



## DIY Vacuum Robot



by CesNiето

This is my first *Vacuum Robot*, which its main purpose is to allow anyone to have a cleaning robot without paying so much money, to learn how they work, to build a nice robot that you can modify, update and program as much as you want, and of course to vacuum all that annoying fluff.

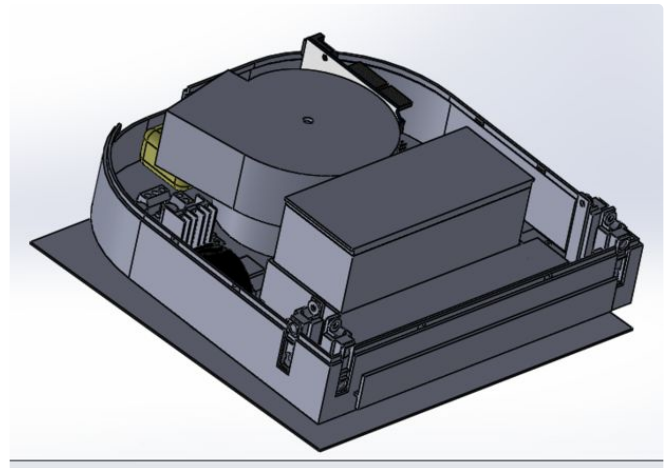
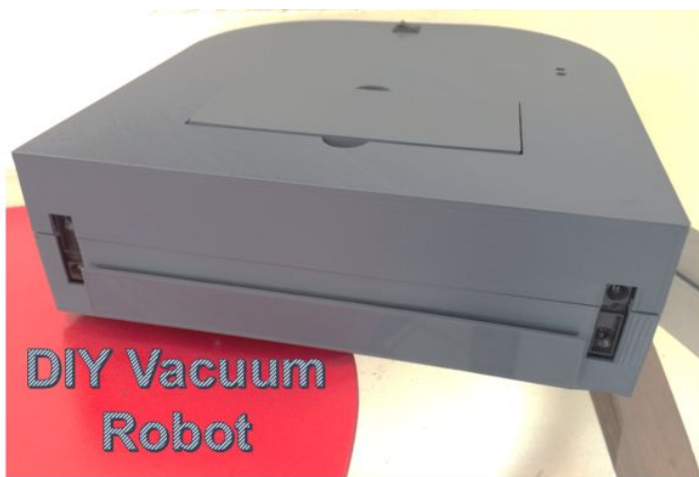
This project is intended to be as easy to build as possible since all the elements and parts are easy to find on **Digikey**, eBay, Amazon, etc.

The whole chassis was designed in **Solidworks** so

that it could be **3d** printed.

Currently it uses an **Arduino Uno** (if you don't like it too much you can easily change it for another micro controller, I decided to use this since my objective is that anyone could actually build it), **micro-metal motors, fan propeller, infrared sensors** and respective **driver modules**.

Another one bites the dust!



<https://youtu.be/zxur8SkHqv8>



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## Step 1: Materials

So, first I will define all the materials that I used and later I will suggest other options with a similar behavior.

### Controllers:

- 1 x Arduino Uno Board (or similar) ([DigiKey](#))
- 1 x IRF520 MOS FET Driver Module ([Aliexpress](#))
- 1 x H-bridge L298 Dual Motor Driver ([Aliexpress](#))

### Actuators:

- 2 x Micro Metal Gearmotor HP 6V 298:1 ([DigiKey](#))
- 1 x Micro Metal Gearmotor Bracket Pair ([Pololu](#))
- 1 x Wheel 42x19mm Pair ([DigiKey](#))
- 1 x Fan Blower AVC BA10033B12G 12V or similar (BCB1012UH Neato's motor) ([Ebay](#), [NeatoOptio](#)  
[n](#))

### Sensors:

- 2 x Sharp Distance Sensor GP2Y0A41SK0F (4 - 30cm) ([DigiKey](#))

### Power:

- 1 x ZIPPY Compact 1300mAh 3S 25C Lipo Pack ([HobbyKing](#))
- 1 x LiPo Battery Charger 3s ([Amazon-Charger](#))
- 1 x 1k Ohm resistor
- 1 x 2k Ohm small potentiometer

### 3d Printing:

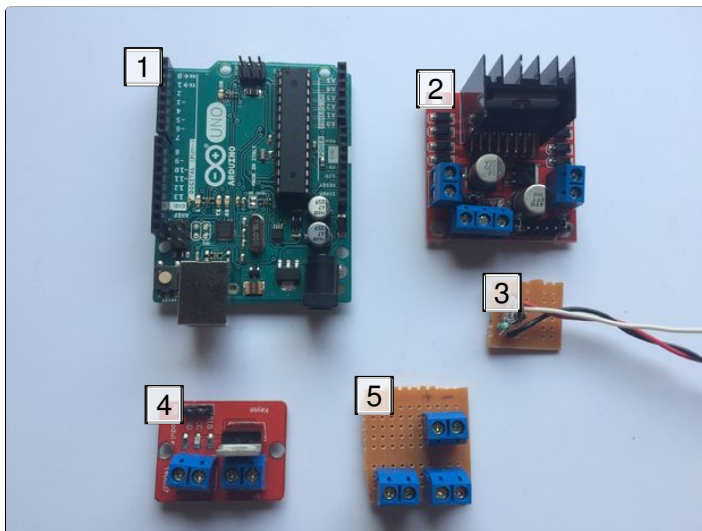
- 3D printer with a minimum printing size of 21 L x 21 W cm .
- PLA Fillament or similar.
- If you don't have, you can print your file on [3DHubs](#).

### Other materials:

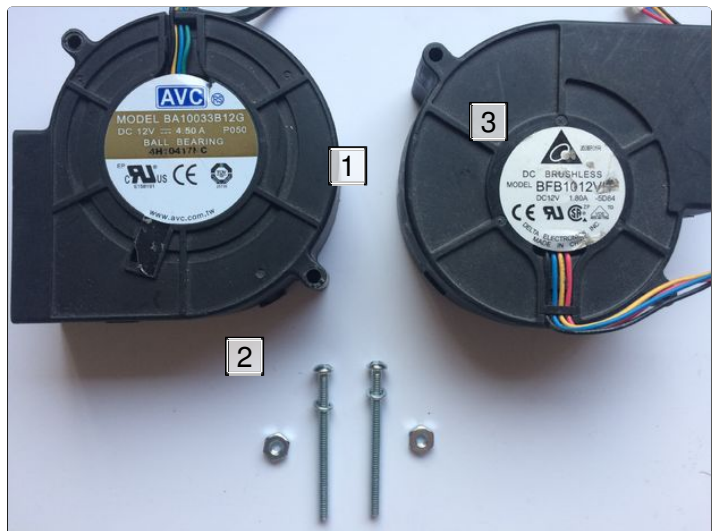
- 20 x M3 bolts with (3mm diameter)
- 20 x M3 nuts
- 2 x #8-32 x 2 IN bolts with nuts and washer.
- 1 x Vaccum bag filter (cloth type)
- 1 x Ball Caster with 3/4" Plastic or Metal Ball ([Pololu](#))
- 2 pushbuttons ([Aliexpress](#))
- 1 x On/Off Switch

### Tools:

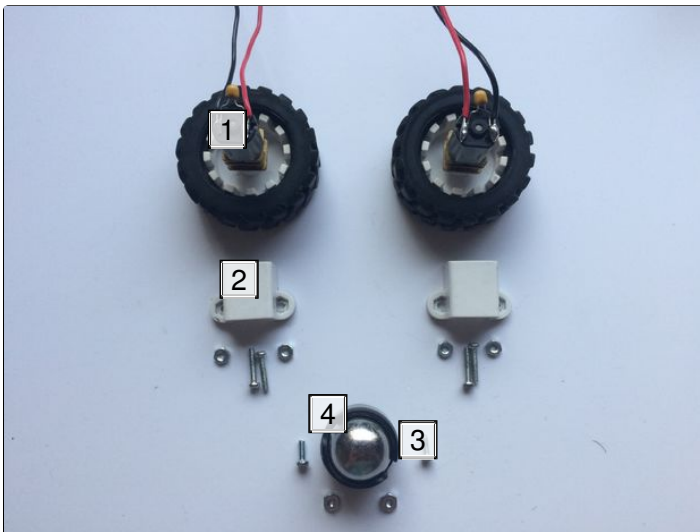
- Screw driver
- Soldering Iron
- Pliers
- Scissors
- Cable (3m)



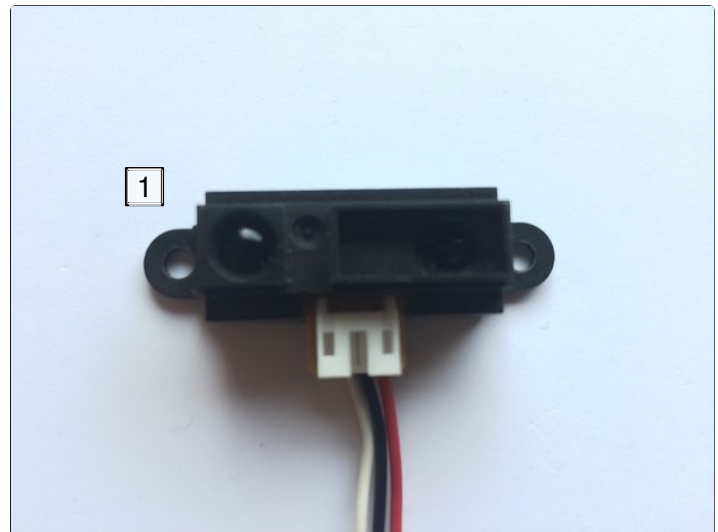
1. Arduino Uno
2. L298 H-Bridge Driver
3. Voltage divider to measure the Battery Voltage
4. IRF520 MOS FET
5. Sensors power supply connectors



1. Choose your fan
2. 2 x #8-32 x 2 IN bolt with nut and washer
3. Similar fan that the Neato's vacuums use



1. Micro-metal motors pair with wheel
2. Bracket pair
3. Bolts cut to 6.11mm length
4. Ball Caster 3/4"



1. Sharp Sensor 4-30cm

## Step 2: How Does It Work?

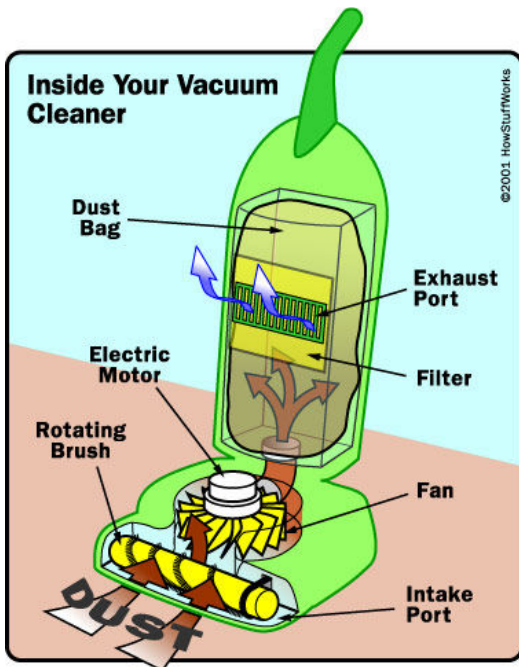
The majority of the vacuums have a motor with a fan. As the fan blades turn, they force air forward, toward the exhaust port. At the exhaust port it has a filter which prevents the dust particles being thrown away again.

### How does a vacuum robot work?

The principle is pretty similar but as you can see in the second picture, the fan motor is at the last step which means that the dust is not driven through it. The air that is being sucked is first filtered and then

pushed toward the exhaust port.

The main difference between each of the vacuums is that the robot one has a microcontroller and sensors which let the robot make decisions so that it can vacuum your room autonomously. Most of the vacuum robots nowadays have really nice algorithms built-in, for instance, they can map your room so that they can plan a path and perform a faster cleaning. They also have other features like side brushes, collision detection, return to its charging base, etc.



### Step 3: About the Ingredients...

As I said at the beginning, I'm going to explain as much as I can so that anyone can understand, but if you already know the basics, feel free to skip this step.

#### The Fan

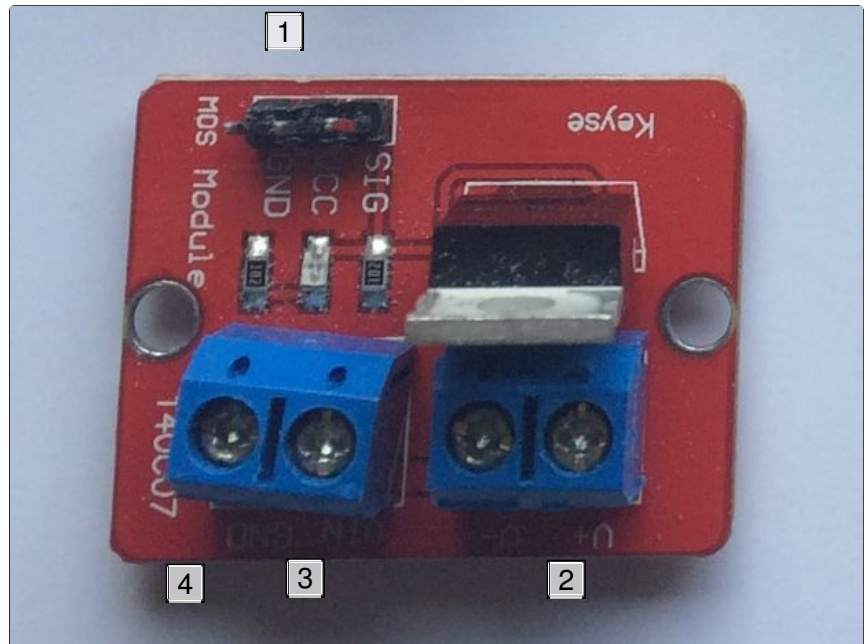
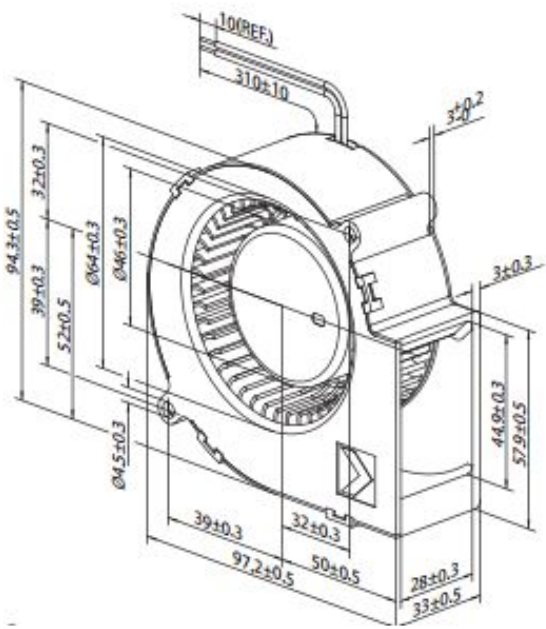
The most important thing of a vacuum is to choose the appropriate fan with a decent **CFM** (Airflow cubic feet per minute), it is the force of this airflow across a surface that picks up the dirt and moves it to the dust bag or container. Therefore, the **more airflow**, the better the cleaning ability of the vacuum cleaner [[Best Vacuum.com](#)]. Most of the big vacuums use more than 60 CFM but since we are using a small battery, we are ok with at least 35 CFM. The **AVC** fan that I will use has 38 CFM [[AVC link](#)] and it actually has a lot of power, but you can use any with the same dimensions (See picture 1).

