Bluetooth Controlled Vacuum Cleaner

Karishma Vora[1], Meghana Vishwanath[2], Naina Mehta[3], Soumya Belur[4]

[1,2,3,4]*Dept. of Electronics and Instrumentation Engineering, JSS Academy of Technical Education, VTU, Bengaluru, India*

Abstract - *With the advancement of technology in the recent times it has become the goal of researchers to make life of mankind comfortable and affordable. The proposed system aims to do the same by being eco-friendly and cost efficient at the same time as reuseable and rechargeable components are used. The major aim of the system is to provide cleaning assistance to indivituals who cannot manage to do the same due to various reasons. As it's already known that a vacuum's suction is caused by a difference in air pressure. A fan/exhaust driven by an electric motor(as desired) reduces the pressure inside the suction creating module. Atmospheric pressurethen pushes the air through the surface and into the nozzle, hence collecting the dust in the collector.*

The proposed system is a bluetooth controlled vacuum cleaner system that allows for automatic cleaning of a particular area or room by covering the area using a moving robot controlled through the game pad available on the 'dabble' app. The system also has a vacuum suction cleaner attached to its back mounted on the robot chassis for dust suction. The range of suction creation can be varied according to preference by controlling the motor speed. The simple and easy construction ensures that the system doesn't require very high maintenance and can be customized with various external features according to the user's needs.

1. INTRODUCTION

The importance of cleanliness and hygiene is very well known but due to the very busy and occupied lifestyles nowadays, this has taken a backseat. This is where the vacuum cleaners come in to the picture. Vacuum cleaners expel soil, dust, pet hair and other undesirable particles noticeable all around and in the surfaces of your living environment. The filtration effectiveness of vacuum cleaners is great and it helps in ensuring a healthy lifestyle. There is UV sterilization that is achieved here. There is a wide range of cleaning modes like general, scheduled, turbo, spot or spiral, etc. However one major issue with them is that the most basic model is also quite expensive and owning one is still seen as a luxury by most of the households even today.

Another issue is that they are quite bulky and heavy and need to be physically carried around the designated area and this might not be convenient to various sections of the society like senior citizens or differently abled people for obvious reasons. Our system overcomes this issue by setting up a Bluetooth module in the system so that the user can operate the vacuum cleaner just by one touch on their phones. It reduces manual labour and ensures that the work is done efficiently. The construction of the system is something that is very unique. It is a very basic model with utmost sophistication at the same time. We aim to make the user self-sufficient through our system.

The arduino programming involved here is to interface and control the motion of the motors and subsequently the wheels of the moving robot. We have also incorporated an uniwheel to maximize the degrees of freedom of the system. We use reuseable and durable components like a plastic bottle, medical gause, etc, thus establishing the economic factor of the system. We what to establish that the user can easily make the system and have it at his/her disposal whenever required.

2. METHODOLOGY

The working of the vacuum cleaner an be divided into two section: the moving robot and the suction

(a) The moving robot:

The moving robot is responsible for the movement of the robot from one location to another. This robot doesn't require the assistance of a human for movement. As shown in the above figure 1, A rechargeable battery of 12 V is used to provide power to all the components the circuit. Here a rechargeable battery is used instead of a single use battery to reduce the e-waste in our environment.

We have used Arduino as our preferred choice of microcontroller. The components are mounted on a chassis that has 4 wheels present on it. The moving of

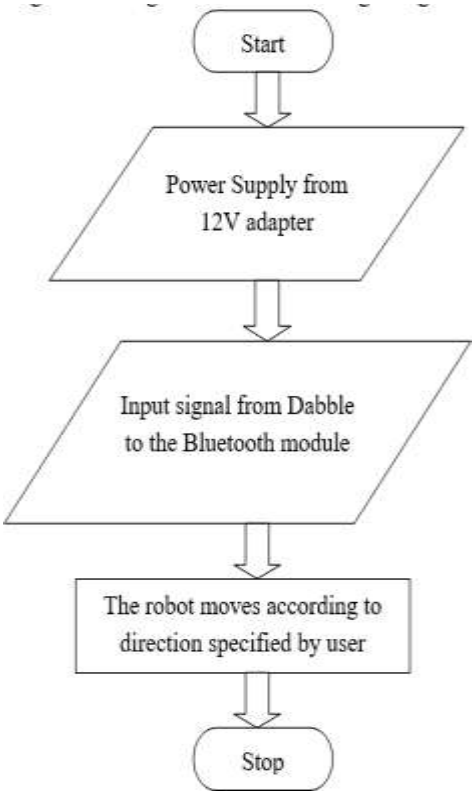

Figure 1: Flowchart representing working of robot

the robot happens due to movement of the wheels. The wheels can be run using a dc motor. The voltage provided by the microcontroller is not sufficient to run the motor, hence a dc motor driver is used. The movement of the robot can be controlled using Bluetooth. Bluetooth is wireless, affordable and a means of easy automation. Including the facts that Bluetooth requires minimal interfaces and is energy efficient adds up to its benefits.

