

ADVANCED FLOOR CLEANER BY USING WIRELESS ANDROID MODULE

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Abstract

The various types of floor cleaning are generally used. Such as conventional floor cleaning machine or automatic floor cleaning machine. In this paper, we are used the smart floor cleaning machine. The conventional floor cleaning machine is very less efficient than the automated mechanism. Therefore, we are focused on smart, which is operated on battery, which has compact size therefore we can operate this device in commercial areas, but very useful in collages, railway platform, hospitals. this technology is a combination of mechanical, electrical and electronics and devices. In this device designing and analysis of the smart floor cleaning machine completed .in our device consist of multitasking component. In which we used mobile we can reach our target by using this technology. Localization, microscopic vision, wireless network as well as human-machine interaction are done in our system. The main purpose of cleanliness with minimum consuming of resources.

Keywords: Smart Floor cleaner, machine, PMDC motor, Bluetooth module, battery, vacuum cleaner.

1. INTRODUCTION

In recent trend, Rubbing the floor is individual of the rudimentary house hold movement extending from small home based to hospitals, collages, societies, malls, guesthouses, railway platforms, office buildings, factories, businesses etc. This arrangement the energetic feature as its tops in CLEANLINESS. Floor cleaning present days comprises physical using efforts washes for minor ones to large machines for huge ranges. As a conclusion, the current apparatus used for washing surface is an overall consumption of period, currency & done entirely manual dynamism. Large apparatuses critically essential expert labour, preservation labors. And all these opinions carried outs a cheap, transportable, cost operative, period consuming mechanism from our sideways. This is an original and can be improved in the adjacent coming for certain with share of conveniences as per the requirement. The handling required for dissimilar categories of floorings is very dissimilar. For safety it is maximum significant to guarantee the flooring is somewhat wet not leftward even afterward washing or wiping.

Sawdust is used on around floorings to captivate at all solutions that reduction relatively than irritating to avoid them actuality dropped. The sawdust seeped up and replaced respectively daylight. This was mutual in the earlier in hostelrys and is still used in some killers and fishmongers. It used to be mutual to use tea leaves to assemble mud from floorings and eliminate odours. Currently it is still quite mutual to use diatomaceous earth, or in fact any kitten disorder type solid, to eliminate influxes from floorings. There is similarly an extensive variability of base washing apparatuses obtainable today such as floor buffers, automatic floor scrubbers and sweepers, and carpet extractors that can bottomless hygienic nearly somewhat type of rigid flooring or carpeted floorboards surface in abundant not as much of period than it would income consuming an outmoded washing technique.

There is not at all unique solo washing technique that is appropriate for altogether positions and instances and operative washing be subject to upon category of cleaning expedient, housework technique and likewise the apparatus should be operator responsive. Cleaning effort can be materially challenging and an essential has been recognized to advanced approaches for efficient ergonomics estimation of original products. In current years, floor washing machines are receiving supplementary general for eventful and elderly residents due to absence of workers. However, in India, being without a job is additional and hence there is an essential to progress a smaller amount labour focused on cleaning machine. Hence, the present-day task is designed to proposal, expansion and assessment of a physically in this proposed navigation system, the cleaning robot is not an independent device. It can be likewise associated to processors or smart phones. Under overall environments, the duplicate and of the cleaning location evidence machine will be communicated to processor. The duplicate handing out and course preparation are carried out on the processor. operators can regulator the housework automaton via human-robot communication Afterward that, the knowledge of the computer will be sent towards cleaning automaton via wireless statement.

Under the manual regulator manner, the processor will stopover distribution knowledge to the cleaning robot, however component. In our original, operators can governor the cleaning robot by smart receivers. How to sponsor the housework presentation lowers than the overall situation, specifically, the programmed method, is the essential of this paper.

2. EXISTING TECHNOLOGY

The construction of the original direction-finding organization is shown. Human-robot communication and self-sufficient map reading are combined collected. Initially, in instruction to variety the cleaning robot recollect the section that is previously prepared, an unassuming but operative self-localization method is functional to highest moved course. Two encoders that connected on the controls are used to quantity the header and reserve. Link with additional self-localization methods, ours is inexpensive and every day. Secondly, a Kinect buzzer is installed on the front of floor cleaning Machine.

