"Design and Fabrication of a Vacuum Cleaner"

A Thesis
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"Design and Fabrication of a Vacuum Cleaner"

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Declaration

We hereby declare that the undergraduate thesis work reported in this thesis has been performed by us under the supervision of **Nuruzzaman Rakib (Assistant Professor)**, Department of Mechanical Engineering, Sonargaon University (SU) and this report is solely for academic requirement of the course **ME 400** and has not been submitted in part or full elsewhere for any other degree, reward or for any other purpose. We do solemnly and sincerely declare that all and every right in the copyright of this practicum report belong to the Department of Mechanical Engineering, Sonargaon University (SU). Any reproduction or use in any form or by any means whatsoever is prohibited without the written consent of Sonargaon University (SU).

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Abstract

In this work we implemented a human friendly cleaning system with the advancement of technology to make human life easy and comfortable. The main objective of this project is to design and implement a floor cleaning system prototype by using AC motors, fan, wheels, the garbage container and AC source is used to drive this project. The study has been done keeping in mind economic cost of product. The purpose of this project is to design and implement a Cleaning Autonomous and Manual. Here Motor is creating air flow and fan suck the dust from floor. Floor cleaning system will have several criteria that are user-friendly. The whole prototype has been put under several tests to validate our work. We have also taken several notes for future improvements.

Chapter- 01

Introduction

1.1 Introduction

There are various types of Vacuum Cleaners such as Upright Vacuum Cleaners, Stick Vacuum Cleaners and Hand-held Vacuum Cleaners. And all these Vacuum Cleaners generally use Electrical Energy as a source of Power. This paper suggests the use of Battery Operated Vacuum Cleaner using Axial Flow Fan for Suction Pressure generation. An Axial Flow Fan is used to generate the Suction Pressure to suck the garbage, dust or dirt [1]. As the outward flow of Axial Flow Fan creates a low pressure than the ambient pressure inside the Vacuum Cleaner, results in the suction of the garbage.

The "Automatic and manual vacuum cleaning system" has been designed for consumer, office environments, hotels & restaurants. Proposed design is being operated in dual modes. In one of the modes, the system is fully autonomous and making decisions on the basis of the outputs of infrared proximity sensors. In manual mode, the system can also be used to clean a specific area of a room by operating it manually.

1.2 Motivation

We are living in the digital era when everything is getting automated. Automation of things give our lives break from many tiring works. We were thinking of coming up with a project that will be beneficial for the society and thus the idea of making a floor cleaning system came to our minds. This system can surely help our household cleaning more effective and less time consuming.

1.3 Objectives

For this project we have some major objectives in our minds, as we want to tackle a major issue of our country which is coping up with the 4th industrial revolution that is coming for us. Some of the main objectives of this project are given below:

- To design and construct the floor cleaning vacuum system for home use using motor.
- To collect necessary elements regarding the project.
- To put the whole system under certain tests to validate our work.
- To take necessary notes for future improvements.

1.4 Methodology

Our methodology for the project:

- Creating an idea for design and construction of "Dry type Automatic Vacuum system". And designing a block diagram & circuit diagram to know which components we need to construct it.
- Collecting all necessary equipment and connect properly.
- Check all kind of connection and finally we implement it.

1.5 Organization of the Book

This project book consists of five chapter. The first chapter contains the statement of the introduction, our motivation for the project, objectives of the study, our used methodologies and the project organization. Chapter two contains literature review in details. Chapter three describes the proposed system architecture with component details and the software which we have used for our work. Chapter four deals with the circuit design, working principle and shows the complete prototype of the project that we have built. In the final chapter, we have discussed the advantages and applications of the project and also about some aspects we had to overcome while doing the project and lastly we gave the conclusion of the book.

Chapter- 02

Literature Review

2.1 Literature Review

After studying the various research papers of floor cleaning machines we have concluded that there are certain limitations in floor cleaning machines which can be worked upon. For example cleaning machines are made with an aim to clean only dry surface of the floor. This means that they are only sufficient in the summer and winter season but not in rainy season this is the major issue for cleaning the floor surface but during the rainy season floor cleaning machines are required which can perform the tasks when the surface contain moisture or little amount of water on the surface of floor. This dry type floor cleaning system is used for light weight dust cleaning.

