Night Patrolling Robot

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Abstract: - Currently the night observation turns out to be unusually testing piece of work. There are certain points where people cannot participate in the visualization. Safety is a necessity for every human being. With the increase in population, the need for security also increases. But due to lack of appropriate resources, proper security arrangements could not be made. To get full security, it requires a lot of money, which is not possible for everyone to pay. The basic prerequisite for this situation is a night patrol robot.

This paper presents a solution to the problem of designing an intelligent robot that can provide quality security at a low cost. This robot takes the advantage of modern technology that allows it to move automatically without human assistance, roaming the area and alerting the control room when it detects abnormalities. The development of a robot also controlled by deterrence reconnaissance sensors to avoid collisions and tear gas gives the police more time to take the necessary actions.

Key Words:— *Robot, patrolling, IOT, safety, GPS.*

I. INTRODUCTION

Robotics is a multidisciplinary discipline that combines computer science and engineering. Robotics is the study of the design, function and application of robots. Robotics aims to create robots capable of assisting humans and aid humans. Robotics is the study of creating robots that can replace humans and mimc the behaviour there. Robots can be used in many situations and for many different purposes, but now many situations and for many different purposes, but now many robots are used in hazardous environments (such as finding dangerous products, detecting bombs and deactivating them), production processes or in situations where humans cannot exist.

The word change faces serious problems related to human safety at night. Recently, robots have been used in various fields including security and defense. This will be a big step towards the rise of automation and security.

Night patrol robot makes the best use of its features for smooth operation. It has obstacle detection and has IOT features to show off its senses. With the help of a camera, a GPS module and a Bluetooth module. All its functionalities are correctly coordinated using a microcontroller.

II. NEED OF THE PROJECT

Safety is an important asset for many businesses, homeowners, and public places. It can prevent harm to people and prevent property from being stolen or damaged.

Reliable protection of most places means that security personnel patrol safe places on foot. Patrols must be conducted on a regular basis and the longer a place is under surveillance, the more difficult it will be for anyone to commit illegal acts.

The existence of security personnel who only write in specific areas not only "on duty" in the guardhouse, but also warns of illegal intruders. However, foot patrols are expensive service that relies on the professionalism and commitment of the personnel involved; therefore, this means that long-term investments in salaries, benefits, and management work are more costly.

With the advent of autonomous mobile robots designed to solve patrol and safety challenges, it is now possible to reduce costs and improve patrol quality in restricted areas.

III. OBJECTIVE

To solve this problem, we have proposed a night patrolling robot whose purpose is to ensure the safety of people at night. The best way to reduce the likelihood of becoming a victim of violent crime is to identify, protect and access resources to help us get out of dangerous situation.

This method of safety does not prevent crime to happen, but it helps to identify criminals for law enforcement when crime do occur. This robot captures the live stream and 360 degree rotating images. This feed is sent to the user in real time, the user will analyze it and if a problem is observed action will be taken and we can also spray tear gas so that the police have time to take the action. This robot can be operated manually as well automatically.

This patrolling robot can move automatically along the base of the foot patrol. Using the built-in automatic guidance system, the mobile robot can independently circumnavigate obstacles and choose the optimal route to follow.

This patrolling robot makes almost no noise while on the move, as it uses batteries and modern high-power, lightweight electric motors. This robot is always on its patrol route; unlike humans, it does not need to rest and it does not need to be supervised by a security guard.