Nowadays, Internet is importantly altering our lifetime. Extra and more mobile apps are advanced for equally Android and IOS system. As an outcome, the mobile phone is not individual an instrument to conversation to somebody else or show message, but also a stand for spending, comical, supporting etc. In the smart home based organization, the mobile telephone wills production a significant character absolutely. A simple but valuable app is established for out triangulation organization. As declared overhead, when the cleaning robot is manually measured, the arrested copy will be also communicated to transportable receiver by WLAN. Operators can do uncomplicated procedure on the machine by using our app, such as production screen, situation period, and regulatory speediness or caption of washing machine. So, we don't have to make a singular inaccessible organizer for respectively cleaning robot. Operators can objective regulator it by transportable receivers, which is appropriate for consuming. The most difference between ours and conventional cleaning robot is that

automatic perception is applied. With the help of computer, the cleaning robot can work more effective. Of course, the proposed cleaning robot prototype can also work without computer.

According to whether there is the participation of computer or not, the working mode can be divided into classical mode and novel mode. In classical mode, our cleaning robot is same as the most secondary generation cleaning robot. Some systematic exploration strategies have been preprogramed in the microprocessor. As shown in, cleaning robot can move on meandering or whirly trajectories according to specific circumstance. In novel working mode, the cleaning robot will perceive the surroundings firstly, and then it will start cleaning by integrating different exploration strategies. At the same time, it will transmit information to computer for recording and navigation. With the guide of computer, the cleaning robot will finish complete coverage cleaning in a short time with a smaller proportion of repeated coverage. A physically functioned ground housework is industrialized with main incline of objects, unique; to reach concurrent dry and raining cleaning in a solo path, also to style the engine charge actual and thirdly to decrease the conservation charge of the manually functioned ground housework mechanism as distant.

Permanent Magnet DC motors are useful in a range of applications, from battery powered devices like wheelchairs and power tools, to conveyors and door openers, welding equipment, X-ray and tomographic systems, and pumping equipment, to name a few [1]. They are frequently the best solution to motion control and power transmission applications where compact size, wide operating speed range, ability to adapt to a range of power sources or the safety considerations of low voltage are important. Their ability to produce high torque at low speed make them suitable substitutes for gearmotors in many applications. Because of their linear speed-torque curve, they particularly suit adjustable speed and servo control applications where the motor will operate at less than 5000 rpm. Inside these motors, permanent magnets bonded to a flux-return ring replace the stator field windings found in shunt motors. A wound armature and mechanical brush commutation system complete the motor.

Merits of Brushless DC Motor

1. Brushless motors are more efficient as its velocity is determined by the frequency at which current is supplied, not the voltage.
2. As brushes are absent, the mechanical energy loss due to friction is less which enhanced efficiency.
3. PMDC motor can operate at high-speed under any condition.
4. There is no sparking and much less noise during operation.
5. More electromagnets could be used on the stator for more precise control.
6. PMDC motors accelerate and decelerate easily as they are having low rotor inertia.
7. It is high performance motor that provides large torque per cubic inch over a vast speed range.
8. PMDC motors do not have brushes which make it more reliable, high life expectancies, and maintenance free operation.
9. There are no ionizing sparks from the commutator, and electromagnetic interference is also get reduced.
10. Such motors cooled by conduction and no air flow are required for inside cooling.

Demerits of Brushless DC Motors

1. PMDC motor cost more than brushless DC motor.
2. The limited high power could be supplied to PMDC motor, otherwise too much heat weakens the magnets and insulation of winding may get damaged.
3. Speed control means intentional change of the drive speed to a value required for performing the specific work process.

3. COMPONENTS USED IN MODEL

Speed control is a different concept from speed regulation where there is natural change in speed due change in load on the shaft. Speed control is either done manually by the operator or by means of some automatic control device. One of the important features of DC motor is that its speed can be controlled with relative ease.

Therefore speed (N) of 3 types of DC motor – SERIES, SHUNT and COMPOUND can be controlled by changing the quantities on RHS of the expression. So, speed can be varied by changing Terminal voltage of the armature V.

External resistance in armature circuit R_a .

flux per pole ϕ .

A. **Dryer:**

Vented dryers are basically hot air vacuums. They pull room-temperature air in from your laundry room, heat it up, tumble your clothes in it, and then blow the exhaust—full of evaporated moisture—outside. It's a process that consumes and wastes a lot of energy, sometimes in unexpected ways. When a dryer is in operation, it's removing moisture and lint and venting it to the outside. The only reason that people vent dryer into water is to contain the lint so it doesn't fly around. Do not vent a dryer directly into a crawl space.

