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Raspberry Pi Based Surveillance Robot for Home Security

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Abstract - *In today's world, robots play a vital role. It may be used for security, to cut down on work time, and to improve job productivity. The safety of the road, the house, the office, and the building are all crucial aspects of human existence. The study proposes a method for increasing police patrolling capability in a given region. This system includes a robot-mounted night vision camera that can catch pictures, record them, and then communicate them to the control centre. This system is capable of sending real-time video and audio signals to the control station. This sort of project may be utilised both at night and during the day. It comprises of a camera that records high-definition footage and transmits it to a control centre. The system will primarily be used to identify and report various activities in the surrounding region to the control station. Many police agencies are currently employing various sorts of robots to carry out various risky tasks.*

Key Words: home safety, IoT, Raspberry Pi, ultrasonic sensor, patrolling

1. INTRODUCTION

India's greatest threat is the safety of its women. Women do not feel safe in a variety of situations. This has to be addressed as quickly as feasible. Technology evolves and develops on a daily basis, affecting how people live. As a result, the focus of this article is on modernising the technological framework in order to strengthen women's safety mechanisms.

The term "robot" derives from the Czech word "serf," which means "forced labour." It was introduced by dramatist Karel Capek, whose fictitious robotic devices were made via chemical and biological means rather than mechanical ones. A robot is defined as a mechanical structure capable of interacting with its surroundings, such as a wheeled platform, arm, or other building. Sensors to perceive the surroundings and provide valuable feedback to the device, and Systems to evaluate sensory data in the context of the present scenario and direct the device to respond appropriately.

The fundamental construction of a robot is the robot body, which contains arms and wheels. To make the arms and wheels turn under command, some power, like as electricity, is necessary. One of the most fascinating elements of a robot is its behaviour, which necessitates intelligence. Robots are powered by a range of electric motors that allow them to move in various programmed motions. A motor's efficiency rating indicates how much of the power it consumes is converted to mechanical energy.

The mechanical system is controlled by a digital logic circuit. A bridge relay is frequently used to connect the circuit to the mechanical construction. A control signal causes a magnetic field in the relay's coil to close the switch mechanically. Transistors, for example, are good silicon switches that may be used to regulate mechanical systems in a variety of technologies.

Robots employ microcontrollers, which are clever electrical devices. They execute operations that are comparable to those done by a microprocessor (CPU) in a computer. Microcontrollers are built for real-world control challenges and are slower and have less memory than CPUs. The quantity of external components required to run CPUs and microcontrollers is one of the most significant disparities between them. Microcontrollers may run without any additional components and just require an external crystal or oscillator to function. A microcontroller's three major factors to consider are speed, size, and memory. Speed is measured in millions of cycles per second and is expressed in clock cycles (Megahertz, MHz). The size of the Microcontroller determines how many bits of data it can handle in a single step (for example, 4-, 8-, 16-, and 32-bits).

Women are skilled in organising various groups for a variety of purposes. They frequently work across ethnic, religious, ideological, and intellectual barriers.

to promote peace. We realise the importance of women's security, but we must also recognise that it must be adequately protected. In a crisis scenario, a woman's physical strength is inferior to that of a male, and she need assistance. The greatest method to reduce your risks of being a victim of violent crime (robbery, sexual assault, rape, or domestic abuse) is to identify and use services that can assist you in getting out of dangerous circumstances. Having these applications on your phone can reduce your risk and provide aid when you need it, whether you're in an emergency or got separated from pals late at night and don't know how to go home.

2. LITERATURE SURVEY

The paper [1] proposes a voice catchphrase perceiving application to perceive the client and enact the application usefulness in any event, when the versatile keypad locked. The GPS module tracks the longitude and scope to follow a definite area of a client and sends the pre-put away crisis message including area to the enlisted contact numbers. The Audio Recording module begins the recording of the discussion for five minutes and put away as confirmations. The message goes in line if network issue and send when organization gets accessible.

The paper [2] proposes a crisis reaction circumstance perceiving application called as IPROB to give ladies security even in the circumstance like psychological oppressor assaults or catastrophic event, simply by shaking the portable over the predefined edge esteem naturally actuate the framework. It begins catching the encompassing voice to test and affirm the hazardous IPROB circumstance where it raised the notice and client neglect to answer in predefine time then the message alert ships off the register contacts.

The paper [3] proposes a SCIWARS application (Spy Camera Identification and Women Attack Rescue System) which comprise of two modules. A first module go about as a keen alarms framework which distinguishes the infrared beams coming from each Night-vision stowed away cameras set in evolving rooms-inns room and so forth and furthermore educated the client about perilous spot through message. Presently it's the client obligation regardless of whether to enlist an objection by sending the notice with the area to lawful specialists like Police.

The paper [4] proposes an android application to give security at two distinct circumstances as follows. The First module give security to Women at Emergency Situations propose a Save Our Souls (SOS) application to gives the security on a solitary snap of SOS button for the ladies going around evening time or alone. Don't bother opening the screen, rather simply by squeezing the power button it straightforwardly sets off the application to run at the foundation, to send the crisis message remembering the area for the type of scope and longitude to the enrolled contacts. The subsequent module proposes an android based home security framework that gives security of house assets and Senior Citizen in the client nonappearance. Since the security of senior resident is consistently a worry with expanding number of theft occurrences.

