seeed studio SENSIRION THE SENSOR COMPANY

Community Innovations: A Showcase of Sensirion-Based Grove Projects

Community Innovations: A Showcase of Sensirion-Based Grove Projects

This pdf document brings you a diverse array of 15 community projects powered by Seeed's Grove modules, all of which feature Sensirion's cutting-edge sensor technology. These innovative endeavors leverage the capabilities of Grove-SCD30, Grove-SGP4x, Grove-SHT4x, Grove-SHT3x, Grove-SEN5x and more, to monitor and enhance the environmental conditions in a multitude of settings.

Dive into this inspiring collection of community-driven initiatives, each providing a unique perspective on how state-of-the-art sensor technology can be harnessed to make a positive impact on our communities and the world at large. Explore the limitless possibilities that emerge when innovation meets environmental monitoring!

Community Project

1. Indoor monitoring system Using Wio Terminal and Node-red

Muhammed Zain and Fasna C created an Indoor Monitoring System using the Wio Terminal, Grove-Temperature & Humidity Sensor (SHT40), and Grove-VOC and eCO2 Gas Sensor (SGP30).

Their system collects data and showcases it on Node-RED dashboards via MQTT and the Mosquitto broker. This project's goal is to establish a seamless connection between Wio Terminal, MQTT, Mosquitto broker, and Node-RED.

Seeed's hardwares used in this project:

Wio Terminal
Grove - Temperature & Humidity Sensor(SHT40)
Grove - VOC & eCO2 Gas Sensor(SGP30)

Softwares used in this project:

ARDUINO MQTT Node-RED

>>Read the full project on Hackster

Community Project

2. IoT AI-driven Yogurt Processing & Texture Prediction | Blynk

Kutluhan Aktar created a user-friendly and cost-effective device in the hope of assisting dairies in reducing total cost and improving product quality.

It measures key data points using a Grove - Temperature&Humidity Sensor (SHT40), as well as a Grove - Integrated Pressure Sensor Kit, to estimate the consistency level of yogurt. Then he uses XIAO ESP32C3 to build and train an artificial neural network model, which analyzes the collected data to determine the most suitable environmental conditions for yogurt fermentation.

Seeed's hardwares used in this project:

Seeed Studio XIAO ESP32C3
Grove - Temperature & Humidity Sensor(SHT40)
Grove - Integrated Pressure Sensor Kit
Seeed Studio Expansion Board for XIAO

Softwares used in this project:

ARDUINO AUTODESK FUSION 360 Blynk EDGE IMPULSE

>>Read the full project on Hackster

Community Project

3. IoT AI-driven Tree Disease Identifier w/ Edge Impulse & MMS

Environmental changes and deforestation make trees and plants more susceptible to diseases, posing risks to pollination, crop yields, animals, infectious outbreaks, and soil erosion.

Kutluhan Aktar developed a device using Grove-Vision AI to capture images of infected trees and created a dataset. He also employed a Grove SCD30 sensor to measure environmental factors accurately. Edge Impulse trains and deploys models for early tree disease detection.

Seeed's hardwares used in this project:

Wio Terminal
Grove - Temperature & Humidity Sensor(SHT40)
Grove - VOC & eCO2 Gas Sensor(SGP30)
Grove - Soil Moisture Sensor
Grove - Vision AI Module
Grove-Wio-E5 Wireless Module
Grove – CO2 & Temperature & Humidity Sensor (SCD30)

Softwares used in this project:

ARDUINO AUTODESK FUSION 360 EDGE IMPULSE

>>Read the full project on Hackster

Community Project

4. Monitoring DIY Lab Incubators via Cellular Networks

Naveen Kumar created a remote lab incubator monitoring system that uses a cellular network to track temperature, humidity, and gas levels.

It uses the Blues Cellular Notecard and Notecarrier-B for network connectivity, ultilizes a Seeed Studio XIAO RP2040 to link the Notecard with sensors like the Grove-VOC and eCO2 Gas Sensor (SGP30) and the Grove Temperature & Humidity Sensor (SHT40).

