

Night Vision Security Patrolling Robot

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Abstract— The Night Robbery is now become a biggest challenge in front of the entire world. According to survey, India is the 3rd top most country where the night robbery rates are increasing every day hence it becomes essential for India to reduce the crime rate and to provide security to the people at night. Now a day's robots are working for people in various sectors like industries, houses, and laboratories etc. hence we can use robot in security and surveillance field also. If the robot is going to be used for security purpose, then it will provide better security and perform its work more efficiently than human being. And as the robot is pre-programmed machine so it will reduce the chances of the errors which are generally happened by human being. Hence autonomous security robots are a new groundbreaking innovation in advanced security and surveillance technology. Patrolling robots are now widely used in various security and surveillance applications such as in household & business security purpose. Thus we are going to make a Night Vision Security Patrolling Robot which is provided with a night-vision-capable wide angle camera which is able to capture video & images at night i.e. in darker area. It is moving robot that can patrol surrounding places and capture pictures of suspicious activities, and if it finds any kind of suspicious/malicious activities, objects or person trying to enter in your compound then it sends alerts to owner via email or text message and also gives alarm through buzzer.

Keywords: Patrolling Robot, Raspberry Pi, Surveillance, Camera, Email Alerts

I. INTRODUCTION

As the crime rates in India and all over the world are increasing drastically, it becomes necessary for us to get better full proof technology for security. Security is a vital asset to many businesses and homeowners. In the present world, safety has become one of the major challenges to be handled. And now a day's night robbery rate has been increased drastically in Household as well as in Businesses sector each year. Today we find most robots working for people in industries, factories, warehouses, and laboratories. Robots are useful in many ways. For instance, it boosts economy because businesses need to be efficient to keep up with the industry competition. Therefore, having robots helps business owners to be competitive, because robots can do jobs better and faster than humans. And if robot is also used for the security purpose of both houses & industries then it will provide complete safety to home & business owners. As robot is used for security purpose then it will reduce probability of human injuries & murders. The proposed security robot cannot only save manpower, but also ensure the performance without mistakes caused by man.[1]

This security robot which has a night-vision-capable can patrol places and capture pictures of suspicious activities, too, and send alerts via email or text message. The robot can also be configured to go into action at any time of the day, guided by a view in front. When programmed to the

customers need, it can move automatically to a desired place and check who is present there and recognize their faces if stored in the database, following which access to entry can be allowed or denied. [3]

A. Need of the System:

As the night robbery rates are increasing day by day in all over the world it becomes necessary to build a system which will going to provide complete safety in night. Because the present scenario is that most of the robbery cases happened at night in the Household as well as in Businesses sector and in most of robbery, mostly the persons as well as personal possessions are harmed or may be stolen or broken. As robot is used for security purpose then it will reduce probability of human injuries & murders. And in case thief destroy the robot rather than killing a person then it will better thing because human life is more precious.

B. Problem Definition:

Night robbery is now become a bigger challenge in India as well as in all over the world. Security is a vital asset to many businesses and homeowners. In India night robbery has become a severe problem. In most of robbery mostly the persons as well as personal possessions are harmed or may be stolen or broken. In the present world, safety has become one of the major challenges to be handled. According to many surveys the night robbery rate has been increased drastically in Household as well as in Businesses sector each year. In most of the night robbery cases in India, victims are either killed or severely injured.

C. Aim:

The main of the project is to provide security to the human & build a Self-propelled patrolling vehicles that can patrol periodically in the designed area to ensure the safety like men do. It has the ability to monitor sound in the premises. Any sound after company is closed and it starts moving towards 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 on sound or human face detection. Thus we put forward a fully autonomous security robot that operates tirelessly and patrols large areas on its own to secure the facility.

D. Objective of the Project:

- 1) To build a robust system that can provide the security at night.
- 2) To make the wireless night patrolling system so that it will help to monitor the parameters like suspicious movement or motions, sensing sounds, measuring distance of that suspicious person or object at night.
- 3) To provide security to the human being so that persons as well as personal possessions will become safe from getting harmed or be stolen or broken.
- 4) To build a robust system that will help to reduce crime rate by continuously capturing and transmitting the

images of the situation immediately on sound or human face detection.

