

Modified Floor Cleaner Machine

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Abstract – Automatic floor cleaner is a system that enables cleaning of the floor by the help of highly stabilized and rapidly functionalized electronic and mechanical control system. Current project work targets to use automatic floor cleaner for large floor in house-hold purposes and office floors. The cleaning purpose is specifically carried out by continuous relative motion between a scrubber and the floor surface. During the cleaning and moving operation of vehicle a propulsion mechanism such as driven wheels and guide wheels for the dry tracking on the floor surface to be cleaned, scrubbing action is done by the scrubber directing water towards rear end. Preferably, a sweeper mechanism is mounted on the body forwarded by propulsion mechanism and operated with such control system for advance sweeping of a debris-laden floor surface. The new automatic floor cleaner will save huge cost of labor in future. The basic advantage of this product is that it will be cost effective and no human control is needed. Once put in on mode it will clean the whole room without any omission of surface.

Index Terms – Battery, Braking System, DC motor, Scrubber

1. INTRODUCTION

1.1 CLEANING:

Cleaning is the essential need of the current generation. Basically in household floors the floor has to be cleaned regularly. Different techniques are used to clean the different types of surfaces. The reasons for floor cleaning are

- i) Injuries due to slips on the floors are cause of accidental injuries or death. Bad practice in floor cleaning is a major cause of accidents.
- ii) To beautify the floor.
- iii) Debris and obstructions are to be removed.
- iv) Allergens and dusts are to be removed.
- v) Surface wears to be avoided.
- vi) To make the environment sanitary (kitchens).
- vii) Traction should be maintained at optimum level, so that no slip will occur.

Floor cleaning is achieved by different technique which might be of different kinds. Different types of floor need different type of treatment. The floor should be totally dry after the cleaning process. Otherwise it may result in hazard. On some floors sawdust is used to absorb all kinds of liquids. This ensures that there will no needs of preventing them from spill of. The sawdust has to be swept and replaced every day. This process is still used in butchers but it was common in bars in the past. In some places tea leaves are also used to collect dirt from carpets and also for odour removing purposes. Different

types of floor cleaning machines are available today such as floor buffers, automatic floor scrubbers and extractors that can clean almost all types of hard floors or carpeted flooring surfaces in very less time than it would have taken using traditional cleaning methods. Again the cleaning would be different for different floorings.

1.1.1 WOODEN FLOOR:

Wooden flooring is treated differently depending on which type of coating it has, whether waxed or oiled, or whether it has a polyurethane coating. The very important thing in case of this type of floor is which type of coating it is having and find out the proper way of cleaning it. Simple cleaning instructions followed are:

- i) The floor should be cleared of all the furniture those are easy to move.
- ii) All loose debris particles are to be swept or vacuum cleaner.
- iii) The floor is mopped going along grains. If the floors are polyurethane, the mop has to be dipped with water and a few drops of dishwashing liquid. The mop should be ringed out thoroughly before it is used on the floor.
- iv) The floor is to be buffed using a soft fabric to remove soapy dirt. The softer the cloth, the better it works because they have good absorbent capacity.

1.1.2 TILE OR STONE FLOORS:

Modern houses are equipped with tiles, marble flooring that can be cleaned easily. Few specific ways are:

- i) Debris particles are to be removed using vacuum cleaner or else broom.
- ii) Floor cleaning solution should be used for appropriate floors. If it is stone surface, it should be cleaned using solutions for stones only. For ceramic floors acidic tile cleaning agent is to be used.
- iii) A mop or scrubber is used to scrub and clean the floor.

1.2 SCRUBBER

Basically the Indian floors are cleaned by rubbing the floor with a hard cloth or plastic like material called scrubber or mop. Hence design of scrubber is an important task while cleaning Indian floors. The motion of scrubber on the surface may be rotator or harmonic depending upon the type of material used or surface to be cleaned. Normally hard materials like heavy cloths are used for making the scrubber. The basic purpose of the scrubber is to clean the surface completely and also soak

the water or liquid used for cleaning the surface. In our case we have used a scrubber that is made up of a cloth wound over a metallic bar (cylindrical rod). The additional purpose of the scrubber is to make proper flow of dirt water towards the direction needed. In some cases a single spot is to be scrubbed more than once. For this purpose harmonic motion is used which enable better removal of debris. But in our case the purpose is to clean household flooring so relative rotation of scrubber is made to achieve required purpose.

2. AIM OF PRESENT WORK

Present work is aimed at working of an automated motion controlled machine that could clean the floor of normal Indian house-hold. Once the machine is put in ON mode it will move all over the surface without omitting any bit of floor space. Again the machine should avoid the obstacles on its path. Proper cleaning is achieved by motion of the scrubber which is relatively rotational in manner. The cleaning process is carried out by making the floor wet and scrubbing it and again making the floor dry.

The floor should be dry after the process is complete because wet floor leads to different sort of problems as discussed above. For this purpose vacuum pumps are to be used. The cleaning also meet challenges like which type of debris it will meet. So dry cleaning arrangements are installed. This leads to proper cleaning when heavier particles are there as debris particle. Thus leading to proper cleaning of the surface. There may be oily surfaces in some cases. To counter act this situation necessary disinfectants are to be used. 4 wheel drive mechanism should be used for proper control of the machine.

To control all the motors and vacuum pumps basically micro controller of Aurdino type is used. For completing the motion all over the surface spiral mechanism and particle swarm optimization method is being utilized. Image sensing technique for avoiding obstacles is to be used. Optimization methods are used for increasing efficiency of movement algorithm. It ensures no repeatability of the motion over a certain space. Basically we are to design a portable machine that could move automatically all over the floor surface avoiding obstacles and cleaning the floor.

3. FABRICATION WORK



Remove Pedal
And use 24 V,
250 watt D.C.
Motor



Use wiper
and Dust
Collecting
equipmen
t in back
side



Use Bike
Handle for
accelerator
with brake
Lever.

4. APPLICATION

- i. Domestic purpose.
- ii. Hospitals.
- iii. Computer centers.
- iv. Auditoriums.
- v. Cultural centers.
- vi. Schools.
- vii. Colleges.
- viii. Large scale industries.
- ix. Medium scale industries.
- x. Theatres.
- xi. Educational institutions.

5. CONCLUSION

The product thus developed is fully operational and gives desired motion. It is being tested in a room which results in successful outcome. The scrubber design should be modified in future because the current design has few problems. Few of those are the motor is not detachable and the high rpm leads to vibration of the whole system. If these features will be modified, this will work well. In our case 2 vacuum pumps are used which leads to loss of power. This can be reduced by substituting these 2 pumps with one pump having 2 path ways. This will be the next development stages. This not only decreases cost but also increases reliability of the instrument. Overall the concept is very much helpful and there is scope of a lot of development in mechanical parts. The optimization will continue till achieving the best one. Overall the project is successful to its intent and will definitely change the era robotics and floor cleaning. In the automation part the

algorithm are designed to give 90% efficiency which is too high in current scenario. The development can be made in the field of sensing. But this product has the capability to detect as well as move in the direction of dust and thus resulting in better cleaning of floors. As a whole this is a successful product developed that can be used in current Indian house-hold.

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