

AI Based Night Vision patrol

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Abstract—The paper includes Designing and developing a reconfigurable independent Security robot which can be used in main or domestic areas. The idea consists of main corridor jeer pi, TV display, IR detectors, ultrasonic detector, motors, vibration detector, camera and battery. The idea behind this is to secure the whole area, robot automatically goes to the particular area and capture the image of that area or shoot it and sends to the user. Raspberry Pi connected with the camera plays an important part in making an automatic robotic system. In this proposed system, jeer pi is installed with the night vision camera which help the system to go for the robotization and help to find the mortal or any problem detected using the camera captures the image using IOT technology.

I. INTRODUCTION

Night vision patrol is a technique used to enhance street safety, particularly in areas with low-light conditions. It involves using specialized equipment that enables the patrol team to see clearly in the dark, making it easier to identify potential threats and obstacles. Night vision patrols are particularly useful in high-crime areas or locations with poor lighting where traditional patrolling methods may not be effective. These patrols require specialized training and equipment and should be conducted in teams to ensure the safety and effectiveness of the operation. This essay will explore the advantages of night vision patrols for street safety and provide some tips on how to carry them out successfully. Night vision patrol is a proactive approach to enhance street safety during the night-time hours. It involves deploying trained

Equipped with night vision devices to patrol high-risk areas such as residential neighborhoods, commercial areas, and public spaces. The goal of night vision patrol is to detect and prevent criminal activities and ensure the safety of the community. During night vision patrols, officers use specialized equipment, such as thermal imaging cameras, night vision

goggles, and other high-tech tools, to detect potential threats and suspicious activities. They are also trained to identify and respond to suspicious behavior and use appropriate tactics to maintain order and de-escalate potentially dangerous situations. They also work to build relationships with residents, business owners, and other stakeholders in the community, to promote trust and collaboration in maintaining public safety. Overall, the goal of night vision patrol is to provide a visible and effective deterrent to criminal activity, increase the perception of safety among residents, and ensure the well-being of the community during the night-time hours.

Street guidance robot is a type of robot designed to provide directions and assistance to people on the street. These robots typically use sensors and mapping technology to navigate their environment and communicate with people through speech, touch screens, or other interfaces. Overall, street guidance robots are designed to make navigating public spaces easier and more efficient, providing a helpful resource for tourists, commuters, and other travelers.

II. EXISITING SOLUTIONS

C. Michelin,g.L.Forest,c. Piciarelli, andl.Cinque, “ An independent vehicle for videotape observance of inner surroundings, ” moment generation is far and wide. As a consequence, the virtual data structure is much toobig.However, one can would be suitable to gain priceless data in a variety of ways, If one can have a propensity to use statisticscorrectly.Many being mechanisms warrant an effective motorized frame for guarding women from vituperative practices. The authors used the apriori algorithm in this scheme. They combined a vaticination fashion with a rule fashion to prognosticate the miscreant's unborn intentions for crimes and the type of felonious most likely to commit them. Eighty percent delicacy was given by goods. Gender- grounded sexual and physical importunity is

on the rise due to a variety of reasons. Both of these are appertained to as "demarcation against women" (1).

Thru Venkatasamy S, "night time creative and patrolling rover navigation device for ladies safety the use of computer studying," girls security is India's topmost challenge. Numerous corridors of the country are unsafe for women. This must be remedied as soon as possible. Every generation evolves and improves in order to change the way people live. As a result, the emphasis of this paper is on streamlining the period system in order to strengthen women's safety mechanisms. One can apply a new protection system in this paper to cover girls when they share in strange sports. A new safety system has been suggested, which is entirely grounded on the patrolling robot and the Jeer Pi. A night vision digital camera can be used to secure any position in this situation. Colorful contrivance literacy models are used to boost the classified delicacy. In ensemble, algorithms similar as boosting, bagging, piling, and the more desirable re one knight medium are used. The delicacy of a confusion matrix with a man or woman classifier is. When comparing results, this is taken into account. The results show that the proposed system performs one call when compared to being algorithms (3).

