

Report on
Bumblebee

Prepared for
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CSE3216: Microcontroller Based system Design Lab

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Objectives:

Dust free environment is one of the most important things in our day-to-day life. Our main objective will be to serve a multi-purpose tool but the main task of this tool will be dust cleaning. It will be able to detect the obstacles around it. There will be a feature of charger light which will come handy at the time of power failure or load-Shedding. Anyone will be able to use it as a Bluetooth speaker too. There will be a garbage separator for separating different types of garbage. It will be controlled with the help of a Bluetooth device.

Social values:

- It will Reduce the trouble of sweeping the house as it will do the cleaning by moving.
- It Can be used as a charger light during power outage.
- It will Save a lot of time as the time of cleaning will be minimal.
- It will keep the operator cheerful with the help of its Bluetooth speaker.
- It can be controlled accurately with the help of Bluetooth RC Controller app.

Required components:

These following parts and tools are required for building this project:

1. 12 V DC Brushless Cooling Fan
2. 15W Speaker
3. 18650 Li-ion Battery
4. Angle Bracket
5. Angle Support Clamp
6. Arduino Mega
7. Battery Holder
8. DC to DC voltage booster
9. DHT11 Sensor
10. DW CT-14
11. Gear Motor
12. Glue Gun
13. Glue Stick
14. Hit Shrink Tube
15. IR Sensor
16. IR Sensor Module
17. L298n Bridge-Dual Motor-Driver
18. LiPo Battery (1100 mAH)
19. Max 7219 Dot Matrix Display
20. MDF Board
21. Mini Drill
22. Multi Screwdriver
23. Off Road Wheel
24. PVC Board

- 25. Royal Magnet
- 26. Saw
- 27. Saw Blade
- 28. Screw – 1 inch
- 29. Solder
- 30. Soldering Iron
- 31. Switch
- 32. T Connector
- 33. Wire (Male to Male, Male to Female, Female to Female)
- 34. YR 6610 COB LED
- 35. Zip Tie

Working procedure:

1. IR Sensor will detect obstacle in front & back side
2. L298N driver module will control the gear module
3. DW CT – 14 is the Bluetooth audio amplifier which will be used for the speaker
4. MAX 7219 dot matrix display will show the emojis based on current situation
5. 12-volt High Speed Cooling fan motor will be used as a vacuum cleaner
6. Arduino Mega will control all the sensors.

Block Diagram:

