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AUTOMATIC WHITE BOARD ERASER

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Abstract: The rapid growth of advanced robots has given researchers unprecedented opportunities to explore and discover new fields of research where robots can be used to assist humans in their daily life. There are many applications that use robots and automation in different aspects of life such as industry, medical, domestic machines and etc. In this paper, the work has been devoted for the use of robotics and robots in cleaning process. The whiteboard cleaning robot is one of the robots that have emerged in recent decay. This robot can be used in schools, colleges and offices. The main target is to design a robot that can clean whiteboards efficiently and rapidly. The robot will be operated by a single switch. The motion will generated by two D.C motors.

Keywords: Robotics, D.C drive, Rack and Pinion mechanism.

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INTRODUCTION

Robots have been created to assist or replace humans in various dangerous and difficult tasks. Robots have been used in construction, manufacturing, security and etc. This is because they are able to adapt to different environments and situations. They have conquered nearly all environments that humans have put them through. Cleanliness is one of the important aspects in human Life. Our prophet said that the cleanliness is part of our faith. Because of the importance, many kind of cleaning mechanisms are invented to ease the human daily chores. This project is also a part of robotics. This robot is use to clean whiteboard (40cm* 50cm) automaticity by the help of Rack and Pinion mechanism.

MATERIAL AND METHODS

In the previous time the problem of cleaning the whiteboard has a great importance as it is now where the man was responsible for manual cleaning. This invention has a great progress and a big factor and helpful for the man until the invention of robot where the man found in this invention the comfort that is because robot is a group of mechanical systems carry out the man's orders.

We have used the following material to design the robot:-

1) Rack and Pinion

A rack is a toothed bar or rod that can be thought of as a sector gear with an infinitely large radius of curvature. The rack is fixed on the upper and lower side of the whiteboard and the pinion is moving on rack linearly with the help of two D.C. motors. In this mechanism the pinion meshes with the rack and moves linearly just vice versa in case of steering wheel.

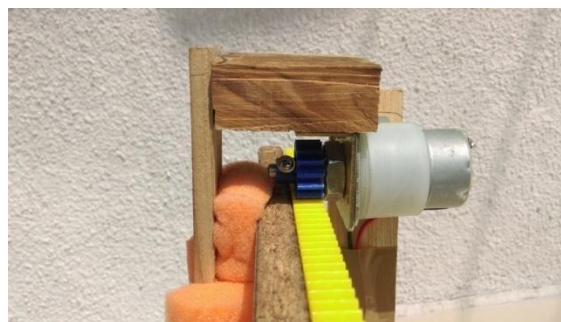


Fig.1 Rack and Pinion Mechanism.

2) D.C Geared Motor

The permanent magnet motor uses a magnet to supply field flux. Permanent magnet DC motors have excellent starting torque capability with good speed regulation. In D.C. geared motor, gear trains are used to reduce the speed and to increase the torque. According to the power required to clean the board, we have used 12 volt, 60 rpm dc geared motor.

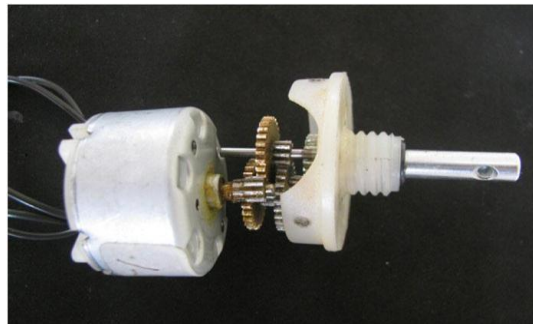


Fig.2 D.C Geared Motor

3) Three Point Switch

An electric switch that has three terminals, used to control a circuit from two different locations. It consisting of a mechanical or electrical or electronic device for making or breaking or changing the connections in a circuit. This switch is used in this robot to change the polarity of connections so that the motor can be rotated in clockwise and anticlockwise direction.

4) Cleaning Panel

The cleaning panel is a straight bar (7cm*50cm) having duster fixed on the side facing the whiteboard. On the upper and lower side of the panel, the D.C. motor having pinioned are fixed. The pinion meshes with the rack which is fixed to the whiteboard.

WORKING

When the power supply is on, the motor along with the pinion starts rotating over the rack. Because of this, the panel moves from left to right and vice versa with the help of switch. The duster attached to the panel clean the whiteboard smoothly.



Fig.3. Automatic Whiteboard Cleaner



Fig.4. Whiteboard before cleaning process



Fig.5. Whiteboard during cleaning process

CONCLUSION

The automatic Whiteboard cleaning robot has been successfully designed and fabricated. The components used in this work are simple and cheap. In general the system works adequately as anticipated in the design process. The cleaning process takes about (4-6) seconds to finish a 350 cm² Whiteboard. This time depends on the speeds of the motors and the degree of dirtiness of

the Whiteboard. Finally, this system should be further developed so that it will have more features.

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