Ghanem Osman Elhaj Abdalla, enforced a surveillance system with a asset robot with the Jeer Pi using internet protocol. It gives colorful ideas about the surveillance of border areas. The border armies need to details the border area cautiously, but indeed by working with high conservative it isn't possible to detect every small incident in the night every time. Thus, there's a need to design a system which can descry the exertion in this region and give a communication to the near security control unit. In this system, they make a asset robot using Raspbian operating system with remote monitoring and control algorithm. The asset robot system is connected with three types of outfits which is Jeer Pi module, a night vision camera and detector. The collected information regarding the conditioning working on the front of the camera is transferred to the druggies through the web garçon which can be posted on the webpage contemporaneously. (1)

Takato Saito and Yoji Kuroda enforced a Mobile Robot using GPS with place recognition system. The paper suggests a check of a mobile robot with GPS

compliances. GPS technology makes it important considering the shadowing of the robot. In this we face some of the critical issues similar as to get high delicacy, stability and also needs to ameliorate many restrictions that GPS compliances face similar as multiple path and loss of signal, especially in the congested area and out of content area. This system is used with positional using GPS to neglect the crimes. We use two types of compliances deduced from global positioning system and place recognition on appearance grounded system to mobile robot localization. This robot can be continuously covered and the fear of loss of robot can be minimized. (2)

In 2013, Cheng Tang, QunqunXie, Guolai Jiang, YongshengOu, make a road night grounded on a planar reflection model. It has given colorful ideas of road discovery and different generalities of covering the examiner. Roads and road monitoring is always veritably important for performing different conditioning similar as Rambler discovery, any questionable exertion, etc. This system classifies the image pixels of the road. Till now, different designs are designed for day conditioning but for night there's no similar kind of exploration is made. This development focuses the any unused exertion discovery at night. Since this system is vision grounded and can distinguish the road depending on the image, it may face difficulty when any other image similar as raspberry or vehicle comes into the picture. Then a planar reflection model is functional to get the intensity distribution of different pixels with an infrared camera. With that, a pixel- grounded bracket is used to check the different pixels belong to the road or not. If only it determines road face also the farther process gets started. (3)

In 2017, Kirk Mac Tavish, Michael Paton, and TimothyD. Barfoot, made night rider visual odometry using headlights. This technology estimates relative stir with a sequence of camera images for mobile robotic system. A camera can be used for getting large quantum of input data and are comparatively affordable detectors, which will make it as the largely usable detectors in portable robots. Still, since it's a unresistant element, it'll be depend on external power force, which can reduce their vacuity. Numerous of the other sources available for lightning purpose we can use similar as headlights. Headlights can be used as an alternate light source, with this; the paper investigates

the out-of-door stereo VO performance with the conditions in lightning for substantially 10 km of driving area for 30 hrs. In this colorful challenges include the visibility range, a dynamic light source, intensity hotspots,etc.(4)

III. PROPOSED SYSTEM

The proposed system will undergo into the following phases Proposed System Framework, proposed System Design, and Proposed System Methodology

PROPOSED SYSTEM FRAMEWORK

Raspberry PI (Small powerful CPU) is installed with the night vision camera which help the system to go for the automation and help to find the human involving in any problem detected using the sound using sound sensor and according to the sound produced it automatically goes to that area and capture the image and send it to nearest police station using IOT technology.

The ability to see in low-light or no-light conditions has long been a critical requirement for military and law enforcement operations. Whether conducting patrols, surveillance, or other activities, personnel operating in darkness or low-light environments face unique challenges and risks. In recent years, advances in technology have enabled the development of specialized equipment that can enhance the ability of personnel to see in low-light or no-light conditions. This equipment, collectively known as night vision technology, includes a range of devices such as night vision goggles, thermal imaging cameras, and other technologies that amplify available light or detect heat signatures.

In this paper, we will explore the concept of a night vision patrol project, which involves equipping law enforcement or military personnel with specialized equipment that allows them to see in low-light or no-light conditions. We will discuss the benefits and challenges of such projects, and examine key considerations for planning and implementing them.

Benefits of Night Vision Patrol Projects:

There are several key benefits associated with the use of night vision technology in law enforcement and military operations. These include:

1. Enhanced situational awareness: By providing personnel with the ability to see in low-light or no-

light conditions, night vision technology can greatly enhance their ability to detect and respond to potential threats. This can be particularly important in areas where criminal or terrorist activity is more likely to occur under the cover of darkness.

2. Increased safety: Night vision technology can help reduce the risk of accidents or injuries that can occur when personnel are operating in low-light or no-light conditions. By providing better visibility, night vision equipment can help personnel navigate hazardous terrain, avoid obstacles, and identify potential dangers.

3. Improved operational effectiveness: By enhancing the ability of personnel to see in low-light or no-light conditions, night vision technology can help improve the effectiveness of patrols, surveillance, and other activities conducted in darkness or low-light environments.