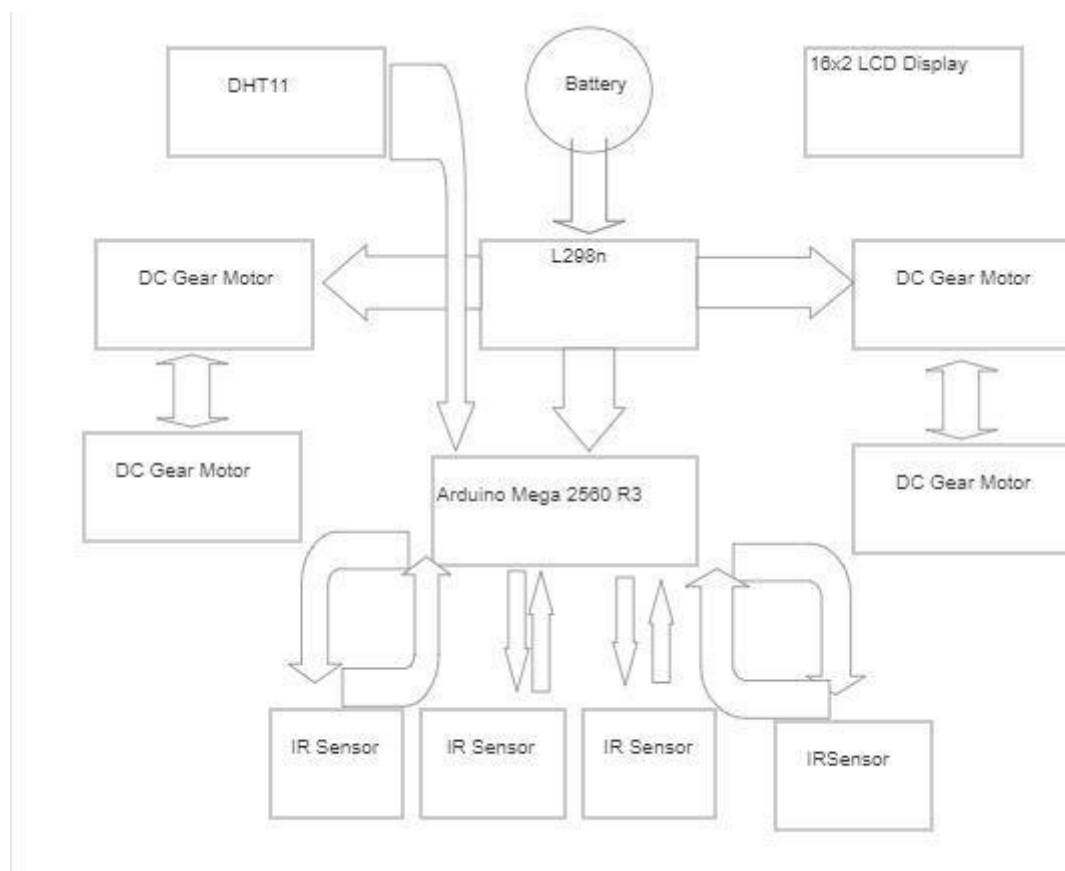


Figure-1: Block Diagram-1

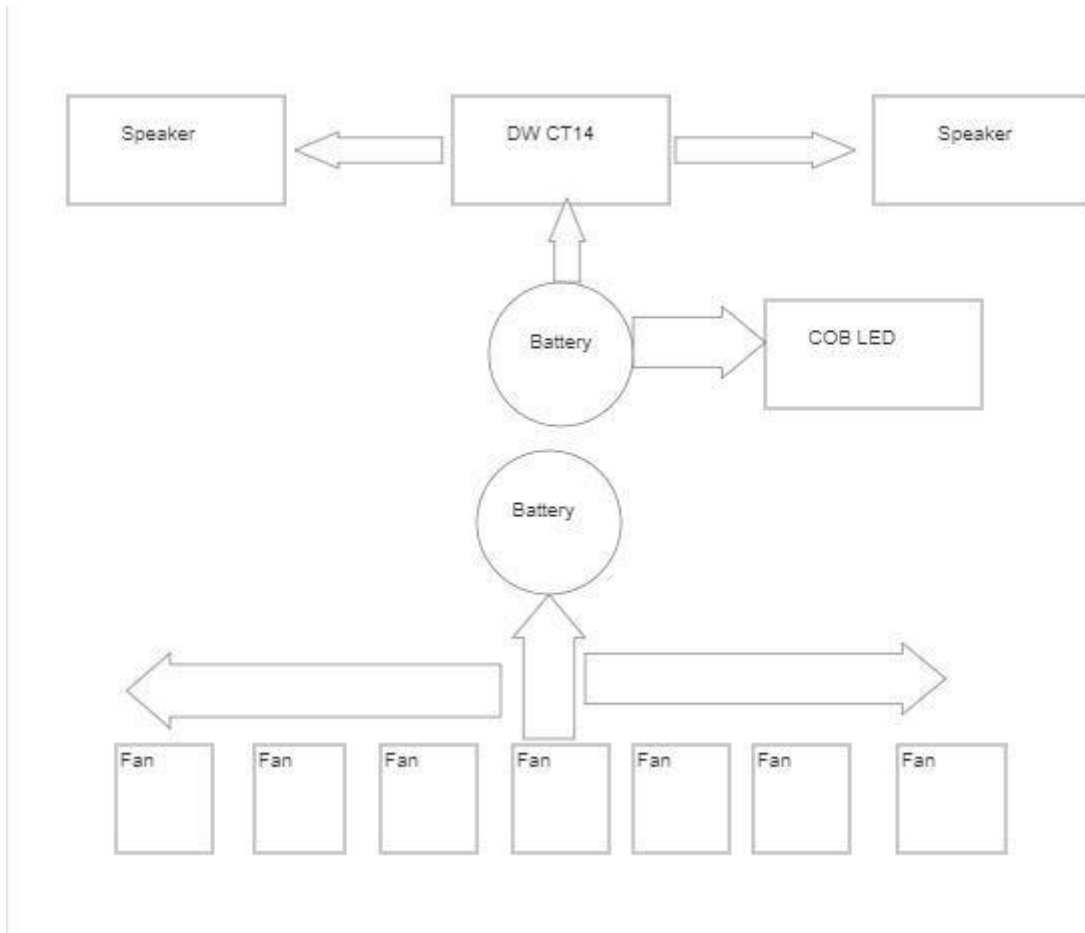


Figure-2: Block Diagram-2

Circuit Diagram:

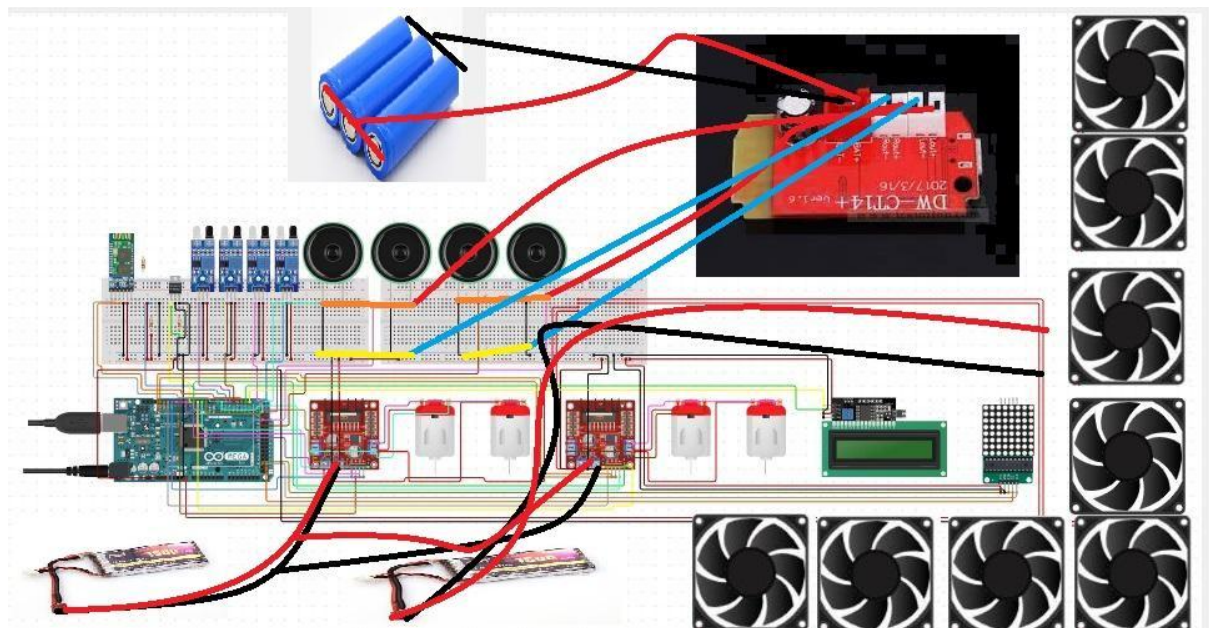


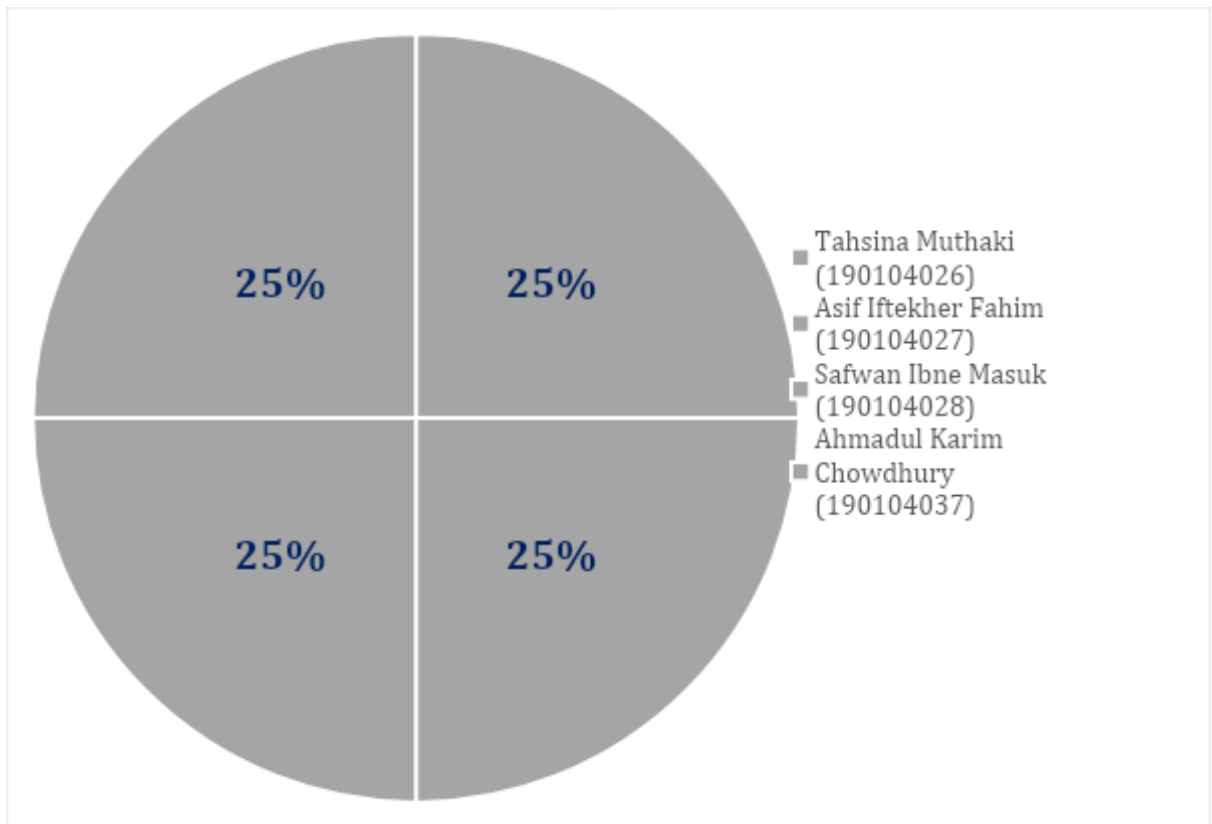
Figure-3: [Circuit Diagram](#)

Equipment	Initial Budget (BDT)	Final Budget (BDT)
Arduino Mega 2560	2000	2000
IR Sensor	110	220
Max 7219 Dot Matrix Display	640	640
Motor Driver L298N	150	150
Gear Motor with Clamp	1800	1800
18650 Battery	240	240
3-inch 15 W Speaker	300	300
3-inch 3 W Speaker	120	120
12 V DC Cooling Fan	0	280
Cooling fan	500	500
3 cell Lithium Battery	2000	2000
Off Road Wheel	2000	2000
Transcend SD Card	700	700

Estimated budget:

M2F Wire	60	60
18650 Battery Casing	100	100
Switch	75	75
T Connector	40	40
M2F Wire	60	60
M2M Wire	60	60
M2F Wire	60	60
Screw Mixed Set	350	350
Door Hinge	60	60
Angle Bracket	24	24
Royal Magnet	50	50
DW CT - 14	220	220
YR 6610 Cob Led	125	125
MDF Board	100	100
PVC Board	675	675
Ultra-Sonic Sensor	80	0
SG 90 Servo Motor	120	0
Suction Pump	400	0
LCD Monitor	0	320
Humidity Sensor	0	145
Total (BDT)	14149	11674

Contribution of Team Members:



Images:



Figure-4: Side View (1)