Generally, a vacuum cleaner can be defined as: "An electrically operated ap-pliance that removes soiled material (dust, fiber, threads) from the surface to be cleaned by airflow created by a vacuum developed within the unit by an electrically powered vacuum generator or fan. The material thus removed is separated and stored in the appliance and the cleaned suction air is returned to the ambient." Vacuum cleaners exist in a variety of sizes, shapes and models for domestic and commercial use and for different applications. (AEA Energy and Environment, 2009.

Before writing this papers we read many type of project papers for gather our knowledge. These papers we use only knowledge purpose . These papers are -

Sandeep. J. Meshram, Dr. G.D. Mehta - ―Design and Development of Tricycle Operated Street Cleaning Machine‖ - Journal of Information, Knowledge And Research In Mechanical Engineering ISSN 0975 – 668X| Nov 15 To Oct 16 | Volume– 04, Issue- 01. M. Ranjit Kumar1 M. Tech Student, Mechanical Engineering, Nagarjuna College of Engineering and Technology, Bangalore, India. ISSN: 2278-0181 Vol. 4 Issue 04, April-2015 . Liu, Kuotsan, Wang Chulun, A Technical Analysis of Autonomous Floor Cleaning Robots Based on US Granted Patents, European International Journal of Science and Technology Vol. 2 No. 7September 2013, 199-216.

Chapter- 03

Equipment and Software Details

3.1 AC Vacuum Motor:

A vacuum engine (also called flame-licker engine, flame-engine, flame-dancer) derives its force from air pressure against one side of the piston, which has a partial vacuum on the other side of it. A universal motor is typically used as suction motor across vacuum cleaners. The universal motor is a series DC-motor that is specially designed to operate on alternating current (AC) as well as on direct current (DC). Universal motors have high starting torque, operate at high speed, and are lightweight.

The vacuum cleaner uses an electric motor that spins a fan, sucking in air – and any small particles caught up in it – and pushing it out the other side, into a bag or a canister, to create the negative pressure.

Product Specification

Voltage	220
Brand	CLEAN VACUUM TECHNOLOGIES
Speed (Rpm)	25000
Power (Watts or HP)	1200 W

Product Description

We are ranked as the noteworthy manufacturer, trader and supplier of Bypass Vacuum Cleaner Motor. Our given cleaner motor is demanded for its heavy duty, low maintenance, and increased production. This cleaner motor is developed from the latest techniques by using topmost grade material.

Features:

- Easy to operate
- Perfect operation
- Low maintenance

Specifications:

- Capacity: 650w to 1300w

Fig 1: AC Motor.

3.2 Motor Fan

AC Motor fan is needed to blow some air in different direction. After the machine on there need some air flow through this fan. Air suction process is produced by this fan. This fan is create a huge air suction power with the help of the AC motor. The motor fan specification and product feature is given bellow.

Fig 2 : Motor Fan

Features:

- Power efficient
- Maintenance-free functioning
- Easy to operate and install

Product Specification

Phase	Single Phase
Power	245 V
Voltage	20-100 V
Size	280 mm

3.3 Blower working principle:

Today, blowers used in many different industries for different purposes provide the movement of air according to the desired conditions. Blower devices used for providing the required air for an environment or process or vacuuming the air from an environment are divided into different models according to certain parameters. Although it seems to do the same with a fan under normal conditions, blowers are used to transport air at a much higher flow rate.

Although the principle of operation is the same for all blower models, there are some minor differences. In the most widely used centrifugal blower products on the market, the impeller that provides the movement of air is directly connected to the electric motor shaft. In centrifugal type side channel blowers, as the engine starts, the air in the environment is taken from the suction section and pressurized and directed towards the exit area. Parameters such as number of blades and profile, propeller diameter, motor rotation speed, discharge pressure that must be supplied, affect the air flow directly.

Features of the Centrifugal Blower

Regardless of the Application area, specific conditions should be checked and supplied for centrifugal blowers as well as all equipment selections. We can list the most important of these features as follows:

- Quiet operation; noise level is within the limits specified in the standards.
- Having a simple and compact design.
- High efficiency and ability to work under harsh conditions without degrading performance.
- Providing oil-free air.
- Maintenance intervals are long; low maintenance costs

While selecting the blower, determining some parameters in advance is very important for a stable, efficient and healthy application. Among these, besides the features such as needed air flow, temperature, pressure, it is necessary to take into account the characteristics of the environment in which the blower will operate. The characteristics of the medium directly affect the choice of material and type of body, propeller, accessories and other components of the blower device.

