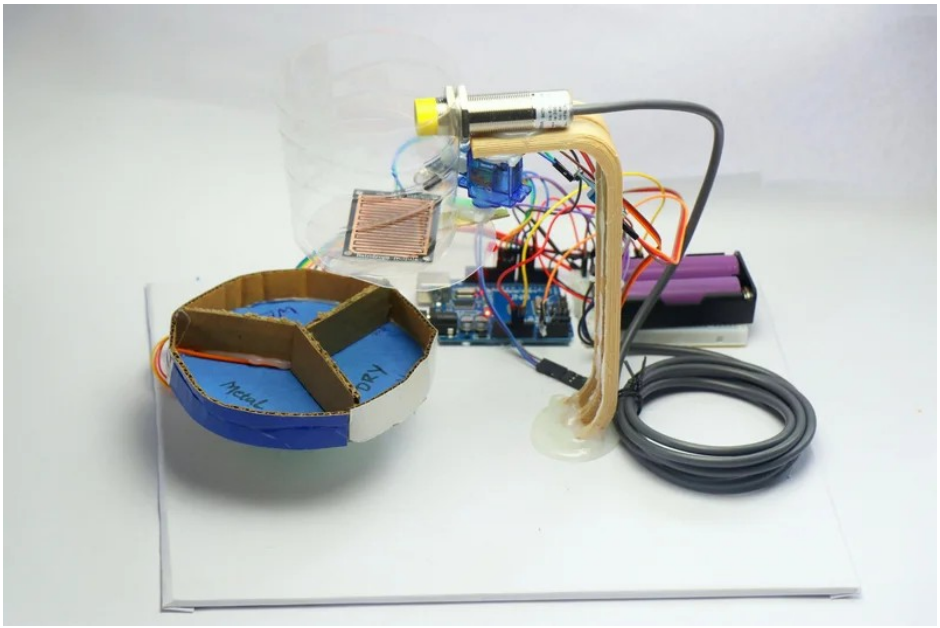
AUTODESK Instructables

Automatic Dry Wet and Metal Waste Segregation Project Using Arduino

By ROBO HUB in CircuitsArduino

Introduction: Automatic Dry Wet and Metal Waste Segregation Project Using Arduino



Hello people in this instructables i will show you how you can make automatic Dry Wet and Metal Waste Segregation Project by using arduino.

The project is very useful in waste management, to begin with let me quickly tell you the origin of idea for this project.

I have and also most of you have seen manually segregation of waste that involves humans, I feel pity and most of you also might have gone through the same.

When some work is left to the machines specially in such environments it will be the true purpose of building machines! So i was gathering information on this topic and came up with a mini segretagor that also can be scaled to be used in practical applications.

