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Design and Manufacturing of Floor Cleaning Machine

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ABSTRACT: system known as a programmed floor cleaner enables the cleaning of a single floor with the help of an incredibly stable and readily functionalized mechanical and electronic command framework. The current business endeavor effort aims to. Continuous relative motion is primarily used for cleaning purpose movement between a brush and utilizing programmed floor cleaner for expensive floors for household purposes and office floors.

KEYWORDS: Remote control device, Brush, LDR, SprayerSystem

I. INTRODUCTION

Cleaning floors is done using a unique process. Different types of floors demand different kinds of care. The cleaning handle should leave the floor entirely dry. Something else could put you at risk. Some floors are covered in sawdust to absorb various fluids. Future labor costs will be greatly reduced thanks to our automated floor cleaner. This ensures that there won't be any need for daily cleaning and replacement of sawdust to stop them from spilling. Numerous people carry out the laborious task of household cleaning every day. Therefore, there is a need to include insurgency in the realm of science and technological advancements, which could successfully provide aid in the mundane tasks that we undertake every day. Additionally, it is considering the increased labor need and advancing attributes to their ideal state. The need to design a contemporary, innovative-based Hoover cleaner seems to outweigh the short lifespan of conventional Hoover cleaners.

II. LITERATURE REVIEW

(2015) Karthick, Robots' electrical viewpoints are used for development by engines. The creator's plan to finish a given project is typically mechanical in nature.

(2016) Dr. J. Hameed Hussion. The front pivot sort demonstration is connected to the small-scale controller and equipped engine. Advancement and production of a prototypical floor cleaner kind exhibition, Aishwarya Pardeshi, 2017. Using DC engines and hardware, Manya Jain (2017).

(2017) Miss. Nayna H. Joshi A cleaning machine is described as being operated by a smartphone using various techniques such as Arduino, PLC controller, and so on. Shubham Khade is capable of successfully completing tasks like floor and corner cleaning, semi-automatic water splashing, cleaning of barns, and dry and damp cleaning. The device will be powered. This effort may be of great value in advancing humankind's way of life.

Purpose of Design

To make an eco-friendly, Remote controlled Floor Cleaning Machine.

Components Description:

The entire framework can then be separated, such as:

1. Frame
2. Wheels

3. Bearings
4. Chaindrive
5. Shaft
6. Rackand Pinion
7. Wastecollector box
8. Brush
9. Watertank, Nozzles
10. Motor
11. Pump
12. Wires

Anytype of room's floor is consequently worked around the entire structure.

Sprayer system: After making the floor clean is made wet by spraying water through nozzles. Water stored in the tank is sprayed by an opening, that is controlled by a pump. The arrangement is made in such a way that there is some moisture throughout the area. The sprayer system consists of 6 nozzles of 0.5mm. The rate of water flow is 4.5 liters per minute.



Fig. 1 Sprayer System

Waste Collector Box: The main function of the collecting box is to collect the waste up to some quantity after that remove box and dump the waste. The sheet metals are used to manufacture the box. After cutting sheet metal into a box dimension, we welded it into a box type.



Fig.2 Waste Collector Box

Main Frame: The main frame is made up of a square iron pipe of (1” *1”). All the load of components is carried on the main frame. Dimensions of the whole frame are 27 inches* 36 inches.

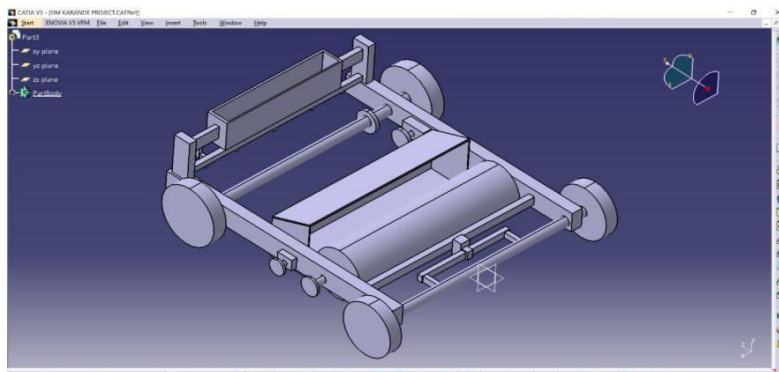


Fig. 3 Model Layout(Frame)

LDR system: LED light is connected to the Battery. Here, we don't use the switch in this circuit. We use a light-emitting Resistor in the form of a switch. When light is detected on LDR it automatically gets OFF.

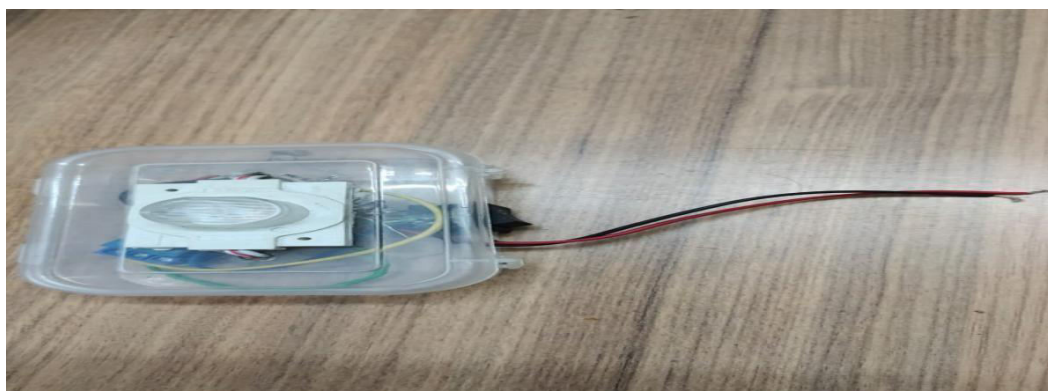


Fig. 4 LDR System

Brush: A brush of synthetic fiber is used for cleaning. The brush is operated with the help of a brush motor of 12Volt operating with 60 rpm.



