Multipurpose Rover

Sarthak Bhagat | Kanav Bhagat | Deepak Singh | Rahul Patwardhan

Problem addressed and Motivation behind the Project

Industries and factories today may have taken measures to reduce human effort and intervention in work places but it still has not been completely eradicated. The health of the human workforce in factories and industries is at a big risk as they have to go through physically unfit atmospheres everyday which is not appropriate for humans. Also, even a small human error in places like these can turn out to a fatal risk to life and property. So, this is our way to counter these problems - a MULTIPURPOSE ROVER. The rover will monitor these areas of work and examine the surroundings. We aim to improve the plight of factories by reducing the involvement of human labour in physically unsuitable environments and the risk of human error in such places.

Project Overview

- Monitoring the proper functioning of environment in terms of adequate temperature, pressure, gas content of various harmful gases of numerous work environments like factories, industries, printing presses, packaging and manufacturing units
- The rover helps minimize the need of human labor in the tracking and surveilling of such environments where an error could cause great loss to life and property. The rover collects values of environmental data using its different sensors for the analysis of surroundings.
- The rover sends these values to the users system, plotting them in form of graphs and stores it in form of a text file that can be used for later analysis too.
- The rover is equipped with complete web-based control and thus, it has a large range of usability

Hardware Components Used

- Arduino Uno
- Raspberry Pi
- Sensors : DHT11 (temperature and humidity), BMP (pressure and altitude), MQ135 (gas sensor)
- Web Cam
- DC motors
- H Bridge (L298h)
- Rover base with wheels
- Breadboard
- Jumpers
- Robo-arm

Software Used

- Arduino IDE
- Cool Term
- Matlab
- IDLE (Python 3)

## Sources used for building the prototype

- Random Nerd Tutorials
- Instructables
- Pi My Life Up

Other necessary information

- The rover can be employed at diverse fields by putting in some more efforts and investment. It can be used in fields like agriculture, space exploration and geographical research.
- By increasing the functionalities of the Robo-arm it can be employed in agricultural departments, so, it can be used for picking up the harvest, putting out the weeds and watering the crops
- It could also be used for exploration of other planetary surfaces as well as other diverse terrains for geographical research
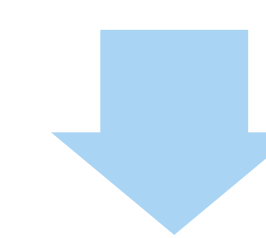
Timeline

Week 1-2 : Setting Up the rover's base with wheels controlled using H bridge
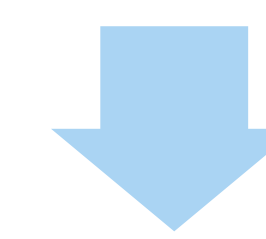
Week 3-6 : Calibrating different sensors so they collect environmental data and stores them on the EEPROM of the Arduino Uno
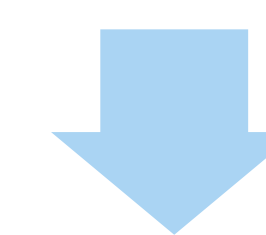
Week 7-8 : The data collected by the sensors is stored to user's system using Cool Term and is analysed in form of graphs using Matlab

Week 8-12 : The rover is made completely web controllable by writing python code that enables the user to control the motors (movement of the rover) using web application
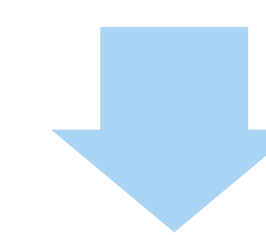
Week 13 : The rover streams live high definition video using a web-cam which can be viewed on any system (even multiple), by accessing a particular IP address
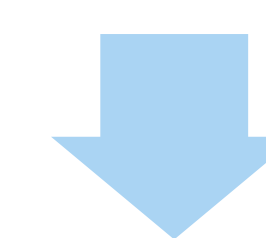
Week 14 : Setting up all components together and getting the final model ready