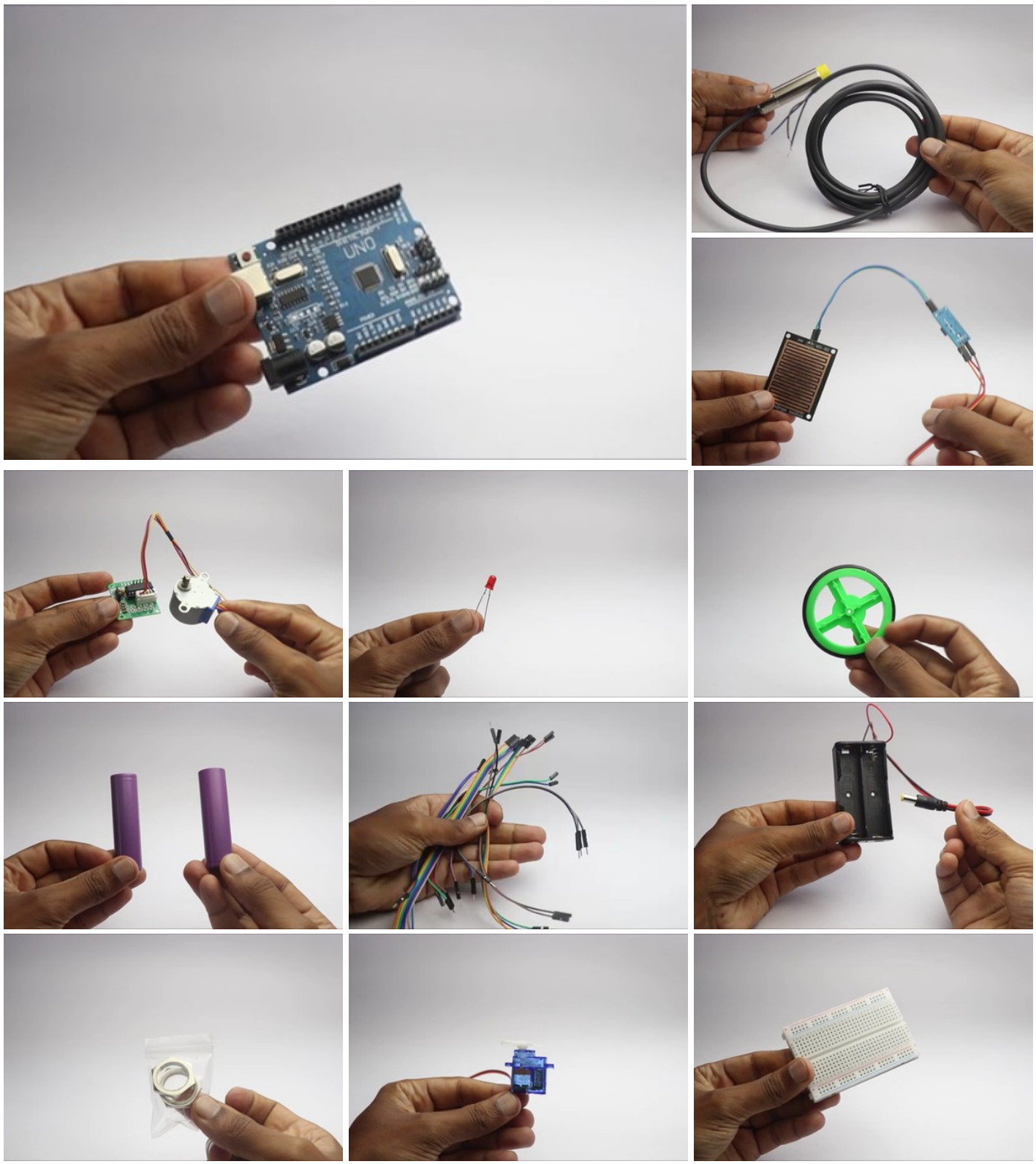
My segregator is powered by arduino and can clearly segregate Dry, Wet and metallic waste materials and drop them in dedicated bins.

I will be using simple electronic components in this project and the mechaims is achieved with with simple idea too.

I strongly recommend you guys to build such useful projects which is most required in today's waste management, I have given all the necessary information to build this project and as always there is a working video given in the end.

If you made a more advanced version than me let me know in the i made it section i will be happy to see it.

