WOMEN SAFETY PATROLLING ROBOT USING IoT

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ABSTRACT

Today in the present global scenario, a woman's word of security and safe life is tough reality to happen, because women's sexual abuse has become a mainstream news in our everyday routine life. We should create a society in which women can travel openly and even at odd hours not of fear. While there are many rules and laws present, they are insufficient to provide the women in society with the full degree of security, safe and stable life. When the technology advances every day, it is a solution to other problems. And why can't we use these to create a stable and prosperous women's community. This project composed of components such as IR sensor, sound sensor, memory card, buzzer, camera, module and Raspberry pi3B+.

I. INTRODUCTION

1.1 INTRODUCTION:

India's greatest threat is the safety of its women. Women do not feel safe in a variety of situations. This needs to be addressed as quickly as feasible. Technology evolves and develops daily, affecting how people live. As a result, the focus of this article is on modernizing the technological framework to strengthen women's safety mechanisms. This project focuses on protecting women, in which women feel secure. In almost every sector, i.e., sports, music, education, politics, etc., women have made an impact today. But the question remains the same-Are women healthy in India? Even, the answer is NO. This project, therefore, proposes an electronic protection device for women, installed in public vehicles such as cars, buses, and auto-rickshaws as women are now being molested, abducted, and abused by drivers.

1.2 PROJECT ELABORATION:

In this project, we designed a system using a raspberry pi controller and we are using the webcam for live stream monitoring and we are using IR sensor. For obstacle detection and a sound sensor for recognizing any sound from 50hz to 10khz. This electronic device is mounted in the IR sensor, sound sensor, buzzer, and memory card interfaced with the Raspberry pi-3 B+ board.

1.3 BLOCK REPRESENTATION:

The block diagram consists mainly of seven components. They are:

1. Raspberry pi-3 B+
2. IR Sensor
3. Buzzer
4. Sound Sensor
5. Camera
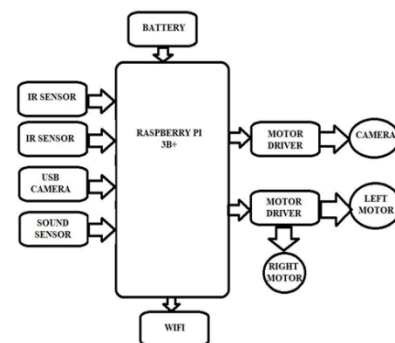6. Motor Driver
7. WIFI

FIGURE 1: BLOCK DIAGRAM

Raspberry Pi is a small single-board Computer developed in the UK by the Raspberry Pi Foundation to promote computer science teaching in schools and developing countries. Original models become far more popular than anticipated sealing the outside of its target market, for uses such as robots. The first-generation Raspberry Pi Model B was released in February 2012, followed by the simpler and cheaper Model A. In 2014, the Foundation released a board with an improved design, Raspberry Pi Model B+. These first-generation boards feature ARM11 processors, are approximately credit-card sized, and represent the standard mainline form factor. Improved A+ and B models were released within a year. A "Compute Module" was released in April 2014 for applications. The Raspberry Pi 3 Model B was released in February 2016 with a 1.2 GHz 64-bit quad-core ARM Cortex-

A53 processor, onboard 802.11n Wi-Fi, Bluetooth, and USB boot capabilities.

