Air Quality

DIY Experiments

Thejesh GN

I Love Bangalore

because it was 23.925 °C on Sep/1903.

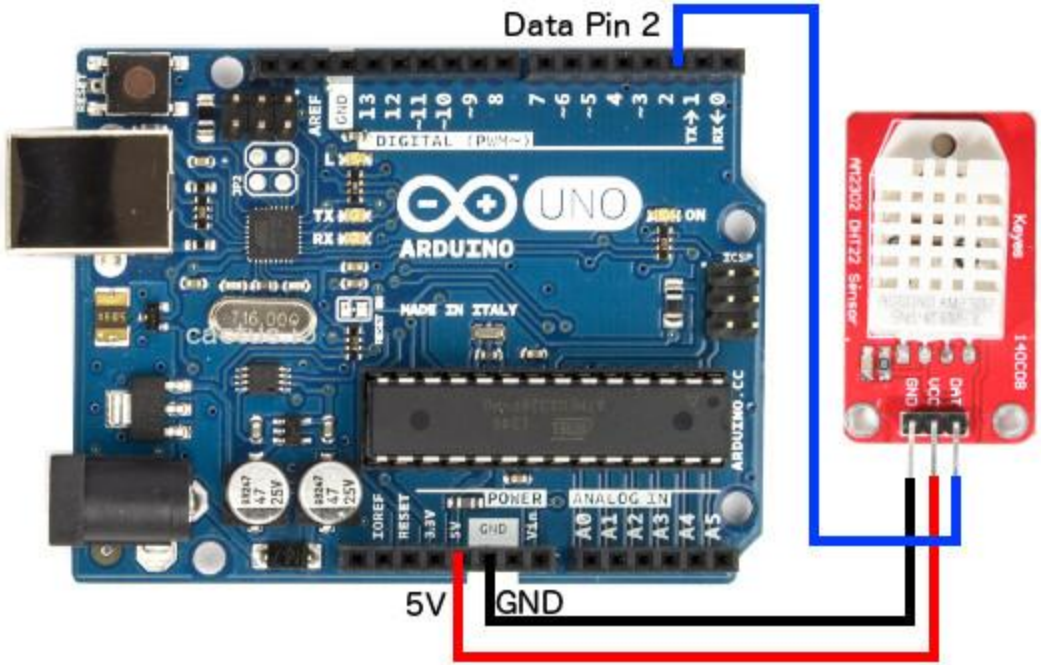
With ♥ Thejesh GN and more about this app and ur comments.

I Love Bangalore

because it was 22.088 °C on Dec/1988.

With ♥ Thejesh GN and more about this app and ur comments.


netatmo
netatmo


Data Pin 2
5V
GND
UNO
ARDUINO
MADE IN ITALY
DIGITAL (PWM~)
POWER
ANALOG IN
GND
DHT
VCC
GND
Keyes
140008
AM2302 DHT22 Sensor

DHT22


YUKTA


BASE SHIELD


DATA CANVAS
OPEN
Bangalore
.org
DATA
Sense Your City.

Bangalore AIR Quality and Allergies

PM2.5, PM10 and others

- Particles with a diameter of 2.5 μm or less
- Particles with a diameter between 2.5 and 10 micrometers
- Measured in volume i.e μg/m³
- Others like C02,S02, NOx etc

AQI - Air Quality Index

- In India, AQI will consider eight pollutants (PM10, PM2.5, NO2, SO2, CO, O3, NH3, and Pb) up to 24-hourly averaging period.
- National Ambient Air Quality Standards defines the averages