#### The Fan Driver

Since we need a way to control whenever the Fan is On or Off, we need a Driver. I will use the **MOS-FET IRF520** which basically works as a switch, whenever it receives a signal from the microcontroller it will supply the input voltage to the output (Fan).(See picture 2)

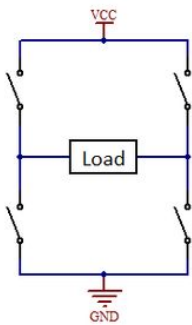
#### The H-Bridge

For the motors we'll need something a bit different from the Fan driver since now we will need to control the direction of each motor. The H-bridge is an array of transistors which allows us to control the current flow, and by controlling that, we will be able to control the motors direction. The L298 is a pretty decent H-bridge that can supply 2A per channel so for our motors it will be perfect! Another example is the L293D but that only gives us 800mA per channel. (The picture 3 depicts the concept of an H-bridge)

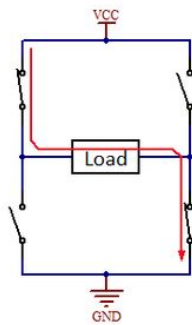


1. Control Signal
2. V+ Fan
3. V+ Battery
4. GND Battery

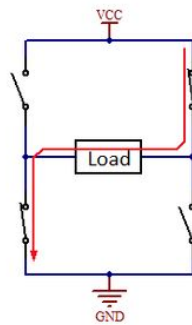
H bridge topology



Connecting the load in one direction



Connecting the load in the other direction

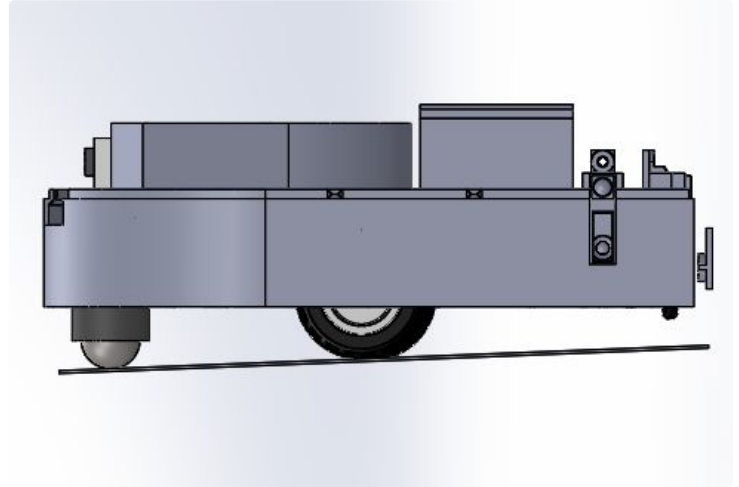
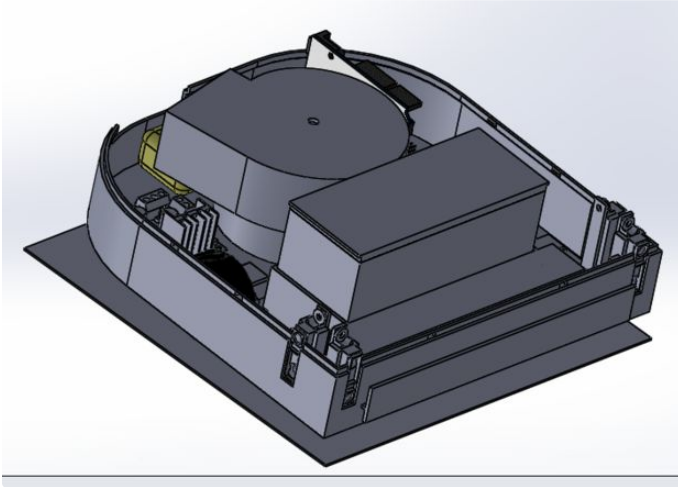


## Step 4: The Design

The design of the robot was done in **SolidWorks**, it consists of 8 files.

This step was the most time consuming since all the robot was made from scratch considering the bumper, the container, the filter, etc.

The total size of the robot is 210mm x 210 mm x 80mm.



## Step 5: 3d Printing

The design was done so that all the parts could be 3d printed. In case you don't have a 3d printer, you can use the [3DHubs](#) wherever you are.

The robot consist of 12 parts (it takes a some time). It was printed on a Robo3d R1 plus using Blue Gray Colorfabb filament.

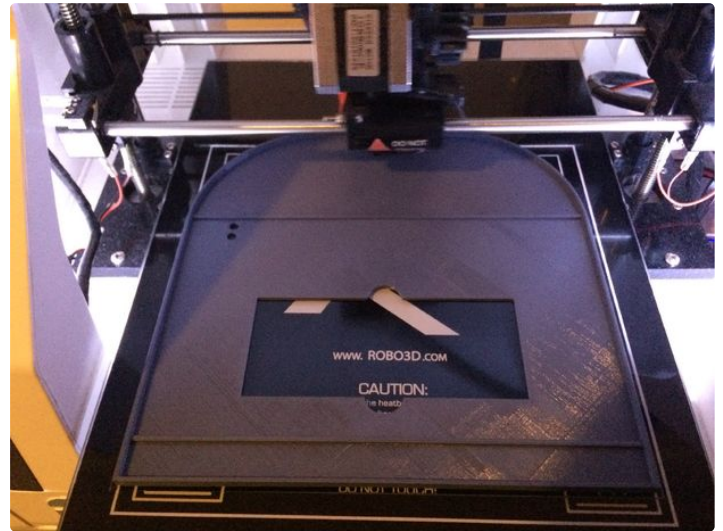
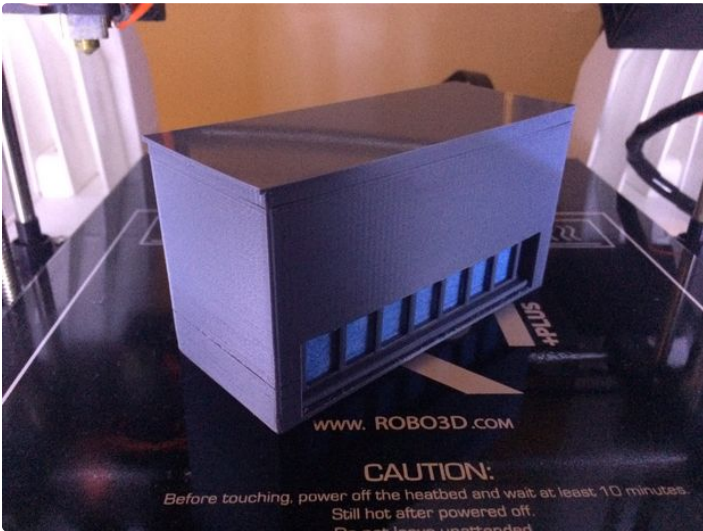
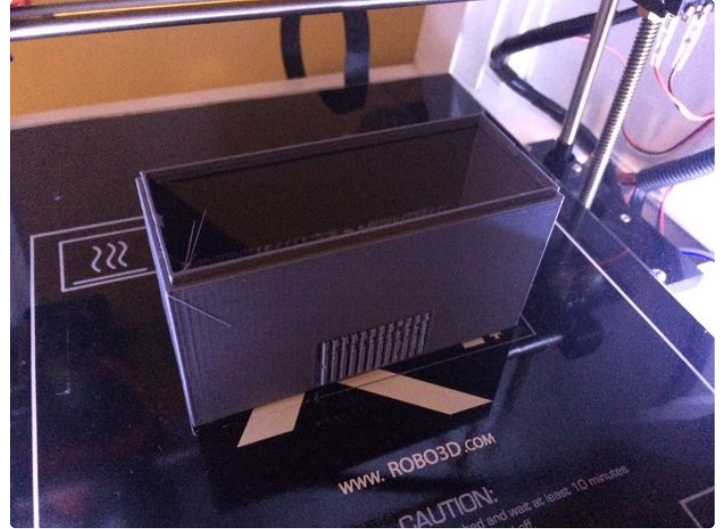
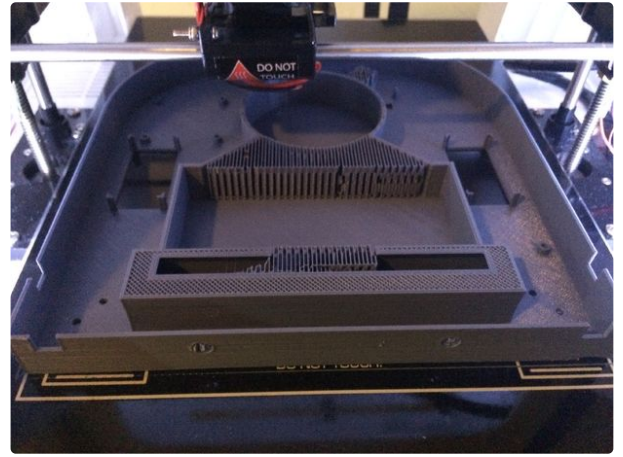
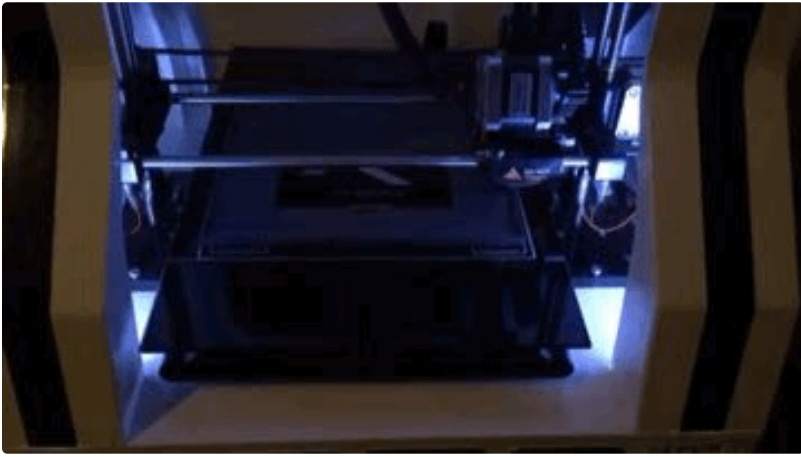
My printing settings were:

- 0.2 mm layer height
- 1.2 mm shell thickness
- 30% fill density
- 215 C printing temperature
- 70 C bed temperature
- Support type everywhere
- Retraction (Very important!!) 50 mm/s 0.7mm
- Printing Speed 60mm/s

Before doing all the prints I recommend to print the test samples that I attached so you can calibrate and modify the parameters. I took me a lot of time since the prints are big.

Note: Remove all the support filament with caution.

Look for the files here: [Thingiverse Files](#)



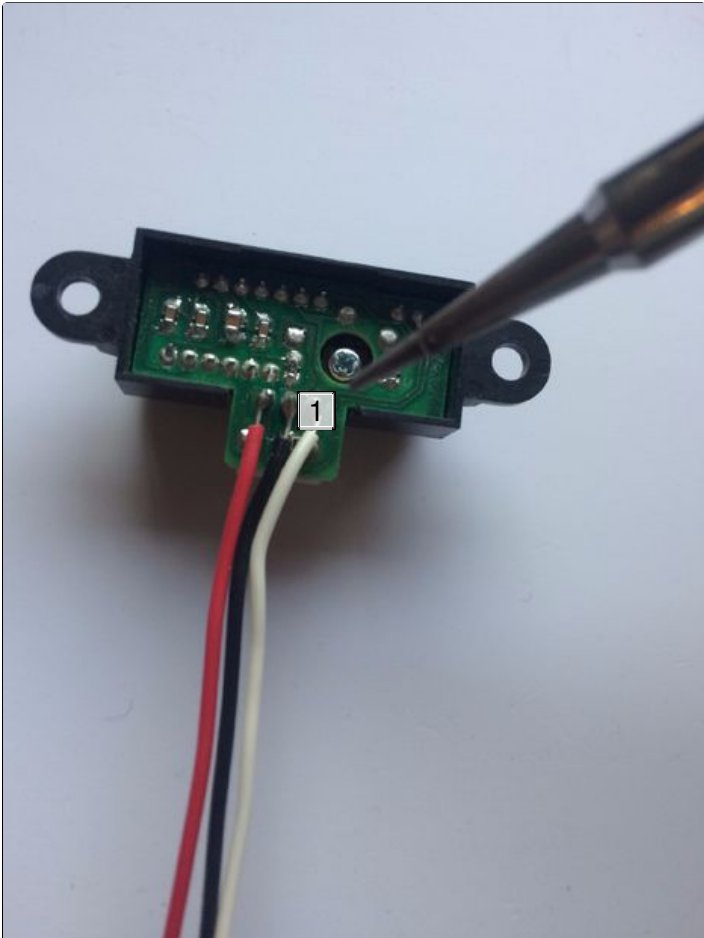




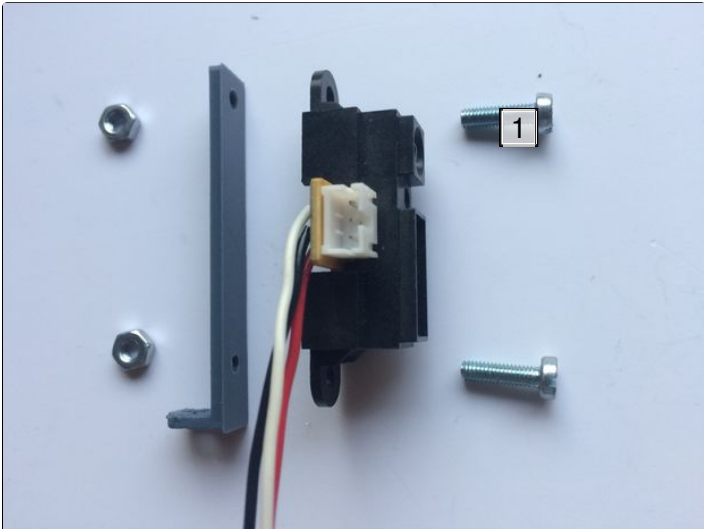
## Step 6: Setting the Sensors Up

For each of the two sensors I soldered cables but in case you have the connector, you can skip this step.

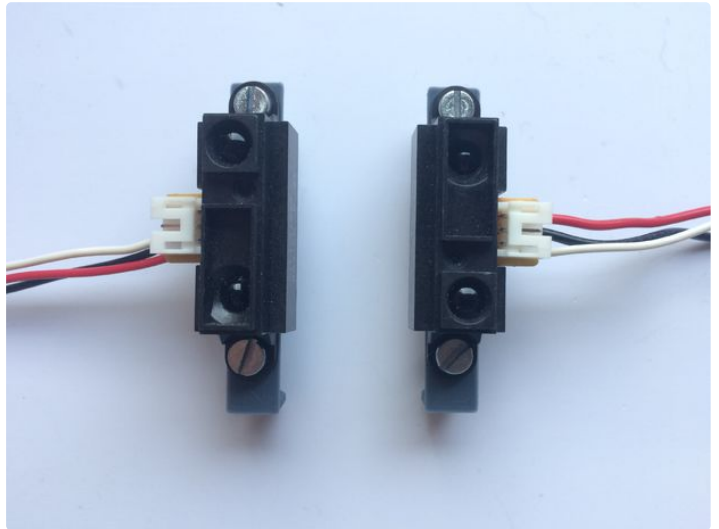
Once we have the sensors support, we will assembly them as it is showed on the picture above using the M3 bolts. It is important to mention that one sensor should be flipped because it will help us when we assembly them.



1. White for signal



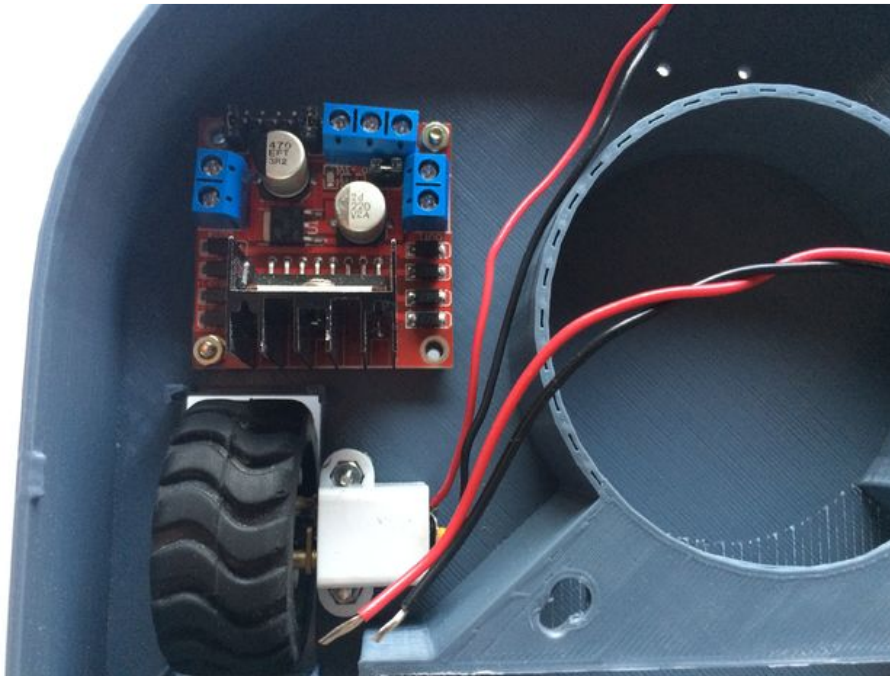
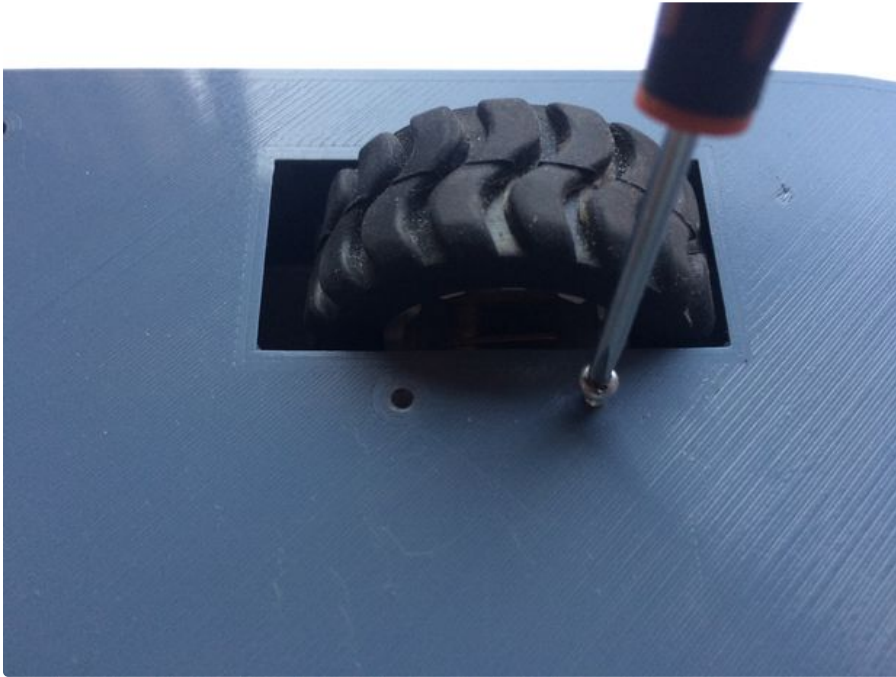
1. M3 bolts



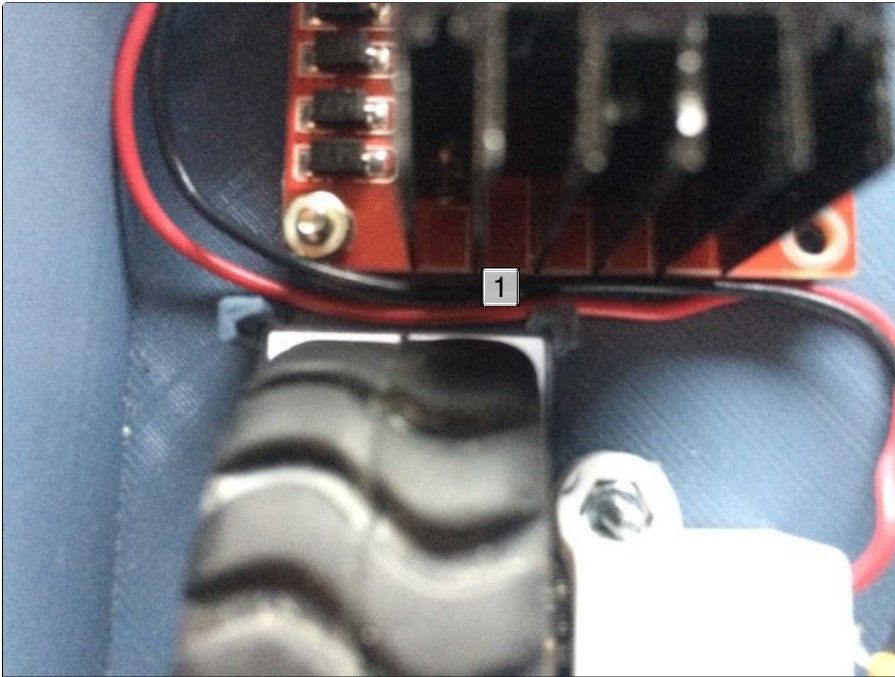
## Step 7: Connecting the Motors and H-bridge

The first objects that are going to be mounted, are the motors. Mount them using their brackets.

