seeed studio

The AI Hardware Partner

2024 Product Catalog

www.seeedstudio.com

V1.0

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About us

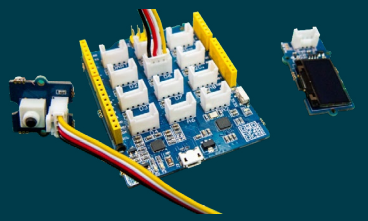
the AI hardware partner

Seeed Studio has been a leading Open Hardware company since 2008, empowering half a million direct users to create real-world digital solutions. Through relentless efforts and earned trust, our ever-growing product lines now form around emerging AI scenarios:

- Sensor networks to fetch extensive real-time data
- Edge computing to push intelligence to new frontiers

We provide industrial-ready modules and devices, and open up the capability of prototype, produce, and promote as Fusion service. Innovators from different vertical domains co-create with us to make their creations widely availalbe for diversified markets.

By embracing open source, community building and integrated software suites like SenseCraft, we are proactively lowering the tech barriers and including users with diverse expertise for glocalized matters.



How it started 2008

From possibilities to productivities

How it's going 2024

From Technology to Industry

Technologies

- Open Source Hardware
- Machine Learning
- Advanced Sensors
- Home Assistant
- Wireless. DePIN
- LLM

Applications

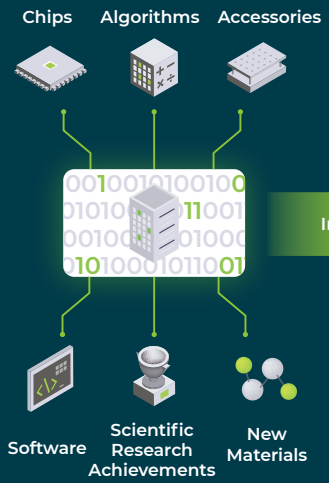
- Asset Tracking
- Smart Building
- Industrial space
- Smart City
- Smart Agriculture
- Smart Energy
- Tech for good
- Open Science

Global Developer Communities

open source hardware

Collaborative Innovation

Emerging Technologies



Integration

Sensor Network

tinyML Ready
Rich Sensor Portfolio
Diverse Connectivity

Edge Computing

IPCs, HMIs, Edge Controllers
From Basic to High-End Performance
Cutting-Edge AI APP integration

SenseCraft — AI Model / dAPP Distribution, Device Config + Data Management

Services — Design & Manufacturing & Co-Create

Solution

Digital Economy

Traditional Industries

Digital Infrastructure
Smart Agriculture
Smart Environment
Smart Energy

Featured Product Lines

Arduino | Beaglebone | Home Assistant | NVIDIA® Jetson | Raspberry Pi | SenseCAP | TinyML

Sensor Network

Nerve Endings of Our Digital World

Transitioning from the physical to the digital world, and from modules to devices, efficiently collecting real-world data significantly boosts traditional industries in their digital transformation. With the proliferation of AI technology, smarter sensors can supply large language models (LLMs) with more authentic data from the physical world. Fortified with AI capabilities, these sensors, along with gateways offering wide network coverage, are compact yet robust, suitable for both indoor and outdoor applications. Seeed's solutions excel in their rapid deployment capabilities within the real-world AIoT sector, including Asset Tracking, Smart Building, Smart City, and Agriculture.

Sensor Network

Seeed provides customers with smart sensing and network coverage capabilities, and the ability to efficiently complete the collection and transmission of physical world data through ready-to-use devices and easy-to-develop open source hardware modules.

Devices

AI Sensors

Smarter sensors, to see, to hear, to understand

AI Vision

LoRaWAN Devices

Low power, long range, low connectivity cost

LoRaWAN Sensors

Gateways

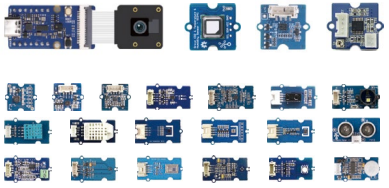
Weather Sensors

All-in-one with multi parameter, easy to integrate

Modules

Sensor and peripheral modules

Grove Open Source Plug and Play Modules



Vision, environmental sensors, actuators and rich kits with tutorials

XIAO tinyML MCUs

Arduino, ESP32, tinyML, diverse connectivity

Wio LoRa Modules

Low-cost LoRa modules for sensor and gateway

AI Sensors

Seeed Studio's AI Sensor series collaborate IOT, Edge Computing and LLM together. By analysing data from vision, sound, and environment sensors through wireless sensor connectivity, it can be naturally fitted into indoor and ourdoor scenarios to help users to improve their management of the space in an revolutionary way.

Application

SenseCAP Watcher

NEW AI-Native

A physical AI agent for smarter space

Equipped with a local tinyML module and connected to a native Large Language Models (LLMs) to ensure privacy, SenseCAP Watcher features a camera, voice detection to achieve an effortless oversight of your business operations, it learns from your commands and performs tasks accordingly, operating 24/7. Experience the new transformation towards a more responsive and smarter space.

Self-learning

Your agent to watch what you care

Activity · Occupany · Condition

Comprehensive Sensors

Vision · Sound

Self Learning and evolving

Capture · Train · Deploy

Local and public LLM

LLM Omnipotent

Pervasive

Low Power AI

On-device TinyML

Nature Interaction

Voice · Touch · Dial

No code setup

App

Small Size

64x68x25mm

Extensive

Seamlessly Integrations

Smart Home · Powerful AI · Node-RED

Grove Extension

Open Source · Ready for Customization

Built-in Battery · Wi-Fi/BLE · SD Card · USB Type-C

SenseCAP Watcher Applications

Kiosk Advertiser

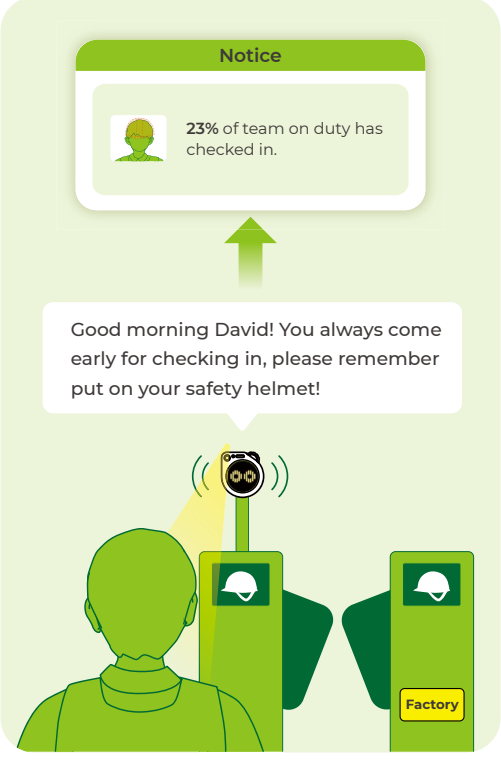
SenseCAP Watcher can function as an AI Kiosk Advertiser in unmanned vending areas, enthusiastically greeting customers and suggesting products to them.

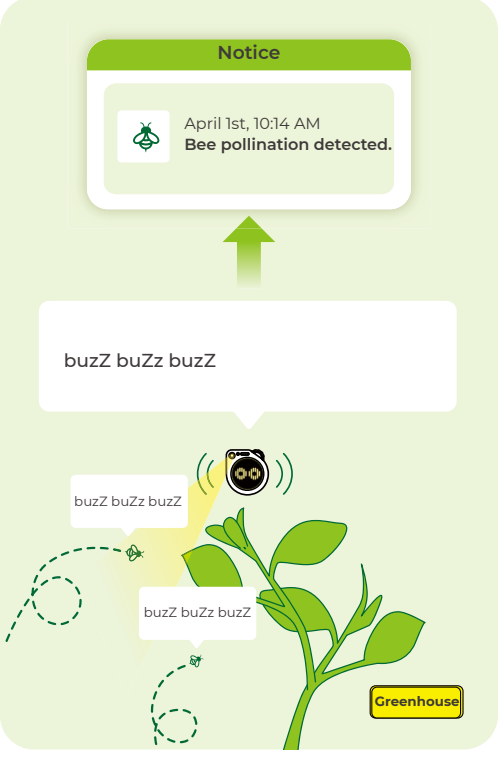
Robo Doorman

SenseCAP Watcher could function as a Robo Doorman for work areas or other entrances. The Watcher can greet people and check whether personnel are wearing their ID badges or safety helmets.

AI Gardener

SenseCAP Watcher could serve as an AI Gardener on farms, capable of detecting bee pollination and reporting the activity logs of bees and other insects.





SenseCAP A1102 - LoRaWAN® Vision AI Sensor

NEW Low-Power AI-Native

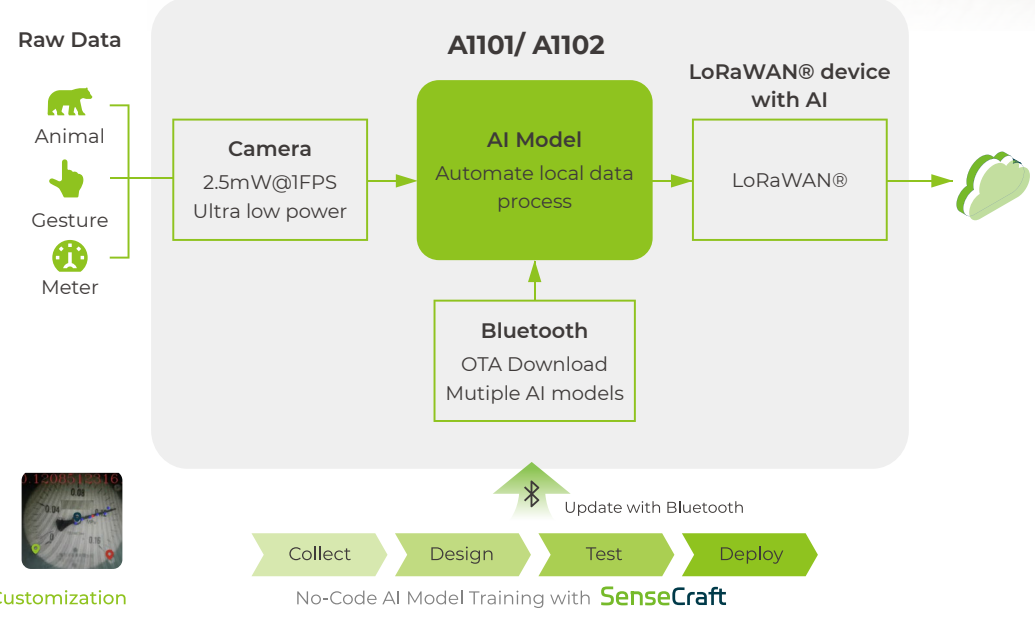
Long-Range, Battery-Driven AI Camera for Efficient Off-Site Surveillance

The SenseCAP A1102 - LoRaWAN® Vision AI Sensor is an Edge AI-enabled smart vision sensor offering diverse AI model functionalities such as image recognition, people counting, target detection, and meter recognition, with TensorFlow Lite support for model training. It facilitates no-code model training and deployment through SenseCraft AI, features extra night vision, LED flashing light, and IR trigger, and uploads inference results data via LoRaWAN® with very low data bandwidth, boasting battery-powered operation lasting over a year.