Supplies



Arduino Uno Board

NPN Proximity Sensor

Rain sensing module

Stepper motor with driver

Red LED

IR sensor module

Wheel

Jumper cables

Lithium ion battery

Battery case

Micro servo

Small Breadboard

Sheet of Board

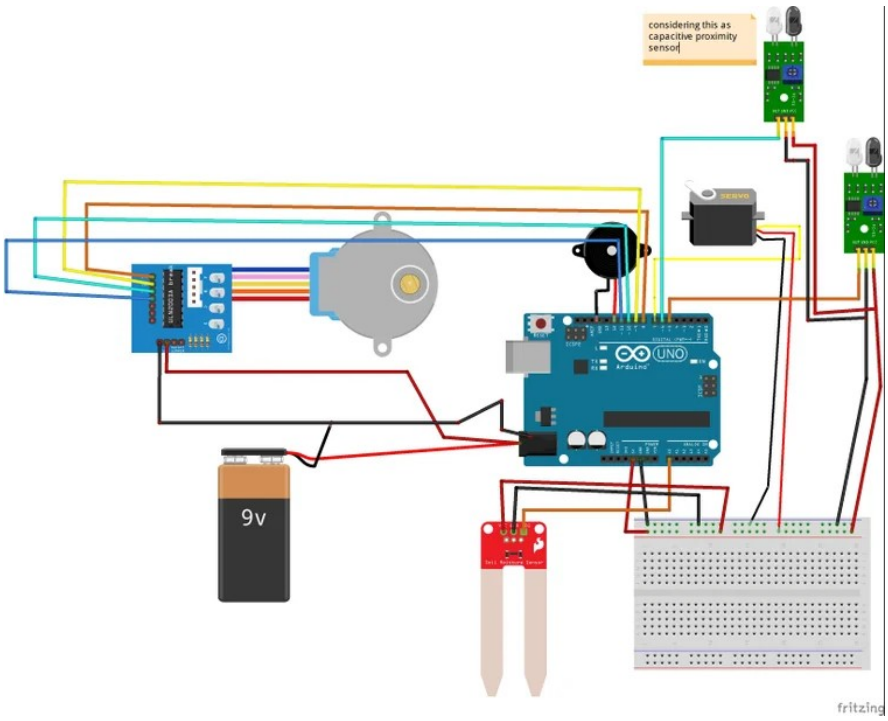
Hot glue

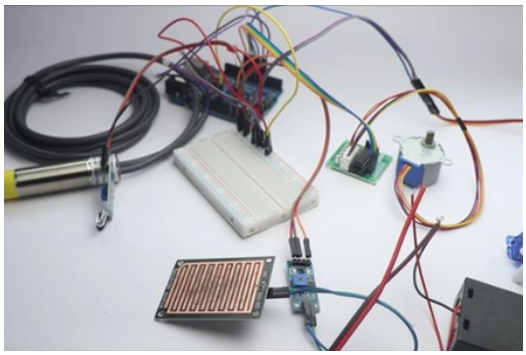
Arduino programming Cable and IDE

Plastic Bottle

Scissors

Step 1: Circuit and Codes





To make it easier for you to build connections i will explain the circuit diagram component wise

NPN Proximity Sensor

This sensor detects the metal and has 3 pins, Vcc, Gnd and signal

You should make a note since the color of wire will not help you understand the terminals so there is a color code for the pins

The power pin is connected to the power rails on breadboard whereas the signal output is connected to A0 on the Uno

Note that i was not able to find the proximity sensor part so i had to use moisture sensor module, anyways the connection remains same.

Stepper Motor Connections

In1 to D8

In2 to D9

In3 to D10

In4 to D11

Negative and Positive pins to Gnd and Battery positive pin(this is done because stepper motor consumes more power and uno board cant supply)

Micro servo connections

Vcc and Gnd to + and - rails on the breadboard

Micro Servo signal to D7 of Uno

IR Sensor

This has 3 pins Vcc, Gnd and Out

Vcc and Gnd to power rails on breadboard whereas the Out to D5 Pin on Uno

Rain Sensor

This sensor senses the water and has 3 pins

The power pins are connected to the breadboard power rails whereas the signal is connected to D6

In the circuit diagram i have added a note(i was not able to find rain sensor module so i used IR sensor)

After you made these connections upload the program to uno, copy the below code and paste it on your Ide, Select the proper type of board and port number and click on upload.

After this is complete we can head over to testing of the circuit.

Step 2: Testing and Calibrating

After you build the connections provide power to the board and add wheel to the stepper motor this is done to check if the circuit is working fine.