Blower used:

All blower models, especially **centrifugal blowers** and **roots blowers**, have a wide range of applications. Blowers are needed in many different areas from cleaning to health, agriculture and animal processing to plastic, food to water treatment systems. Some of the typical applications using these devices are:

- Vehicle washing systems
- Jacuzzi and spa treatments
- Machines used for printing, steam ironing, etc.
- Mineral processing and methane gas aeration
- Agriculture and animal processing practices such as pesticide application, milking, aquaculture
- Chemical surface treatment
- Respirators
- Transportation of food products

3.4 Understanding Vacuum Cleaner Specifications

Understanding vacuum cleaner specifications is one of the most challenging aspects of selecting a new vacuum cleaner. First and foremost, consumers want vacuum cleaners that offer the best cleaning ability. And most consumers typically equate cleaning ability with "power" or "suction".

Cleaning ability is not just about vacuum suction power, even though this is an important element of vacuum cleaner performance. With a little information and education, you will be able to sift through the numbers and better understand what the specifications mean and which ones are important to you.

Unfortunately, there is no single rating that indicates cleaning ability. However, there are a number of primary vacuum cleaner specifications, that when clearly understood, allow consumers to make educated decisions concerning which vacuum cleaner will have the best

cleaning ability. These primary specifications include watts, amps, volts, water lift (or sealed suction), horsepower, air watts, and airflow.

There are also a number of other, secondary specifications that influence cleaning ability that we'll also examine. These include filtration, cleaning tools (agitation), capacity, quality, noise, features and cost. In order to make sense of all this we first need to understand the basics of how a vacuum cleaner works.

All vacuum cleaners operate based on air flowing from the opening at the cleaning head or tool, through the vacuum cleaner and the bag and/or filter system and then out the exhaust port. This airflow is created by the vacuum motor, which also may be referred to as the suction motor.

The vacuum motor consists of electrical components attached to a fan or multiple fans. When the fans spin, a partial vacuum is created and the pressure inside the vacuum cleaner drops below the ambient (or existing) air pressure in the room. Because air pressure is higher outside the vacuum cleaner than inside, air rushes through the vacuum cleaner.

So, it is easy to see that the vacuum motor is the heart of a vacuum cleaner. After all, the more powerful the motor, the greater the pressure differential and therefore the more vacuum suction power and airflow, right? And it is for this reason that most of the specifications you see concerning cleaning ability relate either directly or indirectly to the motor.

But here's where it gets tricky. Specifications for components such as the motor do not necessarily relate to the performance of the entire vacuum cleaner, and therefore are only a part of the story.

Let's take a look at the primary specifications one by one:

Watts

The input power of the vacuum motor is measured in watts. Although this specification doesn't take into account the efficiency of the motor, the number of fans or the overall vacuum cleaner design, motor wattage is a valid way to evaluate and compare the power of the motor.

While the ideal comparison is motor input power in watts of Product A compared to motor input power in watts of Product B, some manufacturers do not provide motor input power specifications in the form of watts but instead rate the entire vacuum cleaner in amps. This can make it hard to compare across brands.

However, you can convert amps to watts by the formula, amps x 120 (volts) = watts. Or conversely, you can convert watts to amps by the formula, watts/volts (always 120) = amps. For example, a 1400-watt motor converts to 11.67 amps (1400/120=11.67).

Comparing machines rated in amps with those rated in watts is not an exact comparison because manufacturers that are using watt ratings typically rate the motor only while amperage ratings use the total electrical consumption of the vacuum cleaner including the motor in the power nozzle (the motorized revolving brush cleaning head), light bulb, etc.

This means that a Power Team (a canister vacuum cleaner with a power nozzle) with a specification of 12 amps might be quite comparable to another Power Team with a 1200-watt motor that converts to only 10 amps.

This is because the power nozzle motor consumes 1.5 amps, the bulb uses additional amperage and so on. So, if we subtract the amperage used by the power nozzle motor from our 12 amp machine, we come up with 10.5 amps for the motor and light bulb. In this example, the two motors both have ratings of very close to 10 amps, and therefore, equivalent motor input power.