4. Better protection of assets: Night vision technology can be used to protect valuable assets such as buildings, vehicles, and equipment from theft or damage. By providing better visibility and early detection capabilities, night vision equipment can help prevent or deter criminal activity.

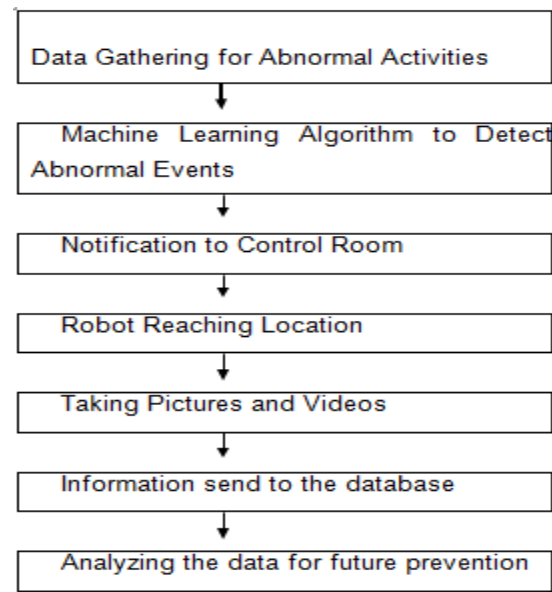


Fig.1: Proposed System Architecture

PROPOSED SYSTEM DESIGN

Requirements for Making the System

Raspberry Pi-Low- cost credit- card- sized machine that connects into a computer display or TV, and uses a keyboard and mouse. It's an accomplished little device that enables crowd of all periods to walk around calculating and to study how to program by Scratch and Python languages.

Night Vision HD Camera- Infrared night vision combines infrared enlightenment of spectral range between 700 to 1,000 nm with HD cameras perceptive to this light. The result, which is supposedly dim to a mortal bystander, appears as a snap figure on a usual display tool.

Sound Detector- Used to notice the sound, this detector is used to notice the intensity of sound. IR Detector-Specific light detector to find a light wavelength in the Infra- Red range. DC Motor(Robot module)- Designed to change the electrical present into power that will force the workings to a robot by apply a establishment degree of necklace to the motor ray.

L293D Motor-L293D is a typical Motor motorist or Motor motorist IC which allows DC motor to drive on either direction. L293D is a 16- leg IC which can control a set of two DC motors contemporaneously in any direction. It means that you can control two DC motor with a single L293D IC. Binary H- ground Motor motorist intertwined circuit(IC). The l293d can drive small and quiet big motors as well, check the Voltage Specification at the end. It works on the conception of H- ground. H- ground is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being suitable to rotate the motor in clockwise or anticlockwise direction, hence H- ground IC are ideal for driving a DC motor. In a single L293D chip there are two h- Ground circuit inside the IC which can rotate two dc motor singly. Due its size it's veritably much used in robotic operation for controlling DC motors.

Given below is the leg illustration of a L293D motor regulator.

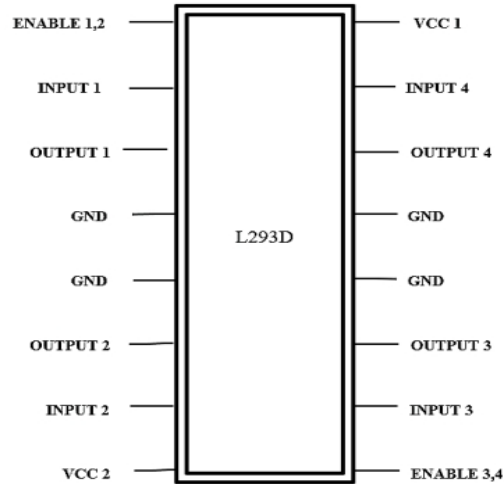


Fig.2: pin diagram of L293D motor driver

Working of L293D

- L293D motor motorist IC contains two H- ground circuit inside it, which may also use Darlington transistor some times for current modification.
- Let we understand this H- ground circuit, in case 1, when sense ‘ 1 ’ apply to transistor T1 and T4, motor starts rotating in clockwise direction due to circuit complete and current overflows through it as shown by blue suggestion.
- In case 2, we apply sense ‘ 1 ’ to transistor T2 and T3, so motor starts rotating inanti-clockwise direction due to circuit complete and direction of current overflows through it's shown by green suggestion.
- As I mentioned that sense ‘ 1 ’ apply to T1 & T4 or T2 & T3 is just for simplicity cause this transistor is hard wired inside IC so you just need to take care of leg- eschewal and apply sense to IC’s leg directly and carried out your work.

