

Project

**Design and fabrication of prototype of
DISPO BOT**

Submitted for

Robo Cup Challenge 2021 2021

Submitted by

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Title of the Innovation : Design, fabrication and testing of
Prototype of **DISPO BOT**

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Dispo Bot



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AIM:

To support the frontline warriors against covid 19 especially for doctors and garbage collectors in disposing the medical and sewage waste.

The safe disposal of medical and sewage wastes of corona patients and doctors plays a major role in controlling the spread of corona virus.

“Robotics And Other Combinations will make the world pretty fantastic compared with today” – Bill Gates

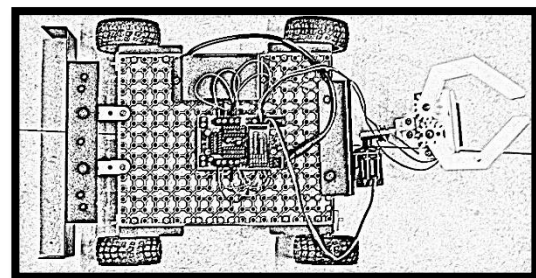
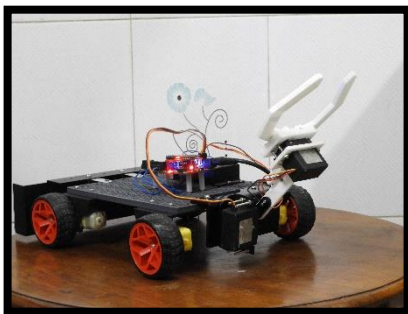
So the objective is to use an automatic mechanism to collect and dispose the waste. We decided to construct a prototype of a robot for this purpose.

ABSTRACT:

It is a prototype of an Automated Robotic Vehicle which collects Sewage and medical, used for multi-purpose works during covid 19 pandemic.

The project aims at safe disposal and collection of medical wastes by controlling the vehicle remotely (Bluetooth).

This is a servo driven and a Bluetooth controlled robot



INTRODUCTION:

“Courage above all is the first quality of a warrior “








– Karl Von Clausewitz

We all know that the second wave of corona is affecting India like a disaster. The frontline Warriors are doing their best to control the cases in India but there are some possibilities where the spread of corona virus can also happen due to the careless disposal of medical and sewage wastes from doctors, corona patients and houses etc. Even the nurses and Pharmacist are afraid to neither shift patients from one place to another nor give them medicines by making a direct contact. So to break this contact and to support doctors and garbage collectors in disposing the medical and sewage waste, giving patients their medicines a new robot was developed by our team. Further Details About the robot, working principle, materials used, Future Scope can be seen in this thesis which has been mentioned below.





MATERIALS USED:

-  Plastic Geared Motor
-  Wheels
-  Lithium Ion Battery
-  Bluetooth Controller
-  Servo Motor
-  Servo Accessories
-  Chassis(Plastic)

1. Plastic Geared Motor:

This single shaft plastic geared motor gives good torque and rpm at lower operating voltages, which is the biggest advantage of these motors. Small shaft with matching wheels give optimized design for your application or robot. Mounting holes on the body & light weight makes it suitable for in-circuit placement. This motor is a perfect choice for light weight robots.



Specifications:

Voltage	2V to 12V
RPM	150 RPM
Gear	Plastic
Motor Type	Straight
Torque	4-kg cm
Connector Type	2 Pin Relimate Connector

2. Wheels:

The wheel can be easily mounted to motors with suitable shaft diameter associated with your robotic projects. This wheel is suitable for all BO motors.



Specifications:

Diameter	65mm
Width	30mm
Shaft type	D-Type

3. Lithium Ion Battery

These are high performance, high current discharge batteries best for all-terrain robots, combat robots, autonomous robots and other electronic projects.

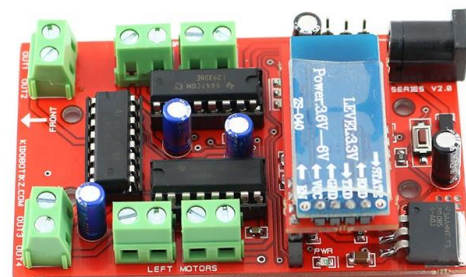


Specification:

Voltage	7.4V
Battery Capacity	2.2AH
End Connector	Barrel jack Connector

4. Bluetooth Controller

L293D based Bluetooth non-speed controller motor driver with 4 Channels. Where 2 channels are used for DC motor control and 2 channels for servo control.