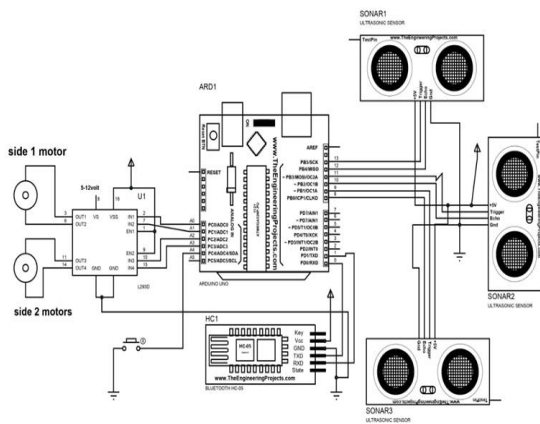### IV. PROPOSED SYSTEM AND IMPLEMENTATION DETAILS

Fig.1. NPR Block Diagram

Night patrolling robot's block diagram is divided into two sections:

Transmitter and Motor Driver and Receiver:

The encoder IC HT12E (IC1), 433MHz RF transmitter module (TX1), and a few standalone components make up the transmitter circuit. Arduino, decoder IC HT12D (IC2), 433MHz RF receiver module (RX1), and motor driver IC L293D (IC3) make up the receiver and motor driver circuit also the IC 7805 (IC4) regulator, and a few discrete components.
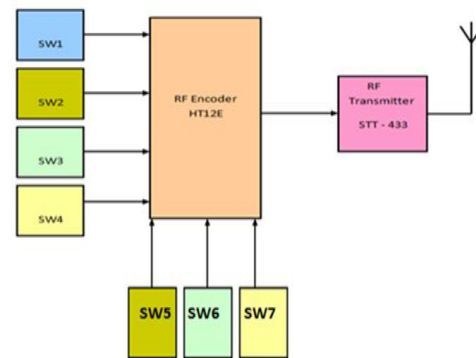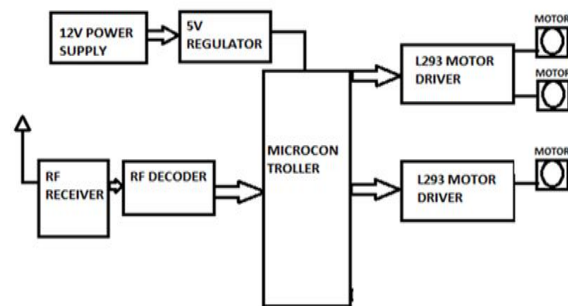

Fig.2. Circuit diagram of Rx-Tx

Arduino:

The Arduino microcontroller is a simple-to-use but powerful single-board computer that has gained popularity in both the hobby and professional markets. Because the Arduino is open-source, the hardware is inexpensive and the development software is free. This guide is intended for ME 2011 students, as well as students anywhere who are encountering the Arduino for the first time. Prowl the web for advanced Arduino users; there are plenty of resources. The Arduino project began in Italy with the goal of creating low-cost hardware for interaction design.

L293D Motor Driver IC:

The L293D motor driver is designed to provide a simple and user-friendly interface for embedded applications. The L293D motor driver is installed on a single-sided PCB of good quality. For simple access to the driver IC's pin functionalities, the pins of the L293D motor driver IC are attached to connectors. At voltages ranging from 4.5 V to 36 V, the L293D is designed to give bidirectional driving currents of up to 600 mA. In positive-supply applications, this device is designed to drive inductive loads like as relays, solenoids, dc and bipolar stepping motors, as well as other high-current/high voltage loads. TTL compatibility is present on all inputs.

IC HT12E:

The 212 encoders are a family of CMOS LSIs designed for use in remote control systems. They have the ability to encode information with N address bits and 12N data bits. One of the two logic states can be selected for each address/data input.

IC HT12D:

The 212 decoders are a family of CMOS LSIs designed for use in remote control systems. They're paired with encoders from Holtek's 212 series. A pair of encoder/decoders with the same number of addresses and data format should be chosen for proper operation.

BLUETOOTH Module:

Bluetooth is a short-range wireless technology standard for transmitting data between fixed and mobile devices over short distances using UHF radio waves in the ISM bands, ranging from 2.402 GHz to 2.48 GHz, as well as for establishing personal area networks (PANs). [4] It was designed as a wireless replacement for RS-232 data wires. It's mostly used to replace wired connections, transfer files between adjacent portable devices, and connect cell phones and music players to wireless headphones. Transmission power is limited to 2.5 milliwatts in the most generally used mode, giving it a fairly short range of up to 10 metres (30 feet).