II. LITERATURE SURVEY

In last few years many circuits and techniques were designed. Separate circuits are implemented for each idea. Thus complexity of project is increased. But we try to implement all this circuits in one. This leads to reducing a size of circuit. [3]

In some project's circuits were designed and implemented a security system in which a mobile robot Lego NXT continuously monitors its surroundings while traveling in search of moving objects or people, considered unauthorized elements. [2] An ultrasonic sensor is used for the monitoring. On suspicious movement detection, a warning signal is sent to a computer via Bluetooth technology. The mobile robot motion is observed with a camera that sends images to the computer controlling the robot remotely. [4]

The results indicate that the security system is reliable in 85% of cases. Today, the growing insecurity makes us live with much distrust and the incidents of robbery have been devising new ways to preserve public safety. In Mexico, according to the ICESI, the number of preliminary inquiries in 2010 was registered 608 cases, an increase of 266% over 2007. So, there are much effort in implementing new security systems like security alarms, surveillance cameras, IP recording systems, and more. In order to give people certainty

about what happens in their homes or businesses, however many of these systems prove to be inefficient for lack of mobility.

Because of this situation various types of technologies have been designed and implemented in search of greater security. Considering that a security system must be the least suspect and as mobile as possible, wireless technologies have been categorized as one of the best alternatives for this area of work, as these avoid the use of wiring, allowing an efficient mobility in the security system as well as a good presentation.[5]

For surveillance different sensors are used like smoke sensor PLG sensor, PIR sensor. These systems with multiple cameras are costly and complicated to install and use. They are not flexible to implement monitoring system in indoor security system.

III. SYSTEM MODELLING

The proposed patrolling system based on the block diagram as shown in Fig.1 is a security patrolling robot which has a night-vision-capable wide-angle camera which is capable of detecting suspicious person or object at night. It can patrol places and capture pictures of suspicious activities, too, and send alerts via email or text message, the stored history of past alerts and pictures are accessible via the Web. The robot can also be configured to go into action at any time of the day, guided by a view in front.