Seeed's hardwares used in this project:

Seeed Studio XIAO RP2040
Grove - Temperature & Humidity Sensor(SHT40)
Grove - VOC & eCO2 Gas Sensor(SGP30)
Seeed Studio Grove Base for XIAO

Softwares used in this project:

ARDUINO blues notehub DATACAKE

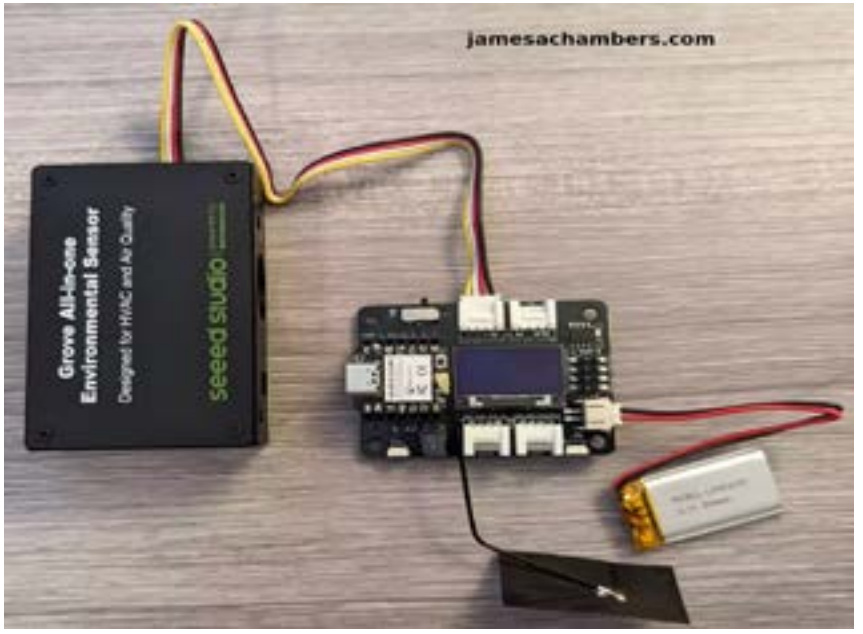
>>Read the full project on Hackster

Community Project

5. Home Assistant Grove All-in-one Environmental Sensor Guide

Creating a home environmental monitoring system often faces the challenge of limited sensor connections. Even with expansion boards, connecting multiple individual sensor boards can become disorderly and cumbersome.

James A. Chambers presented a solution to this challenge by demonstrating a simple and effective air quality monitor using XIAO ESP32C3 and Grove SEN54 all-in-one sensor, seamlessly integrated with Home Assistant for an efficient monitoring setup.



Seeed's hardwares used in this project:

Seeed Studio XIAO ESP32C3
Grove - SEN54 All-in-one environmental sensor
Seeed Studio Grove Base for XIAO
Seeed Studio Expansion Board for XIAO

Softwares used in this project:

ARDUINO Home Assistant ESPHome

>>Read the full project in this blog

Community Project

6. PyonAir - an Open Source Air Pollution Monitor

PyonAir, shared by Hazel M., is a low-cost and open-source system for monitoring local air pollution levels-specifically, particulate matter, and it transmits data over both LoRa and WiFi.

In this project, Grove - I2C High Accuracy Temp&Humi Sensor (SHT35) is used to collect the data of temperature and humidity and a Grove-GPS Module to receive for time & location.

