

Explorer Bot with Artificial Intelligence

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Abstract— There are numerous places that man cannot reach. Certain tasks that a human cannot perform. Surveillance needs to be done in the quiet without any observer being detected. It proves to be a challenging task for the security forces as well as surveillance teams to monitor many locations with a single camera. Further more if the camera is detected by an intruder it could be a difficult task to maintain proof of the incident occurred. The Explorer uses modern technology and robotics to solve such problems. The stable and wheeled chassis allows the explorer bot to be controlled by the user. The camera mounted on the explorer allows the user to get 360-degree view of the surrounding. The 10000kv Taser is capable to stun any person or animal intending to fiddle with the bot. The trending VR technology allows the user to get a gaming experience while the AI technology helps in hands free controlling of the defence mechanism.

Index Terms— Artificial Intelligence, Esp8266, Explorer Bot, Internet of Things, Security, Taser, Virtual Reality.

1 INTRODUCTION

IN the present world, with over population and decrease in housing space. It turns out to be a difficult task to keep our loved ones and things safe and secure.

With nations waring over each other human life is at risk. Humans cannot reach everywhere to observe certain terrains or a particular location. Such tasks can be performed with the help of robots. The user can easily sit at a particular location within the robot's range and can manoeuvre the robot as required.

It is a very costly affair to set up many cameras and a database system associated with it. Even after spending a fortune on such cameras it could render useless if someone fiddles with it. To avoid such incidents something needs to defend the cameras. The explorer has its own defence mechanism in the form of a taser that is capable of producing 10000kv. The bot is capable of moving in a range of 10 meters or 32 feet.

To increase the efficiency of the bot, explorer has a solar panel mounted on it that is attached to the battery to be charged.

The defence mechanism is powered with its own separate set of batteries to have sufficient energy to power the tasers. The night vision camera enables the user to survey the surrounding without being detected. This helps the explorer to function in the dark with ease.

The bot having four wheels and powerful dc motors can move through any terrain while maintaining its balance. The external antenna acts as a range extender to the bot to avoid breakage of network.

The AI used with explorer is Hannah. Hannah is capable of turning ON and OFF the defence mechanism as per the users request. The user just needs to say "turn ON explorer defence" to turn the defence On. To turn it Off, "Turn OFF explorer defence" needs to be said.

Explorer is a low-cost bot made with a basic microcontroller, and

entertainment and gaming purposes too. The VR headset can enable the user to get a theatre type experience while controlling the bot.

2 WORKING

The main body of the bot is made of a metal chassis. The chassis has four wheels attached to it. A motor shield is used to control the wheels of the bot. An Arduino is used to trigger pulses into the motor shield. The controller used for the explorer is Bluetooth paired to an android mobile. The app designed for the explorer controls the front, back, right, left operations.

The tasers mounted on the bot is triggered via esp8266 that is connected to the AI Hannah. Hannah takes in voice commands and processes it before sending a signal to esp8266.

The user can also get live video feedback of the 360-degree view around the bot. This is achieved via a network set up and the camera connected to it. The user can get this live display on the laptop or desktop screen.

Vr enables to achieve a gaming experience so as to make the explorer a fun filled device along with work related applications.

3 CONSTRUCTION

There are various components used to build the explorer bot.

1. Arduino
2. Dc Motors
3. Motor Shield
4. Bluetooth hc – 06
5. Arc Generator
6. Lead acid battery
7. Li-on batteries
8. Solar panel
9. Node mcu
Esp8266
10. Vr Headset

3.1 Arduino
Arduino being a basic microcontroller is available easily

in the market and can

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easily available parts in the market. The bot can even be used for

be programmed with ease. Since it has multiple gpio pins in the form of analogue and digital pins. It proves to be the perfect microcontroller for the explorer. The Arduino used is powered via usb and can give two separate outputs of 3.3v and 5v. The digital pins receive and transmit data from the Bluetooth and sends signal to the motor shield.

Arduino being an open source project is widely used for all types of electronics projects. The easy usb port connection enables programs to be loaded quickly. Arduino does not require any programmer it is a plug and play microcontroller.

3.2 Dc Motors

The motors used in the explorer are 12v dc motors with an Rpm of 500. Four motors are used to manage the weight of the battery and the other electronic components that are harvested within the frame of the bot.

3.3 Motors shield

L293D is a typical motor shield that allows driving in all directions. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.

There are two h-Bridge circuit inside the IC which can rotate two dc motor independently. H-bridge is a circuit which allows the voltage to be flown in either direction. H-bridge IC are ideal for driving a DC motor. Due its size it is very much used in robotic application for controlling DC motors.

3.4 Bluetooth Hc -06

Bluetooth Hc - 06 is a master - slave module. It uses a frequency of 2.4 Ghz. Hc-06 being a class 2 Bluetooth has a range of 10m that is sufficient enough for the bot to perform its operations.

3.5 Arc Generator

An arc Generator is a device that converts Dc current to Ac current. It is capable of amplifying 3.7 volts Dc volts to 10000kv of Ac power. It Generates a large amount of noise while generating the arc and radiates large amounts of light in the process.

3.6 Lead Acid Battery

The lead-acid battery is the oldest type of rechargeable battery. It is usually very heavy and has a very large size. This type of battery is very efficient but tends to become less efficient if not used for a long time of if the battery gets too old.

3.7 Lion Battery

Lion stands for Lithium ion. It is a compact size battery with high power. Generally used in laptops power banks and other portable devices. Lion cells of 3.7v 2300mah are generally available.

3.8 Solar panel

Solar panels absorb the sunlight as a source of energy to generate electricity or heat. These panels being efficient are a good

source to recharge batteries while the device in performing a certain task.

3.9 Esp. 8266

The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions.

3.10 Vr Headset

A virtual reality headset is a head-mounted device aimed to provide an immersive virtual reality experience, for the purpose of computer games and 3D simulations. . Some devices also include headphones, eye tracking sensors and gaming controllers.

4 RESULTS

The outcome of this project is that a low-cost model of a surveillance system along with a moving bot can be created. The created model is capable of defending itself from dangers possessed by intruders or animals. The system is efficient in terms of power consumption and will not go out of power while performing a particular task. The 360-degree view provided by the bot is ideal to get the surrounding status.

Further more the bot is efficient for VR use and can generate a theatre experience for the user.

5 CONCLUSION AND FUTURE SCOPE

The project can further be improved by adding features like bomb detection and diffusion. This can be done by using a Wire Stripper with one end of it being attached to a servo motor which can be controlled remotely.

Ultrasonic sensors to measure the depth to keep it from falling in a pit and also to calculate distance from target. A moving target or an approaching target can be known

with the help of the ultrasonic sensor and this information can be used to avoid any

threats in case of a camera failure or any such issue.

Various sensors so as to keep a track on weather conditions to know if the bot is designed to work under those conditions. For example, a temperature sensor so as to keep the bot safe from areas having extremely high temperatures.

Hannah can be upgraded to collect information of the surrounding and look for any possible threats. It can also be enhanced using various image and video processing

techniques so as to detect faces, objects and many other things and store information related to it. It can also be made to turn on all defenses when a threat is sensed.

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