Fig.5 Brush

Automation of FCM Using Arduino: Transmitter:

A circuit that accepts signals and translates them into a form that can be sent across a medium (transmitted), usually over a distance. Different types of switches for controlling the model such as Forward, Reverse, On, Off, and Left-Right steering mechanisms.

Transceiver:

A transceiver is a combination transmitter/receiver in a single package. While the term typically applies to wireless communication devices, it can also be used for transmitter/receiver devices in cable or optical fiber systems.

L298N5A Motor Driver:

The L298N is a dual H-Bridge motor driver which allows speed and direction control of two DC motors at the same time. The module can drive DC motors that have voltages between 5 and 35V, with a peak current of up to 2A.

Tile or Stone Floor:

Modern homes are equipped with marble floors and tiles that are easy to clean. Here are a few examples:

1. Either a Hoover or a brush must be used to remove debris particles.
2. Floor fitting should be done using a floor cleaning arrangement. If the surface is made of stone, it should be cleaned using, roughly speaking, stone cleaning procedures. It is recommended to use acidic tile cleaner on ceramic flooring.
3. To scour and clean the floor, a wipe or brush is used.

Working Principle:

The floor cleaning machine consists of Brush, Waste collector, Sprayer system, and LDR system. First Motor is connected to Brush through a chain sprocket. The second motor is connected to Rack & Pinion. The third motor is connected to the rear drive-through chain sprocket. The inlet of the Pump is connected to a water tank and the outlet of the pump is connected to Nozzles which spray water. Automation of the floor cleaning machine is done using Arduino. Different types of switches are used for controlling the model, such as Forward, Reverse, On-Off, and Left-Right steering mechanisms. Signals released from the transmitter are converted from Arduino to Receiver.

Project Model:-



Fig. Built Model

III. RESULT AND DISCUSSION

Range and Capacity of Floor Cleaning Machine:

1. Traveltime of Floor Cleaning Machine:

- Floor Cleaning Machine can travel 10 meters in 1 minute.

2. Range of Transmitter and Transceiver:

- The range of the Transmitter and Transceiver is 15 meters.

3. Capacity of Battery and Water tank:

- The capacity of the Water tank is 4 L per minute.
- The battery capacity of the floor cleaning machine is 1.30 hr.

4. Capacity of Waste Collector:

- Capacity of waste collector is 2-3 kg.

5. LDR System:

- LDR system is OFF during the day and ON during the night.

IV. CONCLUSION

The product thus developed is fully operational and gives desired motion. This lowers the price while simultaneously improving the instrument's dependability. Overall, the idea is highly beneficial, yet mechanical elements still have room for improvement. The optimization process won't stop until the best result is reached. Overall, the project achieves its goals and will undoubtedly alter the robotics and floor cleaning eras. The area of sensing is one where advancements can be achieved. However, this device has the ability to move in the direction of the dust, improving floor cleaning. This is an effective product creation that may be employed in modern Indian homes and plane surface cleaning.

REFERENCES

1. Bala Naga Venkata, Sarita Vanka, Venkata Rohit Kumar, Keerthana Mahadeva, Manaswini Gunji, "Automated Cleaning Machine using Arduino", IEEE International Conference on Electronics and Renewable System, (2023) 542-547
2. Dr. M. Sivachitra, S. Dinesh, B. Gowtham, K. S. Vinothraja, S. Eraionbu, "Remote Controlled Multipurpose Road Cleaner", (2022)
3. C. Ramesh Kumar, M. Seiva Kumar, C. Pushparaj, P. Praveen Kumar, V. Ajit Kumar, "Design and Fabrication of Road Cleaning Machine", IT in Industry, vol. 9(2021) 167-
4. BeiQuan Fan, "Floor Climbing Cleaning Robot Based on Slide Rail Lifting Structure", IEEE International Conference of Power, (2020) 425-428
5. Hrvoje V. Basic, Marija Mile tic, and Ivan Pavic, "Experimental Testing and Evaluation of Lithium Battery Calls for a Special Purpose Electric Vacuum Sweeper Vehicle", IEEE, 8(2020) 216308-216319
6. Zola Diki Setiawan, Wikan Sakarinto, Ponang Adi Nugraha, Iswaro Djati, "Ergonomics Design of Electric Road Sweeper Cabin", (2019)
7. Samarth G. Gaikwad, Shashank S. Kulkarni, Virendra P. Patil, Ashutosh S. Nagargoje "Design and Development of Multi-Functional Floor Scrubber and Cleaner", International Journal of Scientific and Technology Research, 8(2019) 3638-3644
8. Ms. R. Abarna, S. Devadharshini, S. Dhileep, M. Dinesh, R. Poongodi, "Design and Fabrication of Automatic Floor Cleaning Machine", International Science of Engineering Research, 6(2018) (p) 2230-235
9. Rithvick Ghosh, H R Vinay Kumar Dattatraya, Pavan Kumar, B. Hiremath, Prof. Pradip Kumar K. V, "Design and Fabrication of a Pedal-operated Floor Mopping Machine," International Journal of Emerging Technology and Advanced Engineering, 6(2016) 3- 39
10. Andrei Borozdukhin, Olga Dolinina, and Vitaly Pechenkin, "Approach to the Garbage Collection in the "Smart Clean City" Project", (2016) 918-921
11. M. Ranjit Kumar, N. Kapilan, "Design and Analysis of Manually Operated Floor Cleaning Machine", International Journal of Engineering Research and Technology, 4(2014) 828-831



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