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Night Patrol Bot

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ABSTRACT: This project suggests a robot patrolling security that uses an evening vision camera to guard any premises. The robotic vehicle travels at different intervals and is fitted with a camera and sensors. It uses a predefined path to patrol along its route. In recent times the important concern is that the parked vehicles being stolen at the night time. It is a well-established fact that a majority of crimes occur in the dark, at night, and also the women's safety is an area of concern. There is no trusted security for women in the evening and night and also in the remote areas.
It collects and sends out the pictures directly to the control room for further action. According to this device, the entire area is monitored by using the night - sight vision camera and even an automatic system when the sound is detected by the robot will automatically send the notification that it can capture the live video of the world where they are often live streaming because the camera used is a night vision camera, the security system can benefit from streaming Video, this machine is an automate intelligent way to patrol night vision.
KEYWORDS: ESP32 Micro controller, RFID, Embedded C, IOT, patrolling, security.

I. INTRODUCTION

The patrol robot is equipped with a night vision camera with the help of which it can perform a 360- degree scan of a specified defined path. It will scan a particular area and if it detects unusual movements, it will trigger an alarm to alert the user. The camera of the patrol robot can capture an intruder's image and send the info to the user. The robot can function during a self-sufficient manner, without requiring you to rent security guards to guard your home. To overcome the crimes mentioned, the night patrol Bot can be used as a guard during the night time and protect the laws. Robots function as a computer and may be controlled remotely. Patrolling is nothing quiet keeping track of a neighborhood where the corresponding robot patrolling area is consistently moving and traveling is continuously occupation the world allocating to the robot. The robot takes the photographs at 360-degree rotation. Then, these images are sent to the user in real-time, they will be evaluated by the user and action will be taken if any problems are found.

The patrolling bot consists of a fire sensor by which it detects the fire accidents and it reaches that place and by with the help of its water sprayer motor, starts spraying water on the fire and blows out the fire.

Nowadays Women Safety is that the biggest concern in many parts of the planet. There is still a fear for ladies as well as men. So here we propose security patrolling robot using ESP32 Microcontroller. Since the world faces serious issues regarding women's safety it is

inevitable to constitute our work towards it. Nowadays robots have been used in various fields which also include safety and defense. The Women Safety Night Patrolling is an effort to form use of robots for enhancing women's safety. It will be a great step towards the rise of automation and safety.

II.PROBLEMS IDENTIFIED

- In recent times, the important concern is that the parked vehicles being stolen at night time and also the theft of vehicles are in large number.
- The irregular practice of patrolling by Cops and their unavailability at all the time.
- Fire accidents in expressway and unavailability of a fire truck at that instant of time
- Unavailability of First Aid kit and ambulance in accident zone at that instant of time.
- The problem faced by a woman in a particular area.

III.OBJECTIVES

- It avoids vehicle theft in the given area and monitors the vehicle movement of the theft vehicle in the specified area.

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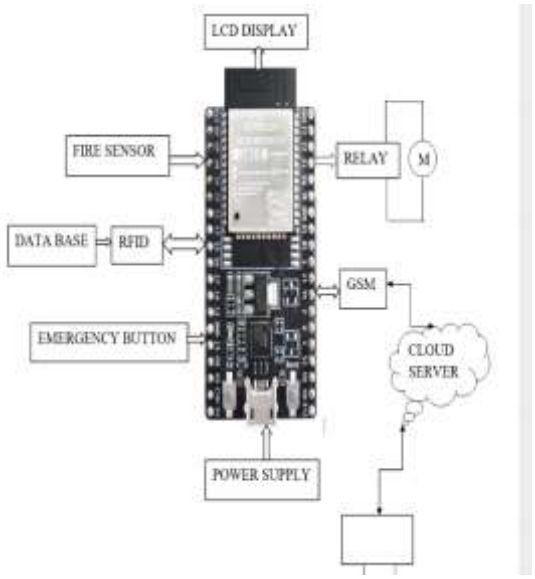
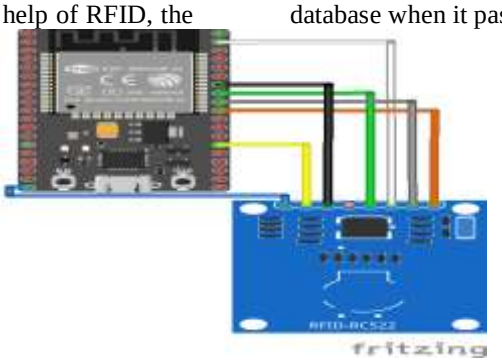
- It will make sure that the patrolling is regular and available at all the time.
- It will detect fire and be used as an extinguisher.
- It will ensure the safety of the person who met with the accident by providing first aid.
- It also checks on women's safety in public places.

IV.METHODOLOGY



The process begins with the major component ESP32 which is interfaced with RFID by which the information is been captured, stored, retrieved, and updated. With the help of RFID, the patrolling bot records the information of the vehicles and this RFID interfacing gives us information about the vehicle information from the database when it passes in this patrolling area.