AQI Category, Pollutants and Health Breakpoints

AQI Category (Range)	PM_{10} (24hr)	$PM_{2.5}$ (24hr)	NO_2 (24hr)	O_3 (8hr)	CO (8hr)	SO_2 (24hr)	NH_3 (24hr)	Pb (24hr)
Good (0–50)	0–50	0–30	0–40	0–50	0–1.0	0–40	0–200	0–0.5
Satisfactory (51–100)	51–100	31–60	41–80	51–100	1.1–2.0	41–80	201–400	0.5–1.0
Moderately polluted (101–200)	101–250	61–90	81–180	101–168	2.1–10	81–380	401–800	1.1–2.0
Poor (201–300)	251–350	91–120	181–280	169–208	10–17	381–800	801–1200	2.1–3.0
Very poor (301–400)	351–430	121–250	281–400	209–748	17–34	801–1600	1200–1800	3.1–3.5
Severe (401–500)	430+	250+	400+	748+	34+	1600+	1800+	3.5+

AQI	Associated Health Impacts
Good (0–50)	Minimal impact
Satisfactory (51–100)	May cause minor breathing discomfort to sensitive people.
Moderately polluted (101–200)	May cause breathing discomfort to people with lung disease such as asthma, and discomfort to people with heart disease, children and older adults.
Poor (201–300)	May cause breathing discomfort to people on prolonged exposure, and discomfort to people with heart disease.
Very poor (301–400)	May cause respiratory illness to the people on prolonged exposure. Effect may be more pronounced in people with lung and heart diseases.
Severe (401–500)	May cause respiratory impact even on healthy people, and serious health impacts on people with lung/heart disease. The health impacts may be experienced even during light physical activity.

Source : Wikipedia

NATIONAL AMBIENT AIR QUALITY STANDARDS

CENTRAL POLLUTION CONTROL BOARD

NOTIFICATION

New Delhi, the 18th November, 2009

No. B-29016/20/90/PCI-L—In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No.14 of 1981), and in supersession of the Notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect, namely:-

NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No.	Pollutant	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2), $\mu g/m^3$	Annual* 24 hours**	50 80	20 80	- Improved West and Gaeke -Ultraviolet fluorescence
2	Nitrogen Dioxide (NO_2), $\mu g/m^3$	Annual* 24 hours**	40 80	30 80	- Modified Jacob & Hochheiser (Na-Arsenite) - Chemiluminescence
3	Particulate Matter (size less than 10µm) or PM_{10} $\mu g/m^3$	Annual* 24 hours**	60 100	60 100	- Gravimetric - TOEM - Beta attenuation
4	Particulate Matter (size less than 2.5µm) or $PM_{2.5}$ $\mu g/m^3$	Annual* 24 hours**	40 60	40 60	- Gravimetric - TOEM - Beta attenuation
5	Ozone (O_3) $\mu g/m^3$	8 hours** 1 hour**	100 180	100 180	- UV photometric - Chemilminescence - Chemical Method
6	Lead (Pb) $\mu g/m^3$	Annual* 24 hours**	0.50 1.0	0.50 1.0	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper - ED-XRF using Teflon filter
7	Carbon Monoxide (CO) mg/m^3	8 hours** 1 hour**	02 04	02 04	- Non Dispersive Infra Red (NDIR) spectroscopy
8	Ammonia (NH_3) $\mu g/m^3$	Annual* 24 hours**	100 400	100 400	-Chemiluminescence -Indophenol blue method

(1)	(2)	(3)	(4)	(5)	(6)
9	Benzene (C_6H_6) $\mu g/m^3$	Annual*	05	05	- Gas chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10	Benzo(a)Pyrene (BaP) - particulate phase only, ng/m^3	Annual*	01	01	- Solvent extraction followed by HPLC/GC analysis
11	Arsenic (As), ng/m^3	Annual*	06	06	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni), ng/m^3	Annual*	20	20	- AAS /ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

