FOREST AIR QUALITY MONITOR

Activity Overview

Air Pollution is global problem; a lot of plant, animal and human life is adversely affected due to pollution in the atmosphere.
The forest environment is polluted due to several natural and artificial causes like:

- Rotting dead bodies of animals in the forest.
- Industrial gas emissions from nearby places.
- Vehicular emissions which visit the parks and forests.

In this activity we shall learn how to monitor the Air Quality of Forests and alert the officials when the air quality deteriorates. We shall be connecting our Genuino 101 with Ammonia sensor which is a primary pollutant in the forests.
We can then visualize the data on our Blynk App.

SUBJECTS

Science Computing

TIME REQUIRED

2 Hours

AGE LEVEL

11 - 18 Years

What Shall We Learn?

- How does Ammonia (NH3) sensor work
- Connecting breadboard with our Genuino 101
- Visualizing Air Quality data on Blynk App

Activity Objective

The aim of the activity is to monitor the Air Quality of Forests, inform officials and give updates about Air Quality of forests.
We shall design a Forest Air Quality Monitor which can be installed in the forests and give Air Quality data on the Blynk App.

Components Needed

To design a Forest Air Quality Monitor we need the following components :

Genuino 101

The brain of our device. It will receive data from the sensor shield and transmit the data to the Blynk mobile App.

Gas Sensor

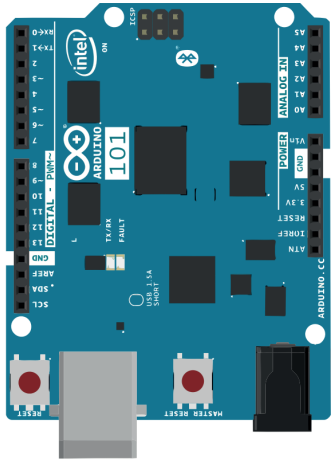
It detects the Ammonia (NH3) and sends the data to the Genuino 101.

Power Supply

It provides energy to our controllers and sensors.

Ammonia Sensor

POWER SUPPLY



GENUINO 101

Understanding Sensors

Ammonia is the main pollutant in the forests. NH3 sensors use Electrochemical gas sensing method to detect the content of Ammonia in the atmosphere.
The ammonia gas pases through the sensors and it reacts with the electrode in the gas sensor and creates an electric current. The current is measured and its data is sent to the Genuino 101.

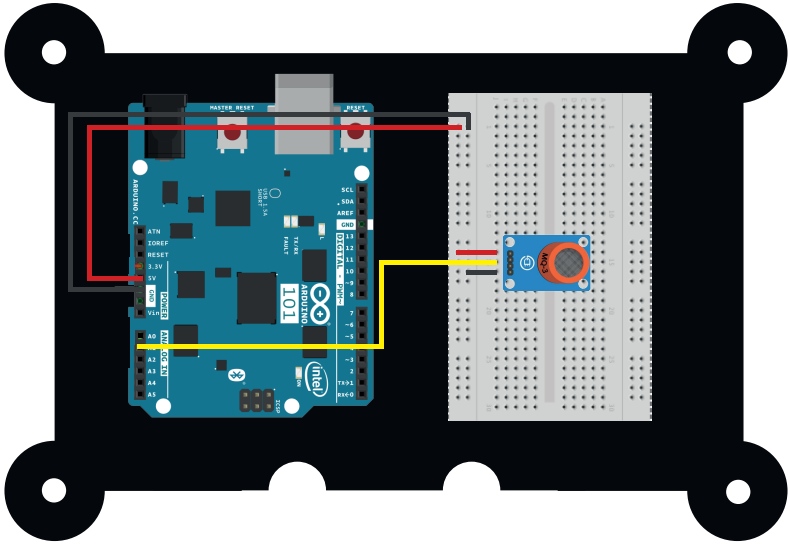
Ammonia Sensor

Connecting Your Sensors

We have all our components ready to be connected. Let us begin by connecting the Genuino 101 and the NH3 sensor to the Breadboard.