Therefore, it is best to either compare motor input power in watts of both machines or if you have to compare a machine rated in watts with one rated in amps, try to get the amperage rating of the motor only instead of the entire vacuum cleaner. You can then convert this to watts and have a meaningful comparison.

Amps

A very common vacuum cleaner specification is amps. The amperage rating designates the maximum amount of electrical current used by all of the vacuum cleaner's electrical components when operating. The biggest consumer of electrical current will be the vacuum motor, but the amperage rating includes all of the electrical components, including the vacuum motor, the power nozzle motor, the light bulb, etc.

The maximum amp "draw," (the number of amps the vacuum cleaner uses when running) allowed for any appliance that plugs into a standard household outlet is 12. Therefore, if you see amperage ratings above 12, read the fine print, as they are not true amperage specifications but some other manufacturer developed "performance rating" designed to create the impression of a more powerful vacuum cleaner.

Although amperage refers to electricity consumption and not power or cleaning ability per se, it can be used to compare the input power of one vacuum cleaner to another. This is because while input power is measured in watts, amps are converted into watts by multiplying by volts. Since volts are constant at 120, amps represent a valid comparison of motor input power.

Again, as mentioned above, when making this comparison, try to get the amp rating of the motor only instead of the entire machine.Therefore, amp ratings give us a means of comparing the input power of a vacuum motor and the vacuum cleaner as a whole and are a meaningful specification for comparison purposes. But again, they are only part of the story. After all, just because a motor or vacuum cleaner consumes more electricity, this does not make it a better cleaner.

The amps specification also does not take into account how efficient the motor is, as well as other design factors, such as whether the motor has one or two fans (two is not necessarily better than one) and the overall efficiency of the vacuum cleaner design.

Voltage

In the United States, standard household current operates at 120 volts at the meter. Voltage within a home is sometimes referred to as "110" and this is because there may be voltage drops through the house wiring. But not to worry, appliances are designed to operate within a range of voltages from 110 to 120.

For the purposes of understanding vacuum cleaner specifications the only thing about voltage we really need to know is the formula, amps x volts = watts and conversely, watts/volts = amps. When doing these calculations use 120 volts for U.S. appliances.

Water Lift (Sealed Suction)

Water lift is what gives a **vacuum** cleaner the power to pick up or "lift" debris from the floor surface, while airflow then removes it to the dust bag. ... Water lift is also a measure of a **vacuum** cleaner's ability to deal with resistance within the **vacuum** cleaner.

Horsepower

Horsepower (hp) is a unit of measurement of power, or the rate at which work is done, usually in reference to the output of engines or motors. There are many different standards and types of horsepower. Two common definitions used today are the mechanical horsepower (or imperial horsepower), which is about 745.7 watts, and the metric horsepower, which is approximately 735.5 watts. Often referred to as "Peak Horsepower" these ratings were obtained by removing the fans from the vacuum motor and subjecting it to the maximum load possible before the motor burned out. Then, a complex formula was applied to come up with a Peak Horsepower rating. Again, this specification is meaningless in terms of evaluating the cleaning ability of a vacuum cleaner.

Air Watts

Airwatt or air watt is a measurement unit of the effectiveness of vacuum cleaners which refers to airflow and the amount of power (watts) a vacuum cleaner produces and uses. It can also be referred to as a measurement of the energy per unit time of the air flowing through an opening, which is related to the energy that electricity carries through the power cable (wattage).

The airwatt is a useful measurement of vacuum cleaner motor efficiency, since the power carried by a fluid flow (in the case of a typical house vacuum the fluid is air) is equal to pressure times volumetric flow rate. The airwatt relates to actual airflow, while part of the electrical power (watts) consumed by a vacuum cleaner is dissipated into heat due to necessarily imperfect efficiency; two vacuum cleaners of the same airwattage have essentially the same suction, while devices of the same electrical wattage may have a difference in efficiency and thus have substantially different airwattage.

Airflow

Vacuum airflow is by far the most important specification in terms of determining the cleaning ability of a vacuum cleaner. Measured in cubic feet per minute (CFM), it is the force of this airflow across a surface that picks up the dirt and moves it to the dust bag or container. Therefore, the more airflow, the better the cleaning ability of the vacuum cleaner.

Filtration

Filtration is very important in terms of cleaning ability because HEPA or other advanced filtration increases the resistance within the vacuum cleaner. Therefore, it is easier for a vacuum cleaner with normal filtration to accomplish higher airflow ratings. In fact, the challenge of coping with higher resistance is one of the reasons that HEPA filtration vacuum cleaners can cost more.

