

A Project
Report On

Bluetooth controlled cleaner

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BY

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CERTIFICATE

This is to certify that the project work entitled “BLUETOOTH CONTROLLED CLEANER” is a bonafide work carried out by Ayush Jain in partial fulfillment of the requirements for the subject Project Based Learning (FE, IInd Semester) of degree of Bachelor of Engineering in First Year Engineering from Dr. D. Y. Patil Institute of Technology, Pimpri during the academic year 2021-2022

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ABSTRACT

Bluetooth controlled 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.

An arduino controller is used to govern the motion of system which takes the input from sensor circuit and feeds it back to microcontroller which gives rise to the simulation of wheel in a synchronized manner. The new Bluetooth Controlled 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

CHAPTER 2 INTRODUCTION

2.1 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

- 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.
- To beautify the floor.
- Debris and obstructions are to be removed.
- Allergens and dusts are to be removed.
- Surface wear to be avoided.
- To make the environment sanitary (kitchens).
- 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 need 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 odor 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.

2.1.1 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

1. The floor should be cleared of all the furniture those are easy to move 2.

All loose debris particles are to be swept or vacuum cleaned.

3. 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.

4. 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.

2.1.2 TILE OR STONE FLOORS

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

1. Debris particles are to be removed using vacuum cleaner or else broom.
2. 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.
3. A mop or scrubber is used to scrub and clean the floor.

2.2 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 rotatory or harmonic depending upon the type of material used or surface to be cleaned. Normally hard material 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.

CHAPTER 3 AIM OF CURRENT WORK

This project mainly focusses of moving a cleaner with a Bluetooth module so it can be more compatible or we can say user friendly to handel. We are mainly aiming to reduce efford as well as time that is needed to clean a floor traditionally. With the help of the designed module a person can control the whole working of the cleaner .

Sitting at a particular place without any human efforts. As we are well familiar to the automatic cleaner which we can purchase online by any modes i.e through the official websites of then respective company, through sale platform like flipcart, amazon etc . On an average it costs around 20k which if we take in consideration would be half of someones's Monthly salary , that's the main drawback a middle class family face it hard to purchase . The module designed by us is economically cheaper to purchase it.

CHAPTER 4 LITERATURE REVIEW

Traditionally floor is cleaned by hand using different handmade instruments. Initially it was being washed by different reed brushes. According to Egyptian houses were built of sundried mud bricks at times white-washed and the floors were stamped earth. The floor of the outdoor kitchen too was simply the ground baked stone hard by the sun. Unless it was raining, which happened only rarely, these floors were easy to keep clean by sweeping. Like most ancient Egyptian tools, these brushes did not have long handles which would have rendered their use less irksome, and required bending low when employing them. For the ease of human beings different designs of brushes are evolved.

Again during the age of monarchs carpets of different designs are utilized to cover the floor to keep it clean. As the time passed new scientific era begins a lot of new methods are used to clean the floor. The first among those was the reciprocating action of brush actuated by muscular force. The brush design is changed time to time depending upon the floor structure and ease of washing personnel. As the electricity came into role vacuum cleaner are invented to clean a dry surface. Moving forward different floor cleaning machines are being invented to clean the floor with less application of muscular power. Then came the concept of mobile robot.. Mobile robots have the capability to move around in their environment and are not fixed to one physical location. By contrast, industrial robots are usually more-or-less stationary, consisting of a jointed arm (multilinked manipulator) and gripper assembly (or end effector), attached to a fixed surface .

