



e-ISSN: 2278-8875  
p-ISSN: 2320-3765

# International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

Volume 10, Issue 6, June 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 7.282



9940 572 462



6381 907 438



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# Solar Based Floors Cleaning Machine

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**ABSTRACT:**In today's Covid-19 pandemic situation cleaning is very important So, here we propose a smart floor cleaning robot that allows for remote floor cleaning. The bot makes floor cleaning very easy and a fast process using a wireless robotic cleaning system. The user may sit at a place, start a bot and clean wherever needed. The system consists of a transmitter app. This app is run in an android mobile phone that allows user to transmit command based on user input. Based on these commands the transmitter sends movement commands to the robot. On receiving the movement commands from the android device through Bluetooth receiver. The microcontroller on receiving the commands, decodes them and thus operates the motors in order to achieve the desired motion. Even the sprayer and cleaner mechanism can be controlled by the android app user. This makes floor cleaning a very easy, fast and an effortless process.

**KEYWORDS:**Android, Decodes, Transmitter, Receiving Commands.

## I. INTRODUCTION

In recent years, robotic cleaners have taken major attention in robotic research due to their effectiveness in assisting humans in floor cleaning applications at homes, hotels, restaurants, offices, hospitals, workshops etc. Basically, robotic cleaner are distinguished on their cleaning expertise like floor mapping, dry vacuum cleaning etc. Each cleaning and operating mechanism of robotic floor cleaners has its own advantages and disadvantages. In this work, "Solar Based Floors Cleaning Machine" have been designed for offices, homes also in collages. In one of the mode this robot is fully automatic and making decisions on the basis of humans or various sensors which are used in this cleaning robot. These sensors are controlled by Arduino Uno also controls the DC motors with the help of driving circuitry. In manual mode, the robot can also be used to clean specific area of a room.

The mechanical design of robot including vacuum cleaning mechanism, phenol tank, DC fan, Brush etc. The main objective of this project is to provide a substantial solution to the problem of manufacturing robotic cleaner utilizing local resources while keeping it low costs. Manual work is taken over the robot technology and many of the related robot appliances are being used extensively also. Here represents the technology that proposed the working of robot for Floor cleaning. This floor cleaner robot can work in dry and wet both conditions.

## II. WORKING

Power supply (5-12V). From solar panel we charge the battery. Voltage which is coming from the sun is not constant for that we use charge controller. This voltage is stored in battery. But this voltage is more than the required voltage of Arduino so that we use voltage regulator. Also for hardware controlling purpose we use RF transmitter and receiver. Here IR sensor is used for obstacle detection and ultrasonic sensor is used for fall detection. Driver circuit is connected to Arduino. Driver circuit is connected to motor. For moving the wheels in clockwise or anticlockwise direction motor is used also for Fan.

- The robot is built to help in daily cleaning tasks and simplify it. It brings together both dry and wet cleaning operations using a vacuum cleaner as well as wet cleaning brush.



- The robot is controlled by an RF remote. The remote is used by user to send movement commands to the user. The robot consists of an rf receiver circuitry to receive movement commands and operate the moors to achieve desired movement.
- The robot uses a battery that is constantly charged by a solar panel as it is drained by the motors. This provides a longer battery life when it is exposed to sun rays. The system consists of a vacuum cleaner with added ultrasonic sensor for obstacle detection.
- Thus the robot does not bump into any obstacle. The robot is integrated with a water tank that sprays water in front of robot which is followed by 2 brushes to clean the floor surface. Thus we here create a remote controlled floor cleaner robot.