The paper [5] proposes an application, where a solitary snap of SOS communicates something specific containing the area and additionally sound video call to the watchman number. At recipient contact the area URL in the message to see it in the Google Map. It likewise gives different assist devices with enjoying First-Aid help, Fake Call Help and video call. The First-Aid help instrument gives the assist on different wellbeing with giving issues happened at an unplanned or crisis circumstance during the evening time. Medical aid help for different issues are as: oblivious and not breathing, stifling, draining vigorously, consumes, coronary episode, diabetes and so on.

The IEEE genuine venture [6] propose a computerized exceptionally dependable ladies security gadget which comprise of the high level sensors implanted in a wearable dresses. It comprise of cutting edge sensors, GSM and ATMEGA8 microcontroller with ARDUINO device which hold client under perception at constantly. It screens the heart beat-rate, temperature and vibration in body through sensors to check for uncomfortable circumstance. In such circumstance it will enact the GPS module to follow the area and remote camera to catch the pictures that get ship off the control room of the collector through GSM modules to make vital moves.

The Paper [7] proposed a convenient gadget as a belt which is consequently initiated base on the tension distinction passes the boundary in hazardous circumstance. A GPS module track the area and sends the crisis messages to three crisis contacts like clockwork with refreshed area through GSM. The framework likewise initiates the shouting caution that utilizes an alarm, to call out for help and furthermore produces an electric shock to hurt the assailant for self-protection which might assist the casualty with getting away. The gadget essentially comprises of miniature regulator on the ATMega328 board which modified utilizing the ARDUINO programming language.

The paper [8] proposes the ladies security gadget called as "Suraksha" which is a simple to work gadget. This gadget can be initiated through-voice order, Press a switch key and shock (for example at the point when the gadget is tossed with force, a power sensor used to actuate the gadget). In crisis circumstance it will send the message including moment area to the police, through the transmitter module and enlisted numbers by means of a GSM module. At present the work is under cycle to install it in gems, portable or other transporter like belt and so forth.

The paper [9] proposes a drawn out vehicle global positioning framework to follow the vehicle in light of GPS with that it additionally gives the wellbeing through a crisis button held under the vehicle seat utilizing GSM. As the rising monetary development pace of a country, many organizations are laying out their arrangement in the close by locale of the urban communities. Since, the security of ladies workers' inside the confidential transportation is the organizations' liability. In the hazardous circumstance a worker need to press the crisis button to initiate the gadget

Teltonika-FM1100. It thus empowers at the same time the android gadget used to catch the pictures inside the vehicle and the GPS framework which track the vehicle position as scope and longitude. An alarm message including the area is send card to the organization exceptional group and close by police headquarters through GSM SIM. After that it is the obligation of police crew and company group to deal with the circumstance.

3. PROPOSED ARCHITECTURE

In many parts of the world, home safety is currently the most pressing worry. Women and men alike are still afraid in isolated regions. So, utilising Raspberry PI, we suggest a security patrolling robot.

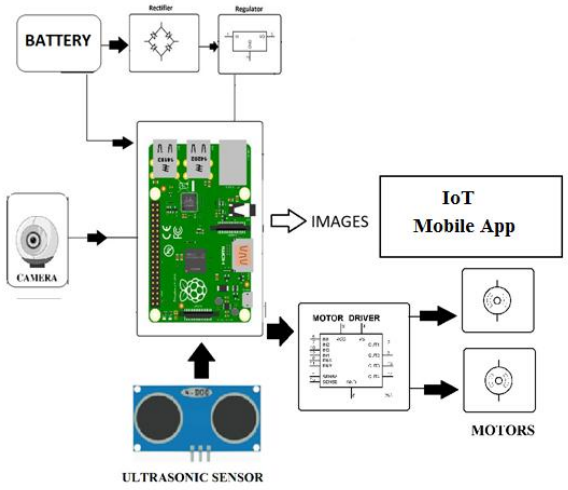

Fig 1 block diagram of proposed system

The device secures any location by mounting cameras and microphones on a robotic vehicle. The robotic car follows a predetermined course and has cameras and acoustic sensors. While patrolling, it follows a predetermined course. If sound is detected, it stops at specific locations and carries on to the next. For patrolling the specified area, the system employs an IR-based path-following system. It uses a camera to monitor each location and detect any problems. It has the capacity to listen in on the noise in the area. The robot hears. After the environment has quieted down, any anomalous activity begins to move towards the sound on its predetermined course. It next scans the surroundings with its camera, looking for any human faces. It instantaneously collects and transmits photographs of the scenario to the IOT smartphone app. For receiving sent photos and showing them to the user with alarm noises, we utilise IOT fairebase. As a result, we propose a completely autonomous security robot that works around the clock and patrols broad regions on its own to keep the facility safe.

4. CONCLUSION

According to this system, a night vision camera is used to monitor the whole region, and an automated system detects abnormal behaviour by sending a robot down a certain path to record the area and upload it through IOT. This technology is a clever, automated approach to patrol at night

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