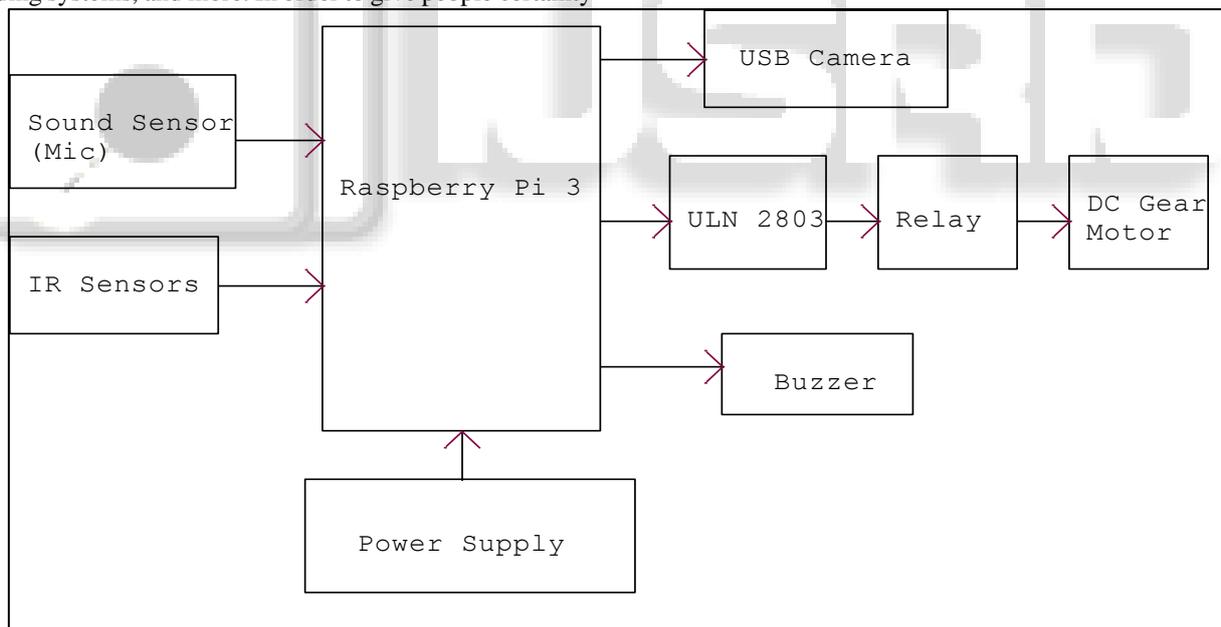


Fig. 1: Block Diagram

When programmed to the customers need, it can move automatically to a desired place and check who is present there and recognize their faces if stored in the database, following which access to entry can be allowed or denied. This robot is built using minimal components, which are effective in carrying out a wide range of basic home security functions. The Raspberry Pi which runs on the Raspbian Wheezy operating system acts as a brain to the robot, controlling all the functions done by it. The face recognition and motion detection programs help in carrying out the major features of the robot. The raspberry pi camera

module is small and efficient even dark locations and is mounted on the robot.

The IR sensor will detect any kind of the obstacle or any suspicious object & sends to Raspberry pi similarly sound sensor detects any kind of sound and send signal to Raspberry pi. The night vision USB camera can patrol places and captures pictures of suspicious objects or person with their activities this captured data is send to the Raspberry pi which compare this with stored/provided data & if received information is not matched with stored data then it takes action and sends alerts via email & text and also gives alert

through the buzzer to the owner. For the movement of the robot i.e. for forward and backward movement of robot a DC gear motor is used which is driven by a relay and relay driver ULN-2803 which is controlled by the Raspberry pi. The

power supply is used for supplying power to entire system. This is the description of the block diagram of Night Vision Security Patrolling Robot.

IV. FLOW CHART

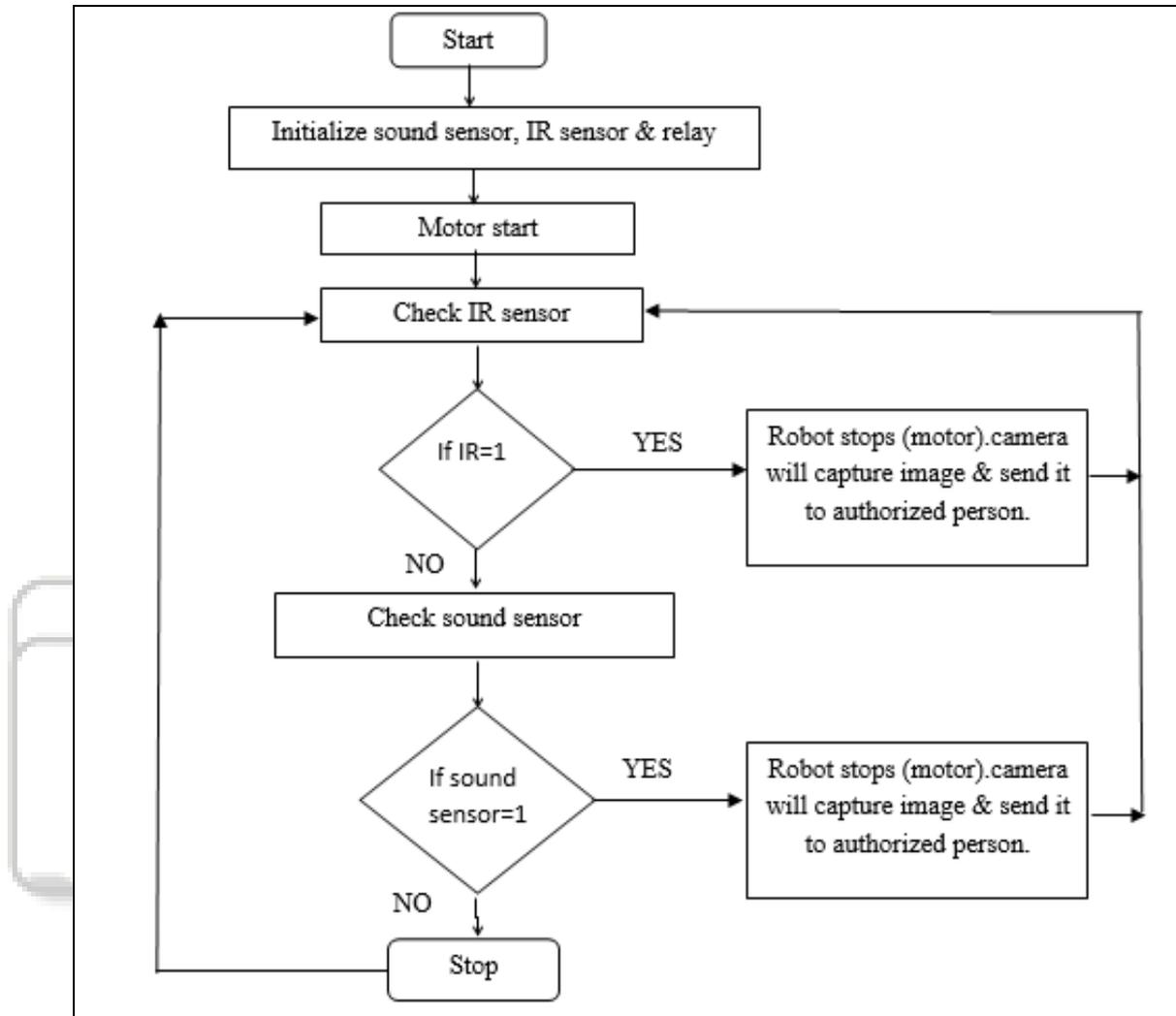
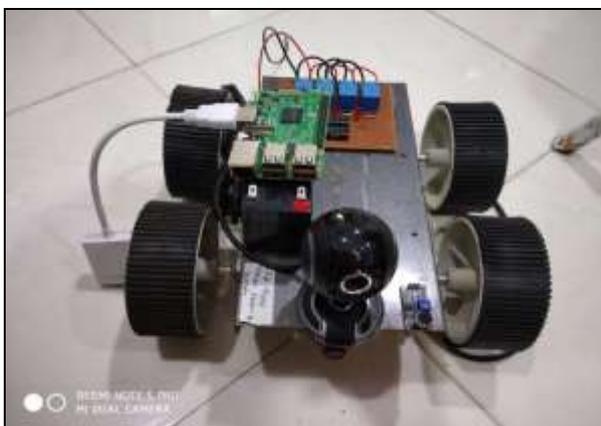