Since the IR sensor is sensitive to light source, Cover it under some object like i did.

Test Dry Object

Now to test the project place your hand in front of IR sensor(hand is considered as dry object), Now the servo should work whereas the stepper should be in same position.

Test Wet Object

When wet material is detected by sensor it should also be sensed by ir sensor, This is now

considered as an object first and secondly it is classified under wet, Now the stepper motor moves and servo opens and then servo comes back to its initial state

Test Metallic Object

This is first sensor that object passes through, If the metal is detected by proximity sensor the stepper moves and servo activates and again stepper moves back to default place

This mechanism is now put into an order to make fully automatic segregation system.

You also can refine this circuit with a Simple small PCB, Complete your electronic projects in the best way from **PCBWay**

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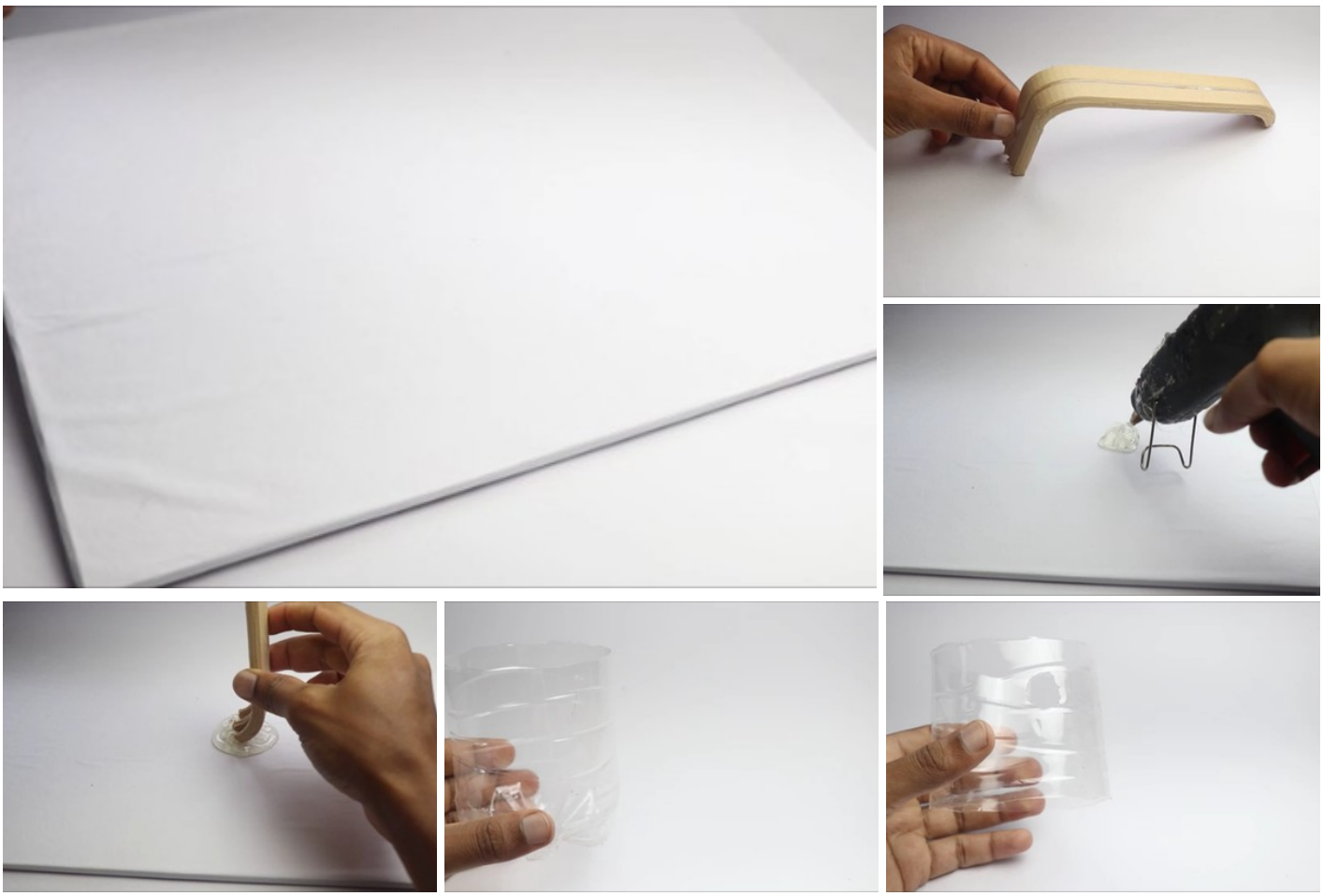
Step 3: Build Phase 1