- We shall begin by connecting our sensor to the breadboard. Plug the sensor on the breadboard.
- After connecting the sensor we shall connect the VCC and Ground wire to the pins.
- Now, let us connect our Genuino board to the Breadboard, take the jumper wires and signal wires and connect it in the points as shown below.

After connecting the breadboard with the Genuino 101 we shall provide power using our laptop. Once the power is connected we shall begin with our programming.



TOP VIEW

After connecting the shield with the Genuino 101 we shall provide power using our laptop. Once the power is connected we shall begin with our programming.

Programming Your Sensors

Download and open the code from *bit.ly/ForestAQMonitor* and now you will have to upload the code on your Genuino 101 Click the upload button and once your code has been uploaded you have successfully programmed your device.

Upload Button
(Top Left)

Model Creation

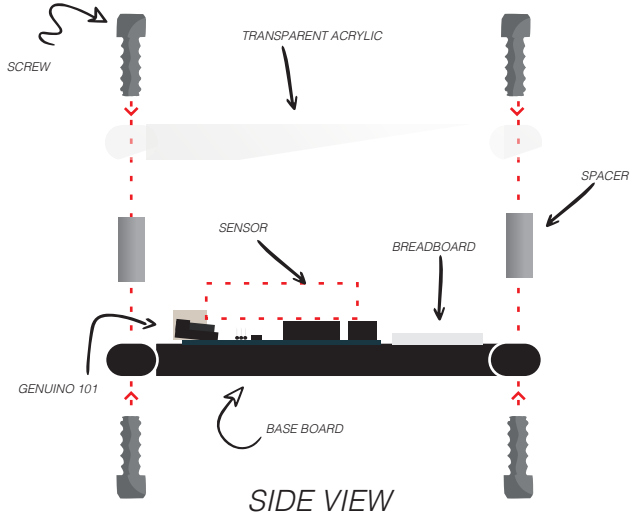
Before we begin with the model creation make sure you have:

- 4 Spacers
- 8 Screws
- Transparent acrylic boar

We will now arrange all the components in a case and make it look cool and easy to use. We will begin by connecting the NH3 sensor module to the base module. The breadboard and Genuino 101 are on the base module while your NH3 sensor is on the Gas sensor module.

Now insert the spacers on the cutouts which are given in the activity kit and tighten them using the screws provided to you. We have our modules attached and spacers set up, now
gently place the transparent acrylic board on the spacers and tighten it using the screw.

Once everything is ready, ensure all your screws are tightened and your modules are connected properly.
It should look something like this:



SIDE VIEW

Output

Once we have assembled the device let us try to test and see if our device is working perfectly fine.
Let us test if our device is working properly. Household items like cleaning bleaches, deodorants contain a mixture of ammonia in them.

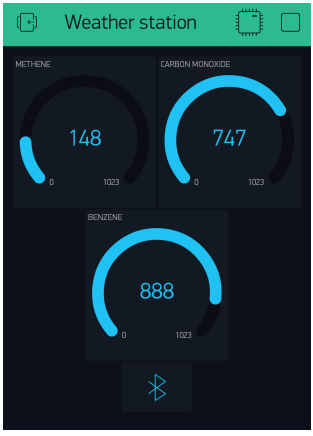
DID YOU KNOW?

Deodorants usually contain ammonia which can cause Skin cancer if applied for a long period of time.

Scan the QR code in your Blynk App and select your Genuino from the list of devices.
Once you select your Genuino the AQ Monitoring App will open in your mobile phone.

You can check the Air Quality level in your phone now.

SCAN HERE



MAKE SURE THE BLUETOOTH OF YOUR MOBILE PHONE IS ON AT ALL TIMES

Impact Analysis

Did you know every year out of all the wildlife deaths 1% is caused due to Air Pollution. Imagine if we could detect Pollution beforehand we could save so many animals from dying.

Future Scope

Our Forest Air Quality Monitor can help us solve even other problems like:

We can install a PM sensor in the monitor which detects dust, usually before a Storm or Cyclone there is a lot of dust in the atmosphere. We can alert the officials about possibilities of a storm.

We can also use the data obtained from this monitor is discover trends and find sources of pollution in the forests.