Search and Rescue Python-SARP

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Abstract – Every year around 60,000 people die worldwide in natural disaster. The majority of deaths are caused by building collapse in earthquakes, mainly occurs in developing nation. Robotics generally had to be the essential part of not industrial manufactures but humans daily life as well. Snake robots are recently being researched as a new type of Robotic, interplanetary probe by engineers and are capable of searching in dirty and dangerous environment that useful in natural disasters, rescues, fields of structures inspections, investigating rough terrain where it is dangerous for human and so on. We demonstrate a work on building and developing a robot to mimic serpentine motion of snake that can transmit many information of current position through wireless RF. SARP is a biomorphic hyper redundant robot that resembles a biological snakes. It can be used to save life of a person being stabbed in a building as it becomes more difficult to locate the person when they are old, deaf, or infant. SARP can assist the rescue team where is the person located exactly. If we can save a single life by implementation of this project, then we would think our project stand worthful.

Key Words: Snake Robot, Arduino Mega 2560, Servo Motor, Proteus, Degree of Freedom

1. INTRODUCTION

Focused on the movement of snake and sending the real time video to the operator for analysing the area. In future, we can make all thing automated by advancing this robot. Now, the question arises how this robot can be helpful. Suppose there is a fire in a building. Now it will be very difficult for fire fighter to go inside the building without analysing the area from the inside. Here our robot will come into play. It can easily go inside in the building and it will send the real time video to the operator for analysing the situation inside that building. By doing this, fire man will know that how many person are there inside that building and what is the situation inside that building. In this way, it will not endanger anyone life and help to save others life. Similarly, it can also help in other situations such as earthquake where people get trapped inside the broken building. This robot can easily go through any small hole and see whether anyone is trapped or not. This robot is most useful in saving others life.

2. Application and future scope

The following are the application of this SARP:

• It can have the measure applications in the areas which are not easily accessible to humans like in mines and damaged buildings.

• During fires outbreaks in houses and factories.

The world is full of disaster where we daily loose someone's life. Sometimes, these disaster are created by nature such as tycoon, cyclone, flood, etc. and sometimes it is man-made disaster such as fire in forest, home, building, etc. These disaster comes with a great destruction to the human life and to flora and fauna. To give a little help in the rescue of life from these disaster, we have come with a solution known as SARP. Snake is an animal which can easily move in any direction. These snake can use their internal degree of freedom to access those locations which cant be easily accessed by any human or machine. The motion of snake can be used to make a robot which can easily go to those small and narrow areas in disastrous situation to rescue human life and analyse that area. Hence we name it as "SARP" means search and rescue python. SARP is a more than a snake robot. It will have a technology which not only help it to move like a snake but it can easily move onto any surface and climb on any tree. This SARP will come with many advance technology such as image recognition, real time area analysis, and many more. Currently this project is mostly

• During terror attacks.

The following are the future scope of this bot-

➢ We can enable AI in our so that according to the condition or contour mapping the bot can decide by itself which motion should it perform for effective locomotion.

➢ India is country which is having vast diversity where natural disasters and unfortunate terror events happens. So SARP will be very useful tool to save lives of many.

➢ The efficiency of this bot can further be enhanced by using better algorithm and motors.

3. Hardware used and its description

3.1 Arduino Mega 2560

Arduino mega 2560 is a micro-controller board based on atmega 2560. It includes digital input/output pins-54, where 16 pins are analog inputs, 14 are used like PWM outputs hardware serial ports (UARTs) – 4, a crystal oscillator 16 MHz, an ICSP header, a power jack, a USB connection, as well as an RST button. This board mainly includes everything which is essential for supporting the microcontroller. So, the power supply of this board can be done by connecting it to a PC using a USB cable, or battery or an AC-DC adapter. This board can be protected from the unexpected electrical discharge by placing a base plate.
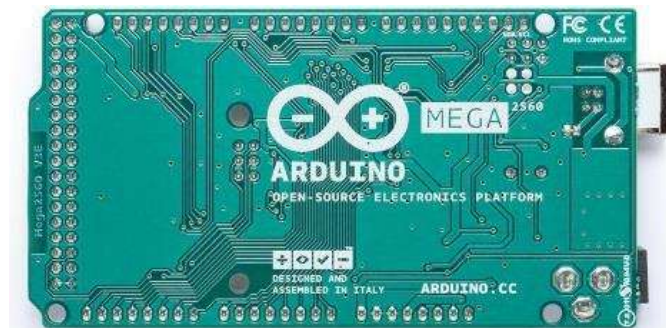

Fig -1: Arduino Mega 2560

A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate and object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servo mechanism. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor.

Fig -3: Servo Motor

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3.2 3-D Printed Shape

We had designed a specific shape for the snake robot. The design is a small piece which consecutively repeated to make snake robot. This is printed using 3d printer.

Fig -2: 3-D design

3.3 Servo motor

3.4 Camera

In this project, we have used a wireless camera for providing continuous video feedback to the system so to keep a view on what are the things in-front of the bot. However for the cost reduction of the project very simple camera was used but in future a high resolution camera can be used with the ability of night vision.

4. Software/language used

- Arduino IDE

- Thinker cad

- Proteus

In this project, we had used three software for the development of the project. Firstly we had used Proteus for designing the circuit for our project. The circuit include Arduino mega 2560 development board, servo motors, battery, IC 7805 and some resistors and capacitors. Now, for designing the 3d parts which is needed for the project, we had used the software called Tinkercad from Autodesk.

It is the best tool for 3d designing especially for beginners.

This software helps a lot in designing the body of the robot . And at last we had used Arduino IDE for the program--ming part. It is the best software for the programming of arduino boards and flashing the code in the board. This is the main tool by which our robot start working. It is a very good tool for anyone who want to programme its arduino boards.

5. CONCLUSIONS

Search and rescue Python is an innovation that has a great scope in India and we should look forward to use it in a wide range of applications. SARP robot can be used in various fields like surveillance, fire fighting, maintenance of dangerous structures and systems like nuclear plants or pipelines, military, disaster Management, and search and rescue operations. Also unique features of SARP and degree of freedom of this robot make it fascinating topic for research and is worth investment and applicability.

ACKNOWLEDGEMENT

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