For the help of mankind the first floor cleaner was manufactured during 1980s. In those equipment the aim was to wash the floor with less power utilization. There sweeping mechanism of mop is actuated by a timing motor which was controlled by the dc circuit. Here water is sprinkled on the mop and hence the wet mop is used to clean the debris from the floor. But the problem here was it can't use any chemical solvent or disinfectant. Again for soaking purpose only hot air is used. Again for moving the machine a worker has to be engaged. To overcome these conflicts current study was done to enable the cleaner move automatically throughout any

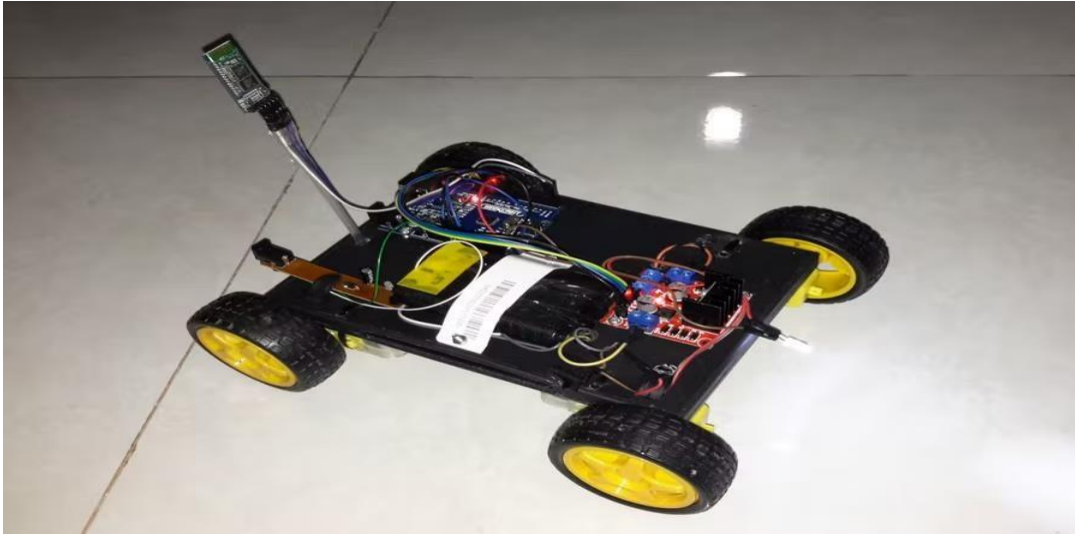
kind of room. The moping mechanism is also modified to lessen the cost. In current study the mop is continuously revolving about a axis perpendicular to the motion of the cleaner which also helps in directing water on the floor backward. Instead of using a wet mop a sprinkle mechanism is used to make the floor wet which is scrubbed by the mop. A vacuum cleaner was used to soak dirty water from the floor surface and side by side cleaning the surface. For automatic motion of the cleaner mobile robotics is used.

Mobile robots are a major focus of current research and almost every major university has one or more labs that focus on mobile robot research. Mobile robots are also found in industrial, military and security settings. Domestic robots are consumer products, including entertainment robots and those that perform certain household tasks such as vacuuming or gardening. From then on more sophisticated robot is designed for household equipment for automating the tasks including washing machine, micro woven. After that only the revolution of mobile robotics came to household usages. The problem with current automatic floor cleaning machines are they are only used in households for only dry and wet cleaning but not as infection remover. So it is only used in households and not in hospitals or small areas in public. The automatic floor mops like hydrobot are bulky and they also require large power and are used for commercial purpose. But we think this (Our cleaner) will solve all in one go... We will basically focus on a smart and smaller and good designed robot which can be used in many sectors like healthcare and educational areas (which are of course small areas) and also for household use. So it will be both for terminal cleaning like medicals and indoor floor cleaning.in future we will focus on indoor air cleaning service as an additional feature to this machine

CHAPTER 5 DESIGN OF PRESENT WORK

5.1 Chasis

It is the back bone of the system. All the systems and parts are attached to it. The solidity of the system is greatly affected by the chasis. It is a rectangle of length 15cm and breath 9cm.



(fig1)

5.2 A SCRUBBING MECHANISM

As discussed earlier scrubbing of surface is necessary for proper cleaning. For different type of floors different types of scrubbers are to be used. For stone flooring soft cloths, for cement floors hard plastics are used. In our case the scrubber is given a rotational motion to scrub the surface. The rotational motion is achieved by a 12v DC motor having 100rpm. The scrubber is as shown in fig5. One side of the scrubber is fixed with the dc motor which again clamped to the chassis by C-clamp and screw. The other part of the scrubber is connected to a ball bearing which is again clamped to the chasis via C-clamp. The connection of bearring is done by a hub. The hub is a metallic object of cyllindrical shape. On one side of the hub a hole is made and the scubber is fixed. Transition fit is the type of fit when the diameter of the shaft and the hole are same and hence the shaft is fixed by applying continious force.