The dust bag is also part of the filtration system and a significant factor influencing airflow. Many new materials, as opposed to traditional paper, are being used to manufacture dust bags in order to retain the fine dirt and harmful small particles while still allowing air to flow as freely as possible.

The surface area of the dust bag is also a factor because the more surface area the bag has, the more easily the air will flow through it. This translates to better cleaning ability as the bag fills. This is a good reason to choose full sized vacuum cleaners versus medium or compact ones.

Cleaning Tools (Agitation)

The primary cleaning tool must be correctly selected because while airflow is what transports those soils to the dust bag, agitation is what dislodges soil from carpeting, flooring and other surfaces.

Therefore, explore the type of cleaning tools that make sense for your home. If you have lots of carpet or difficult soils such as pet hair, choose an upright or a power team with a motorized power nozzle. If you have furniture that is difficult to get under, be sure your vacuum cleaner has a low enough profile cleaning nozzle to reach these areas and so on.

If you have a vacuum cleaner with all the airflow in the world but an inadequate cleaning tool, results will be less than optimal.

Capacity

The capacity of your vacuum cleaner has a role in terms of maintaining high levels of cleaning ability. As we saw above, the larger the dust bag, the better the airflow, and therefore, cleaning ability. All other things being equal, a full-sized vacuum cleaner will offer better cleaning ability, especially as the dust bag or container fills.

Quality

The quality of your vacuum cleaner is also important. You can have excellent specifications in a poorly constructed vacuum cleaner that will last only a few years, compared to extremely high quality products that will deliver outstanding cleaning performance and will last many years and even decades.

Quality can be partially determined by the length of the warranty as well as the type of materials used, the quality of the fit and finish, how heavy duty the housings are, how tight the seals, how close the tolerances and so on. Generally, mass-market, low-priced products are not designed for long-term use.

Noise

Noise is also a significant consideration. Some vacuum cleaners can be so noisy that they're almost unbearable to use. A high-quality vacuum cleaner will often operate at levels that are quite comfortable and will allow you to hear the phone or doorbell ring quite easily.

The amount of noise a vacuum makes while operating is rated in decibels (dB). To give you some idea, a conversation at home is rated at 50dB, a garbage disposal at 80 dB and a motorcycle or lawnmower at 100 dB. Extremely quiet vacuum cleaners can operate at decibel levels in the mid-sixties while cleaners in the 70-77 dB range are still very quiet compared to the vacuum cleaner you grew up with.

Features

Next, you need to consider whether the vacuum cleaner you're considering has all or most of the features that you need for effective and pleasant cleaning.

Consider your cleaning situation and be sure that the vacuum cleaner you choose gives you everything to make the chore of vacuuming as easy as possible. Does it feature a cord rewind, variable speed controls, on-board tool storage, height adjustable wands, an adequate cleaning radius, the proper tools for your flooring such as a soft brush for your slate entry tiles and so on.

3.5 Battery and working principle

Fig 3 : 12 volt Battery charger circuit

A typical 12-volt battery works by converting chemical energy into electrical energy through a chemical reaction inside it. This chemical reaction occurs between zinc electrodes (the anode) and manganese dioxide (the electrolyte). Then, it creates a flow of electrons through the anode, which is what charges your battery. The chemical reactions inside batteries are not 100% efficient, and this is because some energy is lost as heat during this process. So, it would help if you always recharged them before they become entirely discharged to avoid any damage or reduction in capacity

3.6 Inverter and working principle

Fig 3 : Inverter 2000 W

The power requirements of your home appliances vary greatly. Some devices like lamps require only a few watts while others need hundreds of watts. Inverters convert direct current (DC) electricity from the mains supply to alternating current (AC). They regulate the voltage and frequency of the output so that it matches the input. This makes sure that the appliance works efficiently and safely.

Chapter- 04

System Construction

4.1 System Description

The main processing brain of the system is the Motor. The motor takes power from the 220V AC source. The other components take signal voltage from the Ac source. When Motor will rotate then fan rotate and air sucked by the system, and dust will be inside of this machine.