BLOCK DIAGRAM

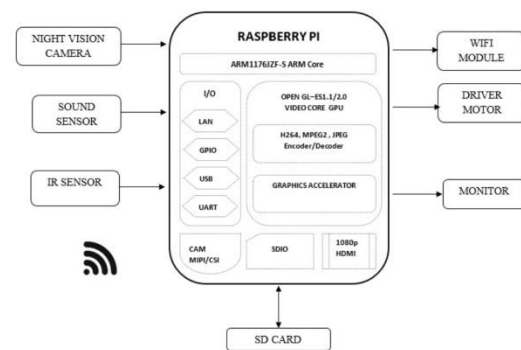


Fig.3: Block diagram of System

In this System, Infrared Sensor is used to make the robot move automatically following a specific path. The sound sensor is used to know the sound in a particular area. IOT is used to send the captured image to the police station. Then Connect USB HD camera with the raspberry pi and also connect Power Bank to Raspberry pi. Plug the HDMI cable to Raspberry pi from the monitor using VGA to HDMI converter cable. Finally, Connect USB Mouse and USB keyboard to the Raspberry pi.

PROPOSED SYSTEM METHODOLOGY

In this proposed device, jeer PI is equipped with the night vision camera that helps the stoner To go for robotization and helps to find the person or any problem detected using the sound detector and Automatically goes to that area and captures the image and sends it to the stoner using IOT technology According to the sound generated. The robot has a range of knowledge to cover the lesser region. This Robot uses two infrared detectors that are able of detecting obstacles robot on both hands. When the hedge does is at the front of the robot it changes its direction to the contrary side of it. In the robotic world, Microphone is used to descry sounds in the real time and shoot them to the Monitoring system. The live prints and vides are recorded by the vision system. Two creators are enough to power the module for robot movement. Because the number of gears in the motor is small, lower power consumption will be entered. This robot will be moving frontal and backwards using infrared detectors with the help of bus with the use of Dc machine. Dc machine transforms electrical power into mechanical power. This motor consists of 60 necklace, this necklace helps to move the bus. Then a 12volt battery is used to supply the power to the jeer PI. Where the jeer PI is used to connect to the Wi- Fi. After connecting to the Wi- Fi the captured pictured and will be visible in the drivers mobile. Where the driver can turn on the camera to check out the road. There's a sound detector using in the robot. This sound detector will smell the sound with the Particular frequence and after seeing the sound the robot will move towards the sound honored side And the camera will be switched on and the camera will record the videotape with the audio train. This videotape and the audio train will be covered by the driver who's having with robot.

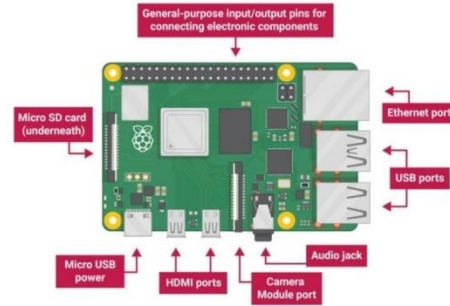
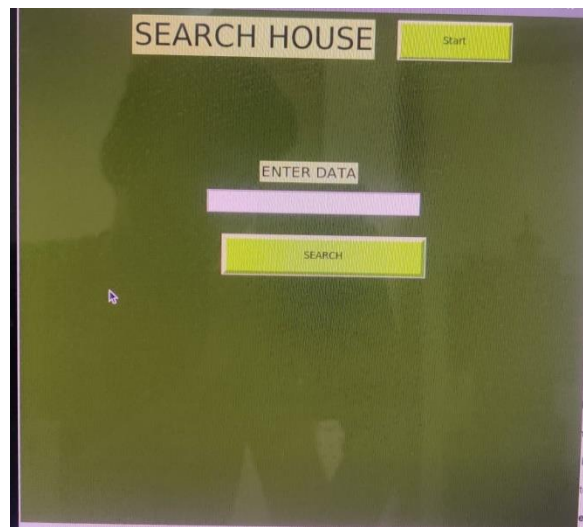
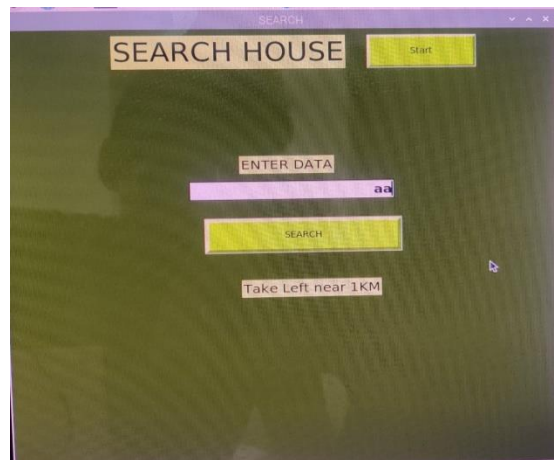