B. **Buzzer:**

A standard bell ringer design works just like a buzzer except the contact arm is attached to a long clapper that hits a metal bell. In a buzzer the simplest sort of doorbell, an electromagnet is used to operate a self-interrupting circuit. A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short).

Typical uses of buzzer and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

C. **Fan :**

Mechanical fan, a machine for producing airflow, often for cooling. Here computer fan (or CPU Fan) is used. The fan consists of a rotating arrangement of vanes or blades which act on the air. The rotating assembly of blades and hub is known as an impeller, a rotor, or a runner.

D. **Battery status:**

Batteries are the most important element in a robot because it provides the power source to all the electronic components. In order to divert the attention of the user towards battery status, the display of the battery starts blinking when the battery is less than 20% owing to sections.

E. **Transmitter circuit:**

A radio receiver is an electronic device that receives radio waves and translates the information carried by them to a usable form. It is used with an antenna. The antenna intercepts radio waves (electromagnetic waves) and converts them to tiny alternating currents which are applied to the receiver, and the receiver extracts the desired information. The receiver uses electronic filters to separate the wanted radio frequency signal from all other signals, an electronic amplifier to increase the power of the signal for further processing, and finally recovers the desired information through demodulation. The information produced by the receiver may be in the form of sound (an audio signal), images (a video signal) or data (a digital signal).

F. RF Receiver Circuit:

Radio receiver design includes the electronic design of different components of a radio receiver which processes the radio frequency signal from an antenna in order to produce usable information.

G. Relay:

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.

H. Power Supply to Sensors

All sensors used are rated at 5V but batteries are supply of 12V and 18V. So, to give 5V to five IR sensors, 2 encoder sensors, one magnetometer and one Bluetooth module.

4. BLUETOOTH MODULE

It has become very popular and it is one of the fastest growing fields in the wireless technology. Hence it is important to learn how the HC 05 Bluetooth module interfacing with the microcontroller. Nowadays, demands of mobile phones and personal the communication channel of the wireless part. The Bluetooth modules can transmit and receives the data wirelessly by using two devices. As shown in fig. 1.

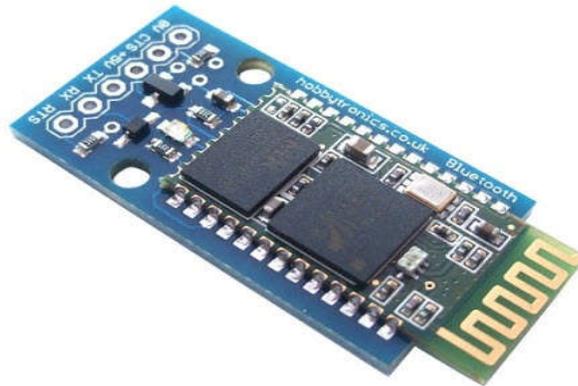


Figure.1 Bluetooth Module

HC 05 Bluetooth is a wireless communication protocol; it is used in two devices as a sending and receiving the information. The Bluetooth is free to use in the wireless communication protocol as the range of the Bluetooth is less than the other wireless communication protocols like Wi-Fi and ZigBee.

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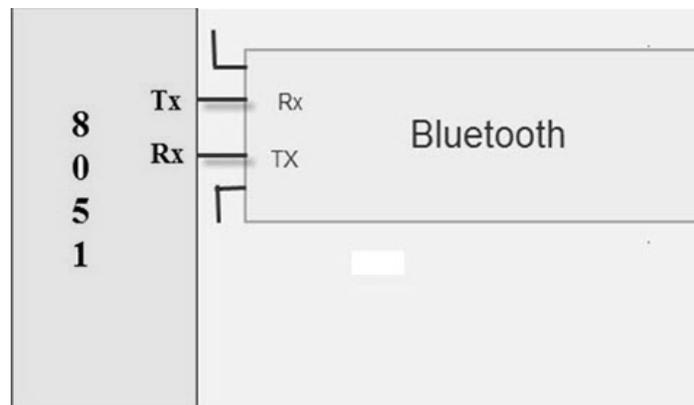


Figure.2 Bluetooth module Interfacing with Microcontroller

HC 05 Bluetooth module interfacing with the microcontroller. Nowadays, demands of mobile phones and personal communication the bandwidth is easy and convenient to use. The Bluetooth technology manages the communication channel of the wireless part. The Bluetooth modules can transmit and receives the data wirelessly by using two devices. The Bluetooth module can receive and transmits the data from a host system with the help of the host controller interface (HCI). The UART & USB are the most popular host controller interfaces and in this article, we have discussed the UART.