A1101 A1102

Features

- Low-power comsuption
  Down to 2.3uWh in deep sleep mode, battery life last over a year.
- Long Range
  Leverage the Wio-E5 LoRaWAN module, up to 10km eye-sight commnunication distance.
- Built-in powerful AI Camera
  Built-in tVOC and CO2 sensors, and an external Grove AHT20 temperature and humidity sensor as add-ons
- Local LoRa® Hub for IoT Connectivity
  Powered by Himax HX6538, Cortex-M55, Ethos-U55, running rich local vision models



Ues Case

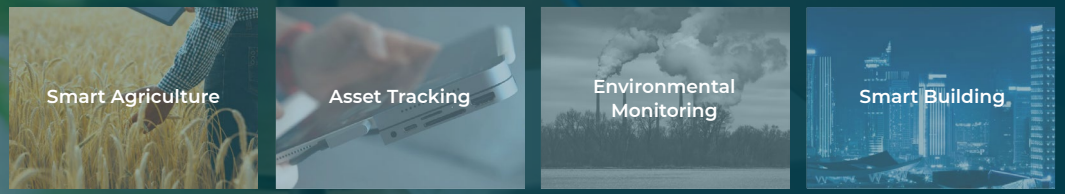
- Person Detection
- Specific Object Detection
- Automatic Meter Reading

Open for Customization

SenseCAP AIoT Products

Seeed offers wireless LoRaWAN sensors, trackers, data loggers, indicator, gateways, and cloud services. Through wireless sensor connectivity, SenseCAP offers the physical world's accurate environmental measurements to the users, along with its robust industrial-grade design, ready-to-use PaaS platform, Apps, and open API services.

Application



SenseCAP T1000 Low-Power

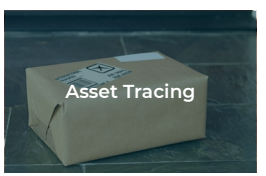
A Card-Size Tracker for LoRaWAN®, Helium, and Amazon Sidewalk

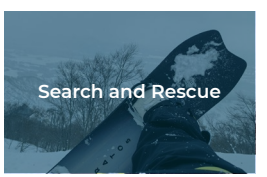
SKU 114993073, 114993106

SenseCAP T1000 is a compact GPS tracker that utilizes GNSS/Wi-Fi/Bluetooth for precise indoor & outdoor location tracking, compatible with LoRaWAN®, Amazon Sidewalk, and Helium Networks. It boasts self-geo-adaptive capabilities, local data storage, and an impressive battery life of months. Additionally, it is equipped with temperature, light, and motion sensors, making it ideal for a variety of location-based applications, asset tracking, logistics tracking, and search and rescue.

Model	Compatible Networks	Temperature	Light	Accelermeter
T1000-A	LoRaWAN® Helium	●	●	●
T1000-B	LoRaWAN® Helium	/	/	/
T1000-C	Amazon Sidewalk	●	●	●

Applications





SenseCAP Indicator

5+ Years Supply

An ESP32 LoRaWAN® Terminal with Touchscreen and Sensors

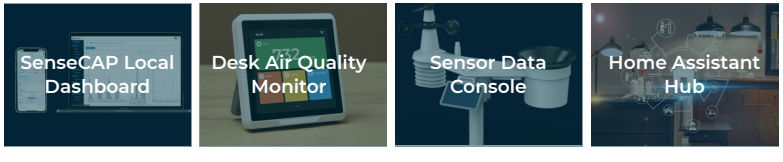
SKU 114993070, 114993071, 114993068, 114993069

SenseCAP Indicator is a 4-inch touch screen driven by ESP32-S3 and RP2040 dual-MCU and supports Wi-Fi/BLE/LoRa® communication.It comes with 2 Type-C USB ports and Grove interfaces, supports ADC and IIC transmission protocols, and can easily connect to other peripherals with rich GPIOs.

Features

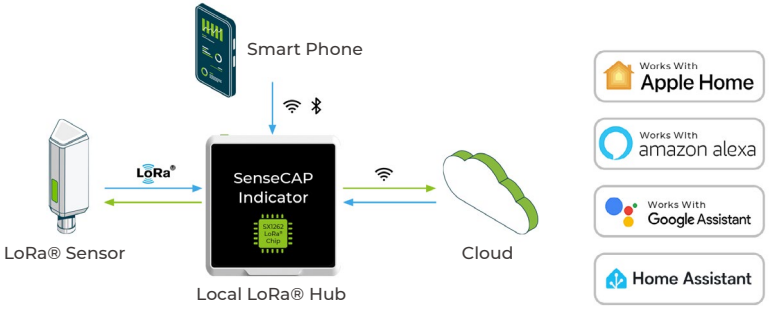
- Dual MCUs and Rich GPIOs
  Equipped with powerful ESP32-S3 and RP2040 dual MCUs and Grove-compatible GPIOs for flexible expansion
- 4-Inch Touch Screen
  A capactive RGB touch screen with 480x480 pixels for data visualization and HMI
- Real-time Air Quality Monitoring
  Built-in tVOC and CO2 sensors, and an external Grove AHT20 temperature and humidity sensor as add-ons
- Local LoRa® Hub for IoT Connectivity
  Integrated Semtech SX1262 LoRa® chip (optional) for connecting LoRa® P2P and LoRaWAN®
- Fully Open Source Platform
  Leverage the extensive ESP32 and Raspberry Pi open-source ecosystem for infinite application possibilities

Applications



Scenarios under Spot Light

Use SenseCAP indicator as a LoRa® hub device to connect your LoRa® sensors to your smart home ecosystem

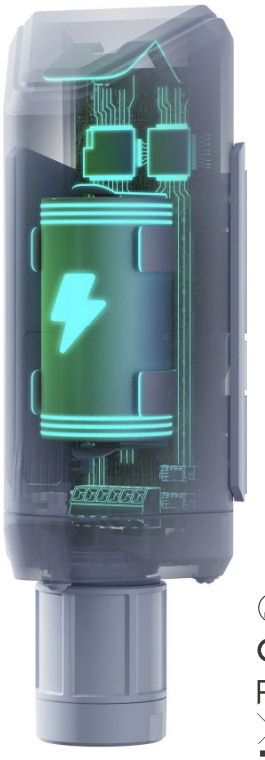


Model	D1	D1S	D1L	D1Pro
tVOC sensor	/	●	/	●
CO2 sensor	/	●	/	●
Grove TH sensor	/	●	/	●
LoRa(SX1262)	/	/	●	●
Wi-Fi	●	●	●	●
Bluetooth	●	●	●	●

SenseCAP S210x LoRaWAN® Sensors

Industrial-Grade *Rugged* *Low-Power*

SenseCAP S210x series' sensors offer long-distance data acquisition via LoRaWAN®. With IP66 enclosure rating, the sensors can operate in extremely low and high temperature zones (-40°C to +85°C). Their built-in, 19AH high capacity battery, S210x series can operate in harsh, outdoor environments up to 10 years with a range of up to 10km. To add, the built-in Bluetooth made them easy to be configured and deployed, that together reduces field deployment costs. Moreover, users can get data in just a few steps, and with open Cloud API, they are easy to be integrated.



Features

- **High accuracy sensor**
  Fast response and superior stability
- **Quick configuration**
  User-friendly set-up with built-in Bluetooth
- **Ultra-low power consumption**
  Battery life of up to 10 years withbuilt-in 19Ah battery
- **Easy deployment**
  Easy to mount via brackets
- **Industrial design**
  -40 ~ 85℃ operating temperature and IP66 rating
- **Efficient integration**
  SenseCAP cloud services with Open API support further development
- **Weather resistant**
  Suitable for indoor, outdoor and harsh environments such as high UV exposure, heavy rain, dusty conditions etc.
- **Multi-platform**
  Compatible with multiple NS (Helium, TTN) and IoT platforms

Designed for Mass Deployment

1. Onboard it with only 3 steps.
2. Update settings across fleets in 1 click.

Product Model	S2101/S2103	S2102	S2104/S2105	S2106	S2107	S2108
Product Name	Air Temperature & Humidity Sensor (and CO2)	Light Intensity Sensor	Soil Temperature and Moisture Sensor (and EC Sensor)	pH Sensor	PT100 Temperature Sensor	Soil Moisture, Temperature and Pore EC Sensor
SKU	114992867/ 114992869	114992868	114992870/ 114992871	101070001	114993078	101070021

SenseCAP S2100 LoRaWAN® DTU

Industrial-Grade *Low-Power* *Rugged*

A battery-powered IP66 wireless data logger/ DTU supports RS485/Analog/GPIO sensors

SKU 114992872

SenseCAP S2100 LoRaWAN® DTU can connect to Modbus-RTU RS485/Analog Input/GPIO sensors and transmit data from sensors to the LoRaWAN® network. It is specifically optimized for OTA with built- in Bluetooth, which enables quick setup and update. It can be battery-powered or connected to a 12V external power supply. With the help of S2110 sensor builder, S2100 Data Logger is able to connect to Seeed Studio's wide range of Grove Sensors, which will make it the ideal solution for developing, fast prototyping, and small deployment for DIY Industrial level LoRaWAN® Sensors.