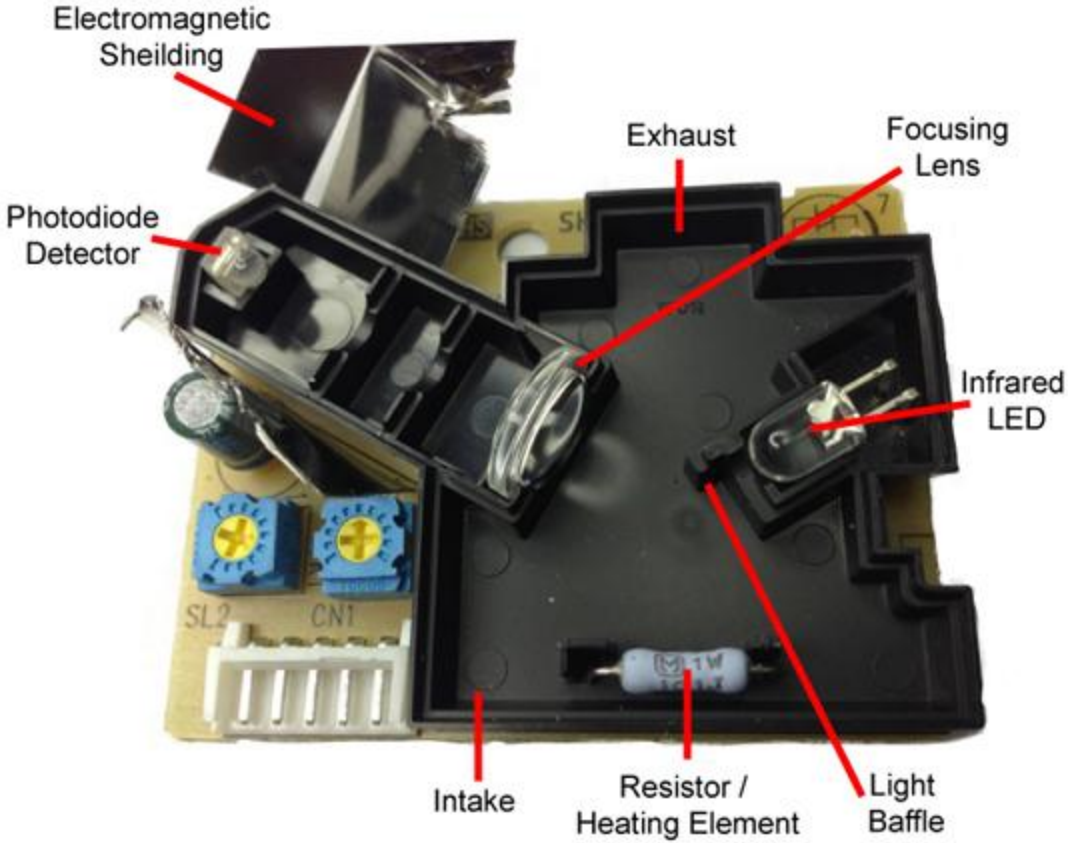
** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note. — Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

SANT PRASAD GAUTAM, Chairman

[ADVT-III/4/184/09/Exty.]