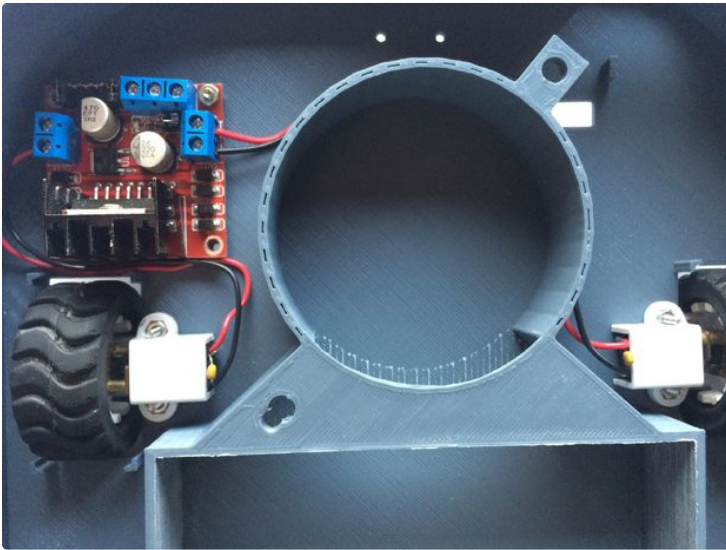
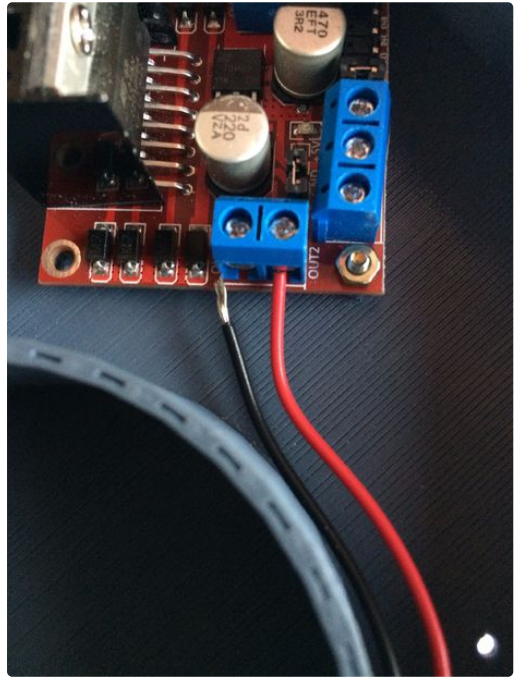
Once you have set them, you can start mounting the H-bridge as it is shown. After that, we shall start connecting the motors on the dual terminals. Don't worry about how the motors shall be connected, you can connect them in any polarity and we can modify the direction of the motors with the code. They should look like the last image. Mo



1. Left Motor  
2. Right Motor



1. Ensure that the wheel is not blocked

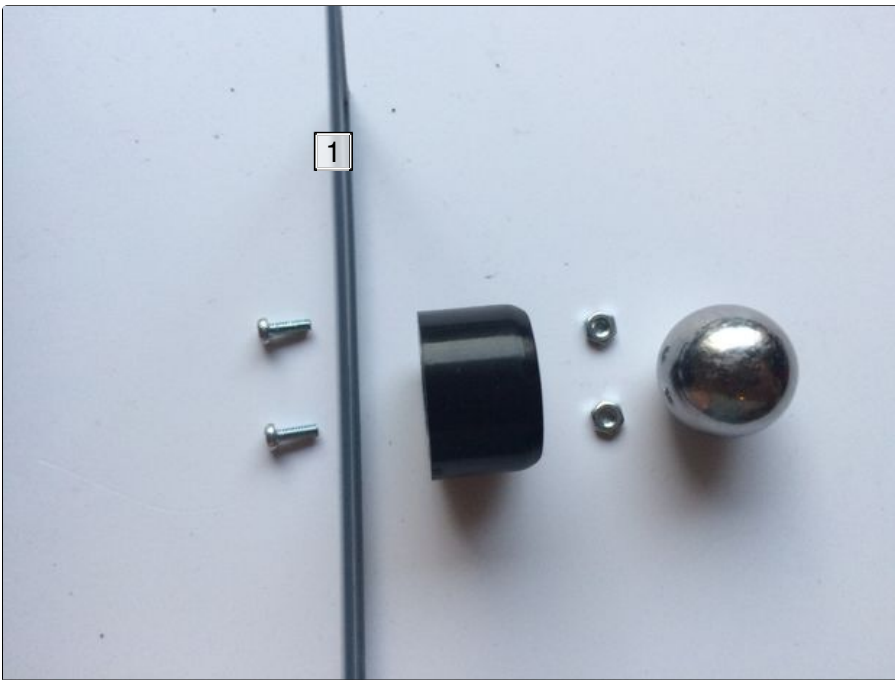


## Step 8: Mounting the Ball Caster

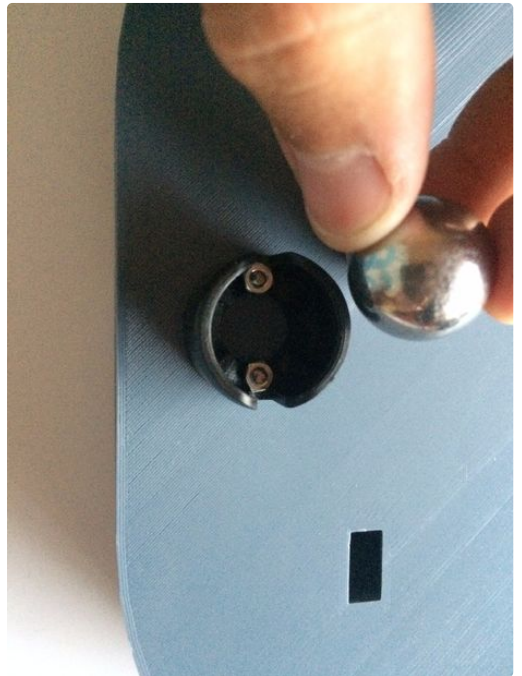
The ball caster will help the robot to tilt it to the front so that robot can vacuum much better.

The **Pololu** Ball Caster has already its bolts but unfortunately they're too large. So, we shall cut them for about 3mm. Use a knife or a saw being **really careful**.

An image above shows the ideal length of the bolt.



1. This should be the bottom part of the robot.



## Step 9: The Bumper

So what happens when the infrared sensors can't see the object?

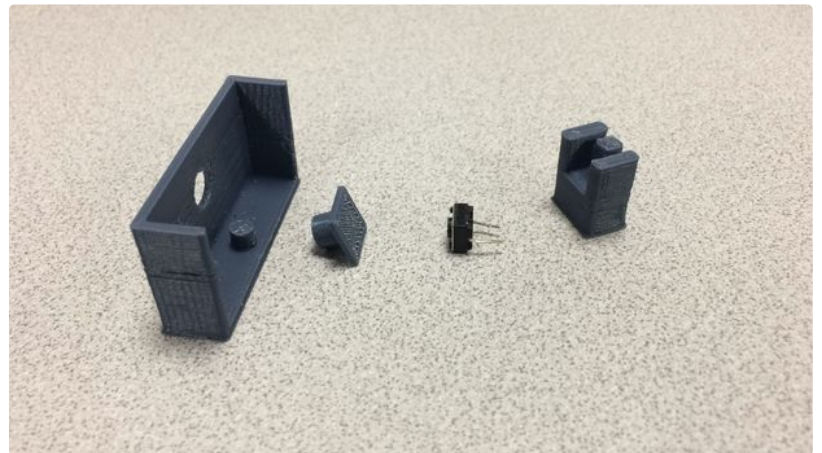
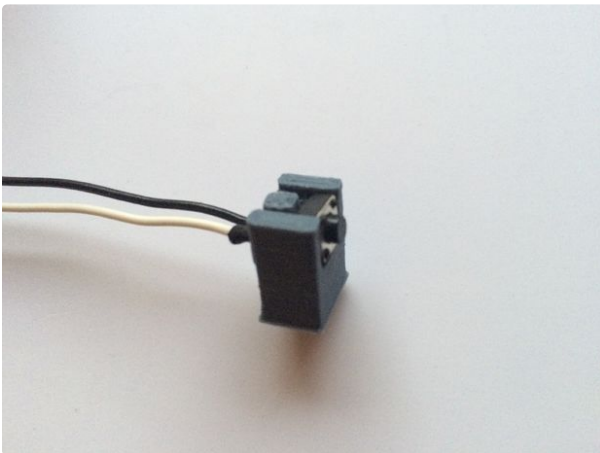
Well I have designed a bumper so that it can detect when it touched a close object.

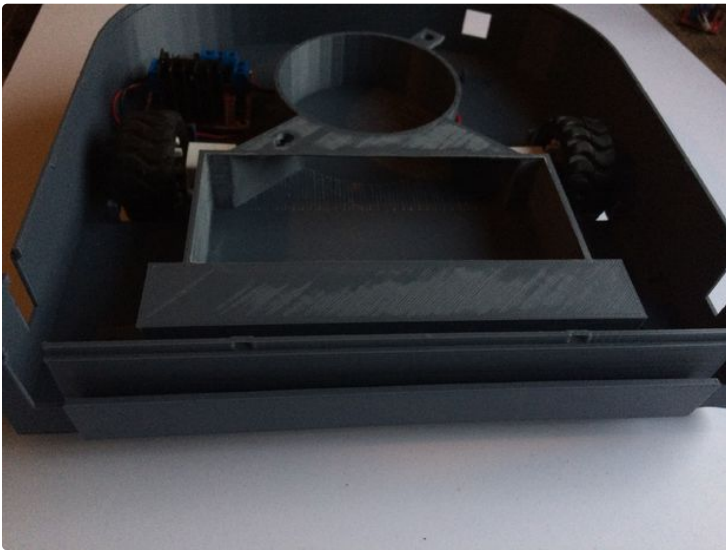
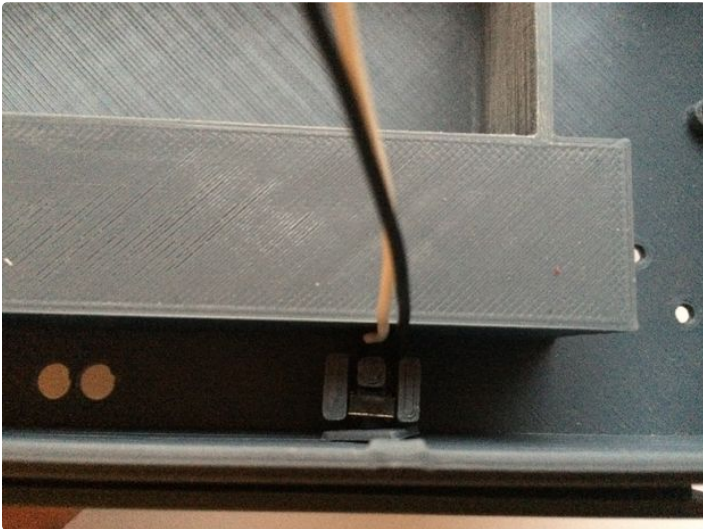
The first image shows the concept and the way it shall be connected.

Mount the **push button** *pushButtonSupport* and connect it to the small cilinder (see pictures).

Once both of the buttons are mounted, you can paste the bumper (use a small amount of glue).

Note: I will only use one of the buttons since one push button got broken :( But it still works really nice!





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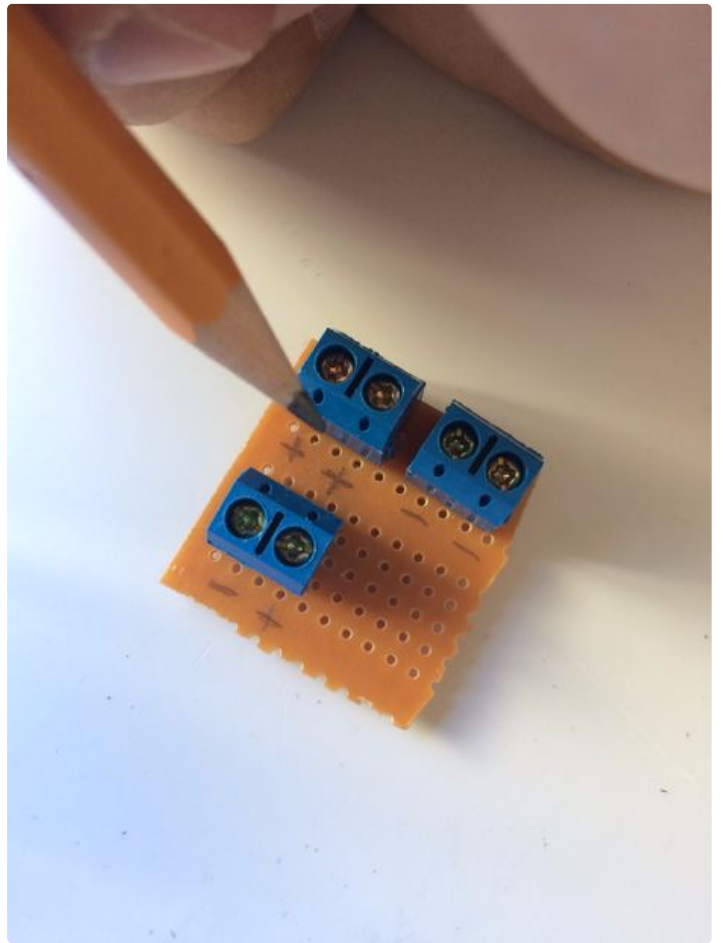
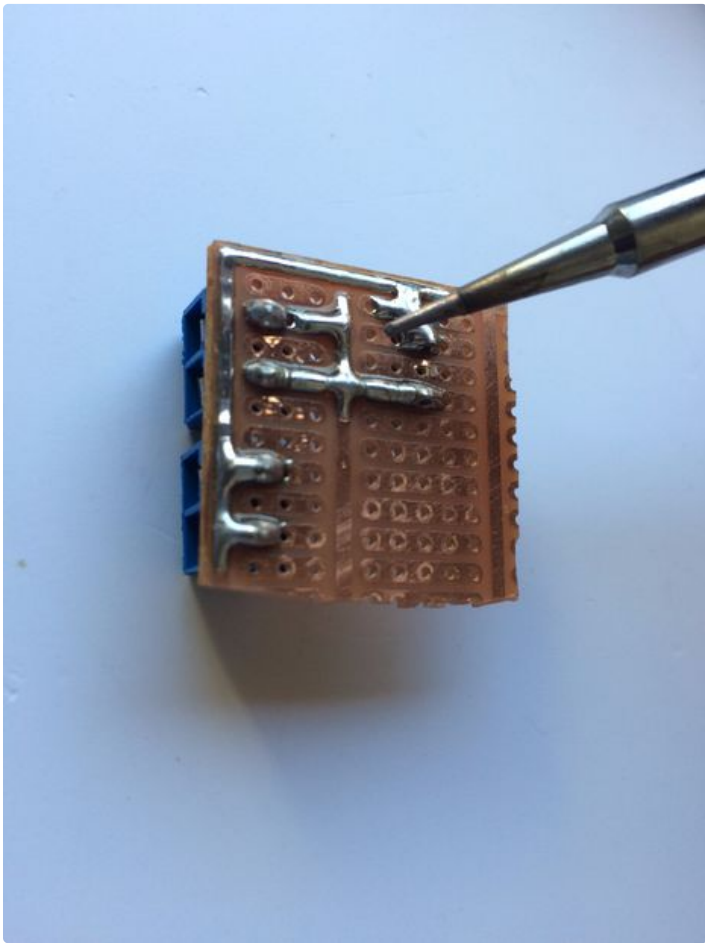
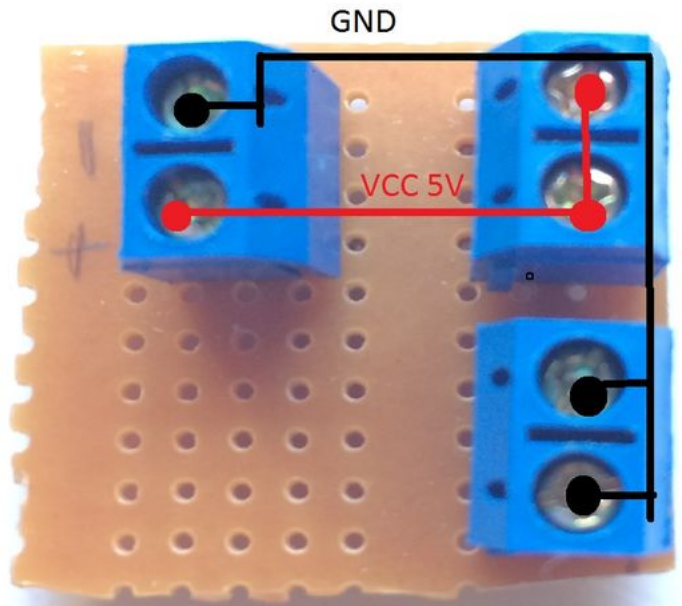
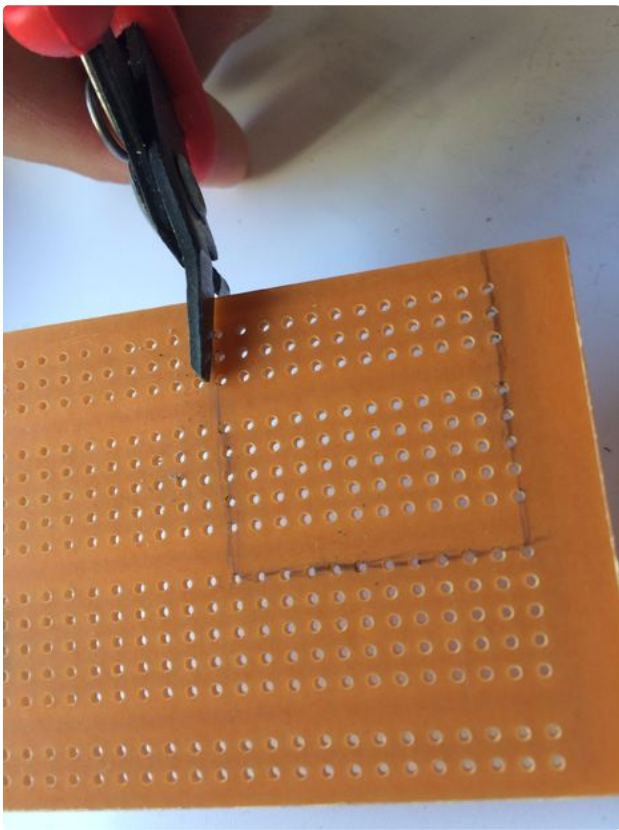
## Step 10: Connecting the Sharp Sensors