Physical World

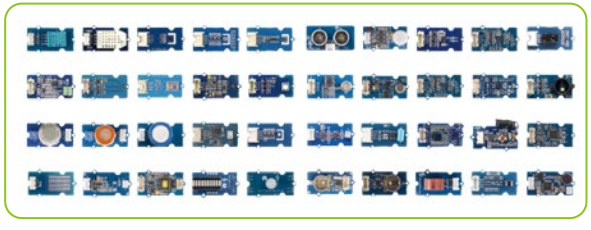
Agriculture

Industrial Control

Energy

Expanding to 400+ Grove Sensors

S2110 Sensor Builder



Increased to 100+ Industrial Sensor Probes

Water

Air

More...

Industrial Sensor Probes

Rugged

Compatible with SenseCAP S2100 LoRaWAN® DTU and SenseCAP 4G Sensor Hub

Soil Temperature , Moisture and EC Sensor

SKU 101990667

Soil Temperature and Moisture Sensor

SKU 101990668

Solar Radiation Shield for Outdoor Sensor Protection

SKU 114992222

pH Sensor

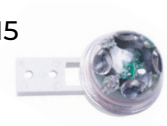
SKU 101990666

EC and TDS Sensor

SKU 314990634

Optical Rain Gauge RG-15 Rain Sensor

SKU 114992321



Light Intensity Sensor

SKU 314990739

PAR Sensor

SKU 314990733

Ultrasonic Level Sensor

SKU 101991041

NH3/H2S/CO2 Sensor

SKU 101990862

Air Temperature and Humidity Sensor

SKU 101990881

Water Leak Detector

SKU 314990618

Ultrasonic Level Sensor

SKU 101991042

Liquid Level Sensor

SKU 314990619

Industrial Total Solar / UV Radiation Sensor

SKU 101991047, 101991048

Leaf Temperature and Humidity Sensor

SKU 314990737

And More...

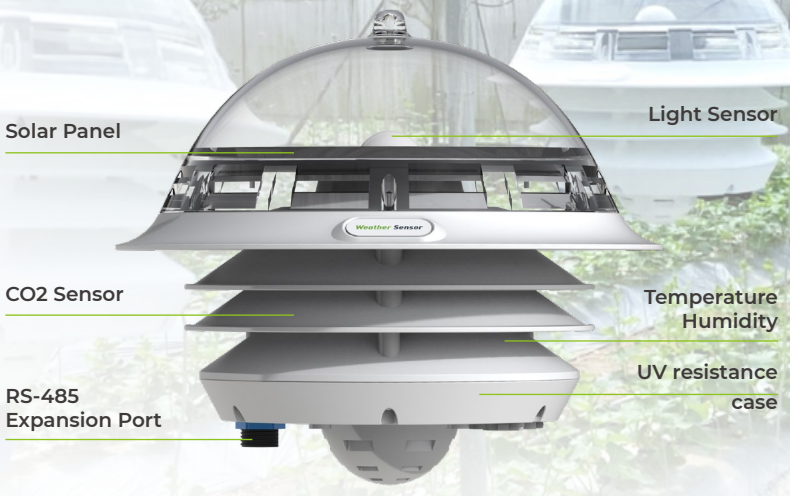
SenseCAP Outdoor Combo

NEW

Low-Power Rugged

A highly integrated autonomous environment sensor

SenseCAP Outdoor Combo is an compact, easy-to-use environment sensor. The device supports multiple measurement elements such as temperature, humidity, dew point, light, carbon dioxide, and supports the extension of up to 10 Modbus-RTU RS485 sensors, allowing it to connect with most types of sensors available on the market. The device uploads the collected data to a designated server via 4G using the MQTT protocol. Equipped with a solar panel and a large-capacity rechargeable lithium battery, it ensures the device can work for up to two weeks in rainy weather or during power outages, while also supporting continuous power supply. The device supports hanging or pole mounting, and allows none-tech users to quickly install and deploy. The device is designed to be waterproof, meets UV aging resistance standards, and supports use in harsh environments such as greenhouses.



Features

- **Compact Body**

  Compact integrated body, containing various sensors and 4G communication

- **Accurate**

  Sensors accurately measure environmental elements

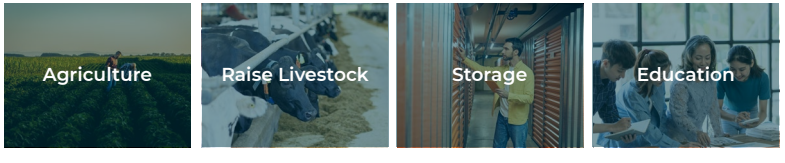
- **Easy to deploy**

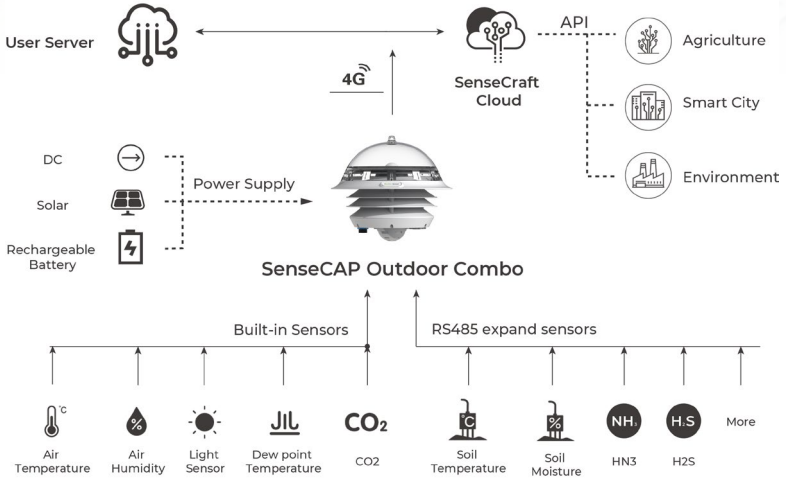
  Ready to use out-of-box, with multiple installation methods

- **Long Battery Life**

  Solar power, battery, and direct current supply options enable long-time operation even in rainy weather

Applications





SenseCAP Outdoor LoRaWAN® Gateway

Industrial-Grade

SKU 102991155

SenseCAP Outdoor Gateway is a robust data collection device designed for large-scale networks. It utilizes a telecom-operator-level LoRa chip and a powerful processor to ensure stable and efficient performance. It can seamlessly collect and transmit data to various platforms like SenseCAP, TTN, and Chirpstack via 4G or Ethernet connection. Encased in an IP66-rated protective enclosure, it is suitable for industrial settings and harsh outdoor environments.

Features

- Cortex A8 processor & Linux system: Stable and reliable
- LTE and Ethernet backhaul, suitable for multiple scenes
- Supports Packet Forwarder mode, built-in Chirpstack Server, and SenseCAP Portal
- Easy to deploy with mounting accessories
- Industrial-grade protection: IP66 enclosure, -40 to 70°C operating temperature
- Certified by CE, FCC and RoHS

SenseCAP M2 Multi-Platform LoRaWAN® Indoor Gateway

EU868 / US915 / AU915 / AS923 / IN865 / KR920 / RU864

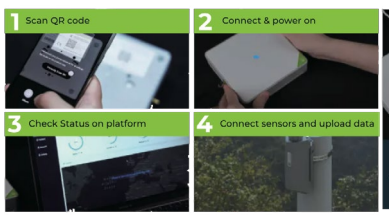
SKU 114992982

SenseCAP M2 Multi-Platform LoRaWAN® Gateway is a standard LoRaWAN® protocol gateway that supports connecting to different network servers. It is compatible with multiple LNS like AWS, TTN, ChirpStack and others via using the Packet Forwarder / Basics™ Station mode.

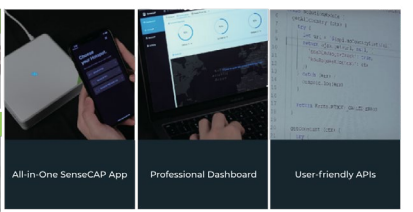
Features

- Power-over-Ethernet (PoE), Wi-Fi and 4G as back haul
- CE, FCC, Verizon, RoHS, TELEC, KC, REACH certified
- Designed for scalability and easy management

Easy to Deploy



Easy to Monage



SenseCAP 4G Sensor Hub

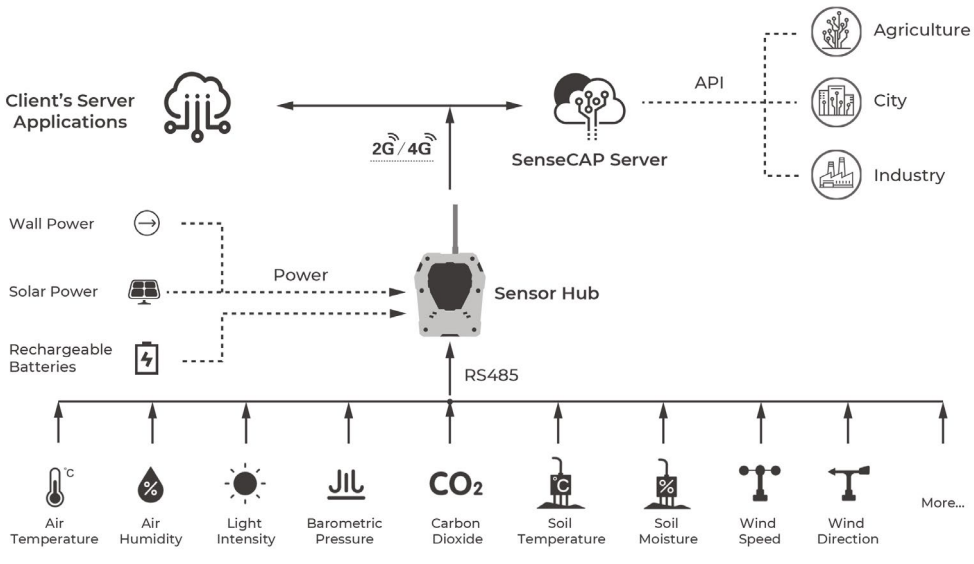
Rugged

SKU 114992170, 114992171

SenseCAP Sensor Hub is a powerful 4G data logger that can be connected to 32 RS-485 sensors. It is designed with industry standards, which makes it robust and stable. Being IP66 rated, waterproof and dustproof, it is highly suitable for long-term, remote environmental monitoring for outdoor application scenarios.