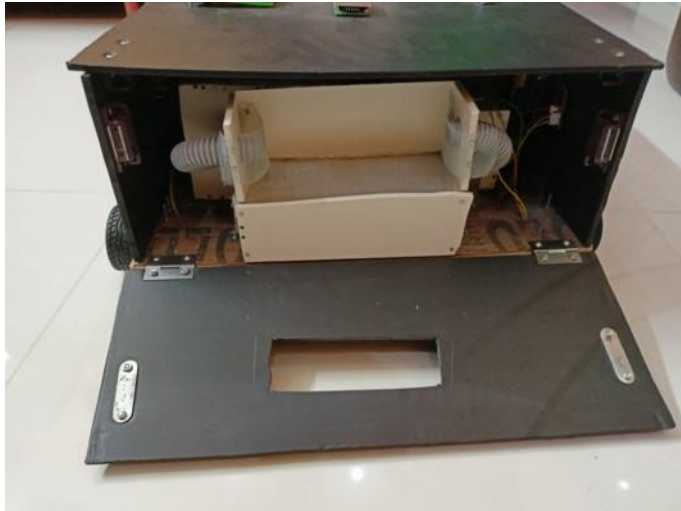


Figure-5: Side View (2)



Figure-6: Side View (3)

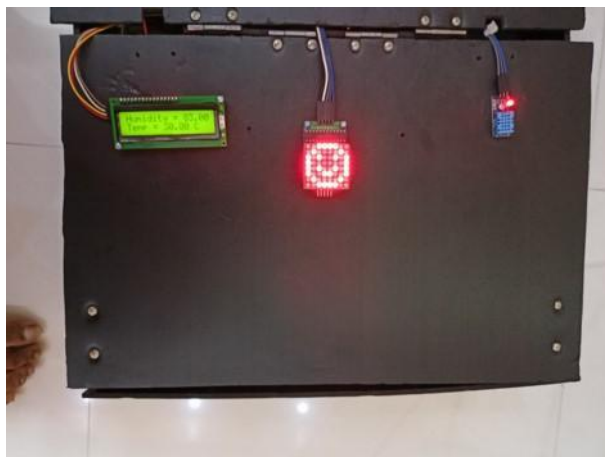


Figure-7: Features from Top



Figure-8: View from Inside (1)

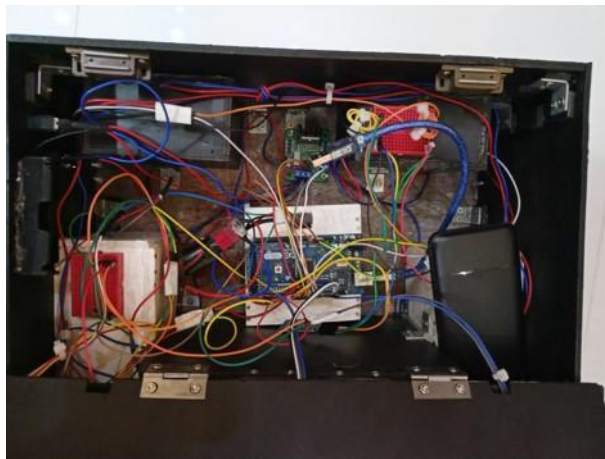


Figure-9: View from Inside (2)

Challenges of the Project:

We faced lots of difficulties while doing this project. Such as:

- We couldn't implement the manual movement of bot to left and right smoothly because of our off-road wheel. The reason behind this is we needed motors with higher torque but we couldn't afford that as we had budget limitations.
- We couldn't do the feature of auto movement of the bot.
- We couldn't use any type of suction pump because it is a prototype and the suction pump is normally sold in industrial levels. So, we had to use CPU Cooling fan for suction.

Conclusion:

BumbleBee will be able to reduce workload. It will be helpful during a power outage as it will have a charger light. It will be able to clean kitchen appliances. It will save time as it will be able to clean big areas quickly. It will be able to trap dust before it spreads.

References:

1. <http://www.arduino.cc> (Used for viewing documentations of libraries)
2. www.circuito.io (Used for making circuit diagram)
3. <https://store.roboticsbd.com> (Used for budget estimation)