In order to supply the Sensors I made a small board which will supply the power for each of the sensors.

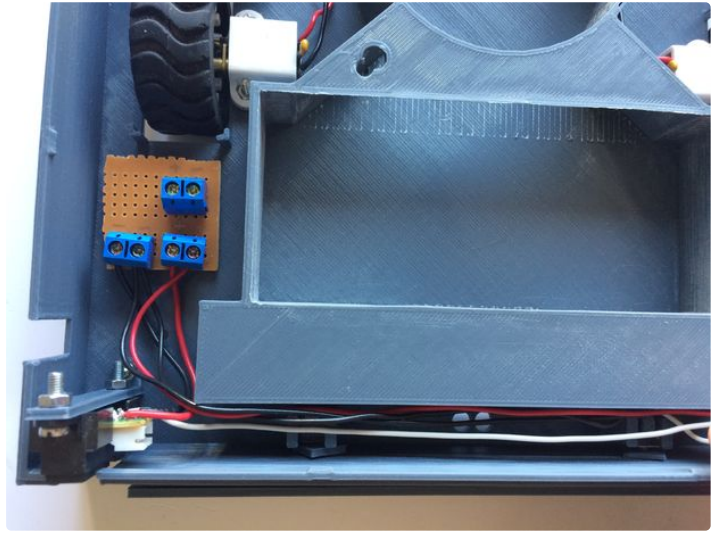
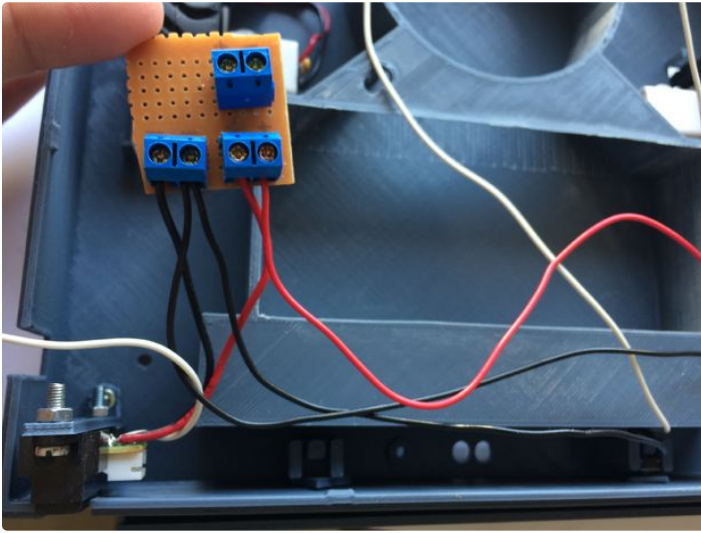
Cut a small surface 3x3 cm then mount the connectors as it is showed on the second picture. Do the proper soldering being careful. Once it is done, mark the board so that you can know the polarity. I use by convention that the right side is always voltage.

Connect the Grounds of each of the sensors and also one terminal of the push button to GND, and the Red wires from the sensors to VCC (Right connectors).

Once they are all connected, fix the wires and set them nicely.







## Step 11: Voltage Divider

We need a way to monitor the battery voltage because if the voltage of a LiPo cell is dropped lower than 3.0V it can be permanently damaged. Our battery is a 3S LiPo battery which means that it has 3 cells of 3.7V each.

Since we can't connect the battery voltage directly to the Arduino (because you will kill the board), we should find a way to proportionally get the voltage of the battery within the range of the ADC (Analog Digital Converter).

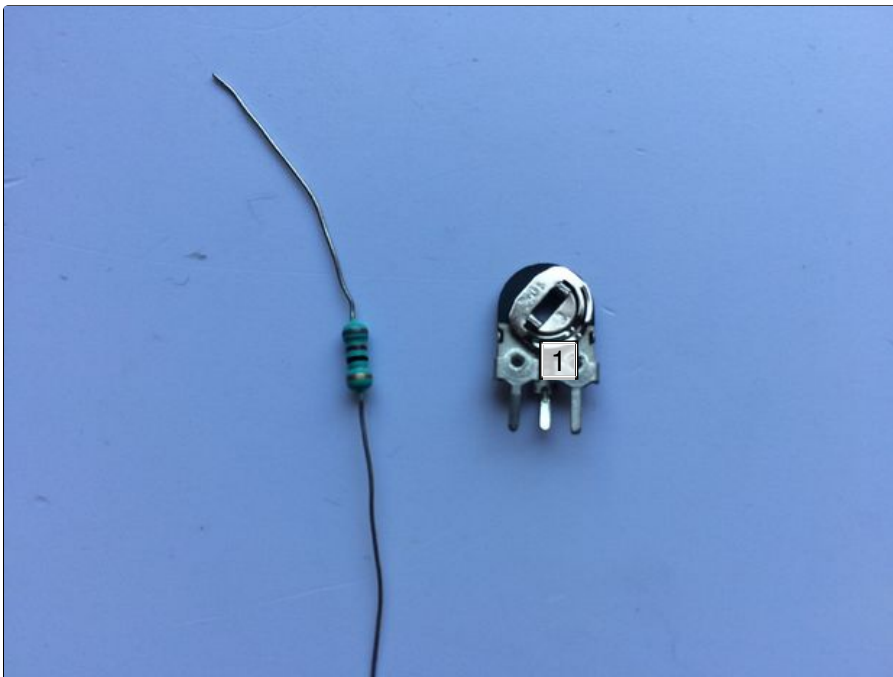
Cut 12cm of wire (Red, Black and White. Use always **white** or other color for signals but not black nor red)

The **Voltage Divider** will help us to reduce the voltage proportionally and thus we can connect it to one of the analog inputs.

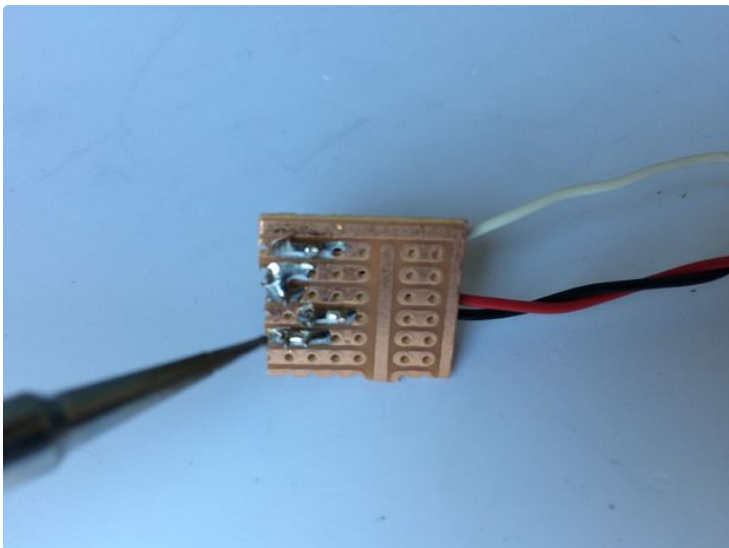
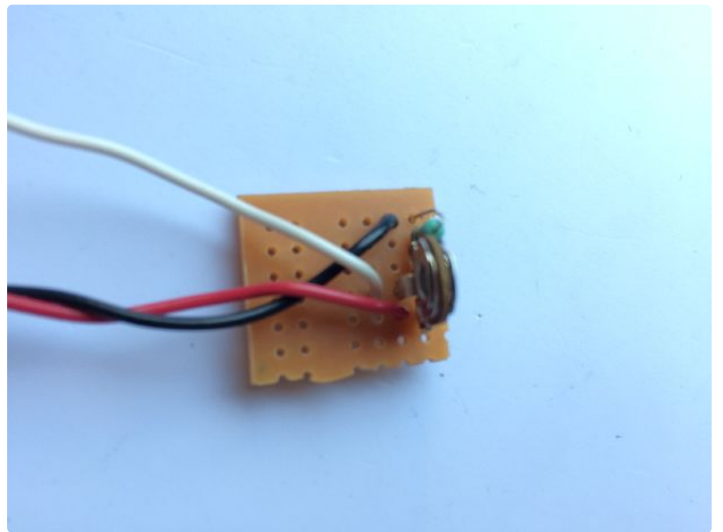
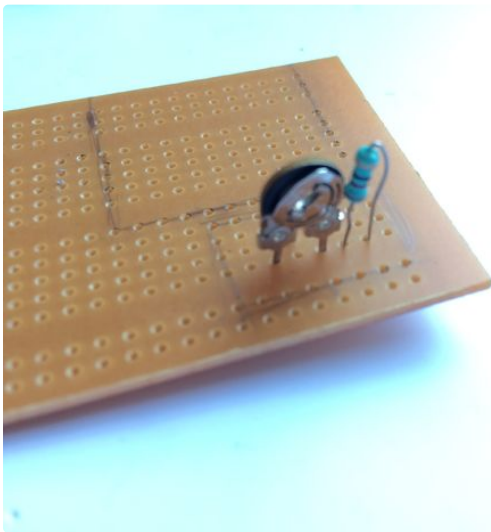
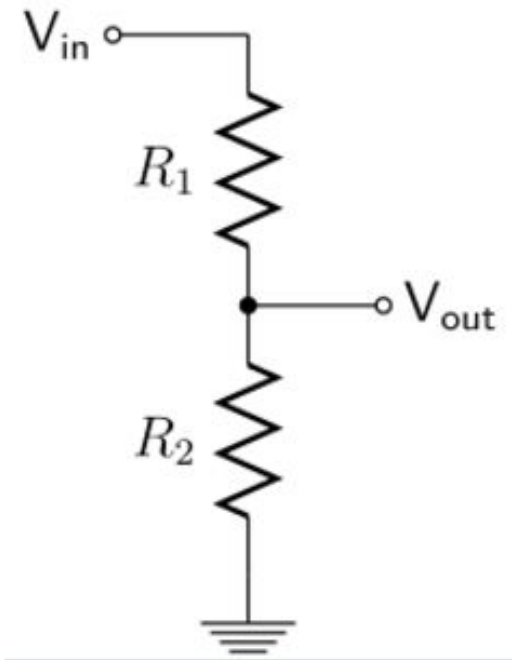
For this we will need two resistors. R1 and R2. I recommend to use one fixed and the other one use as a potentiometer so you can manipulate your circuit and calibrate it carefully.

Use an R2 of 1k Ohms and set the Potentiometer to 1536 ohms. See the theory behind that so that you can probe the voltages (Or you can trust me [Wiki The ory](#)). I set my desired output to be  $V_{out} = 5V$  and my input was the battery voltage when it was fully charged = 12.68 V.

Once you have finished the circuit, test it! Use a Voltmeter and verify that the  $V_{out}$  is actually 5V when your battery is fully charged, otherwise adjust the potentiometer. (**Don't** set it above 5V or you can kill the Arduino!)



1. 2k Ohm or more potentiometer



## Step 12: Get Your Hands Dirty

We are going to start connecting a lot of wires right now so we should be really careful or we can make a short circuit.

The Battery will supply 3 different things:

1. Motors
2. Fan
3. Voltage Divider

And everything will be connected to the MOS-FET board (it is not really ideal but it is a thing to improve)

We will need 2 male to male wires one to supply the motors driver and the other for the connector to the switch.

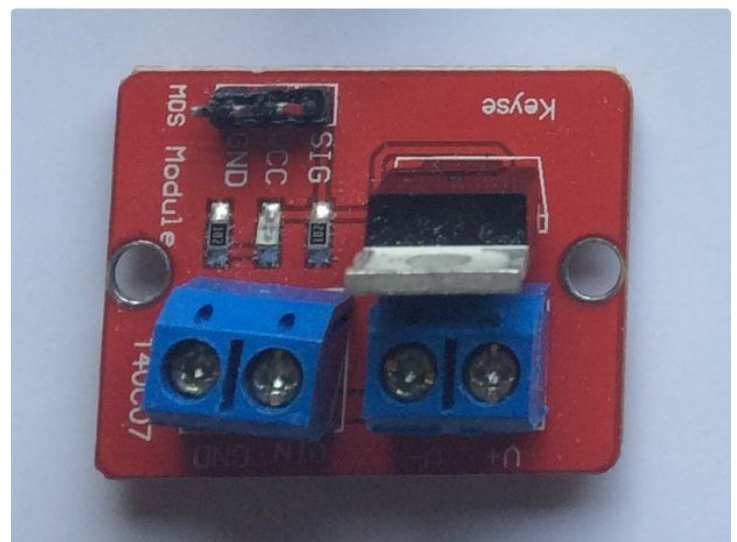
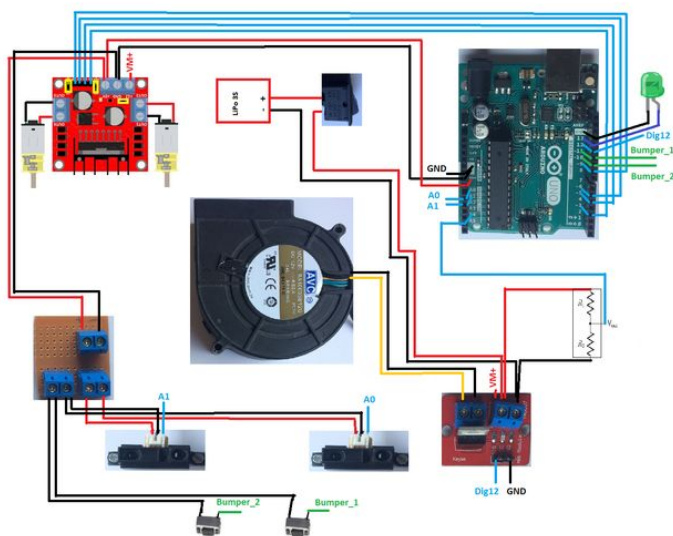
- 21.5cm Red wire for the motors driver to the MOS-FET
- 15 cm Red wire with male connector for the switch to MOS-FET

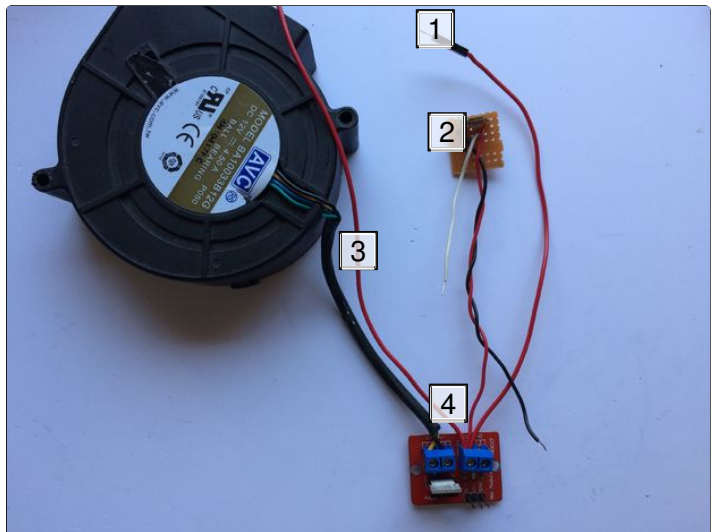
I had to modify the battery's wires since its connector was really big, so I added two new wires, the positive one is a male connector for safety. (see the battery picture)

1. First we will connect the fan. Cut the wires 12cm length. We will only use the Yellow and the black wires. Connect the Yellow to the V+ and the Black to the V- as it is showed on the picture.
2. Then we will connect 3 red wires to Vin of the MOS-FET: The one of 21.5cm for the H-bridge, the 15cm one for the switch and the Vin for the voltage divider.
3. Connect the GNDs: Connect the Ground of the battery and the GND of the voltage divider.