Fig.4: Raspberry PI with the system peripherals

IV. TESTING AND RESULT

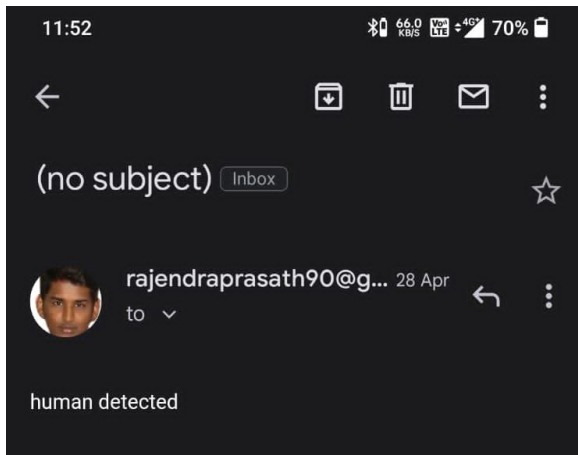
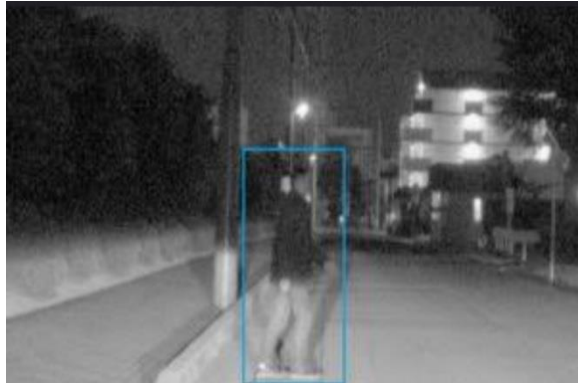


Step 1: Enter the house you need to search and click on the search option and wait for some time.

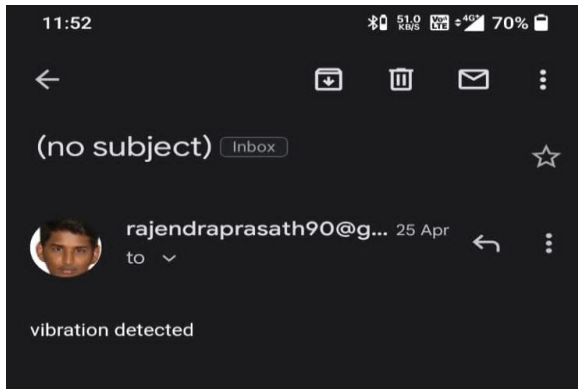


Step 2: Once the house is entered, then the guidance will show u the directions.

Step 3: If any human is detected the will capture the image and sends it to the mail.



Step 4: If any one tries to steal or have contact with the robot it will send us an alert message to our mail.



Sample captures



V. CONCLUSION

This device is an autonomous smart way for night vision patrolling. It involves the construction of a security robot that uses a night vision camera to ensure the safety of its surroundings. Improvement would undoubtedly result in a significant increase in security. The method for creating a robot for observation design is proposed in this paper. Using the concept of IOT, it solves the problem of limited extent observation. With the help of a PC/portable, one can physically monitor the robot, such as taking desired pictures and adjusting camera settings such as Brightness, Shutter speeds, Exposure, and so on. Checking by programmer should also be feasible. Along these lines, this Robot is small in scale and moves into territories where human access is impossible. The Robot is difficult to spot and blends in with the surroundings. One of the most important advancements in the gadgets sector is remote innovation. This breakthrough is being used to support our company as a crucial piece of reconnaissance. This results in a highly efficient and functional robot that reduces human labor while still performing convincing checking tasks.

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