An infrared (IR) sensor is a proximity sensor or a 'nearness' sensor that senses whether there is an object near it. The IR stands for Infrared sensor. Infrared is the light out of our visible spectrum. The white LED here is an IR LED which works as the transmitter and the component next to the IR LED is a photodiode that works as the receiver in the IR sensor. The IR transmitter continuously emits the IR light, and the receiver keeps checking for the reflected light. If the light gets reflected by hitting any object in front of it, the IR receiver receives this light. This way the object is detected in the case of the IR sensor. The blue knob here is a potentiometer. You can control the range i.e., from how far you want to detect the object by changing the value of the potentiometer. An IR sensor has two small LED indicators – one for power, which is ON the entire time the sensor is ON; the other is the Signal LED which detects the object. The signal LED has two states or situations:

• ON (Active) when it detects an object • OFF (Inactive) when it doesn't detect any object

Input to the machine is given through Webcam. It takes snapshots or videos of the area and similarly, the system is sent to the controller/processor. The resolution of the webcam is 640*480 and up to 30 Megapixels can be used. USB Webcams generally have the inferior quality to the camera modules that connect to the CSI interface. They can also not be controlled using the commands in the terminal or by the recording package in Python. Nevertheless, there may be reasons, why you want to connect a USB camera to your Raspberry Pi, such as because of the benefit that it is much easier to set up multiple cameras with a single Raspberry Pi.

The sound sensor detects the level change of the sound sensor through Raspberry Pi Pico. When the sound loudness is greater than the threshold, the sensor is triggered, and then the RGB LED is controlled to light up. Then the LED will automatically turn off after waiting for 3 seconds. The sound sensor acts like a microphone, which is used to receive sound waves. The sensor has a built-in condenser electret microphone that is sensitive to sound. Sound waves make the electret film in the microphone vibrate, resulting in a change in capacitance and a small voltage corresponding to the change. This voltage is then converted into a 0-5V voltage, which the data collector receives after A/D conversion and is transmitted to the microcontroller.

The WIFI module is used to connect the raspberry pi to the robot setup. The WIFI module for Raspberry Pi & computer support USB and is compatible with the raspberry pi and another computer with a transmission distance of about 150m.

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

L293D is a typical Motor or Motor Driver IC that allows a DC motor to drive in either direction. L293D is a 16-pin IC that can control a set of two DC motors simultaneously in any direction. It means that you can control two motors with a single L293D IC. Dual Hbridge Motor Driver integrated circuit (IC). The l293d can drive small and quite big motors as well, check the Voltage Specification at the end.

II. Hardware Description
RASPBERRYPI

Raspberry Pi 3+ is an upgraded version and a much faster version of Raspberry Pi 3, it can be used as a minicomputer to carry out quite lightweight tasks. Before getting started with the Pi 3B+ the pin configuration should be known as it will help in making effective use of this single-board computer. The Raspberry Pi Foundation claims the Pi 3 B+ is much faster than its predecessor as it comes with a 64-bit quad-core processor having a speed of 1.4 GHz and an SDRAM of 1GB. To further dig deeper into its specifications there is a table below that states the specifications of Raspberry Pi 3B+. Raspberry Pi is a small single-board Computer developed in the UK by the Raspberry pi Foundation to promote the teaching of computer science in schools and in developing a country. The original model become far more popular than anticipated sealing the outside of its target market, for uses such as robots.

FIGURE 2: RASPBERRY PI 3B+

III.   BUZZER:

A buzzer is an efficient component to include the features of sound in our system or project. It is an extremely small & solid two-pin device thus it can be simply utilized on breadboard or PCB. So, in most applications, this component is widely used. There are two kinds of buzzers commonly available like simple and readymade. Once a simple type is power-driven then it will generate a beep sound continuously. A readymade type looks heavier & generates a Beep. Beep. Beep. This sound is because of the internal oscillating circuit within it. This buzzer uses a DC power supply that ranges from 4V – 9V. To operate this, a 9V battery is used but it is suggested to utilize a regulated +5V/+6V DC supply. Generally, it is connected through a switching circuit to switch the ON/OFF buzzer at the necessary time interval.

FIGURE 3: BUZZER

3.1 IR SENSOR:

IR sensor is an electronic device, that emits the light in order to sense some object of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes, but infrared sensor can detect these radiations. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode. Photodiode is sensitive to IR light of the same wavelength which is emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.