5. Block Diagram of Proposed Model

The block diagram is a pictorial representation of proposed robot which is shown in fig.3. It shows how the various essential components must be connected to fulfil the desired task. It describes the circuitry of robot chassis. It shows the main structure of inspection and cleaning robot which consists of power sources, dc motors, RF transmitter and receiver. The brain of the robot is microcontroller. Microcontroller reads data from sensors and computer through RF transceiver and decoder/encoder. It is given dc supply as an input; an IC is used to smooth dc input to the microcontroller. According to the inputs received from sensors, microcontroller drives dc motor and hence cleaner works better when the bag is just replaced than during vacuuming for a while. · The size of the opening at the end of the intake port: Since the speed of the vacuum fan is constant, the amount of air passing through the vacuum cleaner per unit of time is also constant.

No matter what size the intake port has, the same number of air particles will have to pass into the vacuum cleaner every second. If the port is made smaller, the individual air particles will have to move much more quickly in order for them all to get through in that amount of time. At the point where the air speed increases, pressure decreases, according to Bernoulli 's principle, the drop-in pressure translates to a greater suction force at the intake port.

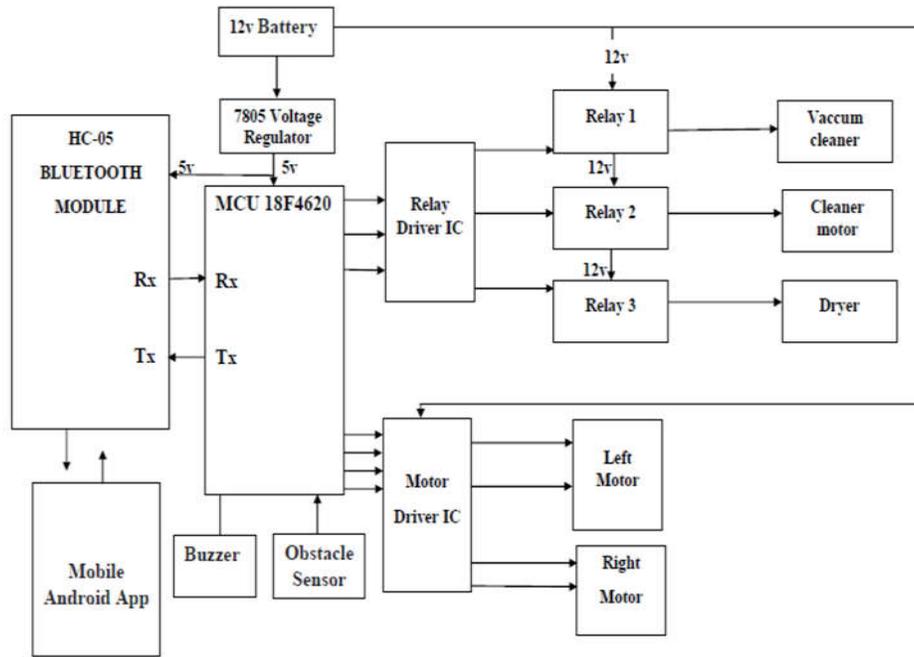


Figure. 3 Block diagram of smart floor cleaner

RN-42 Module Interfacing with PIC-Microcontroller

The RN-42 is a class two type Bluetooth module it has UART and USB port communication interface. The RN-42 can be used for both as a receiver and send the information and it also works as a master and slave. In audio applications, the RN-42 Bluetooth module is used. We need a voltage level shifting circuit with RN-42 to interface this with the pic microcontroller with any microcontroller. The microchip provides its solution by giving the complete compatible board to interface with the microcontroller.

The RN-40 EK board is interfaced with the pic microcontroller by connecting directly, i.e. UART-RX pin of the RN-40 Bluetooth module to the pic microcontroller of TX pin and UART-TX pin is connected to the Rx pin of pic microcontroller which is shown in fig.4. By using the USB cable, the RN-40 EK board is connected to the computer.