To make a stand that holds all the electronics i will use a sheet of cardboard, I recommend to use MDF board since it is strong and would suit the needs.

The holder that holds the dispense mechanism should be tall, You can use ruler, strip of cardboard in my case i had a 3d printed stand from my previous project so it did the job for me

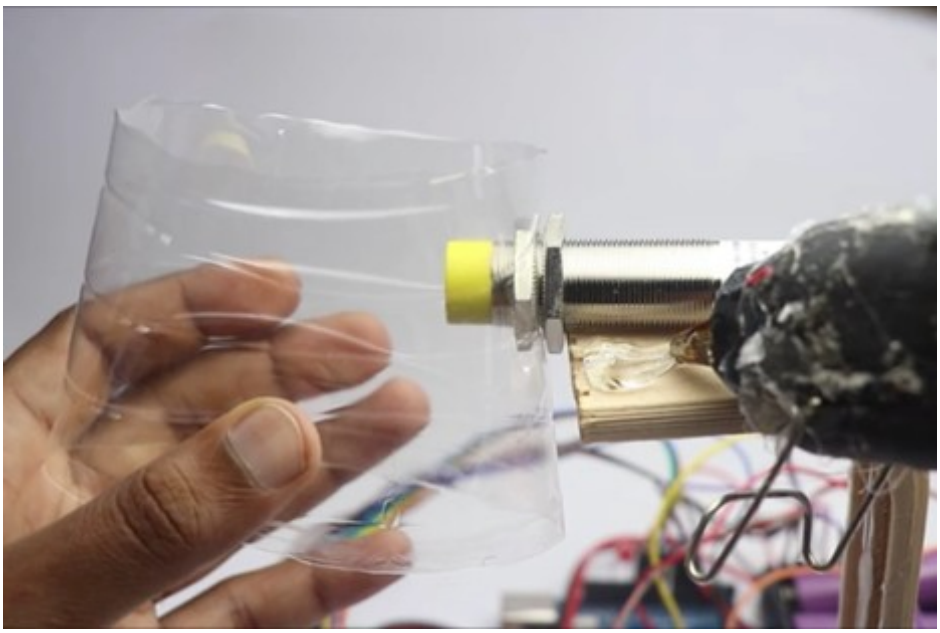
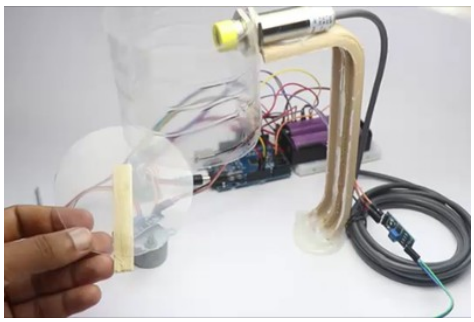
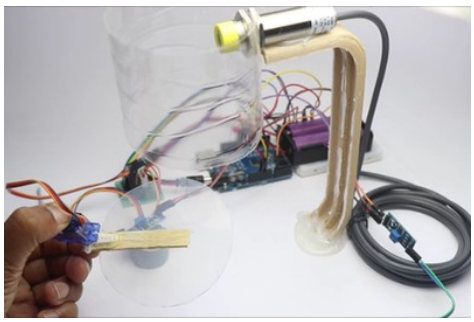
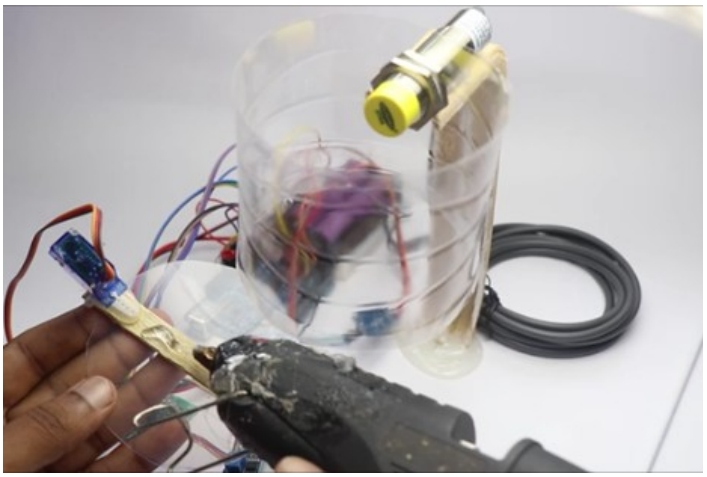
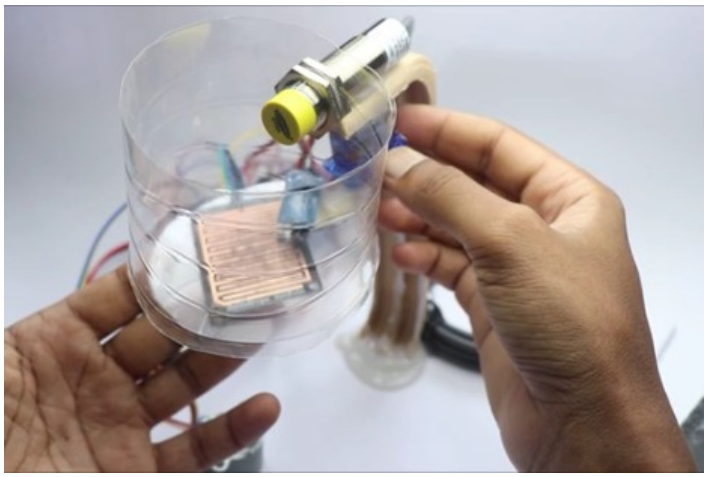
Drop the hot glue(be generous) and place the stand and hold it until the glue is dry.