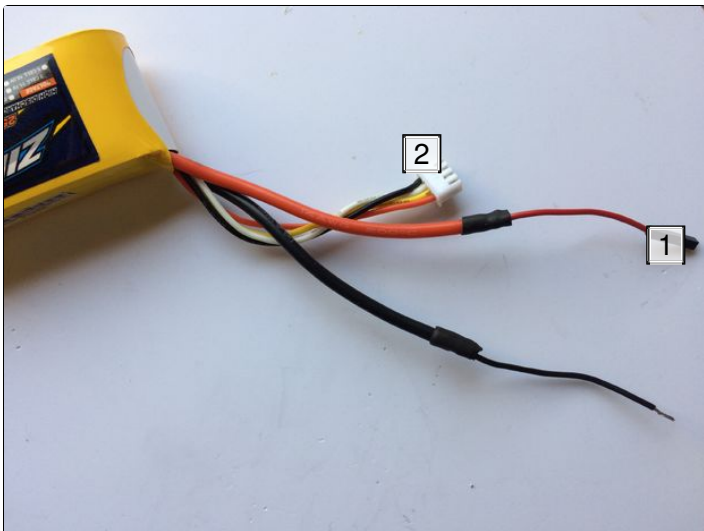
See the notes of the pictures for more help.

Make sure everything is well connected! Hold this connection since we are going to use it later.

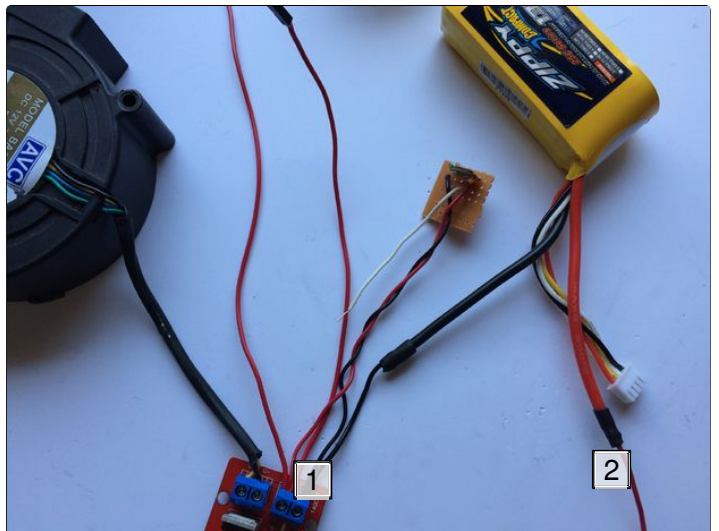




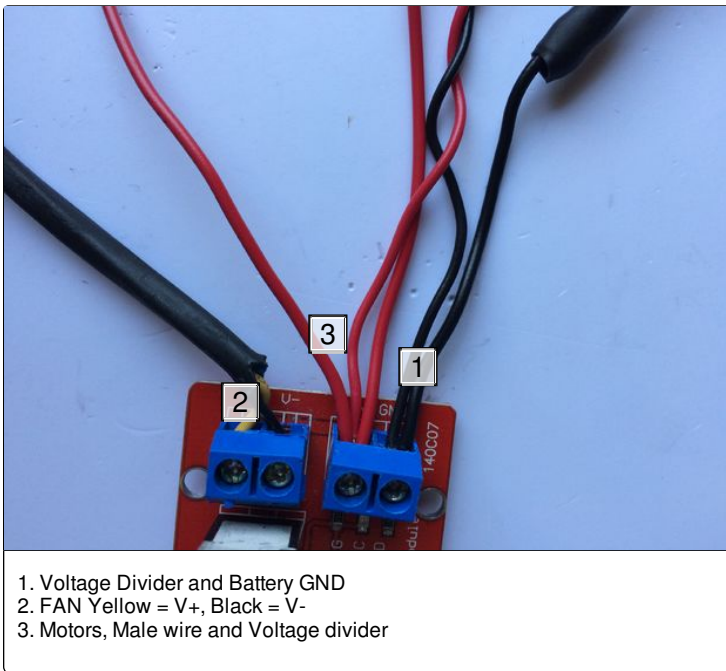
1. Connector to the battery
2. Voltage Divide
3. Wire to supply the Motors
4. All red wires connected to the Vin



1. Female connector
2. Just for charging the battery



1. Voltage divider GND and Battery GND
2. V+ of the battery is still not being connected



### Step 13: Keep Connecting (Terminals, Fan and Motor Driver)

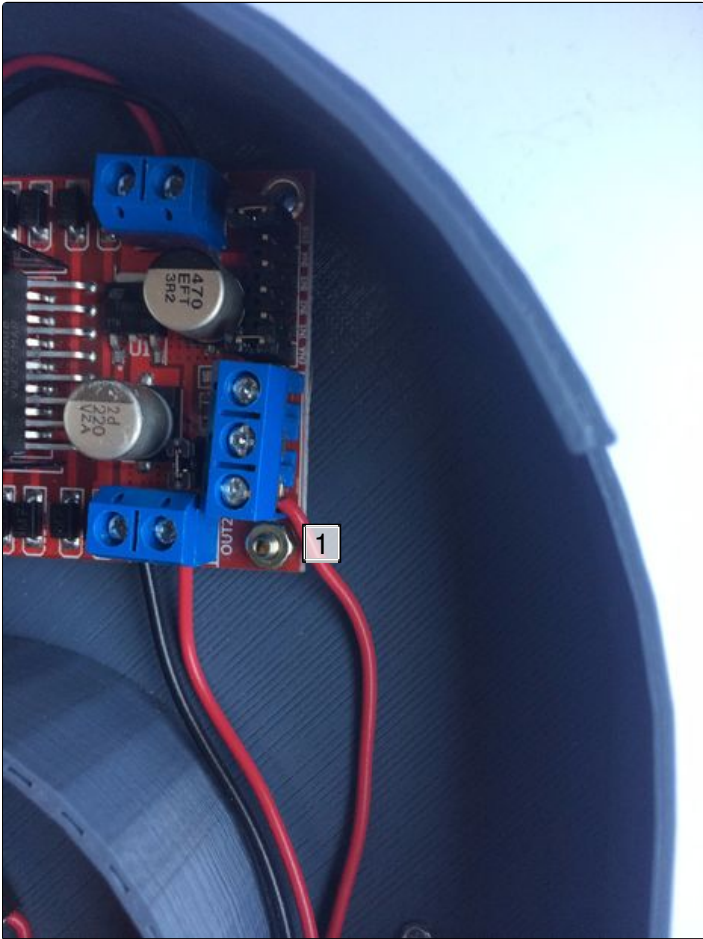
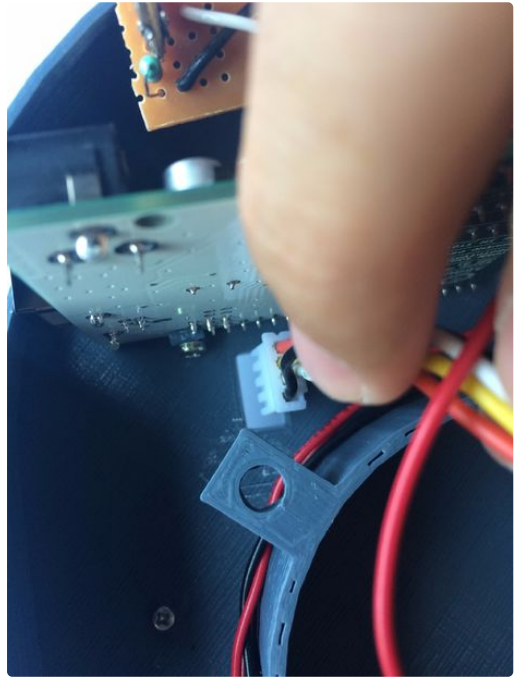
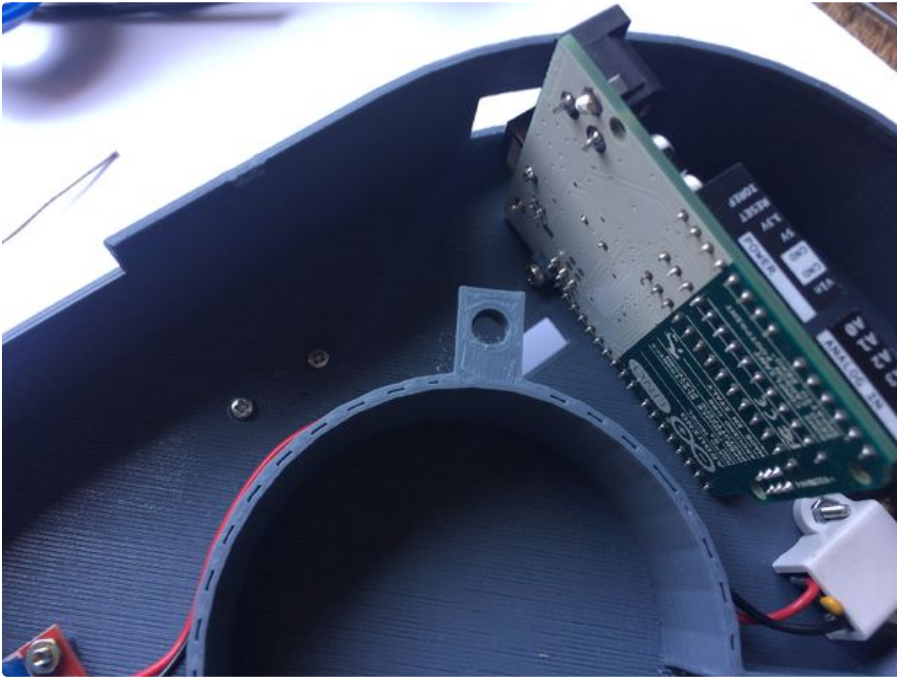
We can start connecting everything together.

Mount the Arduino first with its respective bolt.

Then follow the steps showed on the picture. Connect the Corresponding wires to the terminals.

Place the Fan.

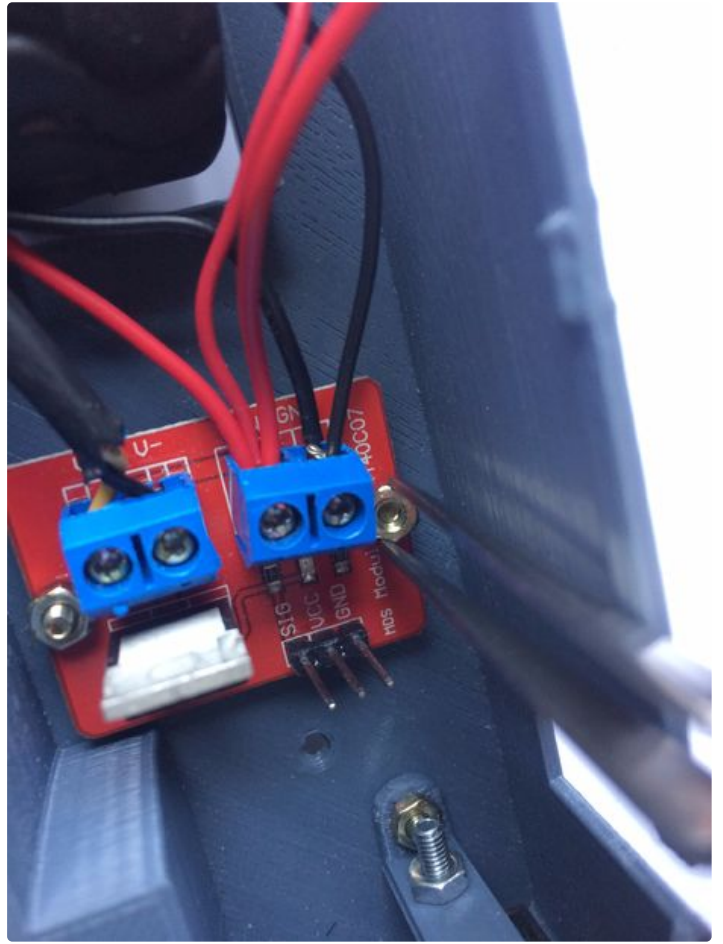
And connect the Voltage divider wire signal to the A4 analog input of the Arduino.

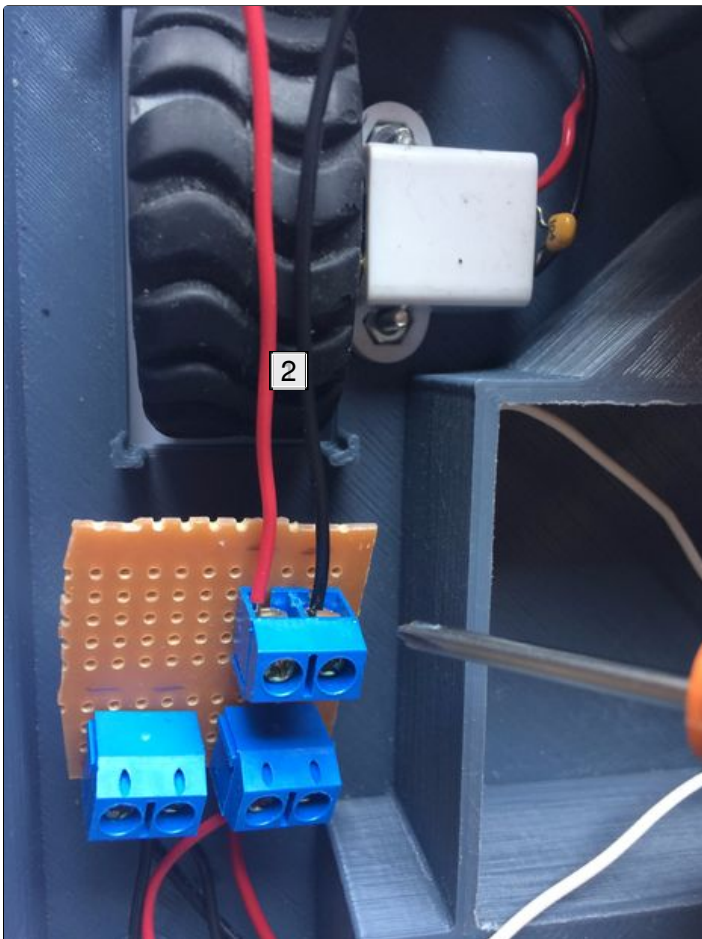


1. wire from the MOS-FET to the Motor Driver(21.5cm)