RFID interfacing with ESP32 microcontroller

The RFID module uses the SPI protocol to communicate with the ESP32.

The SPI communication uses specific boxes on this sort of microcontroller.

The pinout is as follows (left side RFID, right side ESP32):

- VCC <-> 3V3 (or Vin(5V) depending on the module version)
- RST (Reset) <-> D0
- GND (Masse) <-> GND
- MISO (Master Input Slave Output) <-> 19
- MOSI (Master Output Slave Input) <-> 23
- SCK (Serial Clock) <-> 18
- SS/SDA (Slave select) <-> 5

To use the RFID module, we use the SPI.h library which can allow us to determine the communication between the ESP32 card and therefore the module. When a card, badge, or RFID chip is passed in ahead of the module, the identification address of the badge is displayed on the serial monitor. when the card gets closer to the RFID reader chip gets powered up due to mutual induction, this the basic principle of RFID.

ESP32 is been interfaced with RFID, GSM, LCD & Fire sensors. Upon when fire accidents occur, this fire detector will operate. This action closes the circuit, which the hearth

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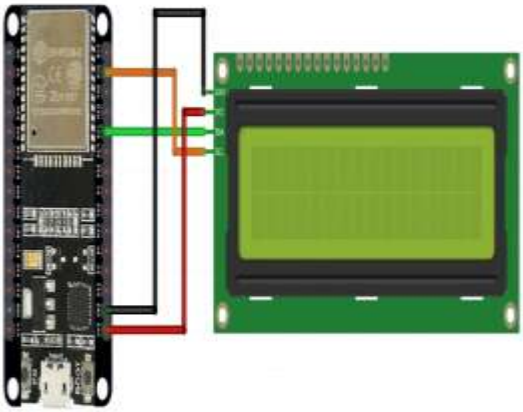
instrumental panel recognizes as an emergency condition. The panel will then activate one or more signalling circuits to sound building alarms and summon emergency help. when there is a fire, it Will emit infrared radiation then these radiations are exposed to IR receiver the voltage from the receiver will be detected by the microcontroller by this process detection of fire is done then the robot moves to that particular place and when it detects the fire it starts spraying the water by the motor.

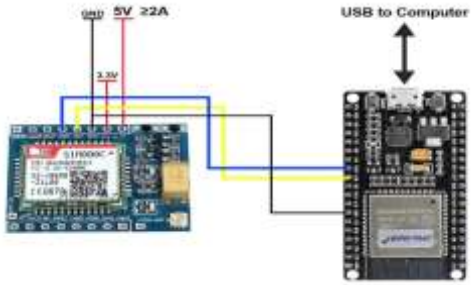
Liquid Crystal Display is may be a sort of flat panel which uses liquid in its primary sort of operation. LCD interfacing with ESP32 microcontroller, fetch the address from the LCD, which is been wired properly, further it has to be connected to the ESP32 microcontroller.

Now upload the following input to the I2C scanner, after uploading the serial monitor has to be opened at the baud rate of 11528. Next, the EN button of the ESP32 microcontroller is to be pressed on which the process the address of the I2C will be displayed on the serial monitor.



LCD interfacing with ESP32 microcontroller

The GSM (Global system for mobile phone) may be a communication module, which is interfaced with the ESP32 microcontroller to transmit messages. An emergency button is been provided for the control of the doors. If a lady feels uncomfortable due to a lawless venture, she will get inside the robotic vehicle & push the emergency button then she will sit safely inside the vehicle and lock the door from inside. within the meantime, a message is going be to be sent to the control room. Then someone can come to the present place and may take care of things. It works on certain commands.



GSM interfaced with ESP32 microcontroller

The AT commands are wony to control modems that are communicating through serial communication with a microcontroller.
Here are some commands to send SMS,

- AT
- AT+CMGF
- AT+CMGF=1
- AT+CNMI=1

V.TECHNOLOGY DESCRIPTION

a) Embedded Technology and IoT based technology

An embedded system may be a microprocessor-based hardware system with software that's designed to perform a fanatical function, either as an independent system or as a

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neighbourhood of an outstanding system. At the core is an micro circuit designed to hold out computation for real-time operations.

b) IoT based technology

The Internet of Things (IoT) may be a system of interconnected digital devices, machines, objects, animals, or people given unique identifiers and therefor the ability to transmit and share data over the network without the necessity for human-to-human or human-to-computer interaction. Bridging the gap between the physical and virtual worlds, IoT aims at creating smart environments during which individuals, also as whole societies, are going to be ready to will live more smartly and comfortably. Pompous because it may sound, the IoT has already become part of our life style and little question it'll settle there permanently. devices are objects which constitute the 'things' within the web of Things. Acting as an interface between the important and therefore the digital worlds, they'll may take different sizes, shapes, and levels of technological complexity counting on the task they're required to perform within the precise IoT deployment. Whether pinhead-sized microphones or heavy construction machines, practically every material object are often become a connected device by the addition of necessary instrumentation (by adding sensors or actuators alongside the acceptable software) to live and collect the required data. Sensors, actuators, or other telemetry gear also can constitute standalone smart devices by themselves. The sole limitation to be encountered here that the actual IoT use case and its hardware requirements (size, simple deployment and management, reliability, useful lifetime, cost-effectiveness).