Features

- Simultaneously collects various environmental data via a RS-485 sensor probe
- Local data storage
- Uploads the collected data to SenseCAP or customer's server via MQTT
- Supports 4G/3G/2G communication, supporting and global LTE frequency band
- Built-in GPS, remote upgrades and maintenance



SenseCAP ONE Weather Sensors

Compact all-in-one weather sensors measure multiple parameters

S200 S500 S700-B S700-A S700 S800 S1000 S2120

SenseCAP ONE Weather Sensors

Industrial-Grade *5+ Years Supply*

SenseCAP ONE is a series of industrial weather sensors, that can measure localized weather patterns. The SenseCAP ONE is equipped with precise and accurate sensors to measure air temperature, relative humidity, barometric pressure, light intensity, rainfall, PM2.5, PM10, wind speed, wind direction, CO2, radiation, etc. With an IP66 enclosure and a wide operating temperature range, it features strong robustness to withstand even the toughest outdoor environment. In order to measure wind speed and wind direction, the sensors use ultrasonic technology, instead of traditional mechanical 3-cup anemometers or vane anemometers, that reduces maintenance costs, and increases the operating life cycle.

Features

- High Wind Speed and Standard Gas Calibrated

  Calibrated in wind tunnel up to 80m/s CO2 accuracy:1%of MV
- Industrial Grade Design

  IP66,vorking on-40℃ ~85℃ ,RS485/SD-12 Integrated heaters; Embedded with electronic compass/magnetometer
- Accurate,Real-time Weather Information

  Powerful sensor chip and algorithm embedded to improve accuracy and reliability
- Maintenance-free,Easy Installation

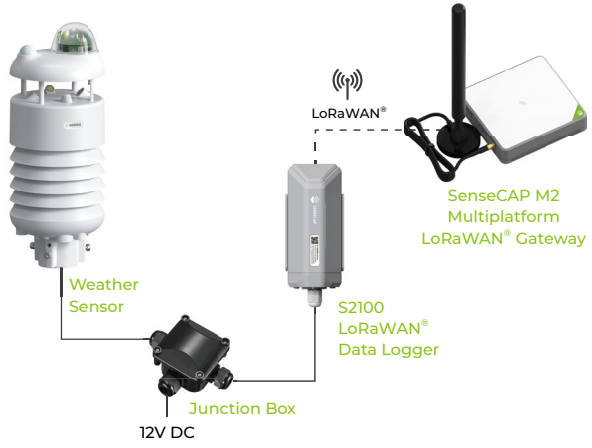
  Compact,no moving parts, Long-term availability
- Customization Service

  Support sensor customization White labeling

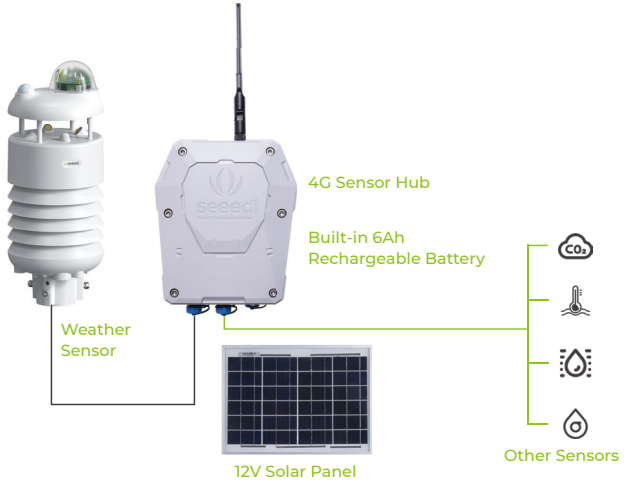
Applications

Get the Weather Data via SenseCAP Data Logger

- Data transmit via LoRa Network



- Data transmit via Cellular(4G/3G/2G) Network



SenseCAP ONE Families

	SKU	Air Temperature	Humidity	Air Pressure	Light Intensity	Wind Speed	Wind Direction	Rainfall	PM2.5	PM10	CO_2	Noise	Radiation
S1000	101991024	●	●	●	●	●	●	●	●	●	●	/	/
S800	101991023	●	●	●	/	●	●	/	●	●	/	●	/
S700/ S700-A	101991022	●	●	●	●	●	●	●	/	/	/	/	/
S700-B	101991102	●	●	●	/	●	●	●	/	/	/	/	●
S500	101991021	●	●	●	/	●	●	/	/	/	/	/	/
S200	101991044	/	/	/	/	●	●	/	/	/	/	/	/

Specifications

	Range	Accuracy	Resolution
Air Temperature	-40~85°C	±0.1°C	0.01°C
Air Humidity	0~100%RH	±1.5%RH	0.01%RH
Barometric Pressure	300~1250hPa	±50Pa	10 Pa
Light Intensity	0~200,000Lux	±5% of reading	5Lux
Wind Speed	0~60m/s standard range; 0~75m/s extended range up to 80m/s withstand range	±0.3m/s(≤10m/s); ±3% (10m/s ~ 50m/s) ±5% (>50m/s)	0.1m/s
Wind Direction	0~360°	±3.0°	0.1°
Rain(Optical)	0~200mm/h	±10%	0.2mm/0.02mm
Rain(60G Radar,Only for S700-A)	0~300mm/h	±10%	0.01mm
PM2.5	0~1000μg/m³	±10%@100~1000μg/m³ ±10μg/m³ @0~100μg/m³	1μg/m³
PM10	0~1000μg/m³	±15% (100~1000μg/m³) ±15μg/m³ (0~100μg/m³)	1μg/m³
CO_2	400~10000 ppm	±(30+3% of reading)(400~5000ppm) ±10% of reading (5000~10000ppm)	1 ppm
Noise	35~100dB	±1.5dB	0.1dB
Radiation	0~2000W/m²	±5%	1W/m²

Power Supply	12V~24V (1W)
Heating Power Supply	24V(3W)
Supported Protocols	Modbus-RTU(RS485), SDI-12 protocol
IP Rating	IP66
Operating Temperature	-40~85°C
Operating Humidity	0~100%RH(non-condensing)

SenseCAP S2120 LoRaWAN® 8-in-1 Weather Station

Low-Power

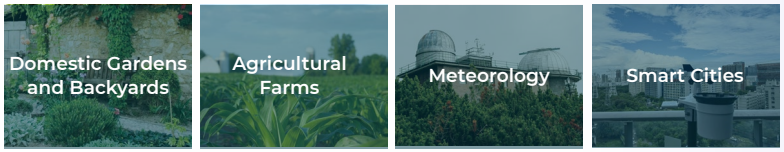
SKU 101990961

SenseCAP S2120 LoRaWAN® Weather Station provides you with hyperlocal weather dataat your fingertips. It supports multi-scenario applications like backyards, gardens, agriculture, meteorology, urban environmental monitoring, and so on. It enables low maintenance costs, thanks to its ultra-low power consumption, reliable performance, built-in Bluetooth for OTA configuration, and remote device management.

Features

- 8-in-1 Weather Station
  Collects air temperature, humidity, wind speed/direction, rainfall, light intensity, UV index, and barometric pressure data
- Bluetooth Configuration and Remote Management
  Simple configurations to check out the latest and historical data
- Ultra-Low Power Consumption, Easily Replaceable Battery & Expandable Capacity
  Powered by a 0.5W solar panel and 3 standard 1.5V AA -sized dry batteries that can lasts up to 2 years of service life, while an external battery compartment can accommodate 6 batteries at maximum to double the service life
- Reliable Performance
  Suitable for outdoor harsh environments outdoors such as a high level of UV exposure, heavy rain, dusty conditions, etc
- One-Stop Deployment & Flexible Layout
  Accessories include poles, mounting stand, among other things, for quick installation to be set up at almost any locations

Applications



Advanced Wind Tunnel Laboratory

The wind tunnel is an essential facility for testing, calibrating, and verifying the quality and performance of wind sensors. To ensure that SenseCAP weather sensors meet industry standards, we have built an in-house wind tunnel laboratory equipped with advanced auto-calibration instruments that allow wind direction control with 360°, a minimum speed of 0.1 m/s, and a maximum speed of 80 m/s.

By subjecting the weather sensors to Seeed Studio's wind tunnel, which generates high-speed airflow and simulates different levels of natural wind speeds, we calibrate and validate each weather sensor's performance to ensure high levels of accuracy, reliability, and durability. Every single Seeed Studio weather sensor must pass a series of rigorous speed tests before being delivered to our customers.

Sensor Calibration

Wind Tunnel Control System

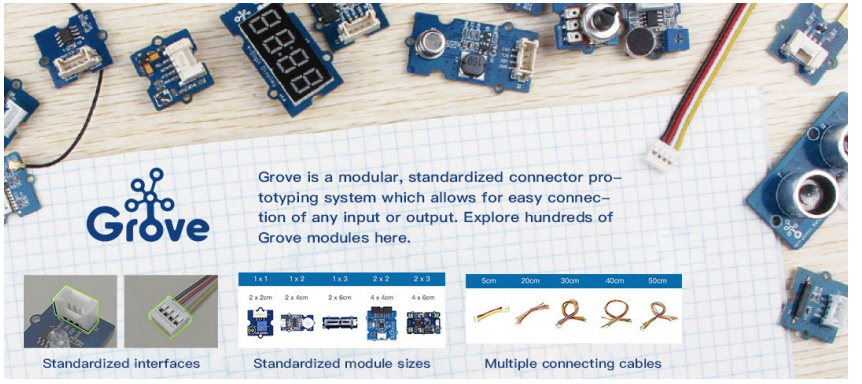
Sensor Network Module

Facilitating Rapid Prototyping and Product Design

Grove Sensor Modules

Grove is an open source, modular, easy-to-use toolset designed for simplicity and rapid prototyping. Sensor connection is made much easier and faster with our plug and play Grove modules. This, in turn, makes breadboarding a thing of the past!