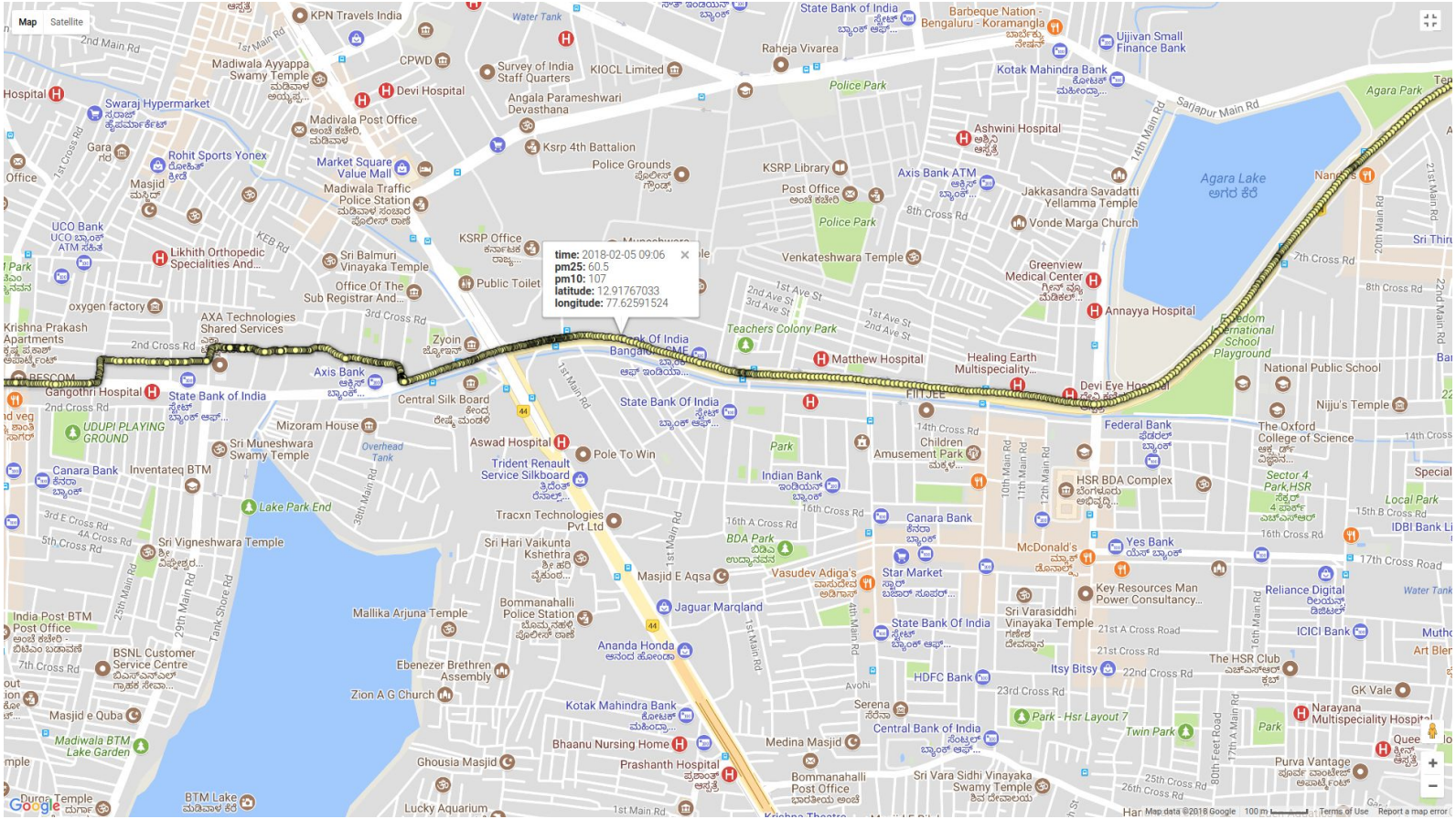
Note: The notifications on National Ambient Air Quality Standards were published by the Central Pollution Control Board in the Gazette of India, Extraordinary vide notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998.