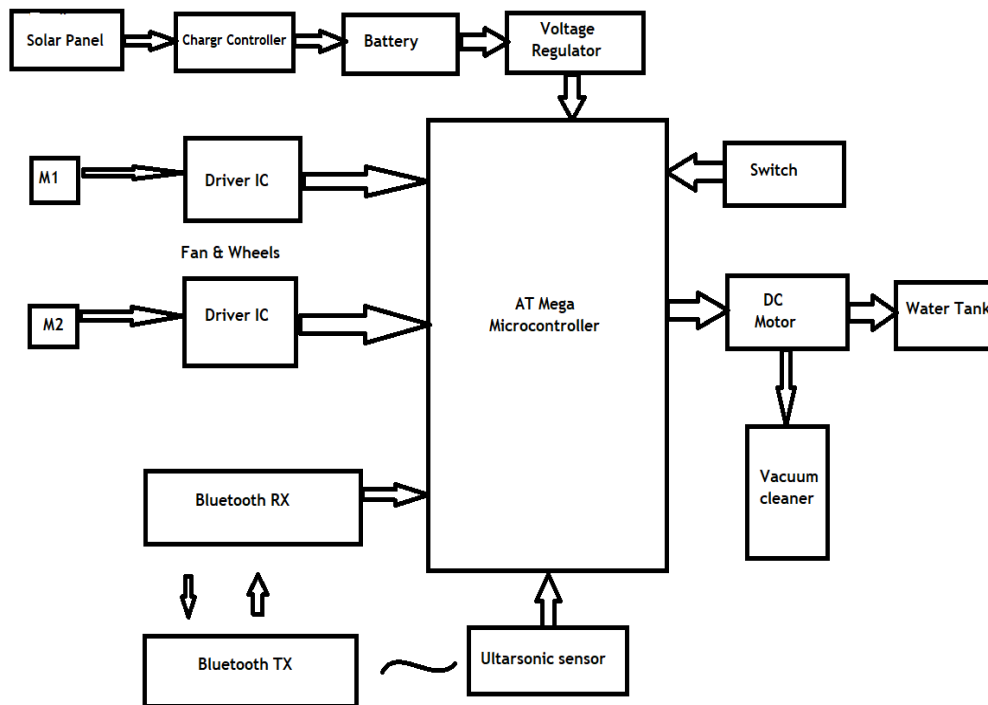


Fig: Block diagram Of Solar Based Floors Cleaning Machine

### III.COMONENT

**A. Arduino:** The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started Arduino is open source prototyping platform based on easy to use hardware and software “Uno” means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions



## ATMega328P and Arduino Uno Pin Mapping

Arduino function	ATMega328P Pin	ATMega328P Pin	Arduino function		
reset	(PCINT14/RESET) PC6	1	28	PC5 (ADC5/SCL/PCINT13)	analog input 5
digital pin 0 (RX)	(PCINT16/RXD) PD0	2	27	PC4 (ADC4/SDA/PCINT12)	analog input 4
digital pin 1 (TX)	(PCINT17/TXD) PD1	3	26	PC3 (ADC3/PCINT11)	analog input 3
digital pin 2	(PCINT18/INT0) PD2	4	25	PC2 (ADC2/PCINT10)	analog input 2
digital pin 3 (PWM)	(PCINT19/OC2B/INT1) PD3	5	24	PC1 (ADC1/PCINT9)	analog input 1
digital pin 4	(PCINT20/XCK/T0) PD4	6	23	PC0 (ADC0/PCINT8)	analog input 0
VCC	VCC	7	22	GND	GND
GND	GND	8	21	AREF	analog reference
crystal	(PCINT6/XTAL1/TOSC1) PB6	9	20	AVCC	VCC
crystal	(PCINT7/XTAL2/TOSC2) PB7	10	19	PB5 (SCK/PCINT5)	digital pin 13
digital pin 5 (PWM)	(PCINT21/OC0B/T1) PD5	11	18	PB4 (MISO/PCINT4)	digital pin 12
digital pin 6 (PWM)	(PCINT22/OC0A/AIN0) PD6	12	17	PB3 (MOSI/OC2A/PCINT3)	digital pin 11(PWM)
digital pin 7	(PCINT23/AIN1) PD7	13	16	PB2 (SS/OC1B/PCINT2)	digital pin 10 (PWM)
digital pin 8	(PCINT0/CLKO/ICP1) PB0	14	15	PB1 (OC1A/PCINT1)	digital pin 9 (PWM)

Digital Pins 11, 12 & 13 are used by the ICSP header for MOSI, MISO, SCK connections (Atmega168 pins 17, 18 & 19). Avoid low-impedance loads on these pins when using the ICSP header.

**B. DC Motor:** A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line. DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor’s speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings.

Electrical DC Motors are continuous actuators that convert electrical energy into mechanical energy. The DC motor achieves this by producing a continuous angular rotation that can be used to rotate pumps, fans, compressors, wheels, etc. As well as conventional rotary DC motors, linear motors are also available which are capable of producing a continuous linear movement. The DC Motor or Direct Current Motor to give it its full title, is the most commonly used actuator for producing continuous movement and whose speed of rotation can easily be controlled, making them ideal for use in applications where speed control, servo type control, and/or positioning is required.