Seeed's hardwares used in this project:

Grove - I2C High Accuracy Temp&Humi Sensor (SHT35)
Grove - GPS (Air530)

Softwares used in this project:

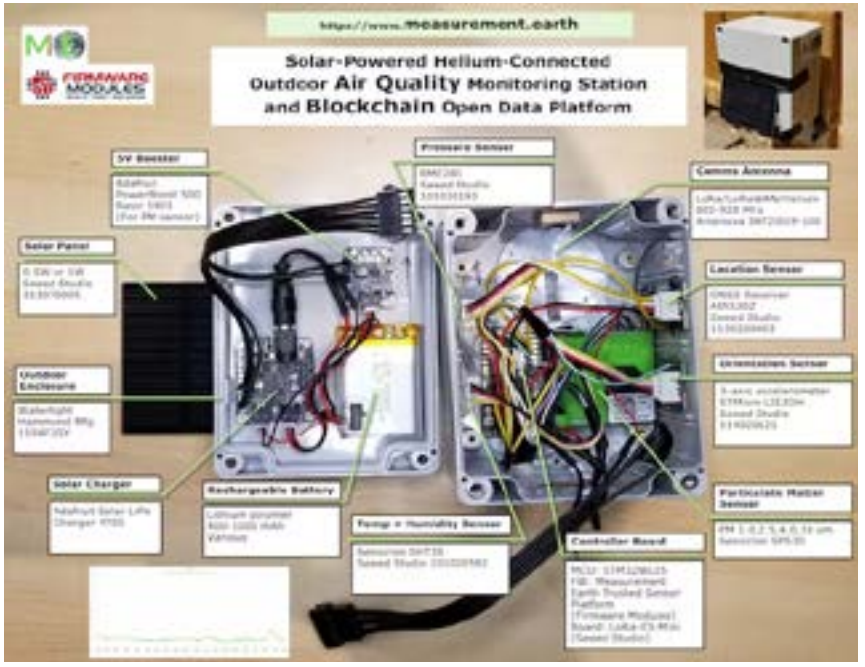
>>Read the full project on Instructables

Community Project

7. Blockchain-Powered Sensor System Using Helium Network

This solar-powered device developed by Evan Ross not only monitors the outdoor air quality but also leverages the Helium network to securely transmit sensor data to a global public blockchain.

It uses STM32 MCUs and LoRa radios for Helium communication, along with BME280 for pressure (with secondary temp and humidity readings), SHT35 for accurate temperature and humidity data, Sensirion SPS30 for PM measurements, LIS3DH accelerometer for device orientation, and AIR530Z for GPS-based location and time data.



Seeed's hardwares used in this project:

Grove - I2C High Accuracy Temp&Humi Sensor (SHT35)
Grove Temperature and Barometer Sensor (BMP280)
Grove - 3-Axis Digital Accelerometer
Grove - GPS (Air530)
Small Solar Panel 80x100mm 1W

Softwares used in this project:

>>Read the full project on Hackstar

Community Project

8. Fight Fire - Wild Fire Prediction using TinyML

"Fight Fire" – a wildfire prediction device created by Muhammed Zain and Salman Faris. This device utilizes an array of sensors to gather crucial data, which is then fed into a Wio Terminal.

The data is processed using Edge Impulse to create a machine learning model, enabling accurate wildfire predictions. In case of a fire risk, the Fight Fire Node promptly communicates this information to the nearest forest ranger and local authorities through the Helium LoRaWAN and MQTT Technologies.

Seeed's hardwares used in this project:

Wio Terminal
Grove - Temperature & Humidity Sensor(SHT40)
Grove - Temperature, Humidity, Pressure and Gas Sensor for Arduino - BME680
Grove-Wio-E5 Wireless Module

Softwares used in this project:

ARDUINO EDGE IMPULSE MQTT Node-RED

>>Read the full project on Hackster

Community Project

9. Smart Luffa Farming with LoRaWAN®

Meilily Li and Lakshantha Dissanayake designed a solar-powered, IoT-based farming system that monitors temperature, humidity, soil moisture, and light levels. This system was installed at the Luffa farm.

The sensor data was transmitted to a LoRaWAN gateway located in DreamSpace and then forwarded to the Helium LoRaWAN network server. Subsequently, the data was seamlessly integrated into Azure IoT Central, allowing for easy visualization through graphs.

