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Review of Women Safety Night Vision Patrolling Robot

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ABSTRACT: In this growing world, population is increasing day by day and because of this, security problems are also increasing. In this scenario, safety is one of the biggest issues for both men and women. But mainly women are facing more problems in comparison to men. Due to the large population, this may not be possible to provide physical security to everyone. Currently we are using CCTV cameras for security purposes which only do the job of recording events, so it can't be considered as preventive measure for women's safety. Therefore, the use of robots came into the picture. Hence, we are here to propose a women's safety night patrolling robot that can be used to replace manpower and provide quality security. In this system we are using ultrasonic sensors, Arduino, PIR sensors and a night vision camera which are mounted on the robotic vehicle. The ultrasonic sensors are used for manual and automatic mode respectively. The night vision camera installed in this robot is used for capturing events in day as well as night. If robotic vehicle senses any live object in front, it sends the notification to the control room. Thus, we come up with the night patrolling robot that can be used in large areas for securing the premises. Keywords- AI, IOT, Night surveillance, Patrolling robot, Women's security.

I. INTRODUCTION

With the fast-growing technologies, Robotics is also growing exponentially all over the world. Robotics is a modern technology which is spreading its arms in almost every field which helps people to make their life simpler and easier. One of the most demanding fields is human security as robots can work more efficiently in comparison to humans. The key and essential components of robotics are control and automation. Robot can be terrestrial or aerial which can have eye on every small detail that is not noticeable to human eyes. The added advantages of using robots are long-range visibility and not having risk to human life. With the use of cameras and different type of sensors like temperature sensor, gas sensor, smoke sensor and sound sensor, we can also detect hazardous situations. Thus, in today's scenario, robot surveillance is the area of great interest.

The basic components required for this robot are GSM, Arduino, Node MCU, night vision camera, ultrasonic sensor, etc. This robot is set in manual mode, which can move forward, backward, right or left. This is a wheeled robot having four wheels which are controlled through android using IOT i.e., Internet of Things. The night vision rotating camera used in this robot records live events over the area, and the controller can see this live video any time they want. When ultrasonic sensor used in this robot detects any moving body in the surrounding area, it activates GSM connected with it and GSM start sending notification to the controller on android or PC. Now after receiving the notification on android, user can see live streaming in surrounding area of robot and if there is something wrong happening there, one can stop or take action against it.

We can mount a solar panel on robot for saving our battery as solar panel is rechargeable and can store charges. To enhance this robot, one can also make this robot in automatic mode using ultrasonic sensors and sound sensor, which can detect sound in the surrounding and start moving in the direction of sound. GPS can also be used in this robot to track its location, so that action can be taken quickly by reaching at exact location. Hence, our aim is to build a night patrolling robot which have full feature to save women from any dangerous situation.

II. LITERATURE REVIEW

Robotics is the most hyped topic in today's date, government organizations and scientists are trying hard to bring the revolution in this field [1]. This technology is spreading at the great speed in various sectors like armed forces, space

exploration, health care, security, etc [2]. One of the most targeted sectors is security. In countries like South Korea is leading the world in robot denseness [3]. South Korea's robot denseness is seven times higher than the global average, and the country has been expanding its robot density by 10% every year since 2015 [4]. TejalDnyandevBarhate and SakshiBalasahebChavanke proposed a basic robot with a wireless camera mounted on it. This robot is used in military purposes for saving the lives of soldiers by sending the robot in place of risking the life of soldiers [5].

The Night Patrolling Robot can be operated in manual as well as in automatic mode depending on the requirement which makes it fully autonomous in nature [6]. SudhaChowdhury came up with a robot which is helpful during natural disasters such as floods, tsunamis, earthquakes etc. This robot is used for detecting the human beings trapped under the collapsed buildings using PIR sensor [7]. The proposed robot has one disadvantage of not being able to detect the real time location of the bot. AdeelAzfar Khan, Muhammad Hamza Khan, SarmadHameed, Muhammad Bilal Taak made a spy robot which keeps a track on the actions and movements of the enemies in the enemy zone. The robot is operated in manual mode using RF (radio frequency) transmission and is mounted with a rotating Night Vision Camera which provides live streaming [8].