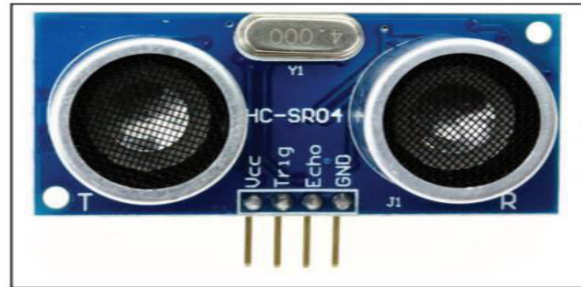
**C. Ultrasonic Sensor:** Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit.





The basic principle of work:

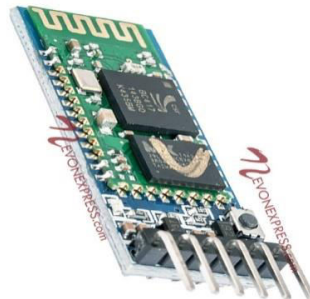
1. Using IO trigger for at least 10us high level signal,
2. The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back.
3. IF the signal back, through high level, time of high output IO duration is the time from sending ultrasonic to returning. Test distance = (high level time × velocity of sound (340M/S)/ 2



**D. Motor Driver IC:** Motor drivers behave as amplifiers since they supply a higher-current signal and take a control signal. This greater sign is utilized to drive the motors. L293D contains two driver circuits that are inbuilt. In its mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. Input logic can controls. two motors' motor operations at pins 2 & 7 and 10 & 15. Logic 00 or 11 will stop the corresponding engine. 10 and logic 01 will rotate it in anticlockwise and clockwise directions. Empower pins 1 and 9 (corresponding to the 2 motors) must be high for motors to start operating. When an enable input is high, the driver gets empowered. As a result, the outputs work with their inputs in phase and become busy. When the input is reduced, this driver is handicapped, and their outputs are off and at the high-impedance state



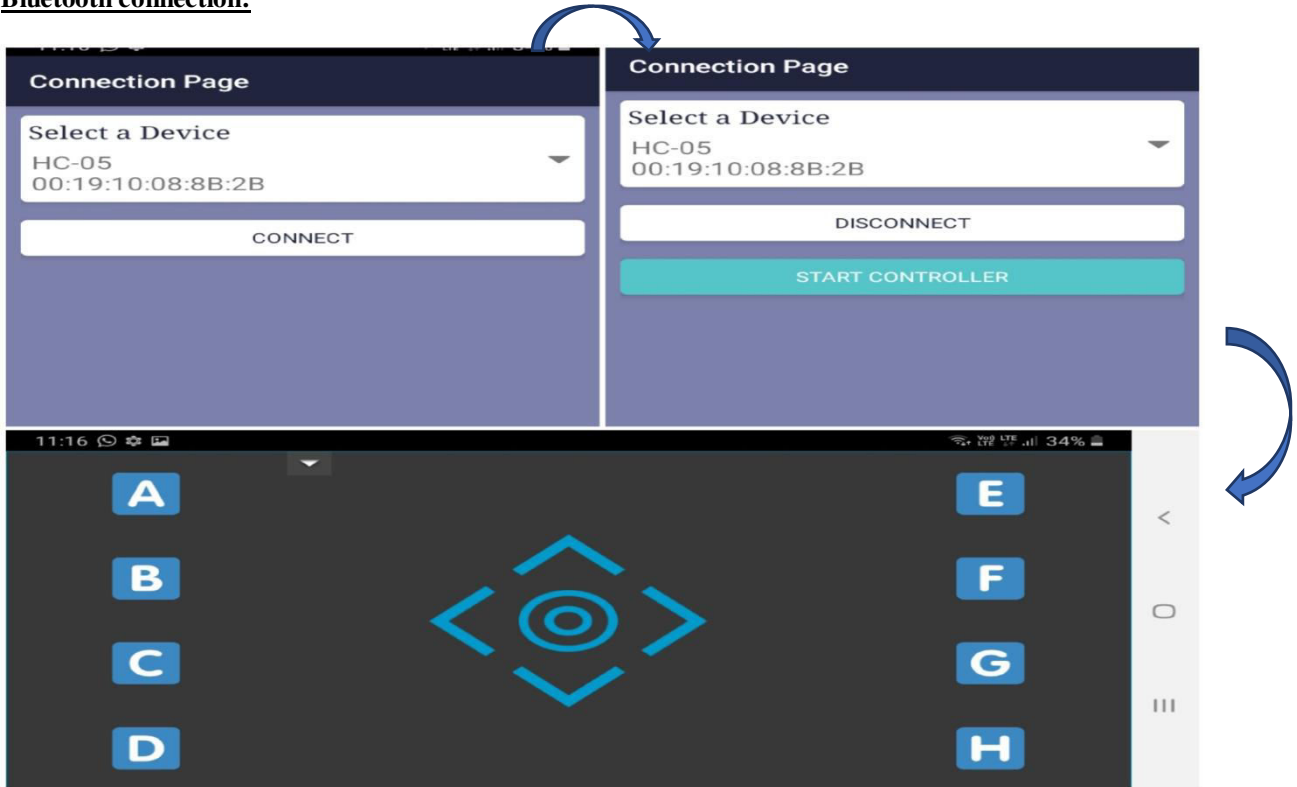
**E. Bluetooth :** Bluetooth module is utilized as UART RS232 serial converter module. It can efficiently exchange the UART data through the wireless bluetooth, without complex pieceB design or profound learning in the bluetooth programming stack. This module can be utilized as a part of Master or Slave Mode and simple switchable between these two modes, By default Slave mode is designed. To setup Wireless Serial Communication, HC-05 Bluetooth Module is most requesting and prominent because of its low cost and to a great degree high highlights.