Seeed's hardwares used in this project:

Wio Terminal
Grove - Temperature & Humidity Sensor(SHT40)
Grove - VOC & eCO2 Gas Sensor(SGP30)
Grove - Soil Moisture Sensor
Grove - Vision AI Module
Grove-Wio-E5 Wireless Module

Softwares used in this project:

ARDUINO Azure

>>Read the full project on Hackstar

Community Project

10. DeViridi: IoT Food Spoilage Sensor and Monitoring Dashboard

Food spoilage costs smallholder farmers and supply chains 15% of their income, impacting global food security. Ashwin Sridhar's IoT device uses AI image detection and gas analysis to monitor and detect spoilage, benefiting farmers and reducing waste and greenhouse gas emissions.

By accurately assessing food storage conditions and the extent of spoilage through gas analysis, this device serves not only farmers but also suppliers, supermarkets, and households. It addresses the critical challenge of food waste and its environmental consequences while ensuring that edible food is not discarded prematurely.

Seeed's hardwares used in this project:

Wio Terminal
Grove - Temperature & Humidity Sensor(SHT40)
Grove - VOC & eCO2 Gas Sensor(SGP30)
Grove - Soil Moisture Sensor
Grove - Vision AI Module
Grove-Wio-E5 Wireless Module

Softwares used in this project:

ARDUINO AUTODESK FUSION 360 TensorFlow

>>Read the full project on Hackster

Community Project

11. AI Agricultural monitoring system

Gabriel Alejandro Giraldo Santiago designed an AI-driven agricultural monitoring system to identify and eradicate pests in crops autonomously.

This system also employs a Grove - I2C High Accuracy Temp&Humi Sensor (SHT35) and a Grove - Water Sensor to collect and analyze agroclimatic data, helping prevent losses due to climate change.

Seeed's hardwares used in this project:

Grove - I2C High Accuracy Temp&Humi Sensor (SHT35)
Grove - Relay
Grove - Water Sensor(RC0603JR)

Softwares used in this project:

AMD XILINX jupyter TensorFlow

>>Read the full project on Hackstar

Community Project

12. Smart indoor farming using Bytebeam SDK for Arduino

In this project, Vaibhav Sharma ultilized two sensors to monitor indoor farming conditions: the Grove SCD30 for CO2, temperature, and humidity, and the Grove SHT35 for precise temperature and humidity.

He also provided a step-by-step guide for creating an IoT solution to analyze this data using Bytebeam Arduino SDK and Bytebeam Cloud.

Seeed's hardwares used in this project:

Grove - CO2 & Temperature & Humidity Sensor (SCD30)
Grove - I2C High Accuracy Temp&Humi Sensor (SHT35)

Softwares used in this project:

ARDUINO BYTEBEAM

>>Read the full project on Hackster

Community Project

13. Smart early wildfire detection system

Rodrigo Juan Hernández used charcoal and paper to simulate a wildfire and employed the Grove-SGP30 to measure VOC and eCO2, along with the Grove-SHT35 for temperature and humidity.

These sensors helped detect early wildfires, and the data was sent to a LoRaWAN server. Telegraf consumed this data from the MQTT broker, storing it in InfluxDB for Grafana dashboard display.

Seeed's hardwares used in this project:

Wio Terminal
Grove - VOC & eCO2 Gas Sensor(SGP30)
Grove - I2C High Accuracy Temp&Humi Sensor (SHT35)
Grove - Temperature, Humidity, Pressure and Gas Sensor for Arduino - BME680
Grove-Wio-E5 Wireless Module

Softwares used in this project:

>>Read the full project on Hackstar

Community Project

14. CO2 Monitoring and Early Warning Using Wio Terminal

Excess CO2 in a crowded office can cause irritability and heart palpitations, impacting our well-being.

Jane Deng's project, using a Grove - CO2 & Temperature & Humidity Sensor (SCD30), tracks CO2, humidity, and temperature, shown on the Wio Terminal. It helps check air quality swiftly and reminds you to open windows for ventilation.