4.2 Block Diagram

The post is about 12V DC to 220V AC inverter circuit designed with few easily available components. Inverters are often needed at places where it is not possible to get AC supply from the Mains. An inverter circuit is used to convert the DC power to AC power. Inverter Circuit are very much helpful to produce high voltage using low voltage DC supply or Battery. DC-DC Converter circuit can also be used but it has certain voltage limitations. The 12V DC to 220V AC inverter circuit is designed using IC CD4047. The IC CD4047 acts as a switching pulse oscillating device. The n-channel power MOSFET IRFZ44n acts as a switch. The 12-0-12V secondary transformer inversely used as a Step-up transformer from converting low AC to High Ac.

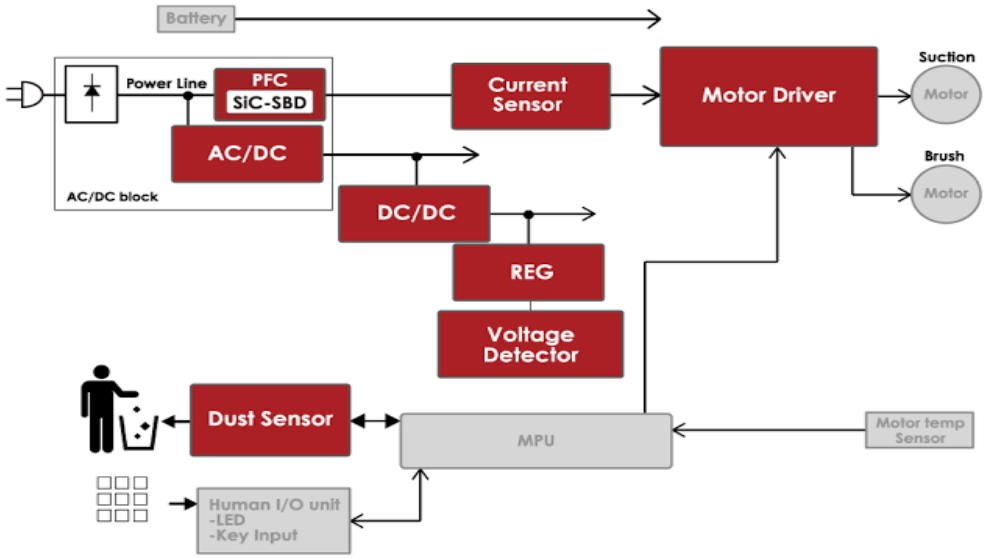

Figure 3 : Block Diagram of Design and Febrication of a Vacuum Cleaner

4.3 Circuit Diagram

The schematic diagram here is representing the electrical circuit and the components of the Floor vacuum cleaning system. Here we have used standardized symbols and lines.