What You'll Need for a Successful System

- The Arduino Uno
- Programming cable for USB (A to B)
- External power supply or 9V battery (for standalone operation)
- For external circuits, use a solderless breadboard and 22g solid wire for connections.
- The Arduino development environment is installed on the host PC. There are versions for Windows, Mac, and Linux.
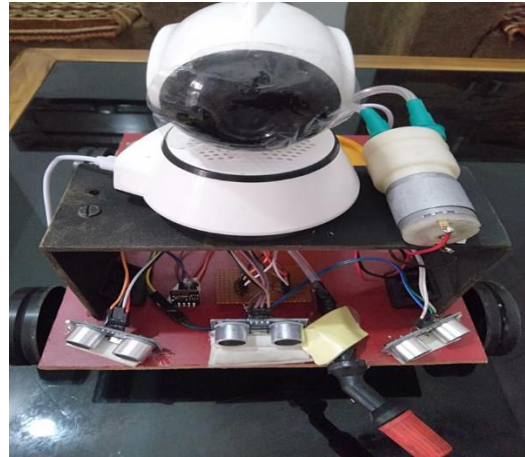
V. RESULTS AND DISCUSSION

Fig.3. Front view of night patrolling robot

VI. CONCLUSION

After carefully considering this system model, we can conclude that this technique will undoubtedly aid in the reduction of crime rates are at an all-time high. Grants are available through the project when it came to designing for crime, there were a lot of challenges. Current scenario and will assist in clarifying Using a compressed kit and concept, they can be studied scientifically. The Night patrolling robot has the ability to keep public safe. A difficult scenario it has an alarm, and SOS light, and a flashlight. Even incorporated a safety app for its extremely important environment. The Night patrolling Robot can be improved. Lot more in the future, thanks to the use of ultra-compact technology Modules for the Arduino microcontroller.

ACKNOWLEDGEMENT

REFERENCES

[1]. S. Chavanke and T. Dnyandev Barhate, War Field Spying Robot with Night Vision Camera, Feb. 2017.

[2]. S. Hameed, M. Hamza Khan, N. Jafri, A. Azfar Khan and M. Bilal Taak, Military Spying Robot, vol. 8, no. 7C2, pp. 2278-3075, May 2019.

[3]. H. Salman, S. Acheampong and H. Xu, "Web-Based Wireless Controlled Robot for Night Vision Surveillance Using Shell Script with Raspberry Pi", Advances in Intelligent Systems and Computing, pp. 550-560, Jun. 2018.

[4]. P. S. Kumar, V. Vinjamuri, S. G. Priyanka and S. T. Ahamed, "Video Surveillance Robot with Multi Mode Operation", International Journal of Engineering Research & Technology, vol. 5, no. 2, Feb. 2016.

[5]. P. Manasa, K. Sri Harsha, D. D M, K. R and N. Nichal O, "NIGHT VISION PATROLLING ROBOT", Journal of Xi'an University of Architecture & Technology, vol. 8, no. 5, Apr. 2020.

[6]. Night Vision Patrolling Robot using Raspberry PI, Dec. 2019.

[7]. H. Bertozzi, A. Broggi, M. Del Rose, C. Caraffi, M. Felisa and G. Vezzoni, "Farinfrared stereo vision for pedestrian tracking," Computer Vision and Image Comprehension, vol. 106, no.2, pp. 194–204.

[8]. J. Ge, Y. Luo, & G. Tei, "Drive assistance systems for realtime pedestrian detection and monitoring at night," Intelligent Transportation Systems, IEEE Transactions on, vol. Nine, no.2, pp. 283-298, 200.