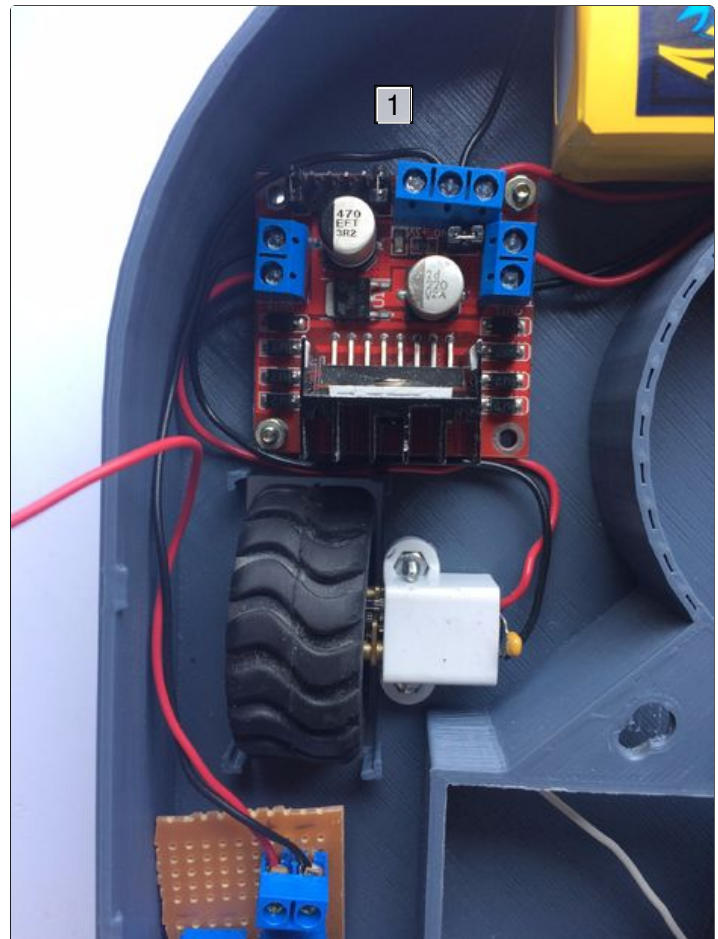


1. Place it carefully

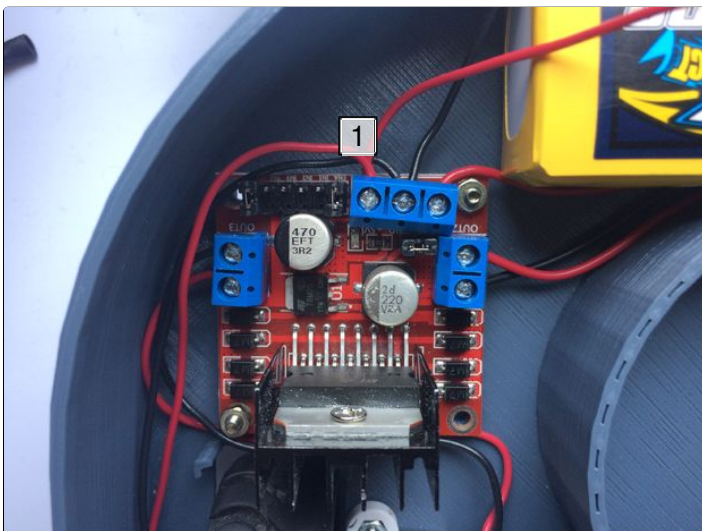




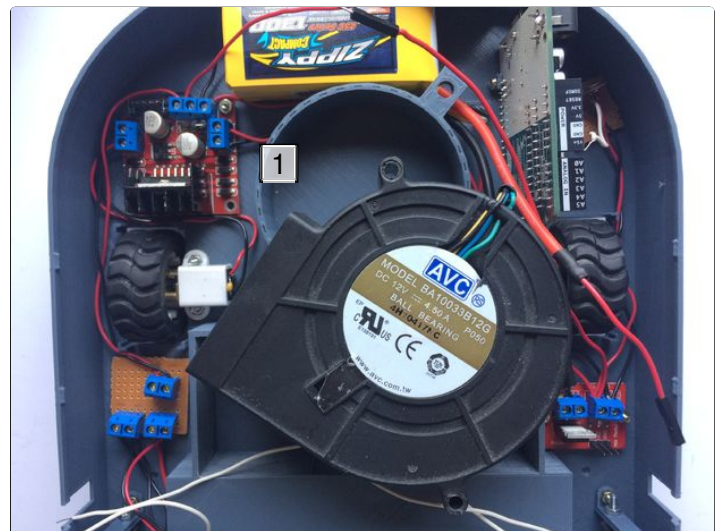
1. 15cm wire from connector to the driver 5V output and GND  
 2. 15cm wire from connector to the driver 5V output and GND



1. Connect the ground of the Sensors and one Ground wire that is to be connected to the arduino (21cm)

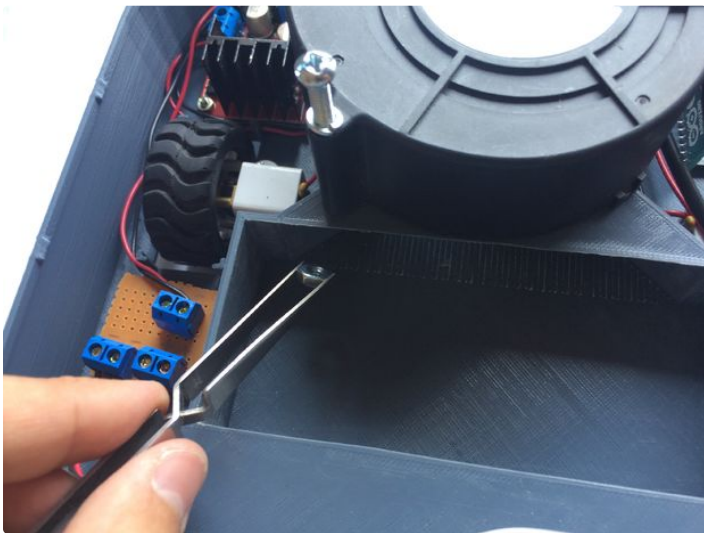
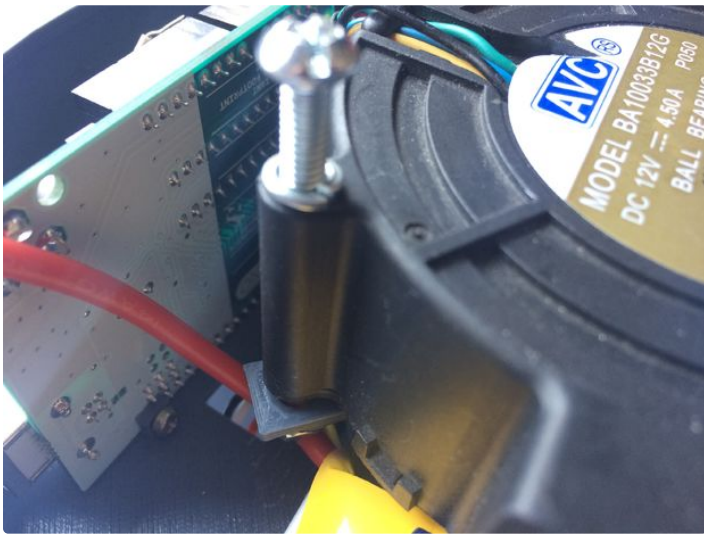


1. Connect the V+ of the Sensors and one Red wire that is to be connected to the arduino Vin female pin (21cm)



1. Progress so far

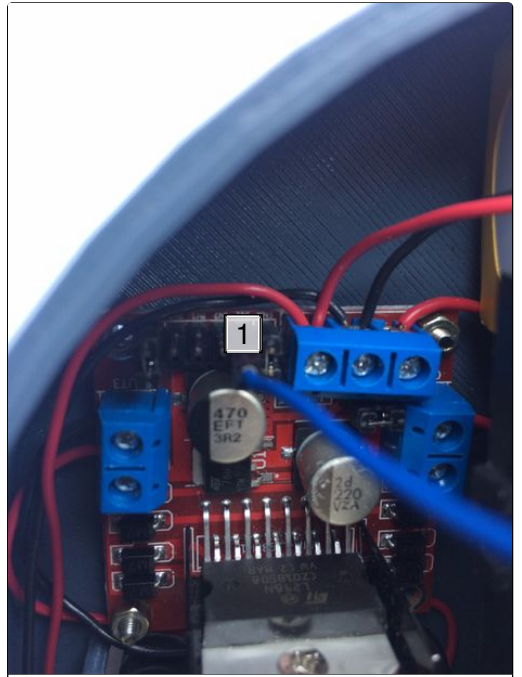




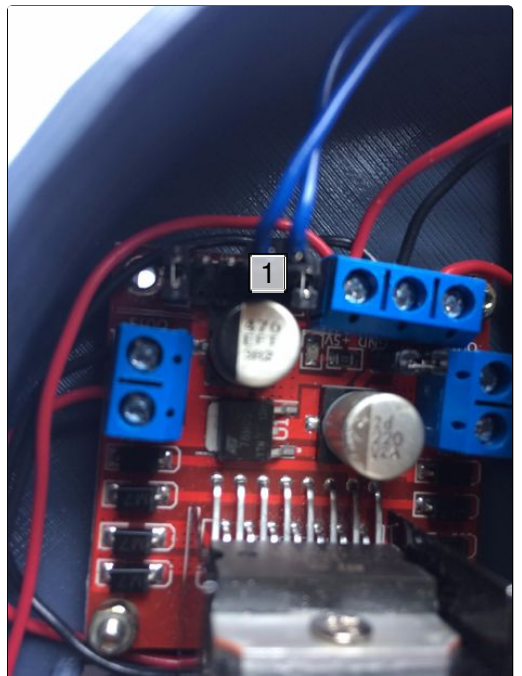
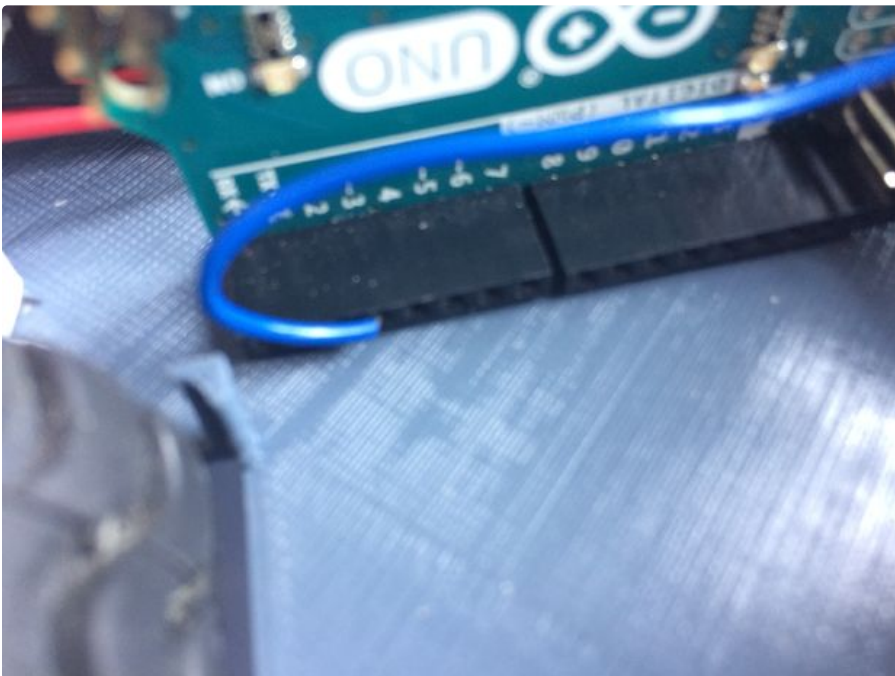
## Step 14: Connecting the Motors Signal Inputs

We will need 4 wires Male to Female 27cm length because they are to be connected from the Motor Driver to the Arduino pins.

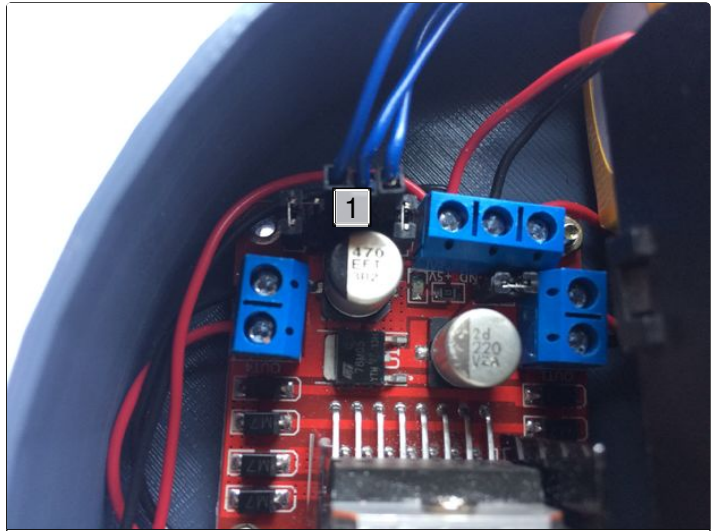
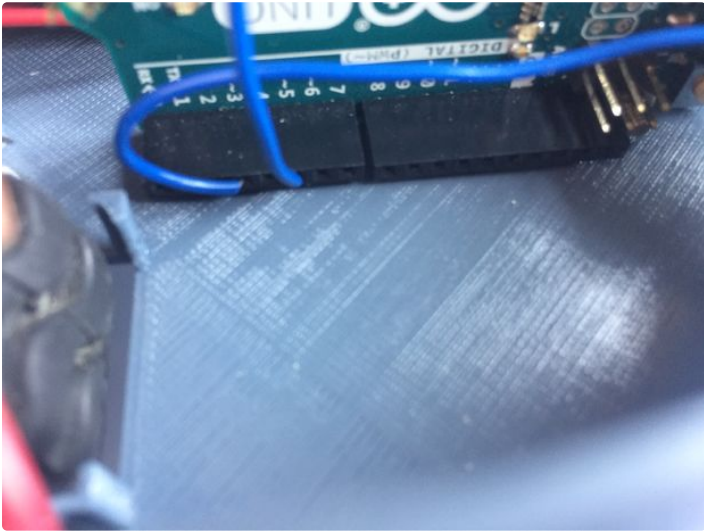
They should be connected to the Arduino inputs 3,5,6 and 9 respectively. (See the pictures for help).



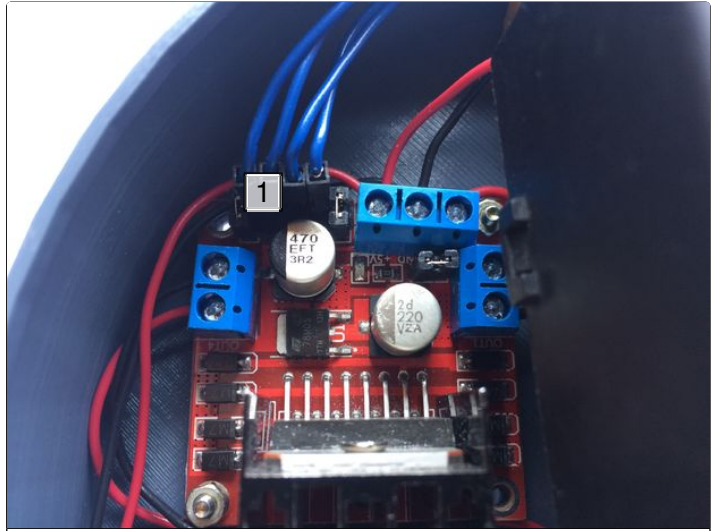
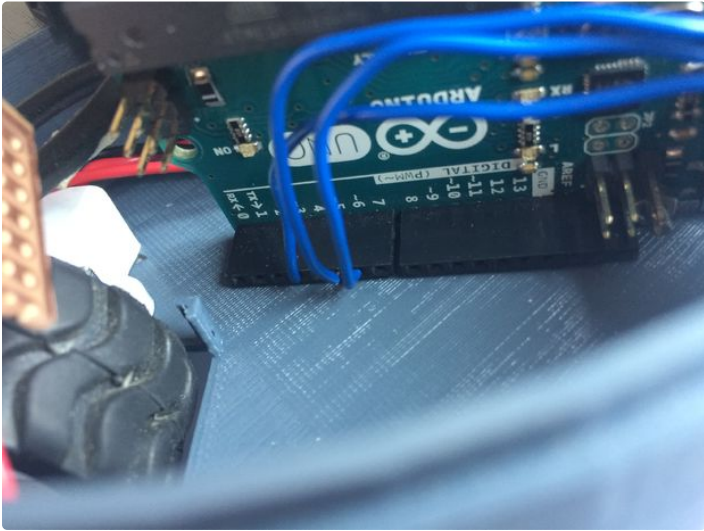
1. First pin to Digital input 3



