

Implementation Of Artificial Intelligence Voice Controlling Rover in Rocker Bogie by Using ARDUINO in Satellite

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Abstract

Robotic assistants reduces the manual efforts being put by humans in their day-to-day tasks. In this paper, we develop a voice-controlled rover with rocker bogie mechanism. The human voice commands are taken by the robot by its own inbuilt microphone. This rover not only takes the commands and execute them, but also gives an acknowledgement through speech output. The Rover Features a Rocker Bogie Mechanism with Voice Controlled Ai Device, Differential Drive, Collision Free Distance Sensing, and Camera Vision. The Rover Features A Flexible Segmented Body With A Multipurpose Arm, Corresponding Multi Wheel Mechanism And Kinect Module Integration For Advanced Image Processing. The System Control, For Both The Rover As Well The Robotic Arm Integrated With It, Is Done Using Feasible Yet Extremely Efficient Microcontrollers And Microprocessors Such As ARDUINO, Raspberry Pi Etc. The Rocker Bogie Mechanism Provides Traction Due To Its Body Weight. The Rover Finds Satellite Applications of Voice Commands For Remote Operation In The Exploration of Moon Surface With The Help of ARDUINO And Harsh Environments. Such An Effort May Even Prove To Be Instrumental In Detection And Study of Satellite Activity In Worlds Other Than Ours.

Keywords: Artificial Intelligence, Voice Controlled, ARDUINO and Rock Bogie Mechanism.

I. INTRODUCTION

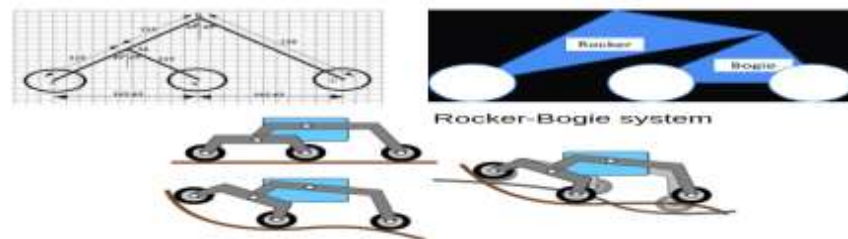
Surveillance is essential in many fields for monitoring and providing accurate information about the status of a place which is prone to illegal entries of spies. Now-a-days as technology improves, robots are being used for monitoring and surveillance applications. These robots have a camera fitted to them which displays the scenes captured by live streaming to the user. But, there are several disadvantages which include the inability of these robots to move on uneven surfaces and slopes. This is overcome by rocker bogie suspension setup which is capable of moving in all types of uneven surfaces and terrains. Rocker bogie suspension is nothing but a combination of a rocker and a bogie where bogie means the wheels of the robot and bogie means the connecting link between the bogies. This setup allows the robot to move on obstacles which are up to twice the diameter of the wheels. Existing Rocker bogies are either remote controlled or based on artificial intelligence. The main drawback of remote controlled rocker bogies is it needs a human to control it within its nearby range which cannot make human less monitoring possible. The disadvantage of artificial intelligence based rocker bogie is it cannot be controlled in

desired direction. It makes its automatic moves and cannot be controlled by the user. To overcome all this problems, rocker bogie robot can be setup with Machine learning is having a substantial effect on many areas of technology and science, it includes robotics and autonomous vehicle control, speech processing and natural language processing.

II. ROCKER BOGIE MECHANISM

The rocker-bogie suspension system was initially used for the Mars Rover and is currently NASA's preferred design for rover wheel suspension. By design it is a wheel robot which comprises of 6 motorized wheels. The word "rocker" describes the back part of the larger links present both sides of the suspension system and these rockers are connected to each other and the vehicle chassis through a selectively modified differential in order to balance the bogie. By construction it has main frame containing two linkages on each side that are called the "rocker" (see Figure 1). One end of the rocker is connected to the back wheel, and the other end is connected to maintain center of gravity of entire vehicle as accordance with the motion, when one rocker moves down-ward, the other goes upward (Figure 1). It plays vital role to maintain the average pitch angle of both rocker and bogie by allowing both rockers to move as per the situation. As per the actual design, one end of a rocker is jointed with a drive wheel and the other end is pivoted to a bogie which gives required moment and degree of freedom.