5. Servo Motor:

The HD-1711MG is a miniature-sized servo from Power HD with the same output spline as standard servos, making it compatible with standard-size servo horns. The gear train uses plastic gears near the motor to reduce weight and metal gears near the output shaft to allow it to deliver the kind of torque typically associated with larger servos. The output shaft is supported by a ball bearing for improved performance.

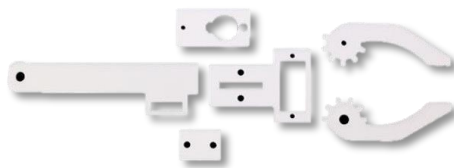


Specifications:

Type	Mini
Voltage	4.8~6.0V
Speed	0.11 sec/60° @ 6V
Torque	3.50 kg-cm @ 6V
Gear Type	Metal
Rotational Type	180°
Weight	17.5 g
Dimensions	29.5 x 11.6 x 30.2 mm

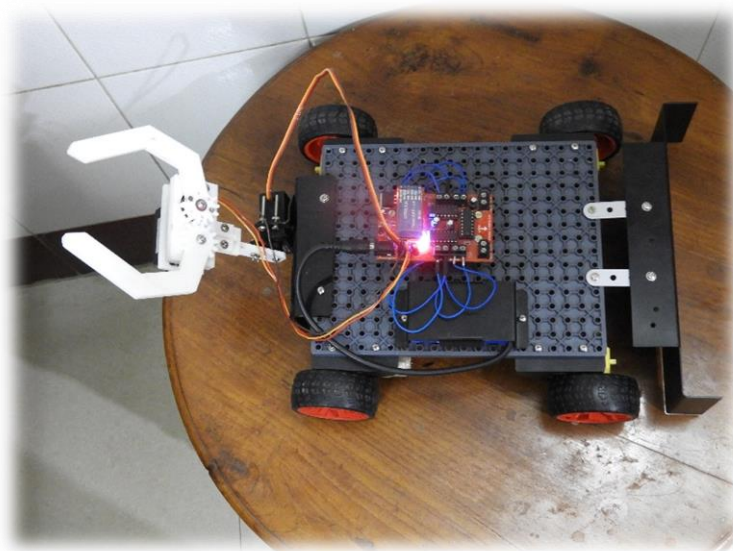
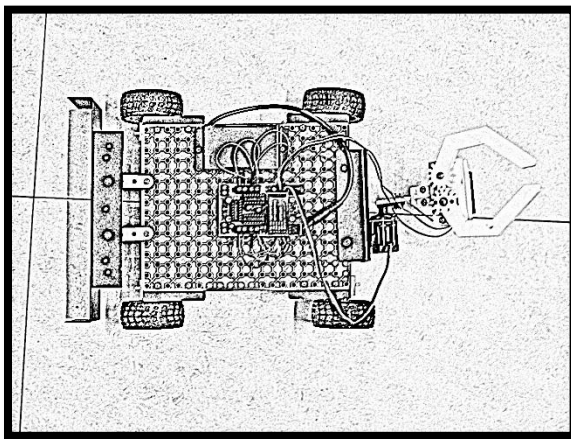
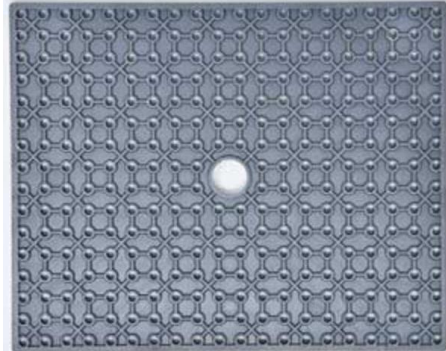
6. Servo Accessories:

Customized acrylic gripper/arm set to equip your robot with a two axis arm structure - pitch axis and gripping action. The arm stem can be fixed on a standard servo motor and the arm collar allows you to fix another standard servo on it. The two gripper pieces can be fixed on the second servo motor, making it a complete arm!