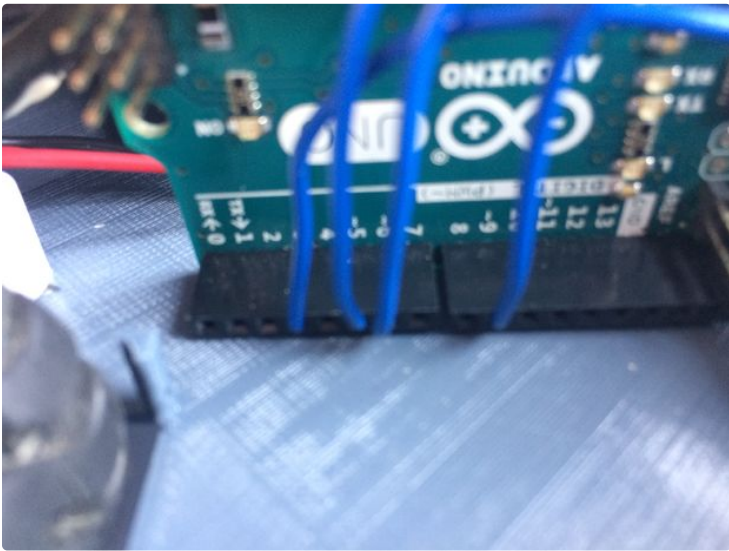
1. Second pin to Digital input 5



1. Third pin to Digital input 6



1. Last pin to Digital input 9

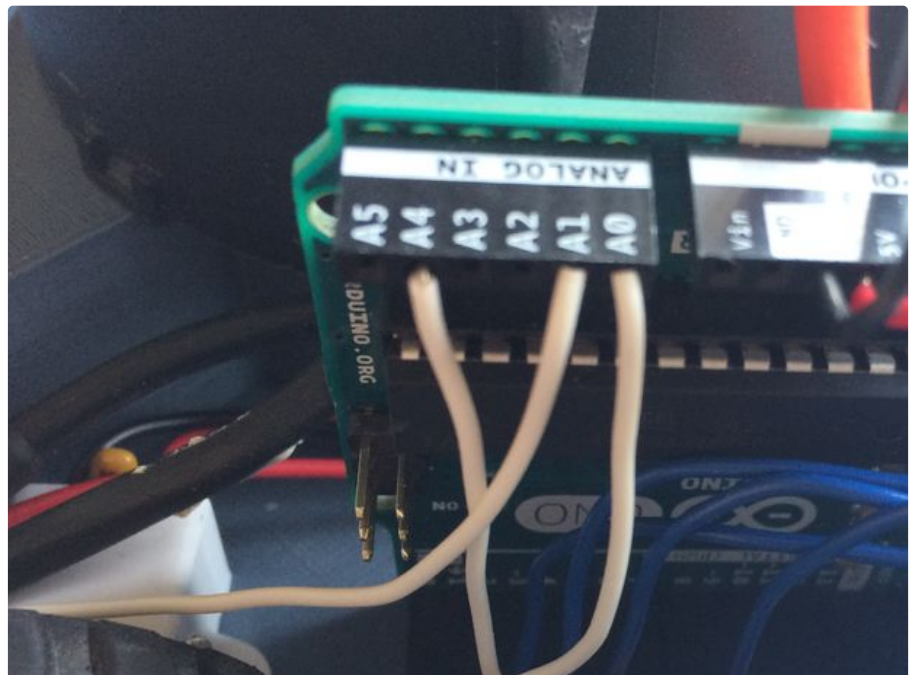
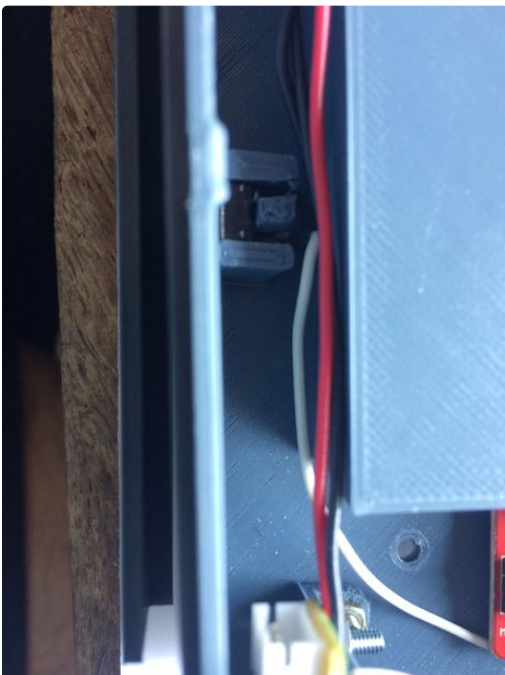
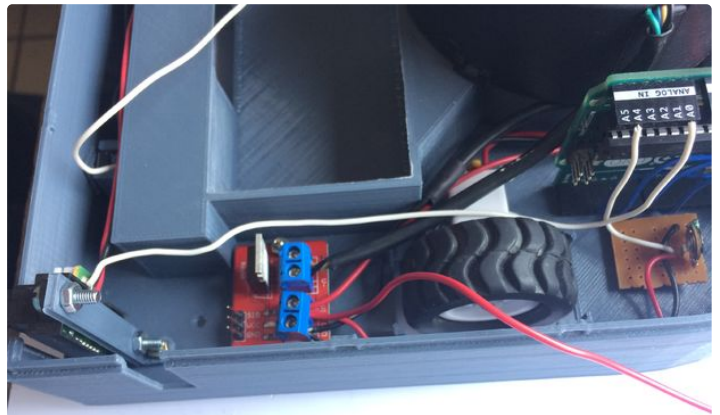
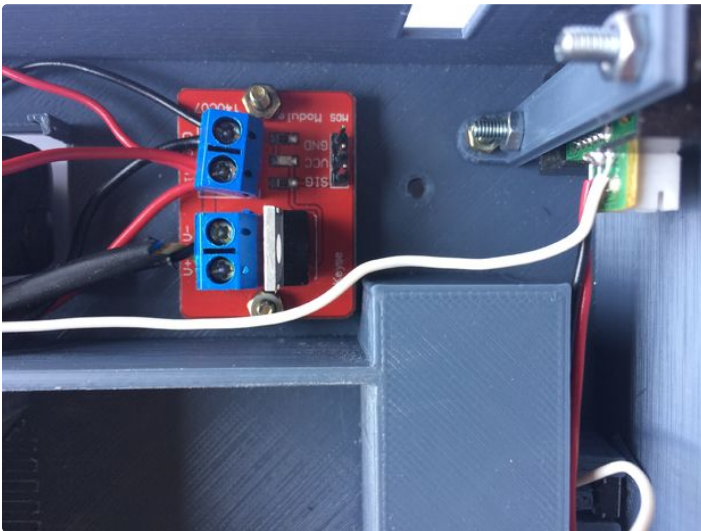


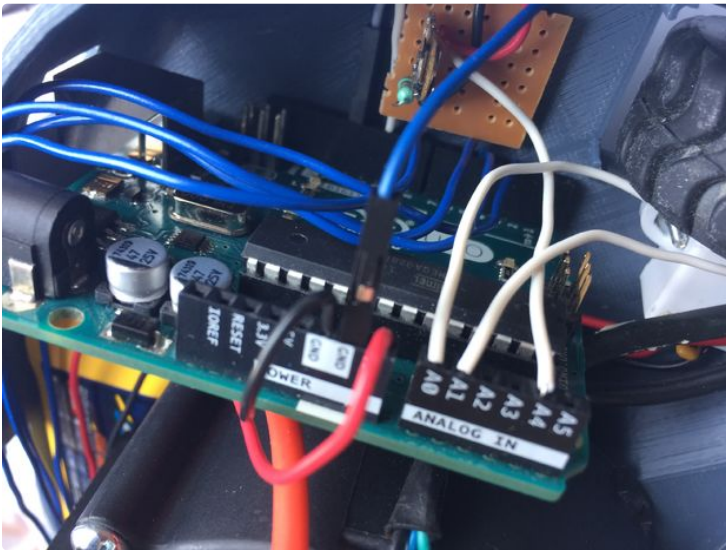
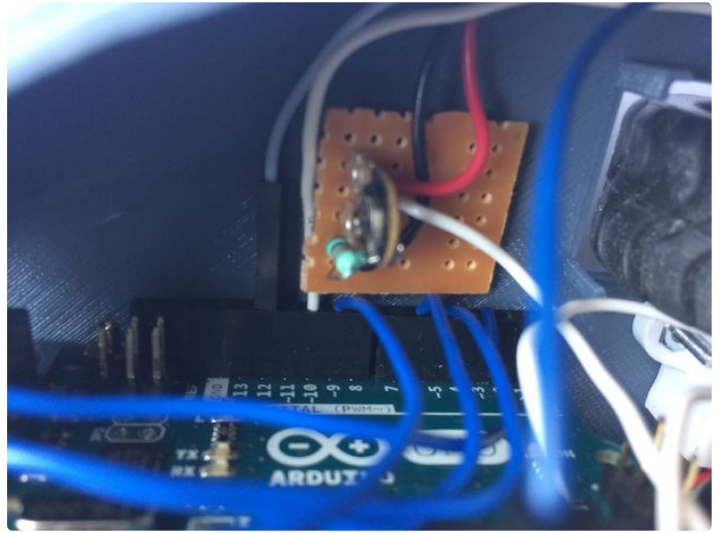
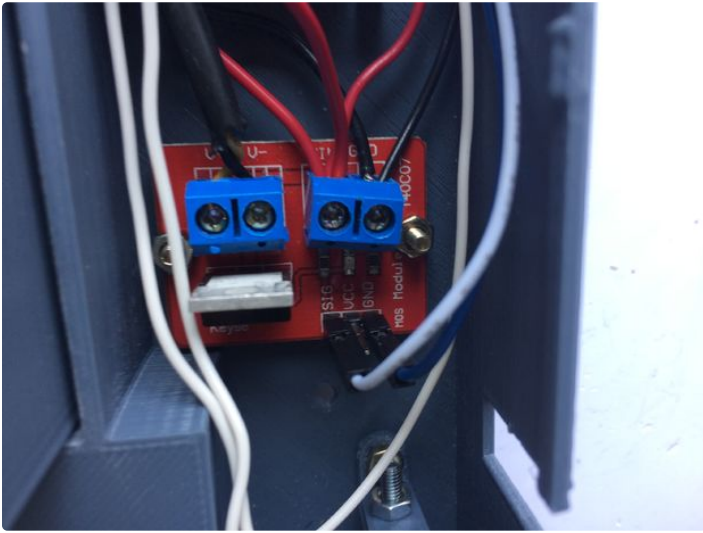
## Step 15: Connecting the Sensors to the Microcontroller

Start connecting the sensors as following:

- Left Sharp sensor to A0
- Right Sharp sensor to A1
- Pushbutton to Digital pin 10

Using female to male jumpers, connect the Mosfet Terminal "Signal" and "GND" pins. The signal must be connected to the digital pin 12 and the "GND" pin to one of the Grounds on the Arduino. (See the pictures)

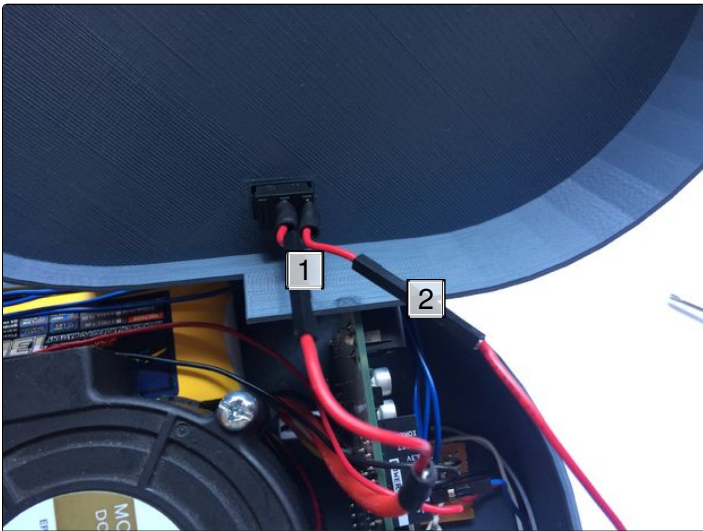
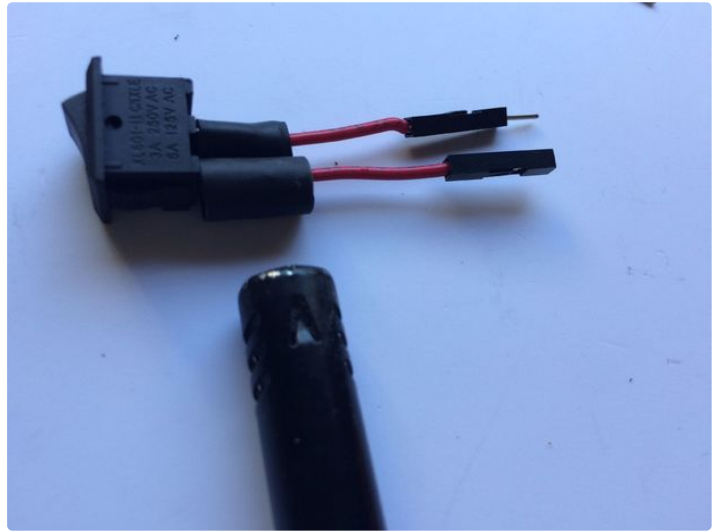
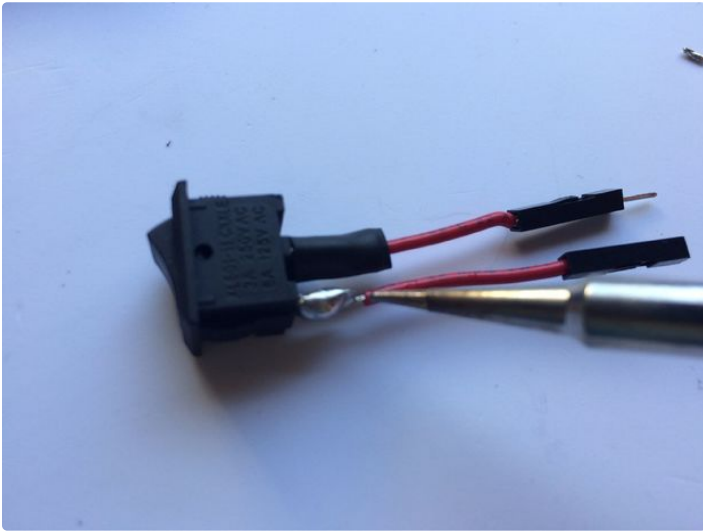




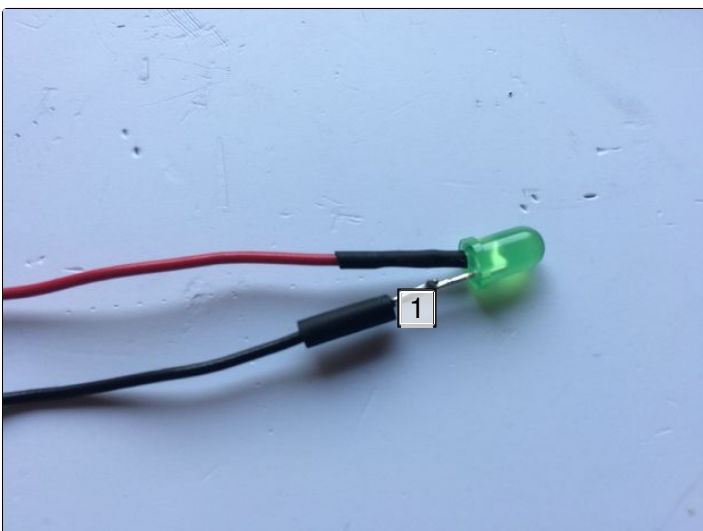
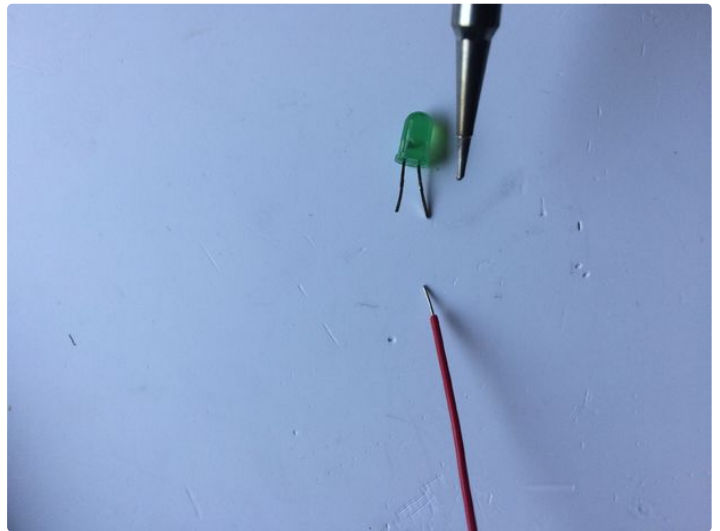
## Step 16: Almost Done

We will need a switch to turn our robot on so I attached a male and female connectors so that it could be connected to the battery.

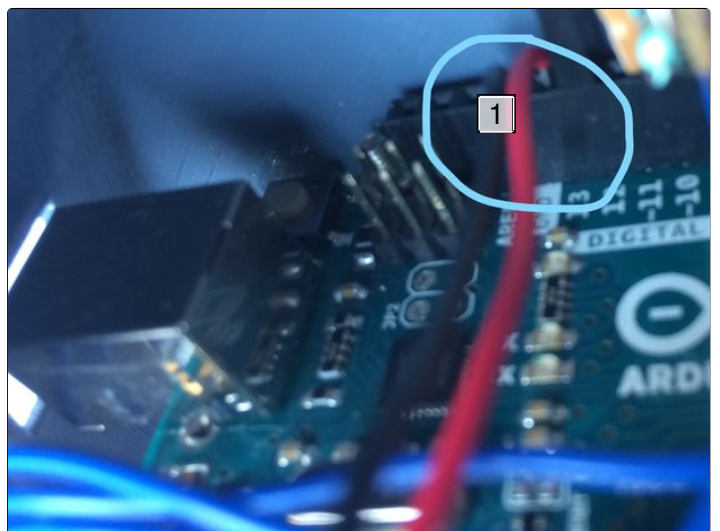
I also wanted to use an indicator LED (optional) connected to the digital pin 13 and GND. See the pictures for help.