ROCKER BOGIE MECHANISM



III. OBJECTIVES

We Will Be Focusing On Voice Controlled Ai With Rover That Is The Current Rocker-Bogie Rovers Is That They Are Slow. The Rovers Made For The Exploration Purposes Are Very Costly Too. Due To The Expensive Cost Of Space Exploration, Most Of The Missions Have Been Conducted By Nasa Team And Other Government Organizations. We, In India Have Not Conducted Any Mission For The Geographical Exploration Purposes. Not Only Exploration, The Rocker Bogie Rover Can Also Be Used For Military, And Civil Purposes But Still It Needs To Be A Cost Efficient And Quick. Our Aim During The Development Of The Rover Will Be To Optimize The Speed And The Voice Signal Is Captured Using Inbuilt Microphone And Is Transmitted Over A Usb Cable To An External Offline Server, Where It Is Converted Into Speech Format And Necessary Commands And Speech Is Synthesised.

IV.CONSTRUCTION DETAILS

A. Mechanical Components

1. PVC pipes and Joints
2. Jubilee Clamps
3. Motors – 30 RPM
4. 12 volt 7.5 Amp Battery.
5. Plywood
6. Nuts and bolts

B. Electrical Components

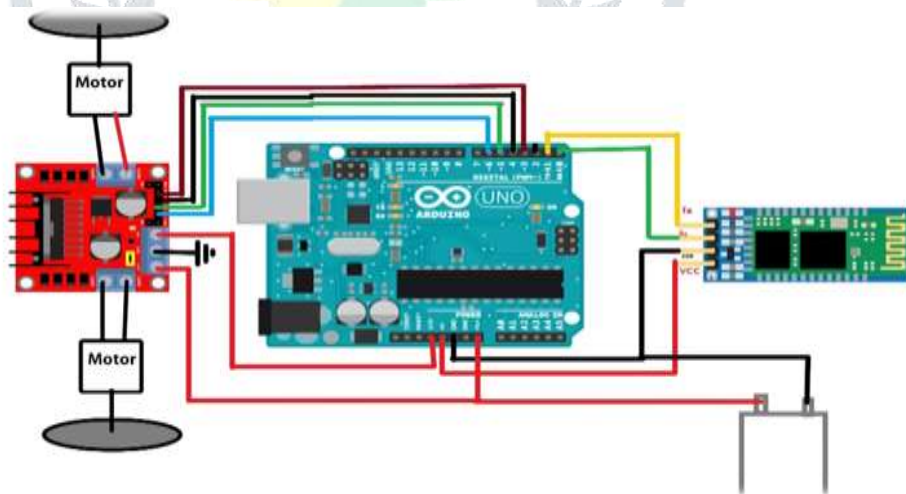
1. Arduino Uno
2. 4-Channel Relay Circuit
3. Bluetooth Model HC-05
4. IC Circuit – 780V
5. Key
6. Buzzer
7. 6 Different colored wires for connection

C. Software

1. ARDUINO IDE
2. MIT app inventor

Codes for Arduino

1. Sun tracking sketch
2. Rover motion and switch sketch



Rover Movement Circuit Using Voice Controlled Module

CONCLUSION

This project completely reforms the robotic vehicle and gives it a new dimension. It can easily recognize the voice commands and runs smoothly. Further enhancement in project can be used for Home security and military purposes where the commands can be given to robot without risk by increasing the range and by installing cameras.

1. This research work has been narrowed down to short range Bluetooth module. Using a long range modules and other connectivity devices will result in connectivity with the robot for long distances.
2. Power Optimization such sleep and wakeup schedules can be incorporated.
3. Image processing can be implemented in the robot to detect the color and the objects.
4. A thermal camera can be installed to sense the heat emitted by bodies useful in military purposes to detect enemies on the lines.
5. Automatic Targeting System can be implemented in the robot for tracking the target.

Implementation Using Remote Terrain	Implementation Using Voice Control
In this paper this rovers is offered by the battery power & the communication range by using solar panels to charge battery & the rover can be made operational in real time on satellite using remote terrain for continuous operation.	In this paper, this rover consists of voice controlled in intelligence on satellite with bogie mechanism is controlled through voice command given by the user who is operating the project.

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