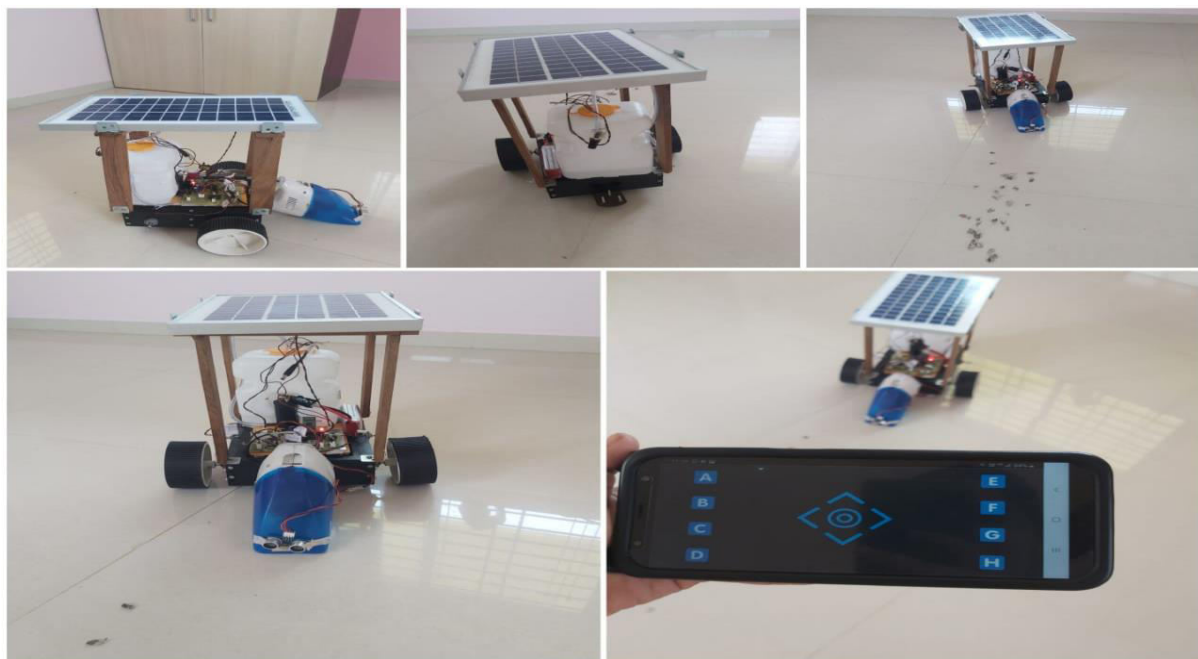


#### IV. RESULT AND DISCUSSION

##### Bluetooth connection:



##### Snap shot of result:





## V.CONCLUSION

This setup of hardware with a combination of software gives better accuracy and reduces the work load. Man power is minimized. It have Low cost. It is a Time Consuming Device Making a small machine brings a flexibility to do work.

## VIFUTURE SCOPE

1. We are control the floor cleaning robot using IOT
- 2.The vacuum cleaner is controlled through an android application and can be accessed from any place.

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