The scrubbing process has 2 advantages.

1. It ensures the surface to be proper cleaning
- 2.to have stable control

5.3 MOTOR WHEEL SYSTEM

The complete product is a four wheel drive automation process. 4 wheels are independently connected to 4 different 12v DC motors. The purpose of the wheels are

1. To give the bot proper motion.

2. Provide traction in all sort of surfaces.

3. Make the movement easier in all direction.

4. Not to slip of from its path

The axis of motor is bolted to the axis of the wheel. The motor-wheel arrangement is fixed to the chassis using L-clamp and screw. The movement of the system can be achieved by giving power to required motor and/or making devoid of power. For example if we need to make the machine give a turn towards right the front right wheel is stopped or slowed down. Again for left turn left front wheel will be slowed. Rear wheels are always in operation to pull the system. The diameter of the wheel is 7.5cm.



(fig2)

CHAPTER 6 ELECTRONICS PARTS USED

6.1 DC MOTOR:

DC motor is an electrical machine that utilizes electric power resulting in mechanical power output. Normally the motor output is a rotational motion of the shaft. The input may be direct current supply or alternating supply. But in case of DC motor direct current is used. The mechanism of dc motor is like a bar wound with wire is placed in between 2 magnets having north and south pole. When it is provided with electric supply the wire becomes energized resulting in rotational motion which leads to rotational output

6.2 ARDUINO UNO

Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. This board can be interfaced with other Arduino boards, Arduino shields, Raspberry Pi boards and can control relays, LEDs, servos, and the motor as an output.



(fig3)

6.2 MOTOR DRIVER (L298S)

The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, DC and bipolar stepping motors, as well as other highcurrent/high-voltage loads in positive-supply applications.



(fig 4)

6.3 BLUETOOTH MODULE (HC-05)

Bluetooth-Connections in your circuit are possible from now on - with the HC-05 Bluetooth Module you will enable your Arduino application an uncomplicated connection via bluetooth. With two HC-05 Bluetooth Modules you will also enable the wireless communication of two Arduino applications



(fig5)

6.4 Jumper cables



(fig6)