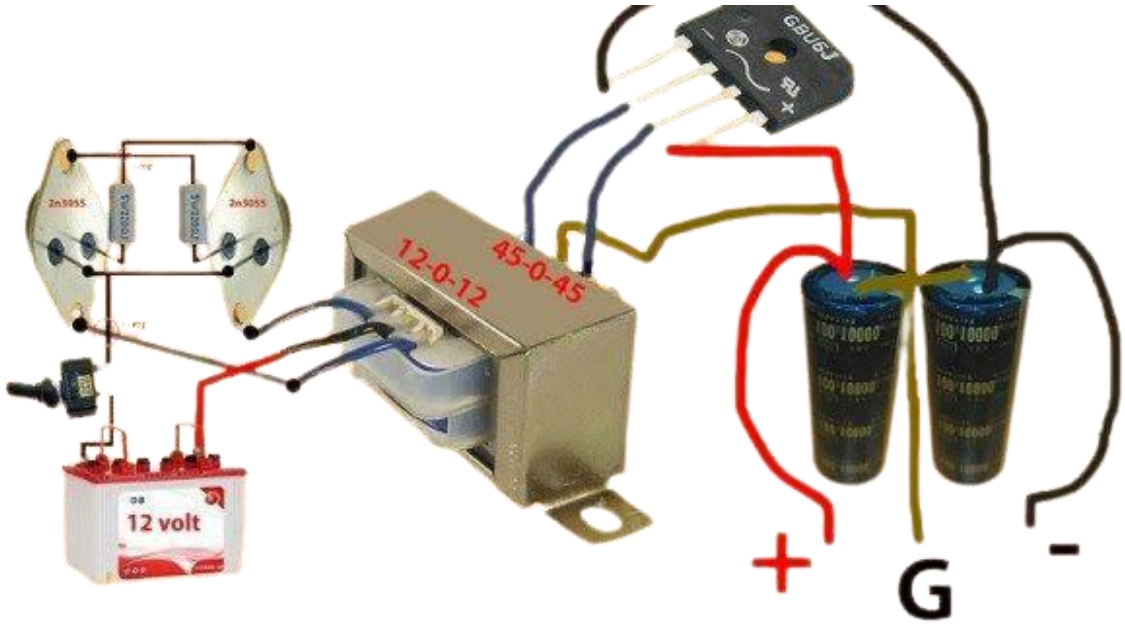

Figure 4: Circuit Diagram of Design and Febrication of a Vacuum Cleaner

4.4 Working Principle

The whole project has 3 major parts. 1) AC Source. 2) Switch and 3) working of the floor cleaning motor.

When AC source is connected with this system then it will be able to work properly. Then when press in switch then it will work. The motor is create air flow for sucking this air. Motor will be start rotating and fan suck the air through the nozzle. This nozzle suck the dust from the floor and store it in a box. Then air out with the air out nozzle. This system has some wheel for move easily. User can move it very easily.

4.5 The Project Prototype

The complete prototype of our project is shown below:

Figure 5 : The Complete Prototype of the Project.

4.6 Results

Now, it's time to talk about the results.

- It will be work using AC and DC source
- Air sucking system is fully work and collect the dust .
- The system is able to collect the dust and the dust collector box is removable from this system.

4.7 Cost Analysis

Sl. No	Particulars	Qty.	Unit Price (Taka)	Total Price (Taka)	Market Price
01	AC Motor	1	1500	1500	
02	Motor Fan	1	500	500	
03	Battery	1	1300	1300	
04	Inverter	1	2200	2200	
05	Others		1500	1500	
Total =				6500/=	6500/=

Table : 01 : Cost Analysis

Chapter- 05
Discussion and Conclusion

5.1 Discussion

We have started to work on this project due to the necessity we felt for it. And while working on the project, we did always consider two very important things and they are: consumer experience and overall performance. The project is in its pilot phase and you can say that this is our minimum viable product, with more practical testing and run-time, improvements will be carried out to make the system more efficient. We have already taken notes for future improvements and working on making the system more efficient.

5.2 Advantages

There are certainly many advantages of our project and some of the major ones have been given below:

- Easy implement
- Reliable and efficient
- Low cost and simple design.
- High Accuracy
- Nature friendly
- Requires low maintenance
- The project is compact and cheap

5.3 Applications

Our project has many application areas and actually we need to use it in many industrial places to reduce human efforts in these kinds of works. Some of the application areas of the project has been pointed out below:

- We can use this system for industrial purposes.
- It’s also can be used in households and offices
- This system can be used anywhere where there’s a need for object detection and floor cleaning.
- It can be used in shopping malls, hospitals, educational institutes as well.

5.4 Limitations

No project is without its limitations and ours is no exception from that but the final output we received from our project is quite satisfactory. Listed below, are some of the limitations we have:

- This project can now be only used for small scale purposes for now
- Must be needed electricity, no backup power .

5.5 Future Scope of Work

As we have already discussed about the limitations of our project so definitely there's room for improvement and thus we have lots of future scope of work available to us for this project. Some of these are listed below:

- Camera can be included, so that virtually users can monitor the room's dust condition.
- We can implement more sensor in future.
- In future, we can add a disinfectant chemical sprayer with the system.

5.6 Conclusion

We have already said that this project has been made with the intension of introducing the 4th industrial revolution to our country. This is a major problem in our country and our system can effectively work against this problem. The things we have used in the project to build are easy to get, cheap. This project is fully automatic and user friendly. This project can also be implemented for any industry or households quite easily. Our system requires minimum amount of maintenance. After building the whole project, it has been put through many different tests to validate our work. Although we did face some difficulties while working on the project but the final results we got were quite satisfactory. At last we will say that this project can really help our country. Our system provides practical solution to some of the problems our current homes and industries are facing and cleaning maintenance is one of them. Object detection with cleaning facility can become one of the key things to do in industrial manufacturing and processing as valuable projects can damaged without proper detection. Thus a low-cost floor cleaning and monitoring system was successfully designed, implemented and tested.

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