

Night Vision Security Petroleum Robot using Sound Sensor

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Abstract— We propose a security robot that uses night vision camera for securing any premises. The robotic vehicle moves for particular intervals and is equipped with night vision camera and sound sensors. It uses a predefined line to follow its own path. If sound is detected it stops at particular points and moves to next points. The system uses PIR based path following system for patrolling assigned area. It monitors each area to detect any intrusion using 360degree rotating camera. It has the ability to monitor sound in the Direction. Any sound after company is closed and it starts moving towards the sound on predefined path. It then scans the area using its camera to detect any human faces detected by the Sensor. It captures and starts transmitting the images of the situation immediately on sound or human face detection to the user. Here we use IOT Local Area Network for receiving transmitted images and displaying them to user with alert sounds. Thus we put forward a fully security robot that operates tirelessly and patrols large areas on its own to secure the facility.

Key words: Arduino, ESP8266, Camera, Wi-Fi Module, Robot, Sound Sensor

I. INTRODUCTION

Security is a vital asset to many businesses as well as homeowners. It prevents harm done to persons as well as prevents personal things from being stolen or broken. Businesses and homeowners set aside a large budget for security measures each year. For the security of our house, building, laboratory or factory security is important factor [1]. The proposed system can identify danger to alarm and also it protects humans, and can detect criminals, fire, gas, and environment status. This cost increases with alarm systems, security cameras, and number of security guards being hired. This method of security does not prevent the crime from happening, but it can aid in identifying criminals to law enforcement when a crime is occurs. There are also alarms systems, where they are once activated, will sound an alarm to deter criminals from further breaking. These systems 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. This robot boasts an assortment of cameras, sensors, and Wi-Fi to guide itself around an area for surveillance. It is not remote controlled and only acts as another set of cameras on the ground as well as an alarm. The Security patrolling autonomous robot presented in this paper will combine several of these technologies which are used to have autonomous and remote control capabilities. It will serve as alarm system, a security camera, as well as have the ability to possibly stop a criminal while strolling. This system should be operating an indoor setting with the help of Wi-Fi. It can be utilized in an office building, mall, or even larger homes, etc.

II. TYPES OF ROBOTS

There are six main types of industrial & agricultural robots: Cartesian, SCARA, cylindrical, delta, polar and vertically articulated. However, there are several additional types of robots. Each of these types of Robot offers a different joint configuration. The joints in the arm are referred as axes.

A. Articulated

This robot design features as rotary joints and can range from simple two joint structures to 10 or more joints. The arm is connected to the base with a twisting of joint. The links in the arm are connected by the rotary joints. Each joint is called as an axis and provides an additional degree of freedom, or range of motion. Industrial robots commonly have four or six axes.

B. Cartesian

These is also called rectilinear or gantry robots. Cartesian robots have three linear joints that use the Cartesian coordinate system (X, Y, and Z). They may also have an attached wrist to allow for rotational movement. The three prismatic joints deliver to a linear motion along the axis.

C. Cylindrical

The robot should have one rotary joint at the base and one prismatic joint to connect the links. The rotary joint uses rotational motion along the joint axis, while the prismatic joint moves in a linear motion. Cylindrical robots operate within a cylindrical-shaped work envelope.

D. Polar

It is also called as spherical robots, in this configuration the arm is connected to the base with the twisting joint and a combination of two rotary joints and one linear joint. The axes form a polar co-ordinate system and create the spherical-shaped work envelope.

E. SCARA

Commonly they are used in assembly applications; this selectively compliant arm for robotic assembly is primarily cylindrical in design. It features two parallel joints which they provide compliance in one selected plane.

F. Delta

These spider-like robots are built from jointed parallelograms connected to the common base. The parallelograms move in a single EOAT in a dome-shaped work area. Which is heavily used in the food, pharmaceutical, and electronic industries, this robot configuration is capable of delicate, precise movement.

III. LITERATURE SURVEY

[1] With the help of robotic technology, the development with each evolution, robot systems have been widely

deployed in many of the applications. Nowadays, robot systems have been applied and also used in factory automation, hazardous environments, hospitals, entertainment, space exploration, military, security systems etc.

- [2] Many of the people get seriously injured and also lost their lives in road accidents because of human mistakes, including driver. To improve the road traffic safety, a new type of vehicles has been get introduced, which is called as Autonomous Vehicle , It enables a driving automation system to replace the human driver to control the vehicle with good identification , decision and driving skills.
- [3] A semi-autonomous robot system dedicated to a road, train inspection is presented in this paper. Therefore far, bridge inspections get performed manually by workers who climb and use so-called mobile negative cherry pickers . This is a dangerous and tricky task which must be carried out during night time is stopped, for safety purpose.
- [4] The robot is also equipped with a multitude of sensors for environmental awareness in support of its role as an intelligent sentry . These monitor both system and room temperature, relative humidity, barometric pressure, ambient light and noise levels, toxic gas, smoke, and fire.

