

# MANUALLY OPERATED LIVE STREAMING PATROLLING ROBOT

Presented By: <sup>1</sup>Balwant Singh, <sup>2</sup>Saksham Sachdeva, <sup>3</sup> Shivam Mishra,

<sup>4</sup>Shubham Rai, <sup>5</sup>Tarushi Srivastava

UG Scholar

Department of Electronics & Communication Engineering,

Shri Ram Murti Smarak College of Engineering and Technology, Bareilly

***Abstract:*** *The main aim of this paper is to deal with the problems faced by the patrolling officers regarding their allotted patrolling duties. Thus, this paper aims to develop a device that would serve as a patrolling assistance to them. One of the biggest problem that the patrolling officers face in day to day life is the fact that the patrolling officers face due to their hectic and overburden duty that they are assigned to. The technology proposed in the paper consists of a LIVE STREAMING PATROLLING ROBOT. Thus we can say that the aim of this paper is to address the development work of a patrolling robot and can be said as, the device which with the help of night vision pie cameras and live recording of the patrolling site or the area that is to be detected and the manually operated directions provided to the robot provides the better patrolling of the desired area and act as the best and the most suitable aid to the patrolling incharges.*

## I. INTRODUCTION

Security is a vital asset to many businesses and homeowners. It prevents harm done to persons as well as prevents personal possessions from being stolen or broken. Businesses and homeowners set aside a large budget just for security measures each year. On average the annual salary of a security guard is about \$25,000 [1]. This cost increases with alarm systems, security cameras, and number of security guards hired. Homeowners spent about \$20.64 billion on home security systems in the united states in 2011 [2]. Patrolling is nothing but to keep monitoring over an area by regularly moving or travelling a rout of the corresponding area. Robot patrolling continuously works in the area which is allocated to robot. There is a variety of technologies that assist in ensuring security alongside security guards or guard dogs. One of the most common forms of security is the security camera. This method of security does not prevent the crime from happening, but it does aid in identifying criminals to law enforcement when a crime occurs. There are also alarm systems, where once activated, will sound an alarm to deter criminals from further breaking in. These systems typically send an alert to law enforcement or a security station and can be triggered through sound, movement within a certain range, and doors/windows opening. There are also rover type remote controlled robots such as the avatar 3 [3]. The robot captures the images in 360 degree rotation. These images are then sent towards the user in a real time, user will analyze it and if there is any problem observed then action will be taken. With the help of motion of the camera we can collect the information from all sides of the outside area. We can control the robot in two ways, one with the wire and the second is with wireless. The wireless controlling helps us to control the robot from different locations. In this GSM module is used and for camera support raspberry pie is used. Robot patrolling is mostly used in military area, hospitals, shopping mall, national functions, industry area, agricultural area etc. We propose a security patrolling robot using Raspberry PI. The system uses cameras for securing any premises. The robotic vehicle moves at particular path and is equipped with camera. It uses a predefined line to follow its path while patrolling. It stops at particular

points and moves to next points by the instructor or the one operating it manually. It monitors each area to detect any problem using combination of HD cameras. This robot can survey an area for a security guard without having to put them in harm's way. It has several capabilities, but is not autonomous. Just recently a prototype of an autonomous security robot was created called the K5 [4]. Here we use live streaming technology for receiving transmitted images and displaying them to user. Thus we put forward a fully manually operated security robot that operates tirelessly and patrols large areas on its own to secure the facility.

## II. LITERATURE SURVEY:

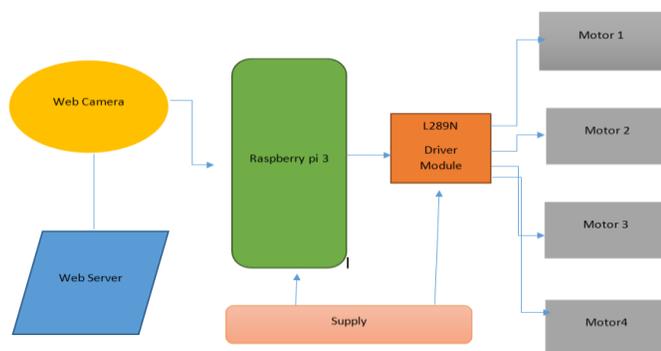
J. Ghanem Osman Elhaj Abdalla, implemented a surveillance system with a spy robot with the raspberry Pi using internet protocol. It gives various ideas about the surveillance of border areas. The border armies need to patrol the border area cautiously, but even by working with high cautious it is not possible to locate every small incidents in the night every time. Therefore there is a need to design a system which can detect the activity in this region and provide a message to the nearby security control unit. In this system, they make a spy robot using Raspbian operating system with remote monitoring and control algorithm. The spy robot system is connected with three types of equipment's which is raspberry pi module, a night vision camera and sensor. The collected information regarding the activities working on the front of the camera is sent to the users through the web server which can be posted on the webpage simultaneously. [5]

Takato Saito and Yoji Kuroda implemented a Mobile Robot using GPS with place recognition system. The paper suggests a survey of a mobile robot with GPS observations. GPS technology makes it important considering the tracking of the robot. In this we face some of the critical issues such as to get high accuracy, stability and also needs to improve few restrictions that GPS observations face such as multiple path and loss of signal, especially in the congested area and out of coverage area. This method is used with positional using GPS to neglect the errors. We use two types of observations derived from global positioning system and place recognition on appearance based system to mobile robot localization. This robot can be continuously monitored and the fear of loss of robot can be minimized. [6]

In 2013, Cheng Tang, Qunqun Xie, Guolai Jiang, Yongsheng Ou, make a road night based on a planar reflection model. It has given various ideas of road detection and different concepts of monitoring the monitor. Roads and street monitoring is always very important for performing different activities such as pedestrian detection, any questionable activity, etc. This method classifies the image pixels of the road. Till now, different designs are designed for daytime activities but for night there is no such kind of research is made. This development focuses the any unused activity detection at night. Since this system is vision based and can distinguish the road depending on the image, it may face difficulty when any other image such as bird or vehicle comes into the picture. Here a planar reflection model is functional to get the intensity distribution of different pixels with an infrared camera. With that, a pixel-based classification is used to check the different pixels belong to the road or not. If only it determines road surface then the further process gets started. [7].