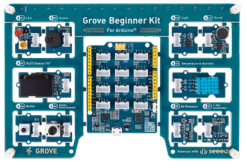
Sensor | Actuators | Network | Accessories



Grove Kits Compatible with

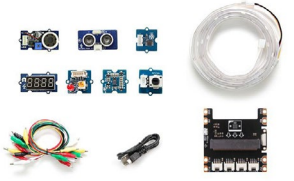
XIAO Starter Kit

SKU 110010044



Grove Beginner Kit for Arduino

SKU 110061162



Grove Inventor Kit for micro:bit

SKU 110060762

Grove Starter Kit for Seeed Studio BeagleBone Green

SKU 110060131

Grove Starter Kit for Raspberry Pi Pico With Free Courses

SKU 110061283

Open Source Courses for STEAM Education

Seeed Studio's curriculums integrate interdisciplinary pedagogy, the latest industry trends, and international curriculum standards for its fully-ready courses.

Grove - Vision AI Module V2

NEW

AI-Native | Low-Power

World First MCU-Based Vision AI Module Powered by Arm Cortex-M55 & U55

SKU 101021112

Features

- **Powerful AI Processing Capabilities**
  WE2 HX6538 processor with dual-core Arm Cortex-M55 + Arm Ethos-U55 neural network unit.

AI

- **Versatile AI Model Support**
  Easily deploy off-the-shelf or your custom AI models from SenseCraft AI, including Mobilenet V1, V2, Efficientnet-lite, Yolo v5 & v8. TensorFlow and PyTorch frameworks are supported.

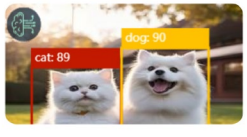
- **Rich Peripheral Devices**
  Includes PDM microphone, SD card slot, Type-C, Grove interface, and other peripherals.

- **High Compatibility**
  Compatible with XIAO series, Arduino, Raspberry Pi, easy for further development

4 Step No-Code Model Deployment with Senscraft AI

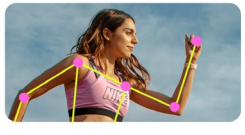
1 Connect Device — 2 Select Model — 3 Click Deploy — 4 Check inference results

Ready to Deploy Models



Pet Detection
The model is a Swift-YOLO model trained on the animal detection dataset for cat and dog.
Detection | Grove - Vision AI V2

Person Detection--YOLOV8
The model is a YOLOV8 model trained on the person detection dataset.
Detection | Grove - Vision AI V2



Pose estimation
Pose estimation is a task that involves identifying the location of specific points in an image, usually...
Pose | reComputer Jetson

Open Source

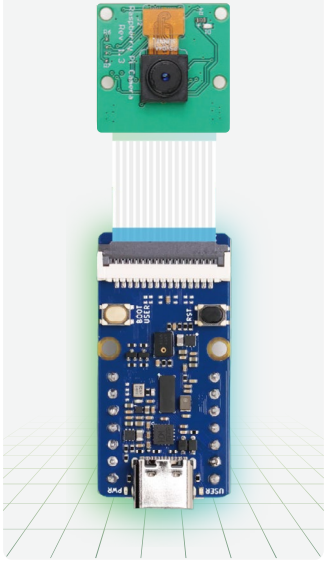
No-code Model Deployment with **SenseCraft AI**

Versatile AI Model Supported
TensorFlow PyTorch

World First MCU-Based Vision AI Module Powered by Himax WiseEye™ WE2 HX6538, based on Arm Cortex-M55 & Ethos-U55

- Cortex -M55 Processor (Big)
- Cortex -M55 Processor (Little)
- Ethos-U55 microNPU
- Security

Grove Vision AI v2



Work as a Smart Expansion

XIAO / Arduino / Raspberry Pi / BeagleBoard , ESP32 and other mainstream controllers

IIC, UART, SPI

SD Card Slot

Support Multimodel Input

Compatible with all Pi cameras

On-board PDM Microphone

Significant boost in on-device ML performance

Tailored for battery-powered endpoint AI applications

Award-winning low power consumption

seeed studio | arm | Himax

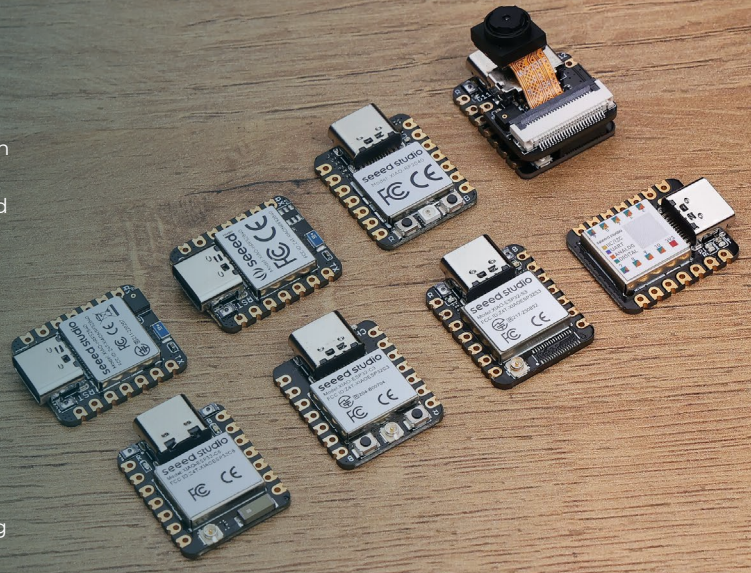
XIAO - tinyML MCUs

Add AI to Almost Everything

The Seeed Studio XIAO Series is a collection of thumb-sized, powerful microcontroller units (MCUs) tailor-made for space-conscious projects requiring high performance and wireless connectivity. Embodying the essence of popular hardware platforms such as ESP32, RP2040, nRF52840, and SAMD21, the Arduino compatible XIAO series is the perfect toolset for you to embrace tiny machine learning (tinyML) on the Edge. Trusted by 500,000 developers globally!

Features

- Module and Development Board Hybrid
  Enabling Rapidly Prototype While Easily Integrate;
  Significantly Streamline Product Development Process
- Invest for Your Future
  Unified Form Factor Enables You to Seamlessly Upgrade or Downgrade Your Product at the Lowest Cost
- Single-Sided Surface Mount Design
  Effortlessly Incorporate XIAO into Other Boards for Large-Scale Manufacturing
- Strong Ecosystem Support
  Extensive Software Compatibility, Abundant Community Resources, and Dedicated Technical Assistance



XIAO ESP32C6

NEW

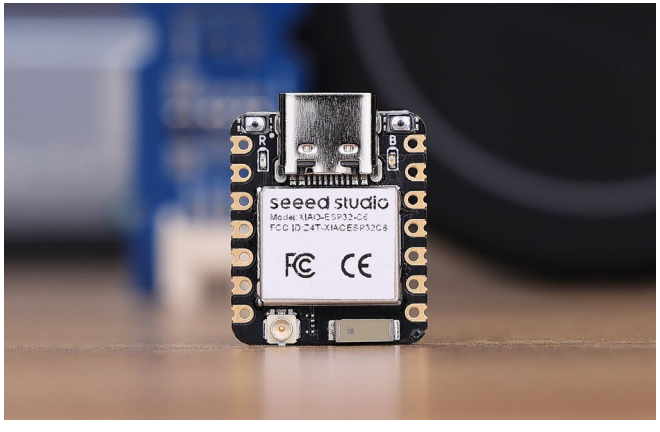
5+ Years Supply

SKU 113991254

A RISC-V low-power micro development board with multi-protocol wireless connectivity.

Features

- Multi-Protocol Wireless Connectivity
  2.4 GHz Wi-Fi 6/BLE/ Zigbee/Thread wireless communication.
- Outstanding RF performance
  Has an on-board antenna with up to 80m BLE/Wi-Fi range, while reserving an external antenna interface for UFL antenna
- Matter Native
  Supports building Matter-compliant smart home projects thanks to its enhanced connectivity, achieving interoperability



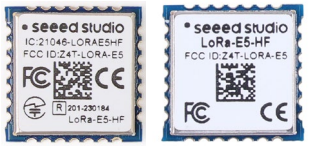
Seeed Studio XIAO Comparision Table

	Seeed Studio XIAO SAMD21	Seeed Studio XIAO RP2040	Seeed Studio XIAO nRF52840	Seeed Studio XIAO nRF52840 Sense	Seeed Studio XIAO ESP32C3	Seeed Studio XIAO ESP32S3	Seeed Studio XIAO ESP32S3 Sense	Seeed Studio XIAO ESP32C6
								
SKU	102010328	102010428	102010448	102010469	113991054	113991114	113991115	113991254
Chip	Microchip SAMD21	Raspberry Pi RP2040	Nordic nRF52840	Nordic nRF52840	Expressif ESP32-C3	Expressif ESP32-S3	Expressif ESP32-S3	Expressif ESP32-C6
Architecture	Cortex-M0+ running up to 48MHz	Dual-core Cortex-M0+ running up to 133MHz	Cortex-M4 running up to 64MHz	Cortex-M4 running up to 64MHz	RISC-V running up to 160 MHz	Dual-core Xtensa Lx7 running up to 240 MHz	Dual-core Xtensa Lx7 running up to 240 MHz	RISC-V running up to 160 MHz
RAM	32 KB SRAM	264 KB SRAM	256 KB RAM	256 KB RAM	400 KB SRAM	512 KB SRAM + 8MB PSRAM	512 KB SRAM + 8MB PSRAM	512 KB SRAM
Flash(Chip)	256KB	x	1MB	1MB	4MB	384KB	384KB	4MB
Flash(On-Board)	x	2MB	2MB	2MB	x	8MB	8MB	x
Built-in Sensors	x	x	x	IMU, Microphone	x	x	OV2640 camera Microphone	x
Wireless	x	x	BLE	BLE	BLE/Wi-Fi	BLE/Wi-Fi	BLE/Wi-Fi	Wi-Fi 6/BLE/ Zigbee/Thread
Battery Charge circuit	x	x	√	√	√	√	√	√
Low Power Mode	x	x	<5μA	<5μA	<44μA	14 μA	26.5 mA	15μA
Arduino	√	√	√	√	√	√	√	√
CircuitPython	√	√	√	√	√	x	x	x
MicroPython	x	√	√	√	√	√	√	x

Wio Communication Modules & Dev Kits

Powered by STMicroelectronics and Semtech, Wio Serires is a collection of low-cost, compact LoRa® Modules and Dev Kits for developers to design LoRaWAN® sensor nodes and gateway.