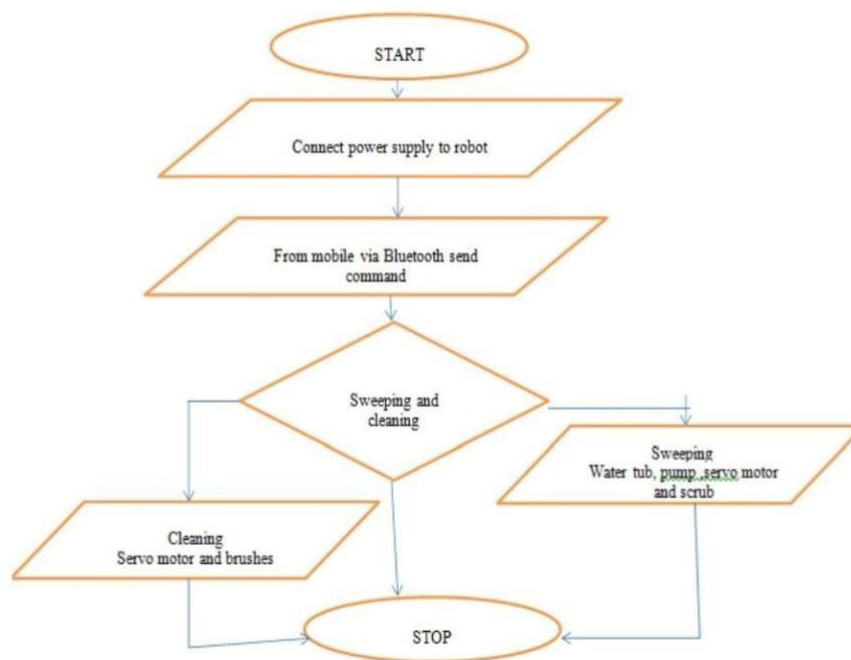
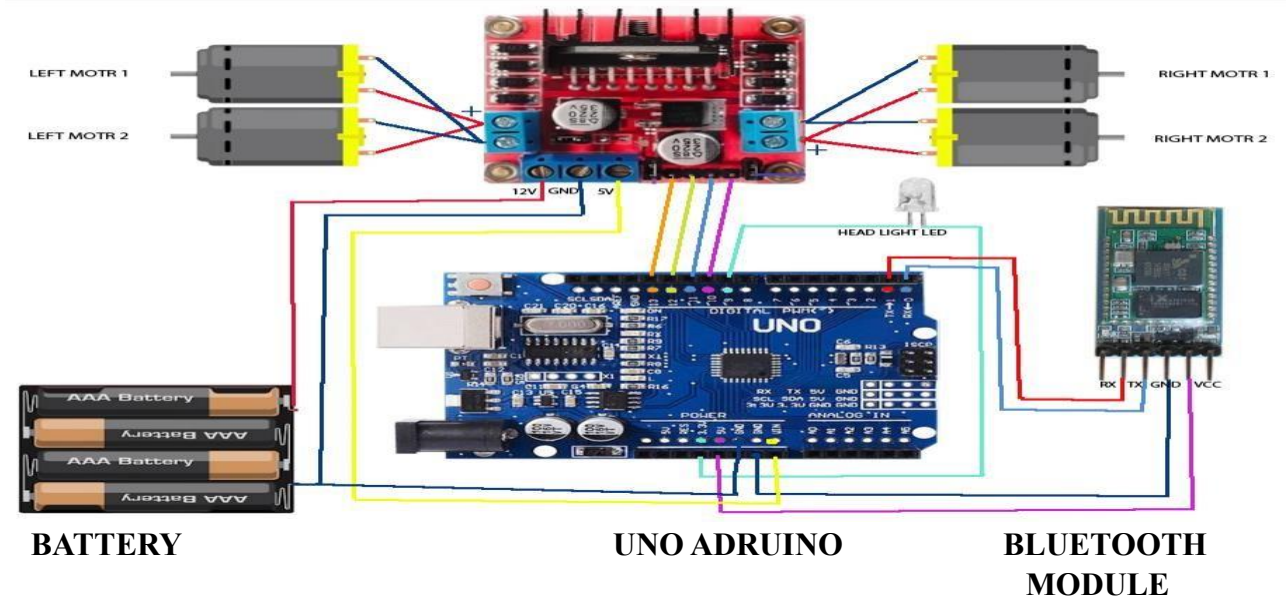
7 CONSCLUSION

This research paper facilitates effective floor cleaning with sweeping and mopping operations. It reduces the labour cost and saves time also and provides efficient

CHAPTER 8 CONNECTION

Circuit diagram

(fig 7)



(fig8)

9. Code

Chart:

```
void setup() { pinMode(13,OUTPUT):
pinMode(12,OUTPUT):
pinMode(11,OUTPUT):
pinMode(10,OUTPUT):
Serial.begin(9600):
} void loop() {
if(Serial.available()){
t = Serial.read():
Serial.println(t):
} if(t == 'F'){           //move forward(all motors rotate in forward
direction) digitalWrite(13,HIGH): digitalWrite(11,HIGH):
} else if(t == 'B'){      //move reverse (all motors rotate in reverse
direction) digitalWrite(12,HIGH): digitalWrite(10,HIGH):
} else if(t == 'L'){      //back motors
forward digitalWrite(11,HIGH):
} else if(t == 'R'){      //lfront motors
forward digitalWrite(13,HIGH):
} } else if(t == 'w'){
digitalWrite(9,LOW):
} else if(t == 'S'){      //STOP (all motors
stop) digitalWrite(13,LOW):
digitalWrite(12,LOW):
digitalWrite(11,LOW):
digitalWrite(10,LOW):
} delay(100):
}
```

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