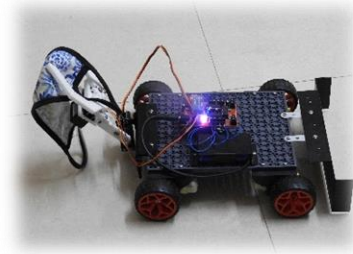
7. Chassis:

This plastic project maker board acts as the baseboard for Electro blocks and Chassis for Ranger Robot to setting up the project and connecting the components in a safe and organized way. The holes on the project maker allows you to mount the components using 3mm diameter bolts.



The purpose of the project is to enable:

- 🤖 Contactless collection of garbage waste
- 🤖 Transfer of waste to collecting vehicles
- 🤖 Shifting of in-patients
- 🤖 Burial of Bodies
- 🤖 Dispatch of tablets, food to Patients



Features:

- 🤖 Pick and place robot
- 🤖 Remote operation Pay load of 500 g
- 🤖 Servo controlled, so accurate positioning is possible

Advantages:

- 🤖 Cost efficient
- 🤖 User Friendly
- 🤖 Multi-purpose Robot (Sweeping, Distributing Tablets, Shifting Patients)

How to Control Our Robot Using Bluetooth:

To use our robot in an effective way:

- 🤖 First we have to connect the Bluetooth controller and the phone using an app which uses Bluetooth as a medium for connection
- 🤖 Then after the successful connection there comes an interface which is like a controller
- 🤖 In that there are forward, backward, right, left controls for controlling the motors in the robot
- 🤖 And also for servos there are two up and down controls which is used for accurate positioning
- 🤖 Therefore By using these controls we can use this robot efficiently.



WORKING MECHANISM:

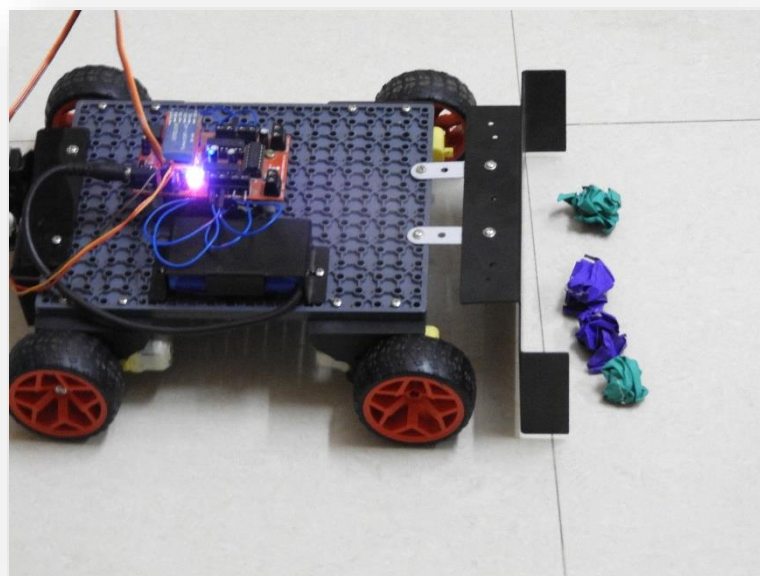
The robot has two end effectors. One end effector is a gripper which is used to collect or pick the garbage's and wastes. The end effector which is on the back side is a sweeper. It cleans the floor. The Robot has 6 dof. The gripper has 2 dof .The robot linear movement is controlled by four DC motors. The gripper mechanism is controlled by two servo motors. The robot is controlled by an app in the mobile device. It has a joystick like screen which is user friendly to control. The operator can control the robot by standing in a safe distance.



TESTING

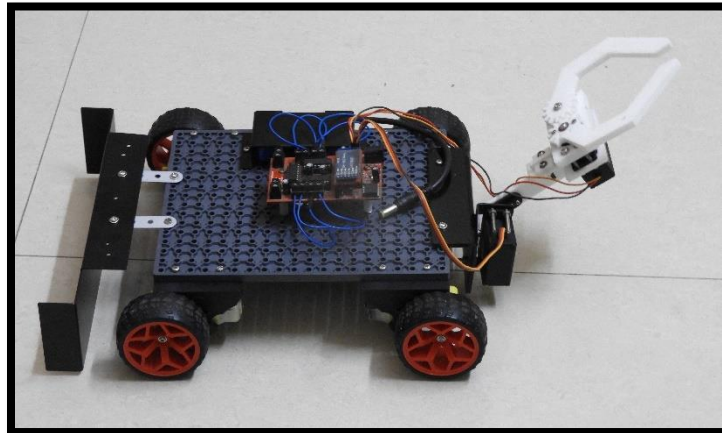
Garbage collection process:

“Contactless Collection of Garbage” is the concept in this robot. This Robot can be used by garbage collectors to collect and dispose wastes form doctors and houses. By standing at a distance of 6 feet the garbage collector can control the robot and collect the garbage from every house and group it in a single place. Even when you think how the garbage collectors are educated. The answer is that all are educated now a days even when we put a hook by connecting the robot and the garbage vehicle the robot will collect he garbage and put it in the garbage decomposing place (Transfer of waste to collecting garbage). This will break the contact between the people and the garbage collector.



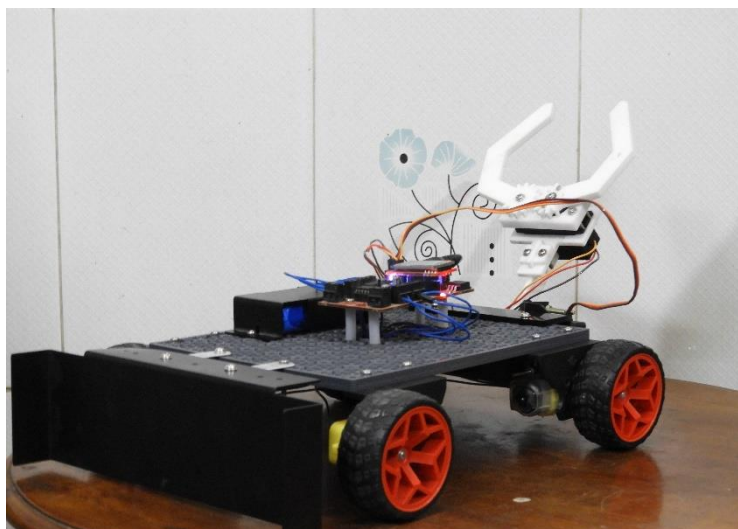
Distributing medicines and food to the patients:

When we compare the distribution of the medicines by nurses or robots, people and doctors prefer robots because in this case also the robot breaks the contact between the doctors and patients by doing their work. And also it can be sanitized in both the cases after completing the work. When we make it very advanced we can also check temperature etc.



Shifting of in-patients and burial of bodies:

This Robot after Enhancing can also lift patients from one place to another. It can also bury bodies of the dead patients where the people will be afraid to bury them. This can also be sanitized after its usage. This also breaks the contact between the buriers and the corona patients by standing as a barrier between them.



FUTURE SCOPE:

**“The Past is Your Lesson
The Present is Your Gift
The Future is Your Motivation”**

This robot is a prototype model. If we fabricate the real industrial model we can use this robot for the following purposes

- 🤖 Increase Pay load to 100kg:
 - 👤 When we increase the pay load to 100kg we can shift corona patients from one place to another and also we can carry a heavy bag of garbage easily.
- 🤖 Make the wheels suitable for different types of roads:
 - 👤 India is a vast land which has all types of roads. When we use appropriate wheels for different types of roads we can use the vehicle in all regions of India
- 🤖 Controlling through GPS or Wi-Fi:
 - 👤 When we use a Bluetooth controller it has a short range but when we use GPS or Wi-Fi we can control the robot for a longer distance
- 🤖 Usage of Industrial Servo Motors instead of Toy Motors:
 - 👤 When we implement this in real life we should use a high torque motor which is used to lift heavy objects
- 🤖 Using Solar panel for Electricity:
 - 👤 When we use solar panel for electricity we can use it 24h instead of charging it for many hours
- 🤖 Self-Sanitation using UV Rays



CONCLUSION:

“The Best Way to Predict the Future is to Invent It”

Thus the prototype is assembled and a trial run has been completed. The result is that the robot can collect or pick garbage accurately using the servos. And also it can distribute medicines and food to the patients like a doctor. Even in future robots can replace doctors. By implementing the future scope this can also bury dead bodies and also sanitize itself automatically. The prototype is tested for its working and found successful

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