Fig. 2: Flow Chart

V. RESULT



VI. RESULT ANALYSIS

The proposed project will provide image of any suspicious object or the person so this system will save our time because in case of CCTV surveillance we have to watch the entire footage/recording when any incident occurs at night & during investigation it will consume more time in watching entire video, proposed system will overcome this problem in such a way that it will capture the image rather than recording the video so during investigation it will take less time & another advantage is that the captured image is of good quality.

VII. CONCLUSION

The system patrols surrounding area by using Night-Vision Camera and Dc Motor. The Night-Vision USB Camera Technology is proposed to improve video and data capturing quality at night so, the proposed project will capture better quality image in the dark area also. Its multi-sensor feature provides a proficient way to monitor security, avoiding false

alarms. A patrolling security system is more efficient compared to a fixed security system. The robot features autonomous patrolling in a defined area, however can also be kept stationary. It also provides the user with variety of alarm methods—call, text, on board alarm through buzzer. Thus the designed robot provides a better and safer environment.

The Night Vision Security Patrolling Robot is a step forward to contribute a solution to the biggest problem of night security. This robot system will be helpful to overcome the problem of the night-robbery which is a major issue & provide complete safety in night. It supports the new technology and effectively supports in reducing crime rates. This system has features for the people to monitor their surrounding area on their mobile phones using the application.

REFERENCES

- [1] Dharani Sethuram, Lakshmi N, Ashvini V, "Home Security Robot", International Journal of Computer Science & Communication Networks, Vol 5(3),169-172.
- [2] Lemuel Uitzil, Michel García, "Wireless security system implemented in a mobile robot", IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 4, No 3, July 2012.
- [3] Dipali Chavan¹, S.A. Annadate², "A Surveillance Robot with Climbing Capabilities for Home Security", International Journal of Computer Science and Mobile Computing, IJCSMC, Vol. 2, Issue. 11, November 2013.
- [4] Bass, L., Siewiorek, D., Smailagic, A., Stivoric, J. "On Site Wearable Computer System", CHI 95 Conference Companion, pp 83-84, Denver, May 2017.
- [5] Norman, D. and Draper, S. "User Centered Systems Design", Erbaum, 2016