Perumal [9] proposed "A robot that can detect bombs under the robot. The robot is mounted with night vision camera and a metal detector for this purpose". The main disadvantage of their proposed robot is that, it cannot provide audio communication [10]. In 2018, dong [11] made: visual audiometry with headlights. This technique measures relative transfer for mobile robotic systems with a chain of camera images [12]. A camera can be used to get large quantities of input data, which are comparatively lowcost sensors, making it highly costly functional captures in mobile robots. As this is an idle part, however, it will be dependent on external strength, which can decrease its accessibility.

There is an android application for women's safety named "Abhaya" [13]. This application does the job of finding the location using GPS, sends the notification to the registered contacts with the location URL and also calls the first registered person [14]. It has the unique feature of continuously sending the message to registered contacts for every five minutes until the person clicks on the stop button. By continuous tracking of location through messages one can easily and quickly rescue the victim [15].

III. METHODOLOGY

1. Working Flowchart

The flow chart shown below depicts the entire operation of the robot. This flowchart is for the manual mode operation. Figure.1 Flow chart of the robot working in manual mode.

1) Hardware Implementation

- a) Arduino board: Arduino UNO is an open-source platform which consist of ATmaga328P microcontroller. The board has various input/output pins that can be used for interfacing with other circuits.
- b) Night vision camera: The camera provides the live streaming of the events in day as well as in night. Night vision camera detects the invisible IR wavelengths through which we can see the objects in the night using camera [16].
- c) Android phone/PC: This block works as the controller unit by which we can give instructions to the robot and receive the notification on it.
- d) Ultrasonic sensor: These sensors use a transducer to send and get ultrasonic sound waves or pulses that transfer back data about an object's vicinity.
- e) DC motor: DC motor is used for converting electrical energy into mechanical energy [17].
- f) IOT server: IOT server is used to connect the robot and android/PC through internet.
- g) Node MCU: It is an open-source development board and firmware that runs on the ESP8266 which connect objects and starts data transfer via Wi-Fi protocol and is a hardware based on ESP-12 module specially designed for IOT based applications [18].

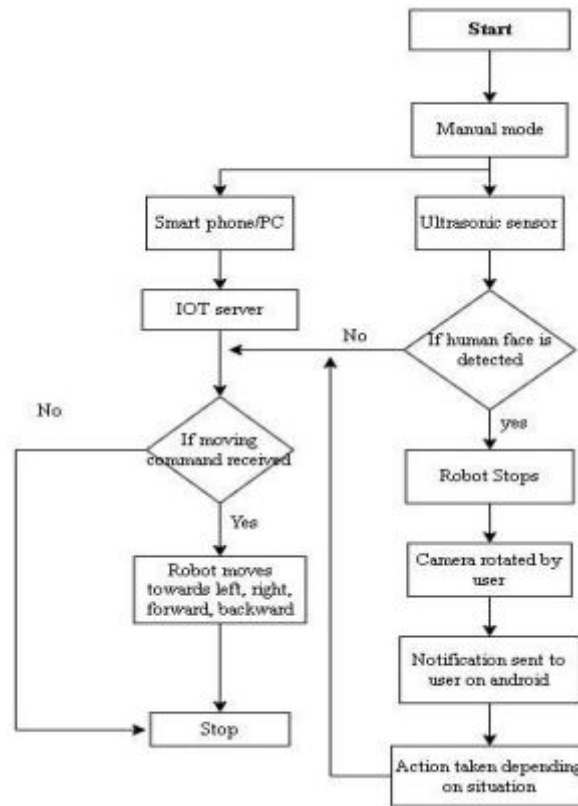


Figure.1 Flow chart of the robot working in manual mode.

IV. CONCLUSION

The proposed model is a fully featured robot which can be used for women’s safety. The multiple devices used in robot help in monitoring a particular area and provides security to women’s who can never feel afraid even at night. Now, we can launch this robot in market with a welldeveloped app through which robot can be monitored and controlled easily by common people. By this method we can also keep a track on criminals. This is how, women’s safety can be improved using night patrolling robot at a great extent.

V. FUTURE SCOPE

The future scope of this project is that we can control the system through image processing i.e capture the image of the person through camera and process it if it is blur and also IoT enables this system to provide more safety to women’s. The future scope is wide and various IoT technologies can enable this system more efficient to use.

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