Short-range IoT network solutions

As a well-established short-range connectivity technology, Bluetooth is taken into a account to be the key solution particularly for the longer term of the wearable electronics market like wireless headphones or geolocation sensors, especially given its widespread integration with smartphones. Designed with cost-effectiveness and reduced power consumption in mind, the Bluetooth Low-Energy (BLE) protocol requires little or no power from the device. Yet, this comes with a compromise: when transferring frequently higher amounts of knowledge, BLE might not be the foremost effective solution.

Being among the primary IoT applications ever implemented, Radio-frequency identification (RFID) offers positioning solutions for IoT applications, especially in supply chain management and logistics, which require the power to work out the thing position inside buildings. the longer term of RFID technology goes far beyond the straightforward localization services, with possible applications starting from tracking hospital patients to improving efficiency in healthcare to providing real-time merchandise location data to attenuate out-of-stock situations for retail stores. Merchandise location data to minimize out-of-stock situations for retail stores.

c) Embedded C

Embedded C programming typically requires nonstandard extensions to the C language to support enhanced microprocessor features like fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations. In 2008, the C Standards Committee extended the C language to deal with such capabilities by providing a standard for all implementations to stick to. It includes several features not available in normal C, such as fixed-point arithmetic, named address spaces, and basic I/O hardware addressing. Embedded C uses most of the syntax and semantics of ordinary C, e.g., main () function, variable definition, datatype declaration, conditional statements (if, switch case), loops (while, for), functions, arrays and strings, structures, and union, bit operations, macros, etc.

d) Eclipse-based IDE

Eclipse is an integrated development environment (IDE) utilized in programming. It contains a base workspace and an extensible plug-in system for customizing the environment. Eclipse is written mostly in Java and its primary use is for developing Java applications, but it's going to even be wont to develop applications in other programming languages via plug-ins.

e) HTML BASED WEB TECHNOLOGY

The Hypertext terminology or HTML is that the standard terminology for documents designed to be displayed during a browser. It is often assisted by technologies like Cascading

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Style Sheets (CSS) and scripting languages like JavaScript. Web browsers receive HTML documents from an internet server or local storage and render the documents into multimedia sites. HTML describes the structure of an internet page semantically and originally included cues for the looks of the document. HTML elements are the building blocks of HTML pages. With HTML constructs, images and other objects like interactive forms could also be embedded into the rendered page.

f) RADIO FREQUENCY IDENTIFICATION

Radio Frequency Identification (RFID) may be a technology that uses radio waves to passively identify a tagged object. It is utilized in several commercial and industrial applications, from tracking items along a supply chain to keeping track of things verified of a library. Radio Frequency Identification works through little device, usually a microchip, that has information stored there on. These devices are generally quite small, sometimes the size of a grain of rice, and can hold large amounts of data. While they don't always emit electricity, some can contain a stored power source or batteries.

VI. RESULT AND DISCUSSIONS

The patrol contains basic automation controls as well as manual controls augmented for the movement. The camera provides constant feedback of the imaging of the surroundings of the patrol robot, which helps in the manual control of the robot.

VII. FUTURE SCOPE OF THE PROJECT

- Patrolling bot is an inheritor for common people, as it deals with the recognition of theft vehicles.
- Provides better stability in surveillance on regular basis.
- It will make sure that the patrolling is regular and available at all the time.
- It will ensure protection over fire accidents.
- On-spot medical assistance to the person who met with the accident.
- Whenever a woman feels intolerable due to a lawless venture, it assists her and provides her safety.

VIII.CONCLUSION

The project ends with a definition of patrolling safety robot, which uses an evening vision camera to secure its premises. The robot runs in the same direction, at different intervals. It also features a camera with night vision and IR sensors. It is employed by a predefined route to patrolling movement given by the controller. The camera of the patrol robot can capture an intruder's image and send the info to the user. The robot can function during a self-sufficient manner. To overcome the crimes mentioned, the night patrol Bot can be used as a guard during the nighttime and protect the laws. The night patrol robot plays a major role in safety measures like protection of fire incidents, vehicles theft, medical assistance, regular patrolling, and finally the protection for women's especially during nighttime in public areas. Patrolling Robots are designed to assist women from dangerous situations. Women can rescue and protect themselves in any circumstances so that she will never feel helpless at any sort locale and can protect herself even at late night. These techniques also will help police to arrest and look for the culprits. Since women's safety is a matter of concern in many parts of the world, this robot can prove itself to be helping assistance. As far because the future scope of this techniques care and as far as women's safety is an problem this robot is often an abetment and an honest Samaritan.

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