Now the dispenser frame would be recycled plastic bottle body, Measure the diameter of proximity sensor and make same size hole on the bottle.

The bottle should be free from sharp edges and you need to make a note on this

Now we can install all the components on these parts and let us see how i did this on the next step

Step 4: Build Phase 2

Use hot glue to add proximity sensor to the frame, Make a note that any object passing by should pass through this sensor first so i kept it at the top.

Now to dispense the detected objects servo is used, Add a small plate that is the size of base of the plastic bottle which you are using.

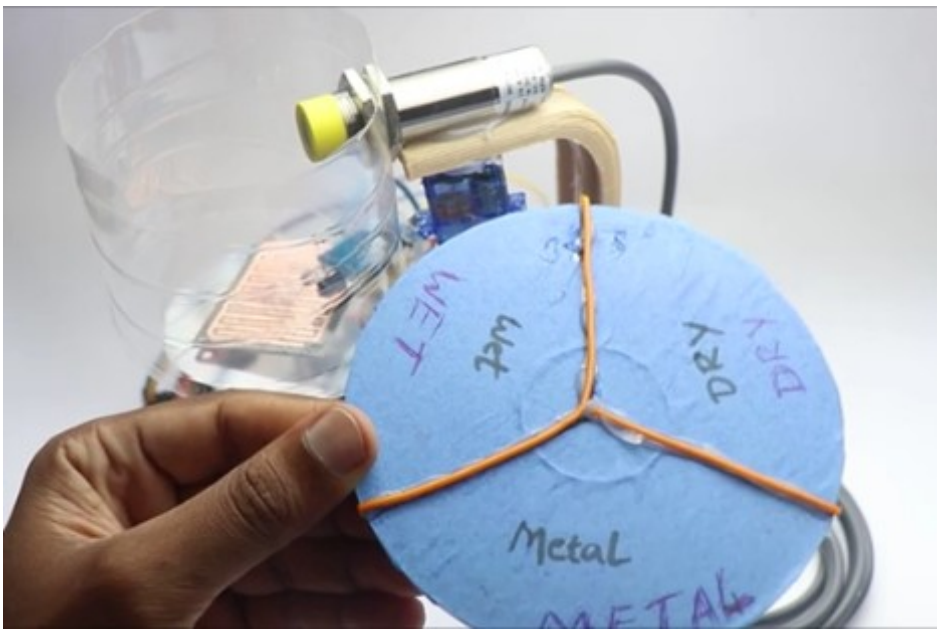
Extend thelength of the servo horns using the popsicle stick, Use hot glue and after this is dry check if everything fits well.

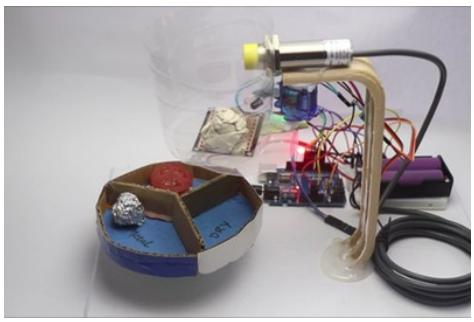
Now add the rain sensor onto this and secure it with double sided adhesive or hot glue, Add the Ir sensor in such a way that when you place something on rain sensor it should be detected by IR sensor too.

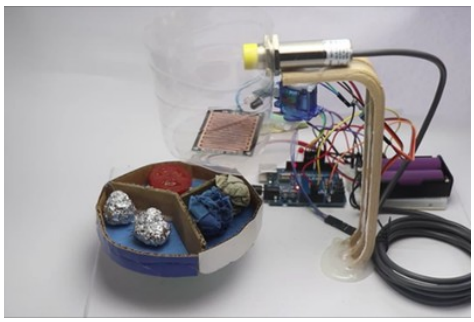
Finally glue all this setup onto this plastic holder, After you add glue make sure everything is dry and no open ends of wires are visible.

Make the project neat by organising the cables, Now we have the project ready and only thing pending now is testing and let us see how that is done on the next step.

Step 5: How to Use







Using this project is truly exciting since it is helping you in sorting one of the clumsy tasks.

Like i mentioned earlier use an external battery to power this project, Once you turn on wait for few seconds and now the project will be ready to use.

The size of bin that you will use depends on the type of application, In my case the size of CD did the job.

Now there is a sequence of working order here, The object should go through order, first it should pass through proximity sensor and if the object is metal the servo turns to some angle and the object falls under metal compartment.

If the object is wet(contains water) it will anyway bypass the metal sensor but it is detected by rain sensor and ir sensor so now the object falls under wet category.

If the object is neither metallic nor wet it will fall under the dry slot, This way it can segregate the materials, You can also add a conveyor belt to increase the speed of process.

This was all about this project, if you still have any question don't hesitate to ask me i will answer all your queries just drop in the comment section.

Step 6: Working Video

How can you miss the working video of this project! Well here is a detailed video tutorial of this project.

If you missed how to calibrate the stepper consider watching this you will get a clear picture, Well that's all for now hope you will use this project to bring some changes to the existing problems.

Thank you for your time and like always stay creative, Bye..