A Bluetooth module (HC-05) is used to receive the signals which contain information regarding which direction the robot should move. A mobile interface can be used to transmit these signals via Bluetooth. Here we have used a mobile application (i.e.) Dabble app (shown in figure 2). Dabble app provides wide range of GUI (Graphic User Interface) and various modes of control for the user's convenience. Since we are using Arduino micro controller, a code has to written in Arduino IDE. The robot will work according to the program loaded in the micro controller.

(b) The Suction:

The cleaning process takes place to due to suction process. The suction is used to remove dust and other minute particle from various surfaces. The plastic bottle is used to provide a hard-outer cover for the dust that is collected, and other hardware parts. A battery is connected to a DC Motor which is connected to a rotating fan. The battery is used to power the motor so that the fan starts rotating. The fan can be connected such that there are two possible outcomes during rotation: expulsion of air; and suction of air.

Connection must be done such that rotation causes suction of air. Motors of different speed of rotation can be used for stronger suction. This battery-motor-fan setup is attached near the back of the bottle. A medical Gauze is attached toward the mouth of the bottle. This is to ensure that the if macro particles are sucked in, they don't cause damage to the fan, motor or the battery. A cut is made in the between to gauze and the opening of the mouth so that the collected particles can be removed. A pipe is attached near the mouth of the bottle so that the surface area on which the suction takes place can be reduces, resulting in increase in efficiency of the vacuum.

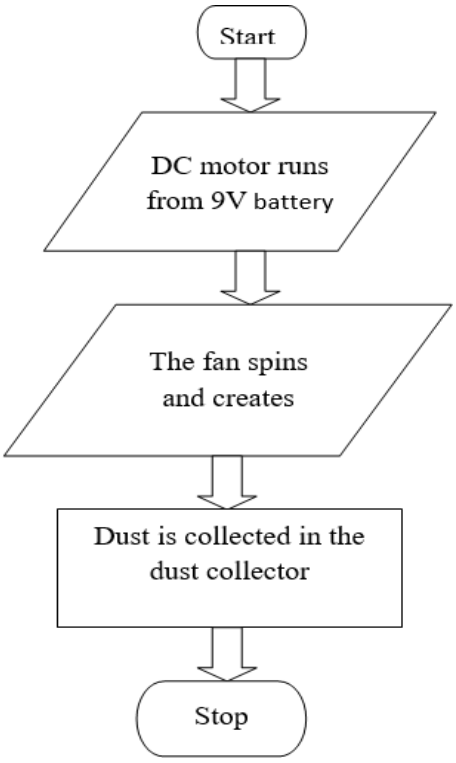

Figure 2: Flowchart of working of Suction

3. CONCLUSION

Thus, by using reusing the materials we are able to build a vacuum cleaner that the user can control from one place via the dabble app. This device ensures that the user doesn't have to constantly move from one place to another or constantly have to search for socket for the connection of vacuum cleaner. Further development to this model can me made by using a Wi- Fi module or my using a motor with very high RPM (Rotation Per Minute). Development of this device will be extremely useful for individuals that are not able to constantly move from one place to another (such as elderly person or people with physical disabilities); or can be used by people who might constantly not be available at home. Further more this device requires very little space and can this be used for personal or commercial purpose.

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BIOGRAPHIES

Ms. Karishma Vora is currently pursuing Bachelors in Engineering (Electronics and instrumentation) from JSSATEB since 2016. She is currently recruited by Accenture.

Ms. Meghana Vishwanath is currently pursuing Bachelors in Engineering (Electronics and instrumentation) from JSSATEB since 2016.She currently recruited by TCS.

Ms. Naina Mehta is currently pursuing Bachelors in Engineering (Electronics and instrumentation) from JSSATEB since 2016.She is currently recruited by Accenture.

Ms. Soumya Belur is currently pursuing Bachelors in Engineering (Electronics and instrumentation) from JSSATEB since 2016.She plans on pursuing theatre in the future.