In 2017, Kirk Mac Tavish, Michael Paton, and Timothy D. Barfoot, made night rider: visual odometry using headlights. This technology estimates relative motion with a sequence of camera images for mobile robotic system. A camera can be used for getting large amount of input data and are comparatively inexpensive sensors, which will make it as the highly usable sensors in moveable robots. However, since it is a passive component, it will be depend on external power supply, which can reduce their availability. Many of the other sources available for lightning purpose we can use such as headlights. Headlights can be used as an alternate light source, with this; the paper investigates the outdoor stereo VO performance with the conditions in lightning for mostly 10 km of Driving area for 30 hrs. In this various challenges include the visibility range, a dynamic light source, intensity hotspots, etc.[8]

### III. METHODOLOGY:



*Fig.2: Block Diagram Night Vision Patrolling System*

A robot had to be constructed that had a high enough power to move all the robot hardware as well as the necessary surveillance equipment. It is to be believed the size of robot would be relatively small because and a smaller robot would require less power and construction expense. The robot needed be at least high enough to offer an onboard camera enough visibility of the hallway in front of it to see when there is a person in it. The robot would operate wirelessly on battery power. The robot is to be made such that it could operate it max 3 – 4 hrs without being recharged. The main aim is to offer the easy patrolling of the robot by continuous recording the scenes that take place in the surroundings. The major methodology adopted is of fulfilling our aim with the help of Internet Of Things. The live streaming is achieved with the help of pi-cameras that live stream the live recorded video to the nearest allocated location. To achieve this prototype possible we will use the Raspberry Pie module to achieve the aim and the various components are interfaced with it to make the things working together. The R-pie is been interfaced with cameras. It monitors each area to detect any problem using combination of two HD cameras. The path following of the robot is been remote operated that is controlled itself by the instructor. Attempts are made to have the live stream report on our cell phones.

### IV. REQUIREMENTS:

The device that this paper elaborates is the combination of both hardware and software components. Thus here we mention the useful requirements needed:

#### HARDWARE REQUIREMENTS:

Raspberry Pie  
Dc Motor  
Web Camera

#### SOFTWARE REQUIREMENTS:

VNC Viewer  
Putty  
Rasbian  
Programming Language of choice

### V. APPLICATIONS:

- In the situations of pandemic like the one of covid-19, robots like these can be a boon to the frontline workers like polices and doctors to keep an control over the people and an close watch of patients respectively.
- In various schools, colleges, universities, offices for the purpose of keeping an eye to the ongoing activities in the premises.

- In remote areas where there is lack of controlling problem and security.
- On roads everywhere to reduce the human labor .
- Surveillance duty in intense situations.
- As the source of help to the police services.
- As the initial strong initiative in war zone areas to know the tactics of the opposite parties.
- In hospitals to watch the patients regularly instead of manually going again n again.

## VI. CONCLUSION:

Thus using this MANUALLY OPERATED LIVE STREAMING PATROLLING ROBOT that we've put forward using all the functionality this prototype model giving an clear idea of the details of the device that we have thought of. Using this we have tried to address all the social problems that occur in the society and the miss happenings happening regularly due to the failure in the patrolling services that usually occur due to the mistakes made by human patrolling officers on a regular basis. Thus, this paper concludes with a design of security robot for patrolling which uses night vision camera to securing its premises. The robot moves with particular intervals in the same direction. It is also equipped with night vision camera and sound sensors. It is used by a predefined path which is given to the controller for the movement of patrolling. It captures and sends the images directly to the control monitor room, for further actions.

## VII. REFERENCES:

- [1] <http://www.bls.gov/oes/current/oes339032.htm>
- [2] <http://money.usnews.com/money/personalfinance/articles/2013/09/09/the-cost-of-keeping-your-homesafe>
- [3] <https://robotex.com/avatar-security-robot/i>
- [4] <http://knightscope.com/about.html>
- [5] M. Bertozzi, A. Broggi, C. Caraffi, M. Del Rose, M. Felisa, and G. Vezzi, "Pedestrian detection by means of far-infrared stereo vision," *Computer Vision and Image Understanding*, vol. 106, no.2, pp. 194–204, 2007.
- [6] J. Ge, Y. Luo, and G. Tei, "Real-time pedestrian detection and tracking at nighttime for driver-assistance systems," *Intelligent Transportation Systems, IEEE Transactions on*, vol. 10, no. 2, pp. 283–298, 2009.
- [7] J.M. Alvarez and A.M. Lopez, "Road detection based on illuminant invariance," *Intelligent Transportation Systems, IEEE Transactions on*, no. 99, pp. 1–10, 2010.
- [8] O. Ramstrom and H. Christensen, "A method for following unmarked roads," in *Intelligent Vehicles Symposium*, 2005. Proceedings. IEEE. IEEE, 2005, pp. 650–655.
- [9] (IJRASET) Volume 7 Issue I, Jan 2019- Available at [www.ijraset.com](http://www.ijraset.com)