LoRa® Sensor Modules



Wio-E5 | Wio-E5-LE

SKU 317990829, 114993120

Powered by STM32WLE5JC, the World's First Combination of LoRa® RF and MCU on One Chip

- 12x12 mm, 28 pins SMS with rich interfaces for expansion
- Ultra-low power consumption of 2.1uA in sleep mode
- Easy to use with LoRaWAN AT commands

Grove Wio-E5 Wireless Module

SKU 113020091

Wio-E5/Wio-E5-LE Mini Dev Board

SKU 113990939, 113991156

Wio-E5/Wio-E5-LE Dev Kit

SKU 113990934, 113991157

LoRa® Sensor Modules

Wio-WM1110 LoRa® Tracker Module

SKU 114992865

Low-cost indoor and outdoor tracker module

- 20x20 mm, 80 pins LGA
- Semtech LR1110 and Nordic nRF52840
- GNSS, Wi-Fi, Bluetooth for outdoor and indoor positioning
- Low-power consumption: 6uA in sleep mode

Wio Tracker Dev Board

SKU 114993186

Wio-WM1110 Dev Kit

SKU 114993082

LoRa® Gateway Modules

Wio-WM1302 / Wio-WM1303

SKU 114992969, 114993268, 114992628, 114992991

LoRaWAN® Gateway Module in Mini-PCIe Form Factor Based on Semtech SX1302

- 50x30 mm, Mini PCIe form factor with 52 pin Golden Finger
- Ultra-low operating temperature, no additional heat dissipation needed
- Low-power consumption: down to 7.5 mA in stanby mode

Wio-WM1110 Raspberry Pi Hat

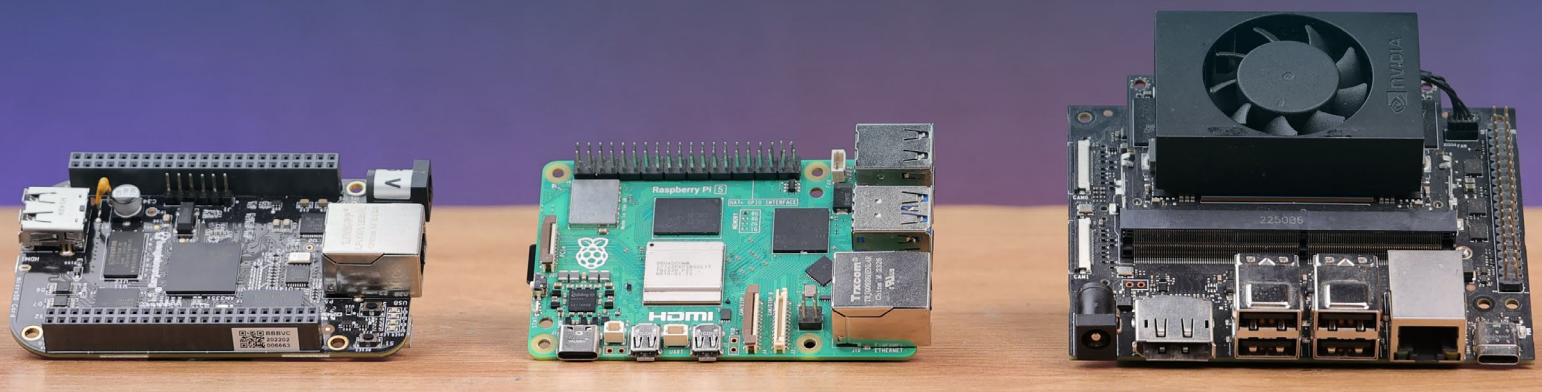
SKU 113100022

Edge Computing

The evolution of Edge Computing is increasingly a big trend in the field of distributed systems, along with a growing demand for processing power closer to data source. The new generation of Edge Computing solutions is characterized by openness, integration, and cloud-native approaches, and it's being fueled by the latest advancements in computing, communication, storage, and interaction technologies.Seeed Studio offers a wide range of Edge Computing options, from development boards to industrial-grade devices. Its open, integrated, and cloud-native Edge Computing solutions are poised to play a crucial role in enabling real-time data processing and enhancing operational efficiency in various industries.

Single Board Computer (SBC)

Partner with the most popular communities and leading chip manufacturers, we bring powerful Single Board Computers (SBCs) to developers. Also, we provide hundreds of related supporting products to help developers realize various creative projects, ranging from the Internet of Things to robotics, faster and more conveniently.



beagleboard.org

The Beagleboard is a fully open source, industrial single-board computer based on low-power Texas Instruments processors featuring the ARM Cortex-A core with all of the expandability of today's machines.

Raspberry Pi

The Raspberry Pi is a low-cost, credit card sized single-board computer with hign performace and rich sets of I/O. Its rich software ecosystem won over a diverse user base ranging from students to engineers.

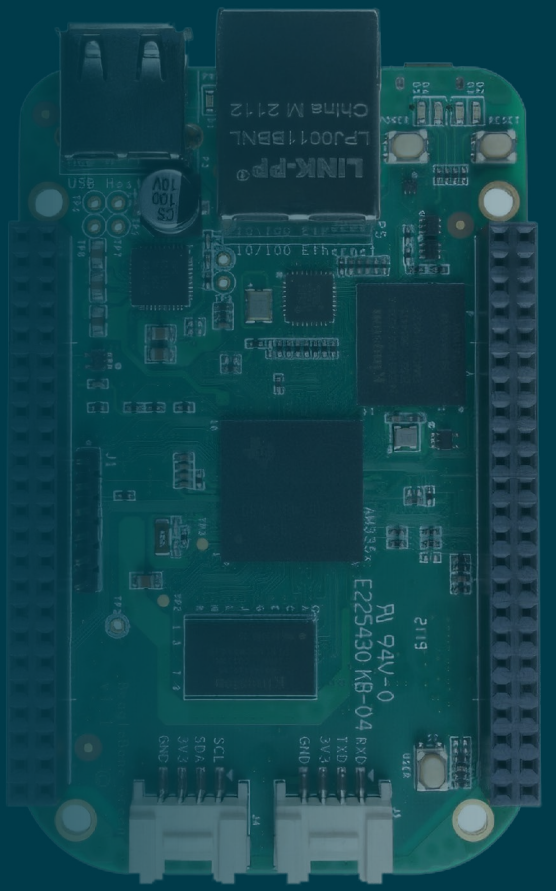
NVIDIA

NVIDIA Jetson is the leading platform for autonomous machines and embedded AI applications. NVIDIA Jetson provides scalable software, a modern AI stack, and application-specific workflows, accelerating the time-to-market for AI products.

seeed studio beagleboard.org

Strategic Design Partner of BeagleBoard®

BeagleBoard® is a series of open source, low-cost, high-expansion, community-supported signle board computers launched by BeagleBoard.org. As the strategic design partner of BeagleBoard®, Seeed Studio actively participates in the product hardware development and community building to bring this fantansitic development platform to developers



Seeed Studio BeagleBone® Green Series

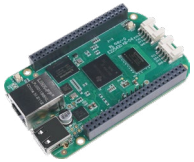
Jointly developed by Seeed Studio and BeagleBoard.org

Processor

AM335x 1GHz ARM® Cortex-A8.

Software Compatibility

Debian, Android, Ubuntu, Cloud9 IDE on Node.js w/ BoneScript library.



Seeed Studio BeagleBone® Green

SKU 102010027

BBG is based on the open-source hardware design of BeagleBone Black and is developed into the differentiated version.It is a cost-effective BeagleBone® compatible board with on-board Grove connectors to extend possibilities.

Seeed Studio BeagleBone® Green Wireless

SKU 102010048

BBGW is the first Wi-Fi + Bluetooth Low Energy board from the BeagleBone community, and it is also based on the open-source hardware design of BeagleBone Black. It offers a built-in 2.4 GHz TI WLinkTM8 module with two antennas. It also supports AP+STA mode of communication, comes with an MRAA library.

Official BeagleBone® Series

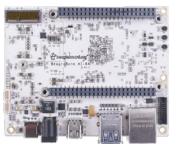
Seeed Studio has been closely collaborating with BeagleBoard.org to help manufacture official BeagleBone® development boards to serve prosperous AIoT/IIoT needs.

BeaglePlay®

Easy. Affordable. Connected. Open. BeaglePlay is an open-source single board computer based on the Texas Instruments AM6254 quad-core Cortex-A53 Arm SoC designed to simplify the process of adding sensors, actuators, indicators, human interfaces, and connectivity to a reliable embedded system.

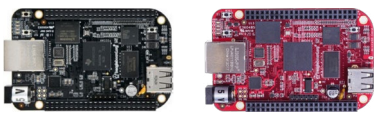
BeagleConnect® Freedom

BeagleConnect™ Freedom is built around the TI CC1352P7 microcontroller, which supports both 2.4-GHz and long-range, low-power Sub-1 GHz. Rapidly prototyping of IoT applications is accelerated by over 1,000 mikroBUS add-on sensors, acutators, indicators and additional connectivity and storage options.



BeagleBone® AI 64

BeagleBone AI-64 like its predecessors (BeagleBone AI), is designed to address the open-source community, early adopters, and anyone interested in a low cost 64-bit Dual Arm® Cortex®-A72 processor based Single Board Computer. Rich on-board interfaces allow the use of add-on boards called capes, to add different combinations of features.



BeagleBone® Black, Black Industrial

BeagleBone® Black is a low-cost, community-supported development platform. Boot Linux in under 10 seconds and get started on development in less than 5 minutes with just a single USB cable. BeagleBone® Black Industrial answers the need for an industrial rated single board computer with extended temperature range.

seeed studio

Raspberry Pi
Approved Reseller

Raspberry Pi
Design Partner

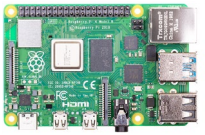
Raspberry Pi® Approved Design Partner and Reseller

Seeed Studio is a leading provider of Raspberry Pi® products, offering a wide range of official boards, kits and devices for various domains tailored to your needs.