Seeed's hardwares used in this project:

Wio Terminal
Grove - CO2 & Temperature & Humidity Sensor (SCD30)

Softwares used in this project:

ARDUINO

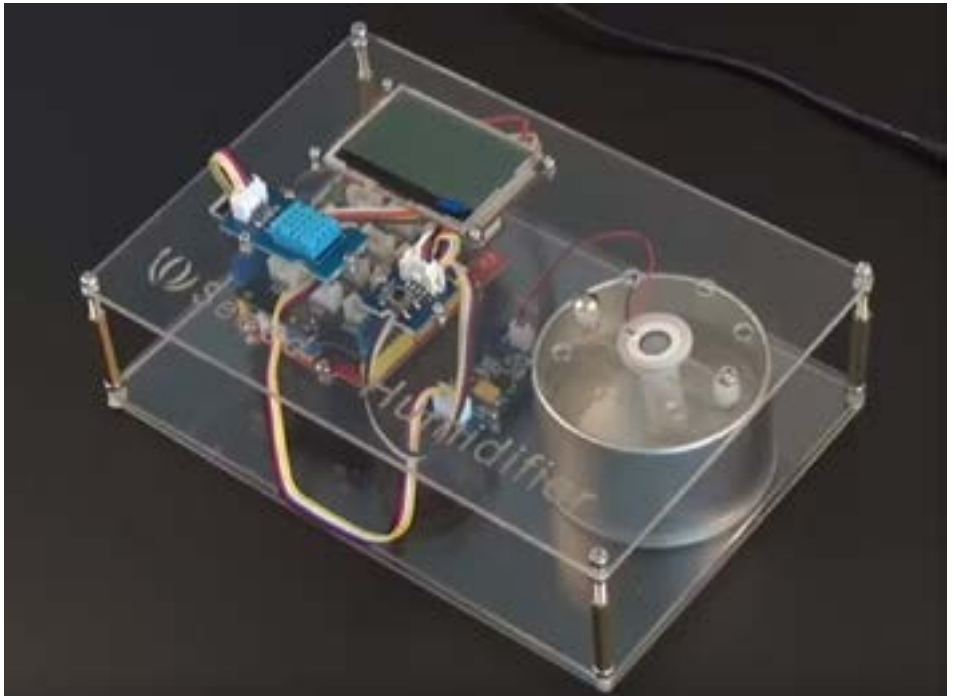
>>Read the full project on Hackster

Community Project

15. DIY a Simple Automatic Humidifier

In our modern society, there's a growing focus on improving the quality of life and creating a healthier and more comfortable living environment. To achieve this, Wanniu developed a device that monitors indoor temperature and humidity.

When the Grove - I2C High Accuracy Temp&Humi Sensor (SHT35) detects humidity levels dropping below safe thresholds, it triggers the automatic operation of a Grove - Water Atomization humidifier.



Seeed's hardwares used in this project:

Seeeduino Nano
Grove - I2C High Accuracy Temp&Humi Sensor (SHT35)
Grove - Barometer Sensor(High-Accuracy)
Grove - Water Atomization Sensor

Softwares used in this project:

>>Read the full project on Hackster

Seeed Studio

Seeed Studio Sensirion-Based Grove Projects

CONTACT US

HEADQUARTERS

9F, Building G3, TCL International E City, Zhongshanyuan Road, Nanshan, 518055, Shenzhen, PRC

X.FACTORY

Chaihuo x.factory 622, Design Commune, Vanke Cloud City, Dashi 2nd Road, 518055, Shenzhen, PRC

Japan Office

130 Honjingai 1F, Shin-Nagoya-Center Bldg. 1-1 Ibukacho Nakamura-ku, Nagoya-shi, Aichi 453-0012 Japan

2023.seeed.cc

LinkedIn
@Seeed Studio

Open Tech Project Hub
hackster.io/seeed

Twitter
@seeedstudio

Discord
Discord.seeed.cc

YouTube
@Seeed Studio