposed system is shown in Figure 1. Along with SoC (Raspberry Pi), the major components involved are the Night vision camera, GPS and Sound sensor.

A. Features of Raspberry Pi

Raspberry Pi board is a miniaturized system meant for performing numerous tasks. Capable of performing multi tasking, it can replace the functionality of a personal computer. This further reduced the area occupied. A designed version of the operating system called Raspbian OS is used for it's working and used as a functioning video game emulator or media streamer with a bit of effort. Various features of the board are as mentioned below.
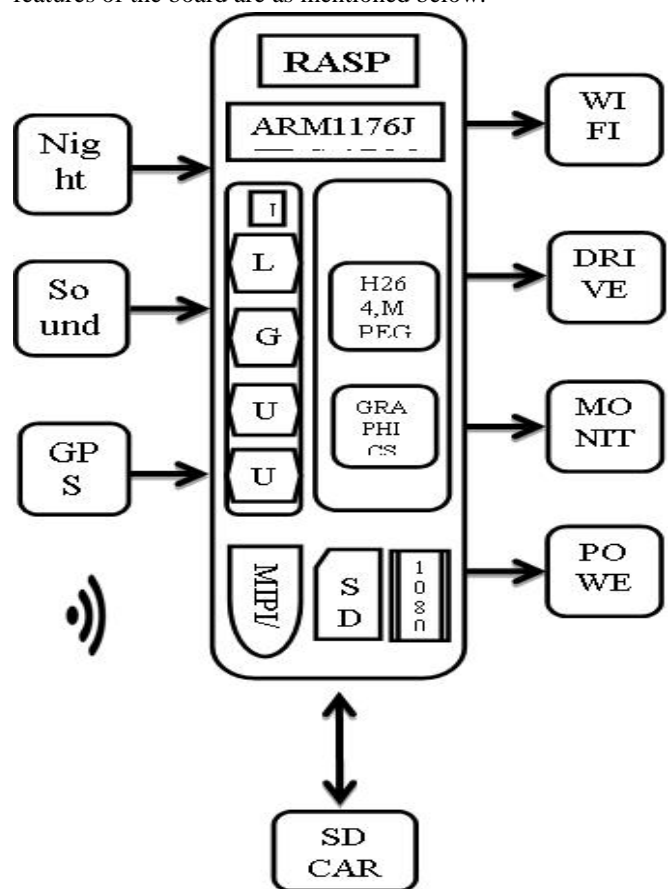

Figure 1.Semiautomated system for fire control.

Broadcom2837 is a SoC that is constructed with Quad-core ARM A53 (ARMV8) Architecture with 1.2Ghz processor and 1GB Ram which forms the core of Raspberry pi with 2,4-lane CSI and DSI displays,TV,DAC,USB2,GPIO pins.

BCM43143 is a IEEE b/g 802.11 WLAN with Secure Digital Input Output (SDIO), USB and MIMO System on Chip (SoC) with 2.4Ghz power amplifier. It supports internal receiver diversity by providing two antennas. Further it is having an 8 General purpose IO ports with multiplexed JTAG interface assembled in 56-pin Quad Full No leads package. The data rate offered stands at 150 Mbps at 2.4 GHz frequency

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HDMI is an Audio/Video stick Interface for transmitting uncompressed video information and packed advanced/sound information from a HDMI upheld gadget. It follows Transition-Minimized Differential Signaling (TDMS) protocols with a data rate up to 48Gbs in HDMI 2.1 version. HDMI connectors are available in A/B/C/D/E types with type-B supporting 29-pin package and remaining with 19-pin package.

The most popularly used interface MIPI CSI-2 is a simple, high-speed protocol developed by MIPI Alliance, mainly used for transmission of video and image between cameras and host devices. This Interface can be implemented on either of two physical layers, MIPI C-PHY (or) MIPI D-PHY. It is enhanced with color depth for that improves High definition range(HDR) and signal to noise ratio(SNR) for advanced vision , LRTE provides increased image sensor quality, provides decision making real-time vision, processing, decreasing the number of wires and power consumption.

B. Other major components

In addition to the above described major components in the board, Temperature sensor, Night vision camera along with Motor driver are incorporated to perform the desired task as mentioned below.

Night vision Camera plays a vital role in automation purpose. The camera is used for monitoring each and every section allotted by the user. The camera used is a USB camera (life cam vx-800).

FEATURES OF VX800 CAMERA

This microphone produces quality audio. It contains a VGA video sensor for a clear image. It also adjusts for low-light condition.

Resolution: motion video (0.31 mega pixel i.e. 640*480 pixel)

Imaging features: fixed focus and automatic image adjustment with manual override.

The camera also comes with integrated microphone.

IC L293D works on the principle of Dual H-Bridge oscillator circuit so that we can interface two DC motors with single IC which can be controlled effectively in Clockwise and Anti-Clockwise directions. The IC can drive motors up-to a voltage of 36V.

GPS (Global Positioning System) module is used to track the location of the robot. As we can observe the values of latitude and longitude in VNC viewer. We have to copy the values and place in the Google maps so that the exact location of the robot will be come into picture.

Sound sensor is mounted on the robot to detect the sound and gives the alert to the control station.

B. Working of the proposed system

The fundamental step in the proposed work is to establish a connection between the automated system and the control device which can rather be a mobile or a PC. This is indeed required as there exists a data or information transfer between the before mentioned. All the relevant hard ware as well as the interfacing required is incorporated onto the system on chip. Along with these minimum Hardware camera as well as sound sensors are also integrated on to the system. The way these devices are interfaced is not unique but based on the nature of the devices connected.

Upon getting information about the threat detected by sound sensor sends the alert message to the control station. So the controls of the robot as been taken and captures the video using night vision camera. We can track the location of the robot by using the GPS module we can get the values of latitude and longitude. The implemented system is presented in figure 2(a). The live streaming video is shown in figure 2(b). The controls of the robot is shown in figure 2(c).

Figure 2 (a) constructional setup of proposed system
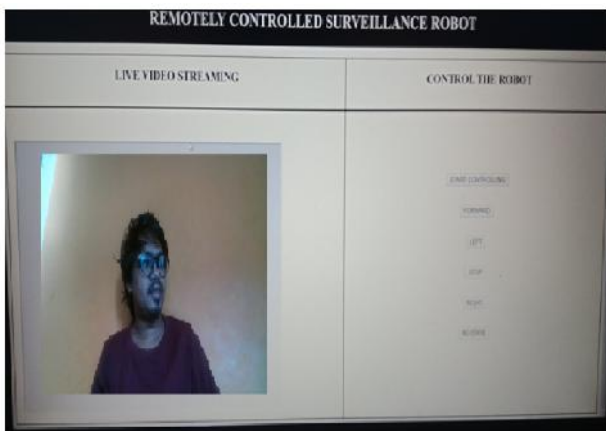

Figure 2(b): Live streaming video

Figure 2(c):controls of the robot

IV. RESULTS & CONCLUSIONS

In the current work an effort is made to develop an autonomous system for robot controlling using HTML and VNC Viewer. The motors can be operated by using the C++ and CGI(Common Gate Interface). Further sound can also be sensed, measured and transmitted to the control station, which is the inherent enhancement of our work when compared to existing works. The significance of this is that robot can be moved to that direction and stop if the sound detected. However, this is possible up to certain decibels only. Beyond this human intervention can be made to take the relevant action. The presence of night vision camera gives the information regarding the whereabouts of items with in the specific area and also tracks the location of the robot using the GPS module. The work can be extended by placing IR sensor the robot can moves in own way and the size of the robot is to minimize in future purpose.

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