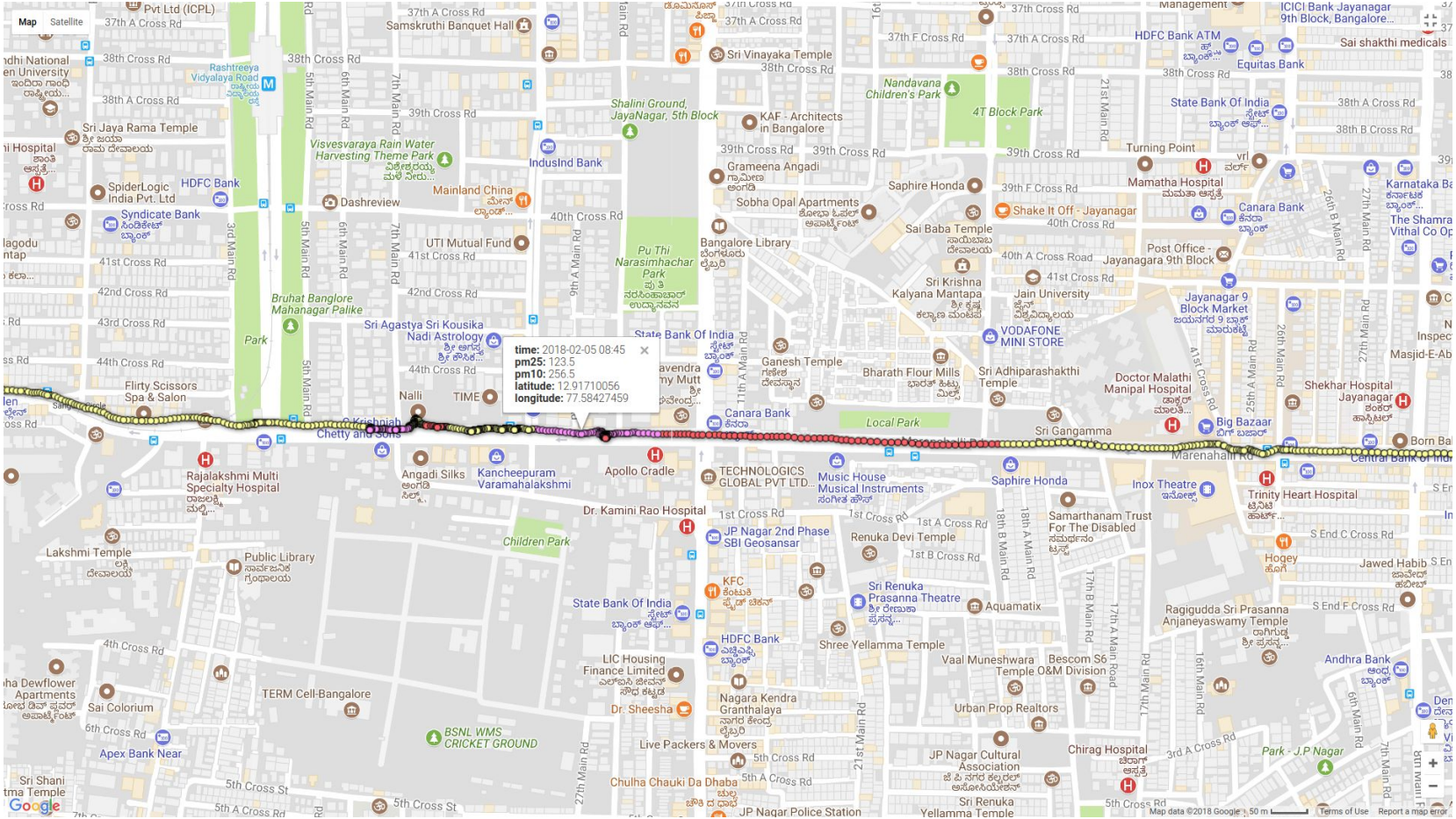
SHINYEI PPD42

Inside the Shinyei PPD42NS from takingspace.org. It is responsive to PM of diameter 1μm

