

DESIGN AND DEVELOPMENT OF STAIRS CLIMBING ROBOT

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Abstract

In today's life, technology related with robots plays a key role in many fields because they are used to operate in dangerous and urban environments, for different operations. Some of the E robots are designed to operate only on natural terrains, but it can also use for rough terrains and artificial environments including stairways. Our previous paper represents the mechanism of how will robot climb the stairs carrying load. Its mechanical design is suitable with front wheel and back wheel driven by DC motor for climbing stairs. Although many robots had been introduced earlier have some problems like need of special device or software to control the robot etc. This paper suggests an advance method for robotics control using the mechanical links. Until recent years, the stair climbing robots are designed with huge hardware and robots are furnished with chain roller to climb stairs or to move on a flat surface. The mechanical design of the this robot contains the fixed and flexible links of wheel legs instead of chain roller moves relative to each other to generate high friction with stairs.

INTRODUCTION

Staircase climbing robot are important for conducting scientific analysis of objectives. Current mobility designs are complex, using many wheels or legs. An eight wheeled rover capable of traversing rough terrain using an efficient high degree of mobility suspension system. The primary mechanical feature of the stair case climbing mechanism design is its simplicity. Which is accomplish by using only two motors for mobility. Both motors are located inside the body where thermal variations and disturbance is kept to minimum, increasing the reliability and efficiency. Eight wheels' stair case climbing design robot is used because stability purpose.

PROBLEM DEFINATION

Staircase climbing robot are important for conducting scientific analysis of objectives. Current mobility designs are complex, using many wheels or legs. An eight wheeled rover capable of traversing rough terrain using an efficient high degree of mobility suspension system. The primary mechanical feature of the stair case climbing mechanism design is its simplicity. Which is accomplish by using only two motors for mobility. Both motors are located inside the body where

thermal variations and disturbance is kept to minimum, increasing the reliability and efficiency. Eight wheels' stair case climbing design robot is used because stability purpose.

OBJECTIVE

1. To develop the intelligent of automated stair-climbing robot which can measure and detect stair and also carry heavy load on the stair.
2. To develop the adjustable of speed control by the using of wireless remote control .
3. To develop the more efficiency climbing and landing performance by using the process of embedded control system .

METHODOLOGY

1. This thesis focuses on rebuild and design of stair-climbing robot and control system and a flow chart of project plan . There are three parts for design of new system.
2. Designing
3. System Architecture and Hardware Development
4. Software Development
5. Testing and result



Fig 1 : ISO View of assembly

LITERATURE REVIEW

1. Design of Low Cost Stair Climbing Robot Using Arduino Jeyabalaji C et al. Int. Journal of Engineering Research and Applications ISSN : 2248-9622, Vol. 4, Issue 10(Part - 3), October 2014, pp.15-18 locomotion. We are proposing a stair climbing robot that looks a lot like the human leg and can adjust itself according to the height of the step. But, we are currently developing a unit to carry payload of about 4 Kg. The automatic adjustment in the robot according to the height of the stair is done by connecting an Android device that has an application programmed in OpenCV with an Arduino in Host mode. 2. Design and development of adjustable stair climbing robot K. Narendra Kumar¹, A. Gopichand², M. Gopala Anjaneyulu³, B. Gopi Krishna⁴ Apr-201

2. Design and development of stair climbing robot K. Narendra Kumar¹, A. Gopichand², M. Gopala Anjaneyulu³, B. Gopi Krishna⁴ Apr-2013 Developments have been made on various kinds of stair climbers, considering how to make its climbing ability higher and its mechanical complexity reasonable and practical. The research includes realizing a large step negotiating. Reducing body weight and energy consumption is also the

important matter of developing. We introduce some solutions to realize stair climbing machines that we developed. Each of them has good performance as in a category of their kind.

3.Design and Implementation of Stair-Climbing Robot for Rescue Applications “Basil Hamed” International Journal of Computer and Electrical Engineering, Vol. 3, No. 3, June 2011 This paper presents the design and implementation of a feedback control system for an RF remote-controlled stair climbing robot. The robot is controlled using PIC 16F877A. The paper presents a complete integrated control architecture and communication strategy for a system of reconfigurable robots that can climb stairs. Its mechanical design is suitable with back wheel to drive the robot over rubble, and large wheels in the front driven by dc motor for climbing stair



Fig 2 : ISO View of assembly

CONCLUSION

I have successfully completed the design and development of the stair climbing robot which can climb very easily on stairs by balancing its chair attached on the system. The accelerometer attached with the circuit will define the analog values calibration for its balancing nature. where as CC2500 Transceiver Module is the perfect hardware module for wireless communication network between transmitter and the receiver module. The mechanically designed and fabricated model is providing a good rigid structure for carrying the material from one place to other. Its controlling unit work on RISC structure, which will provide fast execution of the program embedded on it. Overall the developed model is working smoothly as per my research work.

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