There are five basic elements used in a typical infrared detection system: an infrared source, a transmission medium, an optical component, infrared detectors or receivers, and signal processing. Infrared lasers and Infrared LEDs of specific wavelengths are used as infrared sources. The three main types of media used for infrared transmission are vacuum, atmosphere, and optical fibers. Optical components are used to focus the infrared radiation or to limit the spectral response.

FIGURE 4 : IR SENSOR

3.2 USB CAMERA:

Quantum 25 MP Webcam with 6 Lights & Microphone Possess this Quantum 25 MP. Webcam with 6 Lights & Microphone and never go out of touch. This 25 MP camera with 6 lights is a clean sweep as one of the best products that are available in the market. It also comes with a built-in microphone which helps you chat with your loved ones while you are online. The evolutions in this web camera are the 6 lights that are detailed on this with a potentiometer that automatically switches on these lights when in the dark. This webcam from Quantum comes with 16 special effects and 10 background frames so you can now pep up your images with these frames or special effect and frame these photographs in your living room. Image control like brightness, sharpness, colour contrast options are also available, and the same can be adjusted to get the expected image output. The 10 times real time digital zoom ensures that the click still gives you high resolution quality. It

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comes with high quality 2G glass lens for sharper picture quality.

FIGURE 5 : USB CAMERA

3.3 SOUND SENSOR:

The sound sensor is one type of module used to notice the sound. Generally, this module is used to detect the intensity of sound. The applications of this module mainly include switch, security, as well as monitoring. The accuracy of this sensor can be changed for the ease of usage. This sensor employs a microphone to provide input to buffer, peak detector and an amplifier. This sensor notices a sound, & processes an o/p voltage signal to a microcontroller. After that, it executes required processing. This sensor is capable to determine noise levels within DB's or decibels at 3 kHz 6 kHz frequencies approximately wherever the human ear is sensitive. In smartphones, there is an android application namely decibel meter used to measure the sound level. This sensor includes three pins which include the following.

• Pin1 (VCC): 3.3V DC to 5V DC

• Pin2 (GND): This is an aground pin

• Pin3 (DO): This is an output pin

The working principle of this sensor is related to human ears. Because human eye includes a diaphragm and the main function of this diaphragm is, it uses vibrations and changes into signals. Whereas in this sensor, it uses a microphone and the main function of this is, it uses the vibrations and changes into current otherwise voltage.
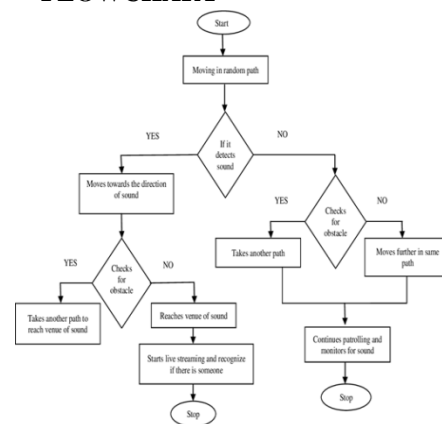
Generally, it includes a diaphragm which is designed with magnets that are twisted with metal wire. When sound signals hit the diaphragm, then magnets within the sensor vibrate & simultaneously current can be stimulated from the coils.

FIGURE 6: SOUND SENSOR

IV.   FLOWCHART

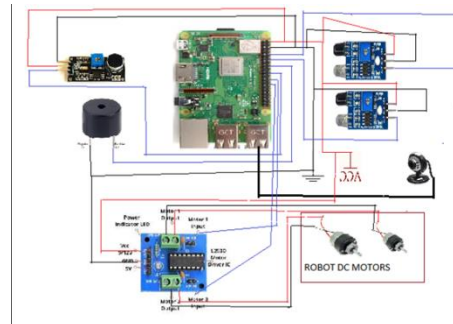**V.   RESULT**

5.1 CIRCUIT DIAGRAM

Figure 7: circuit diagram

5.2 TECHNICAL DESCRIPTION

Nowadays Women safety is the biggest concern in many parts of the world. There is still a fear in alone areas for women as well as Children. So here we propose a security patrolling robot. The main objective to design this project is it monitors each area to detect any problem using HD camera. It has the ability to monitor sound in the premises. Robot hears any sound after area is quite and it starts moving towards the sound on its predefined path. It

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then scans the area using its camera to detect any human faces detected. It captures and starts transmitting the images of the situation immediately to the IOT website. Here we use VNC viewer for receiving transmitted images and displaying them to user.