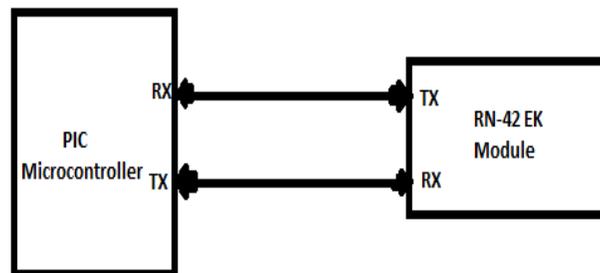


Figure. 4 RN-40 Module Interfacing with PIC-Microcontroller

The following diagram shows the interfacing of RN-40 with the pic microcontroller. There are two types of modes in the RN-40. They have command mode and data mode and there is no antenna for the RN40. The command modes are used for the set configuration of Bluetooth modules like master or slave and serial port control. The Bluetooth module is kept in a particular form before using the data mode. Hence there is a use of the default values of the commands. We have to remember that there is a specific time for the command mode and we have to use the command mode within the time otherwise the Bluetooth module will reach the data mode behind the time.

6. Hardware

Hardware model of advance floor cleaner are given below.

A. PCB

It is wireless controlling kit for movement and cleaning purpose of advanced floor cleaner. As shown in below figure 5.

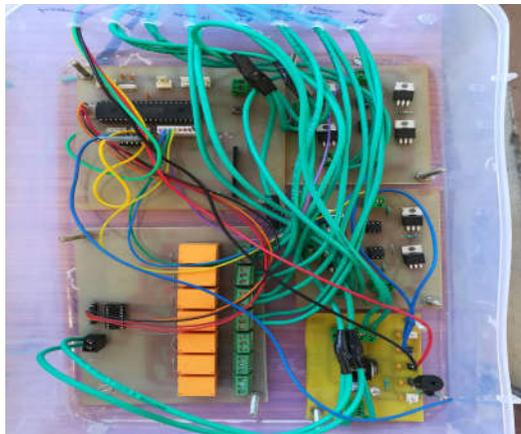


Figure 5. wireless controlling kit

B. Purpose model of advance floor cleaner

This is Purpose model of advance floor cleaner which is given below figure 6.

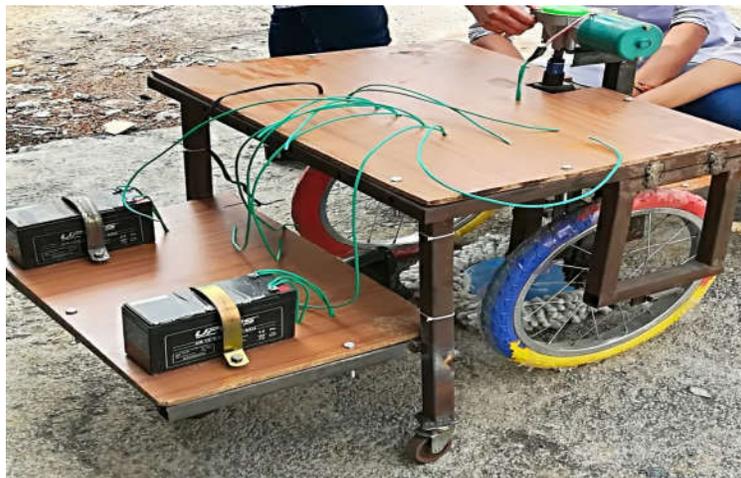


Figure 6. model of advance floor cleaner

7.CONCLUSION

In this paper, we suggested the new concept of an information space system called Smart Floor. We provided Smart Floor using a mobile robot platform mounted with a passive RFID system. At present, we are working on fabrication and electronic hardware development of this project. The proposed paper deals with the use of for sweeping and vacuuming purposes. Instead of individual systems for the sweeper and cleaner using electric systems. The system can save costs on fuel in the long run as well as the fact that electricity remains the only future resource for mankind. This vehicle can also reduce pollution

An automatic water sprayer is attached which sprays water for mopping purpose for the convenience of user. User can also operate this robot manually with the help of remote. It reduces the labour cost and saves time also and provides efficient cleaning. In automatic mode, the robot operates autonomously. The operations such as sweeping, mopping and changing the path in case of hurdle are performed automatically and we will try to make our novel prototype commercialized, and then generate a new generation cleaning robot.

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