1. Connect male terminal to the Battery
2. Connect female terminal to the remaining male terminal of the MOS-FET



1. GND is the shortest wire of the LED



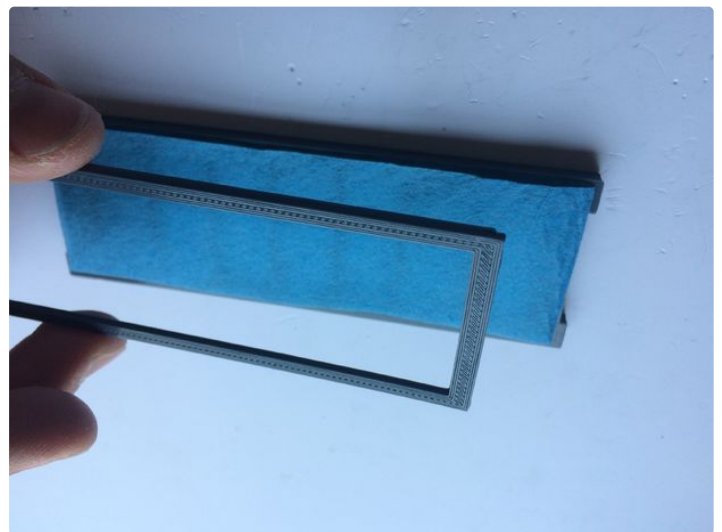
1. LED digital pin 12 and GND

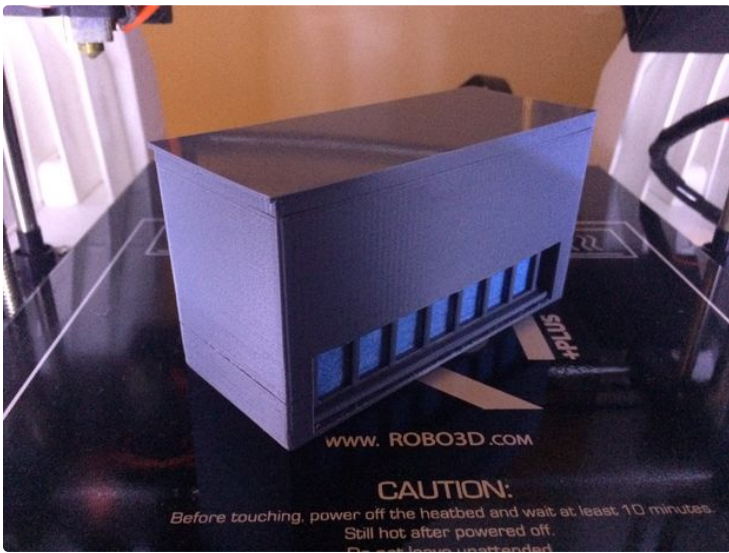
## Step 17: Assembling the Container

Once you have all the Container parts printed we need to assembly it.

Mark the cloth filter to the dimension of the *FilterTap* then ad 1mm on each side and cut the rectangle.

Joining the pieces as it is showed on the pictures and put the filter inside the container.







## Step 18: Close It!! and Program It!

Close it carefully and make sure everything fits nicely. 3.- Fan control

You can charge the robot by just pulling the charging cable and connect it directly to the charger without having to take the battery apart from the robot.

I have uploaded an Arduino Code that you can use, it is pretty simple but it works really nice. Download the Arduino IDE, compile the software and program your robot!.

The code includes:

1.- Battery monitor:

\* It is constantly measuring the voltage and if the battery voltage is below the threshold it will turn off all the motors and the LED will start blinking.

\* When starting it tries to turn on the Fan and if the battery voltage is below the threshold it won't start.

2.- Collision avoidance:

\* It measures the distance from the sensors to an object and when it is close it turns to the opposite side.

\* It senses when it is on a corner and turn 180 degrees.

\* When the bumper touches it turn right.

\* Turn on/off the fan

4.- Motor control

\* With PWM it moves the motors in both directions.

I encourage anyone who wants to improve this to do it and share so that we can enhance our knowledge!

NOTE:

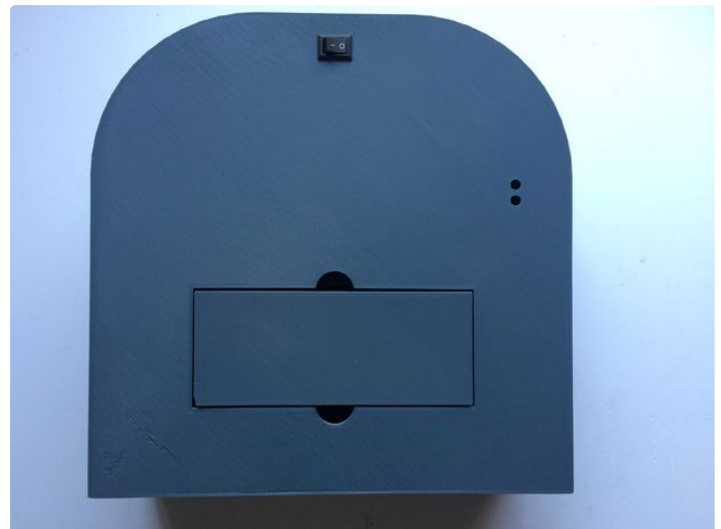
I have added a test code (VaccumCode\_test\_Motors\_1.0.0) to make sure that the motors are wired correctly. If you run this code and the robot is not moving forward you must swap the motor wires on the L298 Driver.

I have also added a Beta Code for side sensors. (VaccumCode\_SideSensorsBeta\_1.0.0)

I like this project a lot but unfortunately I can't give support forever so I will let the community share their knowledge.

Cheers!

-César Nieto





<https://www.instructabl...>

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<https://www.instructabl...>

Download

## Step 19: What's Next?

What about adding encoders to the motors so that you can predict the position of the robot?

Adding more sensors? you can follow edges to ensure a better cleaning

Mapping? Once you have the encoders you can save the objects that the sensors see and create a map!

This is a nice project to start building complex codes and complex navigation algorithms so I encourage you to do it!

Any suggestions?

Updates:

04/10/2017

- Code updated to use Pololu motor encoders with PD controller
- Almost all the code was modified to be more easy to understand

19/05/2017

- Code updated (just some comments were erased)
- Circuit diagram added
- A better explanation for the battery was written

---

## Step 20: Contribute

The project is now available on Github where you can share all your improvements:

<https://github.com/cesnietor/VacuumRobot>

If you like the project you can buy me a coffee. You're awesome!

<https://www.buymeacoffee.com/cesnietor>



I tested the "testmotors" Code on my bot, it worked fine

But when I put vaccum2.0 code, my not gets stuck on moving left iteration

I chcked output value of sensors on output window it remains same and doesn't change at all, I have used 10-80 cm analog sensors

For that I changed the sdsharp value by comparing datasheets of both 4-30 CM and 10-80cm I found if a use the function "return(dist \* 2335.8), i shud get the correct distance (confirmed it analytically)

But output value of sensors is not changing at all it says sd1= 7.01 and sd2=8.6

And tried to put my hand near sensors to check any change in distance but nothing happened

What m I doing wrong, pls help?

@cesnieto my robot turns left in one place only plz help me out .



Hi. Great project! I have recently received AVC blower fan, but I can not find any instructions on how to reverse its rotation? When I turn the fan on, it just blows the air, while as I suppose it should suck the air in. Could you point me out or explain me how did you do that? Thank you!

It does blow air from its outlet, but creates suction inside the bot, vaccum is created inside which sucks the dirt inside from that opening given on the back side of base

i need to make the 3d model of the project , i would like to know ,will u give the dimensions of the model if i buy subsription or not ?

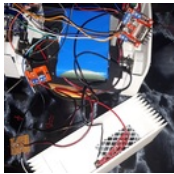
Why you'd do that? He's already providing all the 3D model files.

Just an idea if no one has posted yet. For the bumper you could use an ir/led sensor device that gets physically blocked when bumped. They use it on the camera heads in nuclear medicine gamma cameras for safety. You can literally use one finger to press on the cameras detector surface and it moves just enough to block a little red led inside. This stops all motion so no one gets hurt. The surface is spring-loaded, moving maybe 1/8 of an inch. Hope this helps!

Hello, did you solve the problem?

Hello, this project is amazing!!!but i have a problem,  
when I turn the wire from GND to R2 it catches fire.

can you tell me where I was wrong?



Hi!

Please first take the voltage divider and make sure it works measuring with a voltmeter on the Vout. (Nothing else should be connected, just the Voltage from the Battery to the Vin and the Ground the Ground of the Battery).

I noticed that 12,47 volts come out of L298 instead 5v  
the 12v bridge is enabled

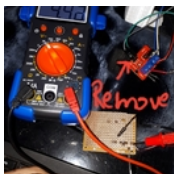
thanks for attention!!

I found the cause, if I unplug the GND it is not short-circuited (GND mosfet-arduino)

this cause I burned to Arduino?

now i have the righ tension!

now I try with another Arduino



Ive not long entered the world of 3D printing and later still the Audrio - this is a cool project. I have just started to print the base and have ordered the parts, however I am unsure of which push

button type is required, please can you advise on specifics or provide a link to an example? best regards :-)



I've just added to the bill of materials. I think is the standard pushbutton for breadboards.



one part of the print got a bit bent out of shape as seen in one pic but it works great, i am impressed that i managed to make something that actually works or i never blew it up, which i appear to be an expert at.

added are 2 side sensors, a second led which lights when a sensor detects and object.

next for me to do is add 2 more sensors and encoders.



Can you please send me the circuit diagram and code which you used? Thank You

I made it (kind of) and I need help!

I built this one with very basic tools and materials as you can see. This was my first robot and second arduino project. I really enjoyed it, thank you for the instructables (I gave it as a Christmas gift).

So my problem is that I'm new to c++, and I am unable to modify the code in order to instead of just going straight ahead, go backwards and turn from time to time. I need this function because it gets stuck a lot (due to the not so good bumper design). I know it will be less effective, but at least it won't be stuck in a chair or something.

I ended up adding some lines above the else if (!control) part of the sketch, but now it just ignores the sensors and bumpers, unless they detect something in the end of the cycle.

You can see the modified sketch here.

<https://create.arduino.cc/editor/Andorjan/c1385cf8...>

I spent my last four-and-a-half hour train trip with an app called SoloLearn (for learning c++), and I think maybe the "while" syntax may help, but I'm unable to test it until next weekend, and I'd like to have the proper code by that time.

Here's a video of the robot and it's issues

[//www.youtube.com/embed/cPbY-wy9AqA](https://www.youtube.com/embed/cPbY-wy9AqA)

Thanks in advance!



Hi, sorry for replying late, I didn't see the post.

Congrats on your robot. I see the problems. It might be due to the bumper. If you are learning how to program, start by removing the bumper. cause with so many sensor you might not know what is happening. First look at the pins that are connected to the bumper and you can disable that code by commenting it or just removing it(look at the bumpers' else if ). Other propose is to connect the arduino and see what is printing on the terminal (on the arduino app). first try to make it work with just one sensor and then with the others. The reason why it detects until the end of the cycle is because the delay(), function inside the move motors functions holds the state and doesn't evaluate the sensors (it might be something to improve from my side). First make it work without

the bumpers add more time to the backMotors func on the else if of the side sensors and if suddenly it get stuck because the side sensors are not detecting then try to add bumper code on it but first make sure that the bumper works. Good luck Cheers.



Thank you for your help!

I posted the question to the arduino forum as well, they replied something with the loop() things also.

<https://forum.arduino.cc/index.php?topic=521143.0>

The accelerometer arrived, and I managed to integrate it into the robot, so now it detects if the robot is stuck, but the sensors are not giving any signal about this.

The accelerometer I am using is called 6DOF MPU-6050 3 Axis Gyro With Accelerometer Sensor Module For Arduino ([https://www.banggood.com/6DOF-MPU-6050-3-Axis-Gyro-With-Accelerometer-Sensor-Module-For-Arduino-p-80862.html?rmmms=myorder&cur\\_warehouse=UK](https://www.banggood.com/6DOF-MPU-6050-3-Axis-Gyro-With-Accelerometer-Sensor-Module-For-Arduino-p-80862.html?rmmms=myorder&cur_warehouse=UK)).

I used a code from an other project to integrate the accelerometer. That project is for a head mouse that clicks if the cursor stays inside a 10\*10 pixel square for 2 seconds. I raised this value to 20\*20 pixels, but maybe it was not a good idea, since I get a good amount of false positive readings from the accelerometer, while the robot is moving straight ahead. I replaced the click to an order to a desired movement.

Here's that project (also awesome): <https://www.instructables.com/id/Head-Mouse-With-MPU6050-and-Arduino-Micro/>

Here's the code I am currently using. It still needs some adjustments because of the false positive readings from the accelerometer, and for a yet unknown reason my left side bumper does not work (might be even contact issues because I don't see anything in the serial terminal from that one.

<https://pastebin.com/V8hZKMED>

The new part of the code is at the bottom.

Maybe my battery died recently as well, I don't know why, but I'll try to figure it out.

So again: thanks for the project, it's awesome!

Go forward(∞);



Very nice project !

For those who have I built one, how effective is it in cleaning ?

I think of build mine for fun but if it is actually work pretty well it is even better !



It is only good at picking up very light material. It has no beater, so carpet cleaning is minimal. It is effective at cat-hair, though. That is the way I am using it.



Thanks for the project. It was fun and educational to build it. I plan on a version 2.0 now with a lot of changes.



[https://youtu.be/h\\_QPO4D5dFw](https://youtu.be/h_QPO4D5dFw)



<https://youtu.be/-r5Zucc35mY>



<https://youtu.be/BeNVHW-ly4k>



<https://www.thingiverse.com/thing:2519029>

more pictures and stl



Hello, i'm french and i'm trying to build this perfect vacuum robot! Can you say me if they are 6v or 12v motors? because in parts list it seems to be 6v but when i go on digikey, voltage semms to be 12v. Thanks a lot.



Hi! The pololu motors of 6V can handle 12V but it might affect their lifetime.

I recommend this ones:<https://www.pololu.com/product/3056>, their extended shaft will help when trying to add the encoders (which I recommend also to buy).

Since they are 12V the current consumption is less.



thanks a lot! do you have solidworks files?



I've never seen your project it's very good. I built mine based on the roomba 600 series, but you gave me good ideas Congratulations. see my project is still unfinished

<https://www.youtube.com/watch?v=fDb9jKIR71I&t=25s>

I would like to be able to print in 3d a more robust box, but in my country (Brazil) 3d printing still costs more expensive than an original roomba.



It is actually really nice, the suspension on the wheels looks great. If it is to expensive you can try services like 3dHubs or maybe you can actually find someone who might be up to send you the printed parts for lowcost.



[//www.youtube.com/embed/YS2ubfFxW1o](https://www.youtube.com/embed/YS2ubfFxW1o)



Awesome work! Nice. Your improvements are going really well. The bumper looks better, eventhough is the same principle, it looks that it performs much nicer. Are you doing wall following? Did the encoder code work for you? (I saw that is actually moving straight)



the wall following is enabled and works great, the encoders i am yet to wire in as i am waiting for 2mm pitch connectors to make it easier to solder as i have nurve trouble which makes for non stedy hands , i reprinted the lower body with a few modifications such as added motor mounts for brushes, your original code for the bumper seems to work better than other methods i tried, 1 idea i had was to add 5 basic ir sensors in between the front sharp sensors but that caused battery drain to the point of no start up from arduino so i used 4 micro switches instead which works.



sorry to keep asking things but i have the encoders you recommended, i found the library needs for the sketch but are there and tutorials out there as i can not find any for the polou one's or do you have any advice as to implementing them to the main sketch.

thanks



I have uploaded a new code, I changed a lot of things but I hope you understand everything. The pins for the motors changed and since you are using arduino Mega, you will need to verify the attachinterrupt() because it has different ones. I tested the code with one motor and it works nice, still it can be improved though.

I saw your project on thingiverse and it looks really nice. Cheers!



Can i use the new code for adruino uno to get the side Sensord working and both bumpers ?



me help please connected everything together when the unit turns on everything works great but the output to the fan motor is only 6 V if I disconnect one of the ground to the board and rhe motors stop the fan is working full blast is that normal ?



Hi, make sure that all the connections are ok (like looking for any shorts that might be happening). Check specifically the Motor driver since some jumpers should be connected. It can also be the battery power, if it is not enough current, the voltage will drop. Try to connect each thing separately and add each element at a time. There are so many other things that I would check but I'm assuming that you are using the same fan (consider that some might be broken), and the same drivers (that support the correct current consumption). Sorry for the late response.



All good faulty FET Driver Module

Some help please connected everything together when the unit turns on everything works great but the output to the fan motor is only 6 V if I disconnect one of the ground to the board and the motors stop the fan is working full blast is that normal ?



i had the same problem so swapped the yellow wire for the red ans it is now 12v



Yellow wire from the fan?



when i connected the yellow wire from the fan to the mos it never worked and it turned out that i had to change the fan yellow for the fan red for it to work, if the mos is only out putting out 6v when 2 or more grounds are connected but works when 1 is removed then try remove that ground wire and connect somewhere else but could there be a short elsewhere as something is coursing drain for that to happen



I'm talking about the output of the mos fet how does change the wire change the voltage output on the mos fet?



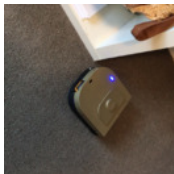
thanks for the code and the one i printed from thingiverse i am using to try other things such as lcd with battery monitor, bumper using limit switches, to which i will eventually upload a video and any files that may be of use to other's, i seem to be hooked on this now as its a good way of learning and has so much potential.



No worries. For the encoders it needs a bit more of code since they need to use Arduino interrupts and a PID controller. I have a project where I used a similar encoder so let me adapt it to this project and I will reply you soon. You can start by looking at those concepts to try to understand why we need them, you don't need to understand all the theory behind PID controllers, just a bit of intuition.



Complete



Great! Do you have any video? YouTube link? Looks really nice though.



[//www.youtube.com/embed/8TNIMs2vZ7w](https://www.youtube.com/embed/8TNIMs2vZ7w)

" frameborder="0" allowfullscreen>