5.3 PROCEDURE

➤ Here we propose a security patrolling robot using Raspberry PI. The system uses cameras and mics mounted on robotic vehicles for securing any premises.

➤ The robotic vehicle moves a particular path and is equipped with a camera and sound sensors.

➤ It uses a predefined line to follow its path while patrolling. It stops at particular points and moves to the next points if sound is detected. The system uses IR based path following system for patrolling assigned areas. It monitors each area to detect any problem using a combination of HD camera

➤ It has the ability to monitor sound on the premises. The robot hears any sound after the area is quiet and starts moving toward the sound on its predefined path.

➤ It then scans the area using its camera to detect any human faces detected. It captures and starts transmitting the images of the situation immediately to the IOT website.

➤ Here we use the IOT gecko for receiving transmitted images and displaying them to the user with alert sounds. Thus we put forward a fully autonomous security robot that operates tirelessly and patrols large areas on its own to secure the facility

5.5 RESULT:
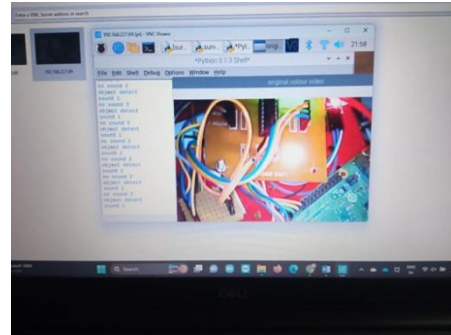

FIGURE 8: Result without power supply

FIGURE 9: Result with power supply

5.6 APPLICATIONS OF THE PROJECT

1. Used for the safety of women
2. Used for the safety of children
3. Used for the safety of physically challenged people.
4. Applicable as a legal evidence of crime.
5. Remote regions can likewise be investigated.
6. Used to record and send video of the necessary conditions.

5.7 ADVANTAGES:

1. It is very cost efficient
2. It can be controlled automatically
3. And quick control
4. Reduced error

5.8 DISADVANTAGES:

1. Time Consuming
2. Internet Issues
3. Uploading Issue

VI.   CONCLUSION AND FUTURE SCOPE

6.1 CONCLUSION:

It is made for the purpose when Women can feel afraid or   helpless in any situation, and they can defend themselves even late at night. Those methods will also aid authorities in apprehending and tracking down the criminals. Because women's safety is an issue in many parts of the world, this robot can prove to be a valuable resource.

Patrolling Robots are designed to help women from the dangerous situations. Women can rescue and protect themselves in any circumstances, so that she will never feel helpless at any sort locale and can protect herself even at late night. These techniques will also help police to arrest and search for the culprits. Since women safety is a matter of concern in

many parts of the world, this robot can prove itself to be a helping assistance. As far as the future scope of this system is concerned and as far as women's safety is an issue this robot can be an abetment and a Good Samaritan.

6.2 FUTURESCOPE:

• There are numerous enhancements to the current design and technology that can be made, as well as numerous extra features that may be introduced.

• Different types of sensors, such as temperature sensors, pressure sensors, heat sensors, position sensors, and proximity sensors, can be used to use robots in many fields.

• A wireless network can be used to create a multipurpose robot, with applications ranging from surveillance and home security to industrial applications where the user does not need to be physically present at the work site but may do it from his house.

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