

Low Cost SURVEILLANCE ROBOT USING WLAN

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AIM

The main idea of the project is to develop a cost efficient system capable of aiding disaster management team to identify people trapped within debris and places where they cannot reach personally in case of a disaster. Personnel at field are at great risk while searching for survivor with shifting of debris leading to injuries on both sides.

ABSTRACT

The system makes use of Bluetooth and WI-FI for the purpose of control and communication respectively. The vehicle travels within the debris searching for survivors and analyzing the condition within while the search and rescue team controls it from a safe distance from the disaster struck point.

The Bluetooth system aims for the control of the vehicle by receiving commands from a smartphone and later programming the microcontroller for driving the motors with the help of motor driver and PWM .

The WI-FI system aims at giving the video feed for vision within the debris in order to search for survivors and analyzing the stability within.

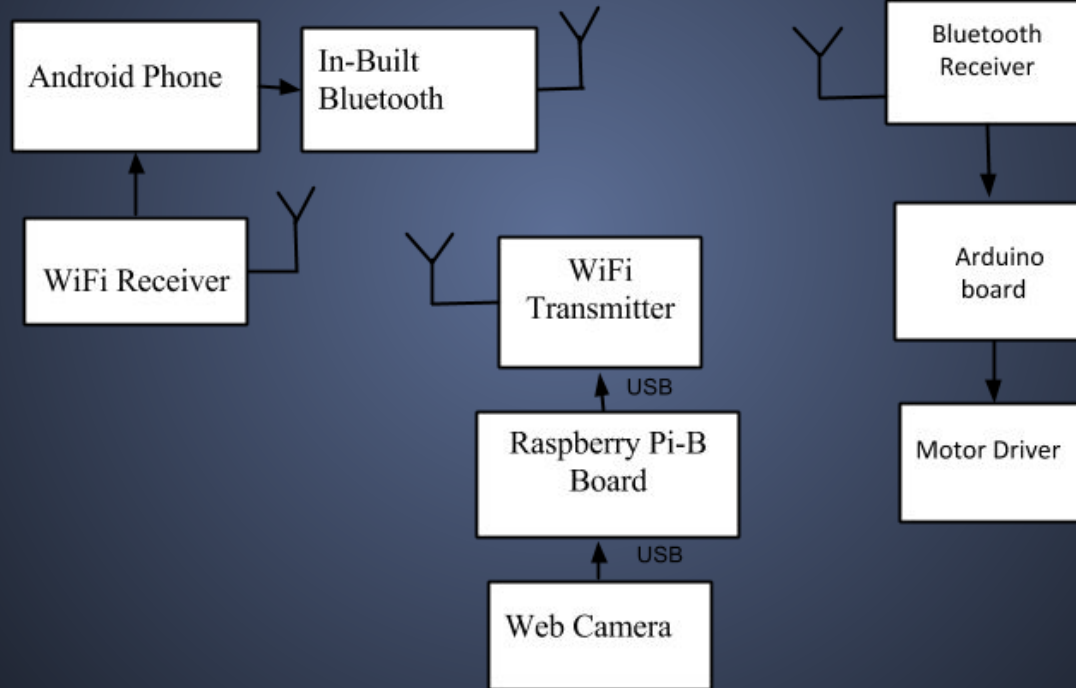
EXISTING SYSTEM

A basic surveillance robot costs a minimum about Rs.1.8 lakhs. This is said to have controls and uses which needs the use of devices made exclusively for it. Having such a mechanism, tends to make the person, using it, dependant on other people and instructions to run the surveillance. During a disaster, the military or the government are the ones considered to perform search and rescue operations which also include controlling this robot. The robot has basic functions of controlling the robot, and video surveillance in the view of the camera. The range of video transmission and control is also limited to about ten meters in radius.

PROPOSED SYSTEM

This system aims at reducing the cost without reducing the range of the video and controlling of the device. The functionality of the robot is made easy giving accessibility and control to every person, who has a smartphone, use it. This helps people to have a robot at their home and also helps saves those lives that could be saved if they are found early, during a disaster. We propose to reduce cost, increase the amount of usage time (by decreasing the power used) and also make it user friendly so as to increase the number of users.