Sensor Workshop
For Children
ODC/Google



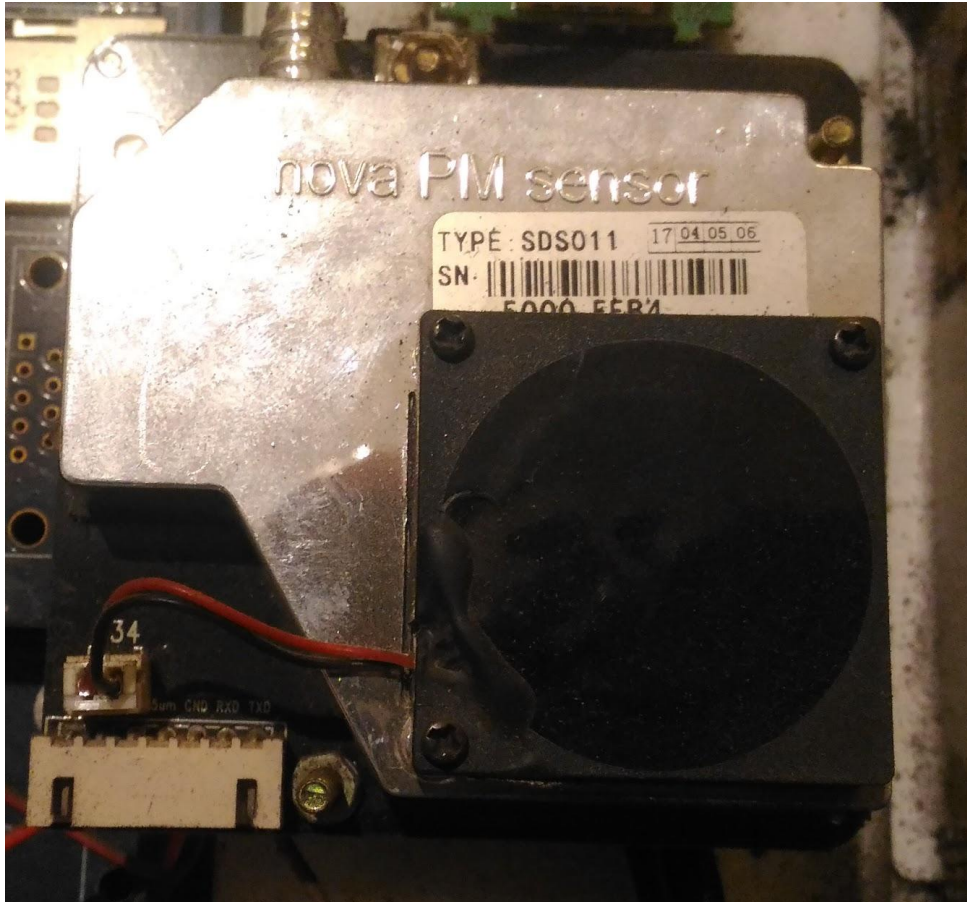
Auto Ride with PM Measurement Device



Auto Ride with PM Measurement Device

It's responsive to a wide scope of harmful gases, as carbon monoxide, alcohol, acetone, thinner, formaldehyde and so on. It gives you a number 0->3. 0 is Bad and 3 is great. Useful as an Indicator.