Arduino board designs a variety of microprocessors and controllers. The boards are set with sets of digital and analog input or output pins that may be interfaced to various expansion boards or on the breadboards and other circuits. Most Arduino boards consist of an Atmel 8-bit AVR microcontroller with varying amounts of flash memory, pins, and features. The 32-bit Arduino Due, based on the Atmel SAM3X8E was introduced in 2012. The microcontrollers are typically programmed using a dialect features from the programming languages C and C++. In addition it also use traditional compiler tool chains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

B. Wi-Fi Module:

ESP8266 is a wifi-module which is low cost standalone wireless transceiver that can be used for end-point IoT developments. ESP8266 Wi-Fi module enables internet connectivity to the embedded applications. It uses TCP/UDP communication protocol to connect with the server/client. The new version of the ESP8266 WiFi Module has increased the flash disk size from 512k to 1MB

C. Sound Sensor

This Sound Sensor is a simple microphone transducer which is sensor based on the Transistor Amplification which converts the sound energy into electrical energy, and it can be used to detect the sound strength of the environment. A Sound Sensor is a simply the device that detects sound. It simply put a Microphone with some processing circuit. Using a Sound Sensor, you can measure the intensity of the sound from different sources like knocks, claps, loud voices, etc.

D. Camera Module:

The OV7670 Camera is a small image sensor, and low operating voltage, which provides all functions of a single chip of VGA camera and image processor. This model decoder supports real time encoding for collected image, and also external controller can easily read the M – JPEG video streams, by getting the camera design of the double stream. The product VGA image can reach up to the maximum of 30 frames per second. Users can completely control the image quality, data format and the transmission mode. Camera module performs image processing such as the AWB (auto white balance).

E. PIR sensor:

The term PIR is the short form of Passive Infra-Red. The term “passive” shows that the sensor does not aggressively take part in the process, which means, it does not emit the referred IR signals itself, rather it passively detects the infrared radiations coming from the human body in the surrounding area. The detected radiations which are converted into an electrical charge, which is proportional to the detected level of the radiation.

F. DC Motor:

DC motor converts electrical energy in the form of Direct Current into mechanical energy and even in the form of rotational motion of the motor shaft. DC motor speed can be controlled by applying varying DC voltage, whereas the

IV. BLOCK DIAGRAM

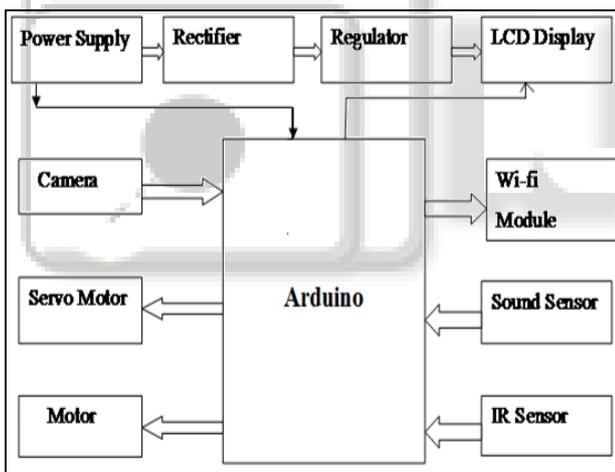


Fig. 1: Block Diagram

A. Arduino



direction of the rotation of the motor can be changed by reversing the direction of current through it.

G. Servomotors:

Servomotor is rotary actuator or it is a linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for the position feedback. It also requires a relatively sophisticated controller that often is dedicated module designed specifically for use with servomotors.

H. LCD Display:

The LCD (liquid crystal display) which is used for displaying in notebook and computers as like light emitting diode (LED). LCDs allow display to be much thinner than cathode ray tubes (CRT) technology.

LCD consume very less power than LED and gas display displays because they work on principle of blocking light rather than emitting it. A 16 x 2 character LCD display with standers Hitachi HD44780 compatible interface for the easy connection to microcontrollers.

I. Rectifier:

Rectifier is an electrical device which converts alternating current to pulsating DC, in which the signal flows in only one direction. The process is known as rectification. It can be Single Phase or Multi Phase. Single Phase is mostly used low power rectifiers for domestic equipment. Three-phase rectification is very important for industrial applications.

J. Regulator:

A regulator is a device or mechanism that automatically controls temperature in a room or the growth of a person's body. An automatic voltage regulator ensures a constant output from the generator. Regulators can be designed to control from gases or fluids, to light or electricity.

K. Result:

The robot will identify the thi

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V. CONCLUSIONS

According to this system, the whole area surveillance is done using the night vision camera and also automatic system when the sound is detected robot will follow the particular path and go to that area and capture the area and send using Wi-Fi. The robot is safer for security guards on or while duty, allowing them to have eyes and ears in the area without physically being in harm's way. The robot will better identify the intruders from ground level were video compared to high placed security cameras. The robot can also be cheaper than hiring multiple security guards in the long run, it does not required to be paid annually. The robot utilizes multiple sensors and motors to have an autonomous patrolling mode as well as being remote controlled via Wi-Fi.

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