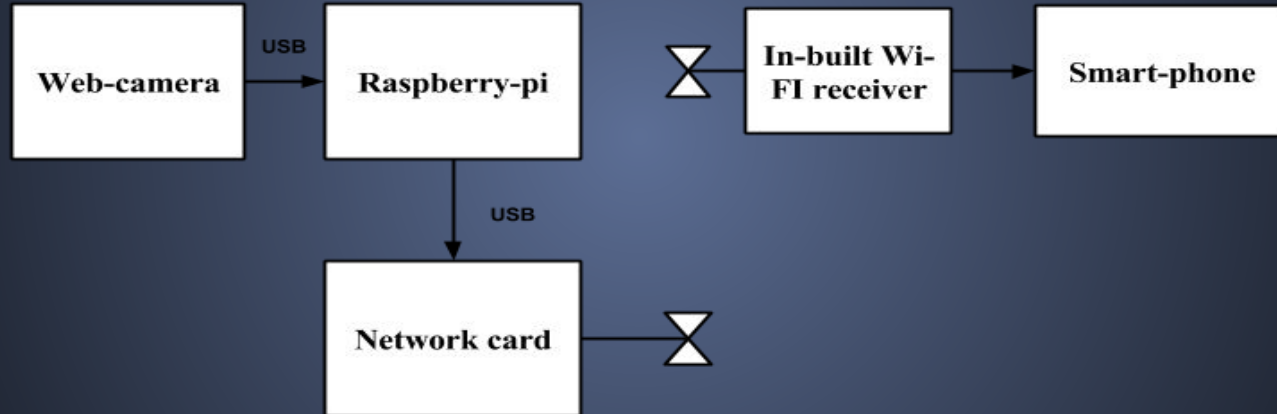
BLOCK DIAGRAM (BASIC)



Our project consists of:

- Raspberry-Pi model B for video streaming purpose.
- Wifi trans receiver module.
- Arduino-Uno development board.
- Bluetooth module.
- H-bridge.

VIDEO STREAMING



VIDEO STREAMING TO MOBILE PHONE

- EDUP wifi adapter for Wi-fi transfer of video.
- Web camera for getting the video feed from the surroundings.

- The Raspberry-Pi model B is fed with an SD HC class 4 macro sd memory card containing Raspbian operating system.
- The current and voltage rating of Raspberry-Pi is 1200mA and 5v respectively.
- The web-camera and Wi-fi adapter are connected to the USB port in the PI.

WIFI ADAPTER AS ACCESS POINT:

At first the Wi-fi adapter has to be configured as an access point so that wireless transmission of video can take place through it. Hence we have created a configuration file to config at startup.

The adapter is given a static IP address such that the same IP address can be used to view the video on the smartphone. The access point is also password protected using WPA2-PSK.

SHELL SCRIPT:

- At first video feed is received from the web camera using V4l2 which reads frames from the video feed.
- The frames so received are later converted from RGB to YUV color space which enables JPEG encoding of data.

- The frame rate is maintained at 30 fps but varies as a function of distance between server and sink.
- The width and height of the video is maintained at 320x240.

- The data is transmitted through TCP server-sink connection.
- At the receiver side (smartphone) an android application is created so as to receive the video feed.

- The smartphone must be connected to the access point first which in this case is the Wifi adapter in the Raspberry-pi.
- The viewer must also know the password of the adapter so as to view the video.

ON THE SMARTPHONE SIDE

- Then the host IP address must be entered along with port number, height and width of the video feed so as to receive video feed in the application.

BLUETOOTH ROBOT CONTROL

Bluetooth control part of our project consists of following sub components:

- Bluetooth module namely CuteDigi BMX module.
- DC motors (12v, 100 rpm).
- H-bridge is for controlling the DC motors.

H-BRIDGE IS FOR CONTROLLING THE DC MOTORS

The H-bridge consists of L293D motor driver IC capable of driving 2 motors along with 7805 voltage regulator IC for constant voltage rating.

PROGRAM EXPLANATION:

- A program is written in arduino programming language so as to receive data transmitted from smart phone via bluetooth.
- The program is written to receive the ASCII value of the transmitted character and perform the operation as the program demands.

BLUETOOTH APPLICATION

- Connects to an already synchronised device.
- The authentication pass-code given is 3009.
- The module connects to the device and receives only these signals using the UTF-8 protocol.

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