Grove Air Quality Sensor v1.3



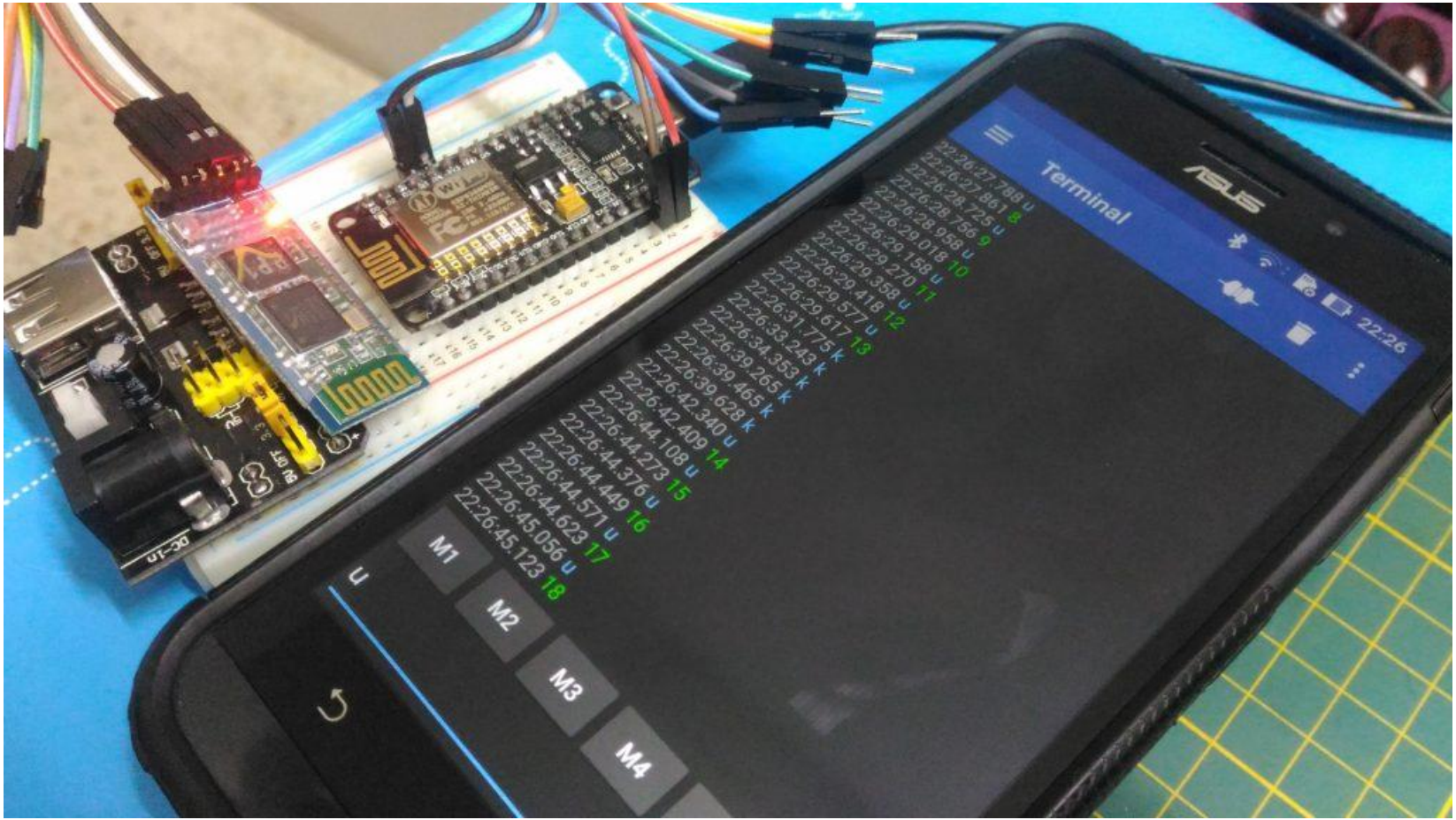
PM2.5, PM10, 0.0-999.9μg/m3

SDS011
AQI CN has a page on Sensors

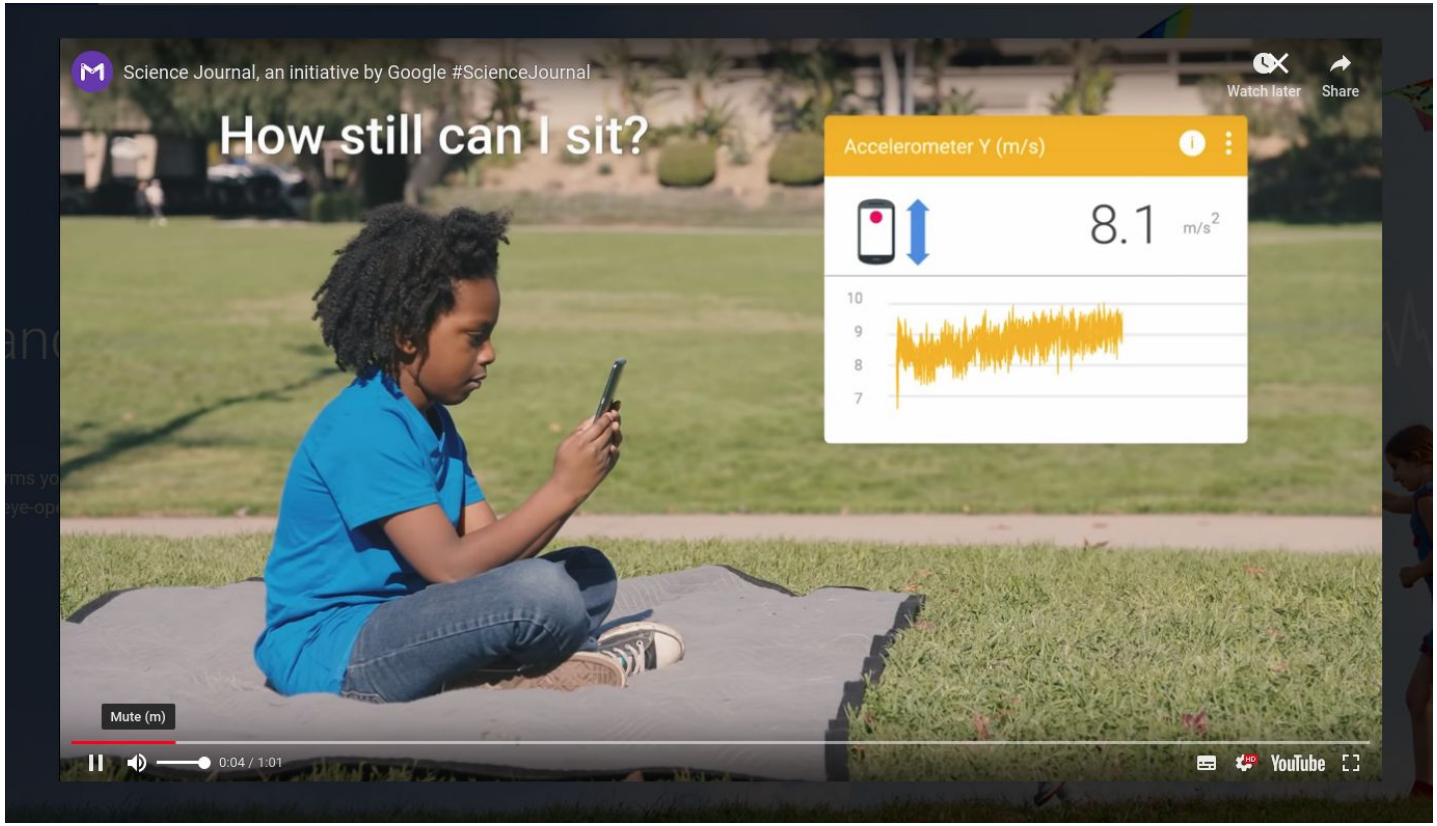
Dylos DC1100-PRO-PC
For Lab

MicroController

- Arduino
- ESP8266
- ESP32 - Best - NodeMCU
  - Wifi and Bluetooth (**BLE**)
  - 2 - 32 bit core
  - RTC (not so great but exists)
  - Deep sleep
  - All kinds of interfaces (SPI, UART, CAN)



ESP32 is my choice



Google Science Journal

google / **science-journal**

Watch 49 | Unstar 321 | Fork 95

Code | Issues 16 | Pull requests 0 | Projects 0 | Insights

Science Journal Android code. https://makingscience.withgoogle.com/...

1,825 commits | **1** branch | **5** releases | **8** contributors | Apache-2.0

Branch: **master** | New pull request | Create new file | Upload files | Find file | Clone or download

dsaff Merge pull request #33 from GauthamBanasandra/redundant-func ... Latest commit 2521c30 15 days ago

OpenScienceJournal	Move getFirstDeviceAddress to BleClientImpl	15 days ago
ScalarApiSampleApp	API service scans for sensor on reconnect	2 years ago
api/ScienceJournalApi	Bring API appcompat version up to match project versions.	2 years ago
docs	Import docs from github	a year ago
sensor_providers	Add copyright headers	2 years ago
third_party/jsyn	Quick open-source fixes.	2 years ago
CONTRIBUTING	OSS license header additions	3 years ago
LICENSE	OSS license header additions	3 years ago
README-pl-PL.md	Translated to Polish	a year ago
README.md	Add info on Dresselhaus release.	a year ago
RELEASES.md	Refocusing the Dresselhaus text	a year ago
unheadered.sh	Log which services time out during scan	2 years ago

README.md

Science Journal allows you to gather data from the world around you. It uses sensors to measure your environment, like light and sound, so you can graph your data, record your experiments, and organize your questions and ideas. It's the lab notebook you always have with you.

Open Science Journal is the core of the Science Journal app with the same UI and sensor code and can be compiled and run on its own.

Features

- Visualize and graph data from sensors.
- Connect to external sensors over BLE (firmware code).
- Annotate with pictures and notes.

What next?