SBCs and MCUs

Raspberry Pi® 5

8GB SKU 102110919
4GB SKU 102110918



Raspberry Pi® 4

8GB SKU 102110421
4GB SKU 102110301
2GB SKU 102991317
1GB SKU 102110299

Raspberry Pi® 3 Model A+

SKU 102110207

Raspberry Pi® Zero

W SKU 102110358
WH SKU 102110359
2W SKU 102110617

Raspberry Pi® Pico

SKU 102110537

Cameras

Raspberry Pi® Camera Module 3

SKU 114993028

Raspberry Pi® Camera Module 3 NoIR

SKU 114993029

Raspberry Pi® Camera Module 3 Wide

SKU 114993030

Raspberry Pi® Camera Module 3 Wide NoIR

SKU 114993031

Raspberry Pi® Camera Module V2

SKU 113990214

Computing Modules

Raspberry Pi® Compute Module 4

Part Number	SKU	Part Number	SKU	Part Number	SKU
CM4001000	102991380	CM4102008	102991377	CM4101008	102991419
CM4001008	102991415	CM4102032	102991378	CM4102000	102991376
CM4008000	102991434	CM4104000	102991431	CM4104032	102991379
CM4002016	102991424	CM4104016	102991433	CM4108032	102991441
CM4108000	102991438				

Expansion Boards

Grove Beginner Kit - Raspberry Pi® 4B - 4GB

SKU 110061127

Grove Starter Kit for Raspberry Pi® Pico with Free Course

SKU 110061283

Add-ons & Expansion Boards

reSpeaker 2-Mics Pi HAT for Raspberry Pi®

SKU 107100001

Water Cooling Kit for Raspberry Pi® 5

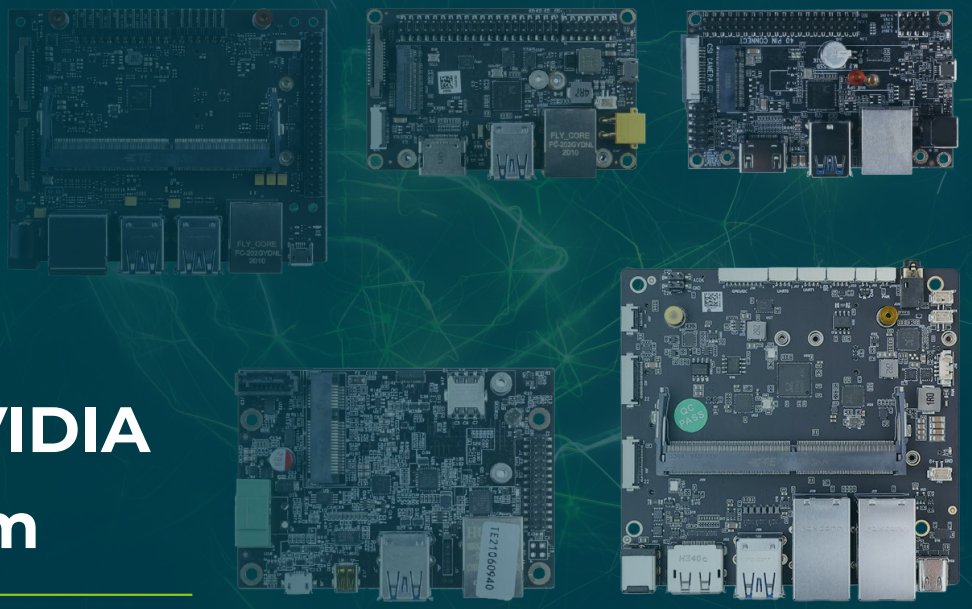
SKU 110070128

Raspberry Pi® Official Active Cooler

SKU 114993229

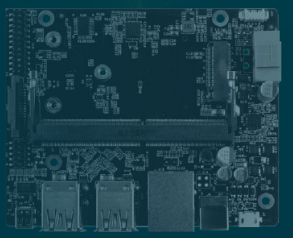
seeed studio

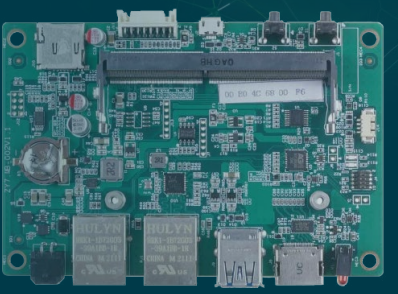
NVIDIA Elite Partner



Elite Partner in NVIDIA Jetson® Ecosystem

Seeed Studio plays a pivotal role in contributing AI at the edge with a comprehensive selection of compatible carrier boards, accessories, and full systems. We commit to simplify access to cutting-edge technology, accelerating the development of intelligent devices and applications, and facilitating the creation of smarter, more efficient solutions across various industries.





Pioneering Embedded AI Partner

Support every stage of edge AI hardware development

NVIDIA Elite Partner

Jetson Developer Kits

NVIDIA® Jetson Orin™ Nano Developer Kit

SKU 102110839

NVIDIA® Jetson AGX Orin™ Developer Kit

SKU 110991725

Carrier Boards

J101 Jetson Nano

SKU 102991694

J202 Jetson Nano/ Xavier NX

SKU 102991695

A203 Jetson Nano/ Xavier NX

SKU 103110043

A205 Jetson Nano/ Xavier NX

SKU 114110048

J401 Jetson Orin™ NX/Nano

SKU 102110770

A603 Jetson Orin™ NX/Nano

SKU 102110840

A607 Jetson Orin™ NX/Nano

SKU 102110841

A608 Jetson Orin™ NX/Nano

SKU 105110001

Lidar

RPLIDAR A1M8

SKU 114992561

RPLIDAR S3

SKU 101090041

RPLIDAR C1

SKU 101090061

Camera Module

IMX219-77 8MP Camera

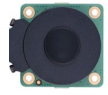
SKU 114992260

IMX219-200 8MP Camera

SKU 114992265

IMX219-160IR 8MP Camera

SKU 114992264



Raspberry Pi HQ Camera

SKU 114993032

Raspberry Pi Camera Module V2

SKU 113990214

IMX390 2.12MP 118°(H) FOV 4-lane MIPI CSI Camera

SKU 114993127

Accessories

Aluminum Heatsink for Jetson Nano Module

SKU 114992686

Jetson Nano Module Active Heat Sink

SKU 101110061

Aluminum Heatsink with Fan for Jetson Xavier NX Module

SKU 114992687

Aluminum Heatsink with Bigger Fan for Jetson Xavier NX Module with Long Cable

SKU 114992746

Aluminum Heatsink with Fan for Jetson TX2 NX Module

SKU 114992731

Aluminum Heatsink with Fan for Jetson Orin NX/ Orin Nano/Xavier NX Module

SKU 110991904

reComputer, reServer

Compact and powerful edge AI computing solutions for efficient data processing and insights.

reComputer B Series NEW

Industrial-Grade | 5+ Years Supply | AI-Native

beagleboard.org

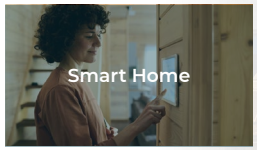
reComputer B6712

Open-source industrial vision AI computer powered by BeagleY-AI SBC from BeagleBoard.org, ideal for cost-sensitive high performance compute applications in Factory Automation, Building Automation, and other markets

Features

- **Powerful Performance**
  Based on the TI AM67x SoC which includes quad 64-bit Arm® Cortex®-A53 along with deep learning accelerator, supporting up to 4 TOPS AI performance
- **TI Model Zoo**
  100+ pre-trained AI models provided by Texas Instrumrnts
- **Industrial-grade stability**
  10+ years lifetime; 2-year warranty; RoHS, CE, FCC supported
- **Open**
  Fully open soure; Fueled by BeagleBoard.org Community

Applications



reComputer R Series NEW

5+ Years Supply

Raspberry Pi Approved Reseller

Raspberry Pi Design Partner

reComputer R1000 Series

Open-source, cost-effective, high-performance edge controller with extensive connectivity and powerful IoT capabilities, ideal for smart buildings and energy management.

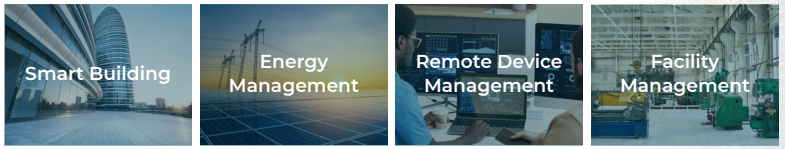
Price from:

$150

Features

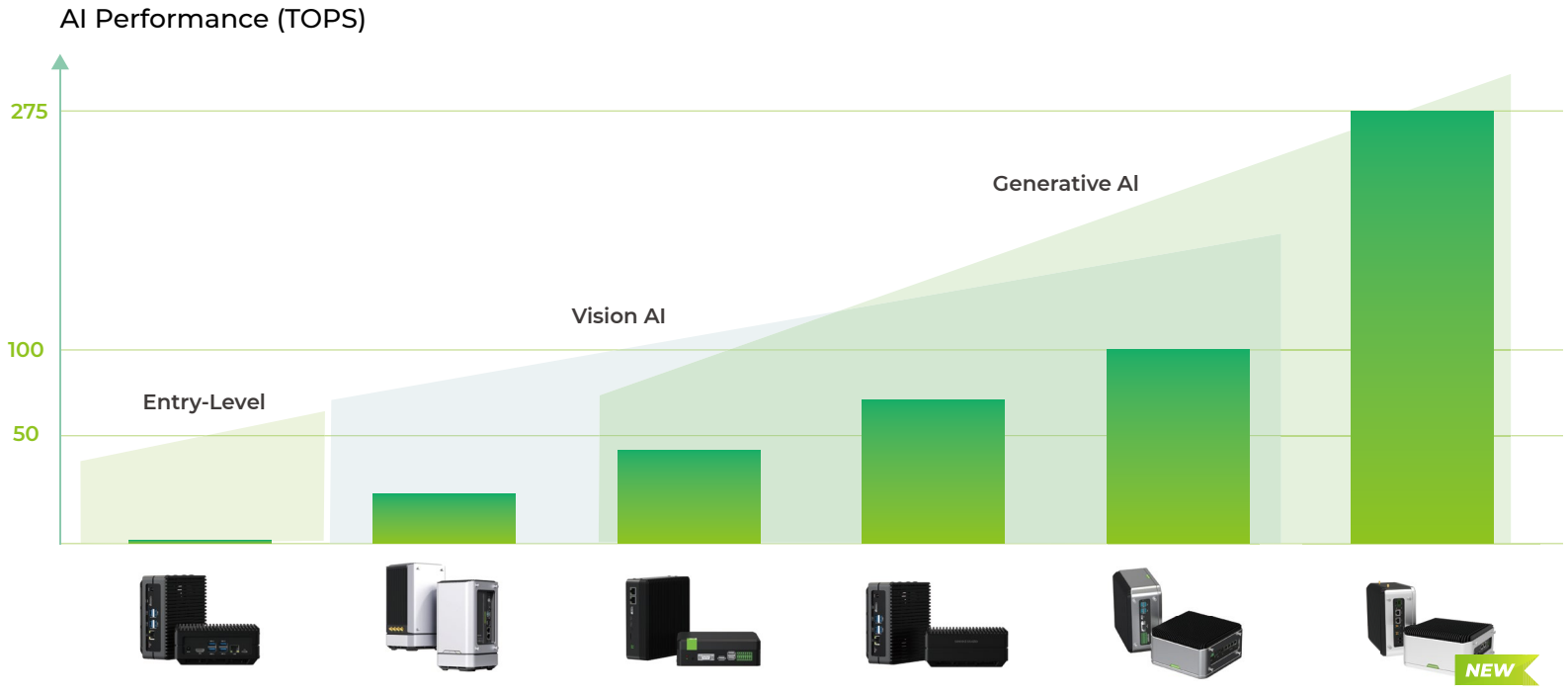
- **Powerful Performance**
  Raspberry Pi CM4, quad-core A72, up to 8GB RAM and 32GB eMMC
- **Multiple Industrial Interfaces**
  3*RS485, 2*Ethernet Ports, 1*HDMI, 1*SIM Card Slot
- **Versatile Wireless Options**
  Support Wi-Fi, BLE, LoRaWAN, Zigbee, and 4G LTE
- **Perfect Fit for Building Automation System**
  Support BACnet & Modbus Protocols to ensure interoperability
- **Safety and Reliablity**
  Hardware Watch Dog, UPS, EMC protection and 6 year lifetime

Applications



Devices		reComputer B6712	reComputer R1000 Series
			
MSRP		Coming Soon	Start from $150, coming soon
Description		An ultra-low power industrial vision AI computer powered by BeagleY-AI board form BeagleBone	High-performance and Cost-effective edge IoT controller based on Raspberry Pi, ideal for smart buildings and energy management
	CPU	TI AM67x	Raspberry Pi CM4
	Storage	4GB RAM	1GB/2GB/4GB/8GB RAM; Lite/8GB/16GB/32GB eMMC
Wireless	Wi-Fi	2.4 GHz, 5.0 GHz IEEE 802.11 ax	2.4 GHz, 5.0 GHz IEEE 802.11 b/g/n/ac (optional)
	Bluetooth	Bluetooth 5.4, BLE	Bluetooth 5.0, BLE (optional)
	Cellular	x	Mini-PCIe for 4G (optional)
	LoRa	x	Mini-PCIe for LoRaWAN (optional)
	Zigbee	/	Mini-PCIe for Zigbee (optional)
Interface	Ethernet	1000M RJ45 *1	1000M RJ45 *1; 100M RJ45 *1
	HDMI	HDMI 2.0 *1	HDMI 2.0 *1
	USB	USB3.0 Type A *4; USB2.0 Type C *1	USB2.0 Type A *2; USB2.0 Type C *1
	RS BUS	x	RS485 *3 (isolated)
	Mini-PCIe	Mini-PCIe *1	Mini-PCIe *2
	M.2 socket	requires separate M.2 HAT or other adapter	Support M.2 2280 NVME SSD card
	40-pin GPIO	inside	x
Power	Power Range	5V DC	9~36V DC/ 12~24 AC
	PoE	x	IEEE 802.3af Standard (optional)
	Power Switch	NO	NO
	Reboot Switch	YES	YES
	UPS	x	UPS Supercapacitor (optional)
Extra features	RTC	optional	RTC
	Watch Dog	x	Hardware Watch Dog
	Security	x	TPM2.0 or ATECC608A(optional)
	Operation Temperature	0 to 55 °C	-20 to 60 °C
	Ingress Protection	IP40	IP40
	Fan	Fanless	Fanless
Mechanical	Dimension	130mm x 50mm x 90mm	130mmx93mmx49.6mm
	Mounting	Din-Rail	Din-Rail/ Wall Mounting
EMC	ESD	EN61000-4-2, Level 3	EN61000-4-2, Level 3
	EFT	EN61000-4-4, Level 2	EN61000-4-4, Level 2
	Surge	EN61000-4-5, Level 2	EN61000-4-5, Level 2
Certification		RoHS, CE, FCC, REACH, TELEC	
Warranty		2 Years	

reComputer & reServer Jetson Series Selection Guide



reComputer J1010
NVIDIA Jetson Nano 4GB

reServer J2032
NVIDIA Jetson Xavier NX 16GB

reComputer Industrial J3011
NVIDIA Jetson Orin Nano 8GB

reComputer J4011
NVIDIA Jetson Orin NX 8GB

reServer Industrial J4012
NVIDIA Jetson Orin NX 16GB

reServer AGX Orin J50 Series

Generative AI at the Edge

Bring generative AI to the world with NVIDIA® Jetson™

NVIDIA Elite Partner

Text Generation

Run LLM-based chat bot on Jetson

Text + Vision

Run multimodal Vision-Language models to give your AI access to vision

Image Generation

Run diffusion models to generate stunning images interactively on Jetson

Vision Transformer (ViT)

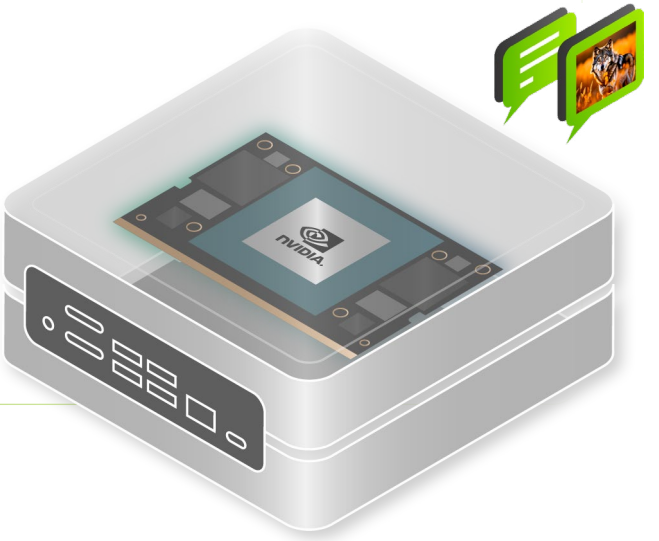
Vision Transformer examples, with models optimized to run in realtime on Jetson

Whisper

Run OpenAI's Whisper model to transcribe audio

Llamaspeak

Live interaction with Llama LLM using NVIDIA Riva ASR/TTS



reComputer Jetson Classic Series

5+ Years Supply *AI-Native*

Compact Edge AI computer, classic design covered wide range of NVIDIA® Jetson™ modules

SKU

Jetson Nano
110061362, 110061441

Jetson Xavier NX
110061381, 110061402

Jetson Orin Nano
110110146, 110110147

Jetson Orin NX
110110144, 110110145

Price from:

$219

Features

- Design for Both Development and Production
  Open-source carrier board with rich set of I/Os: 4x USB3.2, HDMI, GbE, M.2 KEY M, M.2 KEY E, GPIO, etc.
- Immediately Go-to-Market
  Pre-installed Jetpack, Linux OS BSPCertification including ROHS, CE, FCC, KC, UKCA, REACH
- Long Life Time Supply
  Available through 2030

Vision AI & LLM Framework

aws · Hugging Face · Node-RED · NVIDIA TAO · ONNX · PyTorch

AI Performance

0.5 TFLOPS — 100 TOPS

reComputer Jetson Industrial Series

Industrial-Grade *5+ Years Supply* *AI-Native*

Robotize machines in the harsh environment of facility or the wild

SKU

Jetson Xavier NX
110110188, 110110189

Jetson Orin Nano
110110192, 110110193

Jetson Orin NX
110110190, 110110191

Price from:

$799

Features

- Industrial Interfaces, Robotize Machine Facilities
  2x RJ-45 GbE(1xPoE), RS232/422/485, 4x isolated DI/DO, 1x CAN
- Fanless Compact PC, Designed for Harsh Environment
  Thermal reference design, wider temperature support -20°C ~ 60°C
- Support Flexible Mounting Options
  Desk, DIN rail, wall-mounting, VESA

Vision AI & LLM Framework

aws · Hugging Face · Node-RED · NVIDIA TAO · ONNX · PyTorch

AI Performance

20 TOPS — 100 TOPS

reServer Jetson Industrial Series

Industrial-Grade *5+ Years Supply* *AI-Native*

Local Inference Center with ultra high computing power, ideal for vision AI and Large Language Models

SKU

Jetson Orin Nano
114110250, 114110249

Jetson Orin NX
114110248, 114110247

Jetson AGX Orin
114110267, 114110268, 114110269, 114110270, 114110271, 114110272

Price from:

$899

Features

- Support Multiple Streams for Complex Task Inferencing
  4x PoEs in 5x GbE interfaces Optional GMSL2, FPD LINK III
- Local Storage Expansion
  2x SATA SSD/HDD
- Hybrid Connectivity
  1x M.2 KEY B, 1x miniPCIe for 4G/5G/LoRaWAN, 1x GbE, 1x 10GbE(RJ-45)

Vision AI & LLM Framework

aws · Hugging Face · Node-RED · NVIDIA TAO · ONNX · PyTorch

AI Performance

20 TOPS — 275 TOPS

Production Module	Jetson Nano	Jetson Xavier NX	Jetson Orin Nano	Jetson Orin NX		Jetson AGX Orin
Device						
Product Name	reComputer J1020v2	reServer J2032	reComputer Industrial J3011	reComputer J4011	reServer Industrial J4012	reServer Industrial J5014
SKU	110061441	110061403	110110193	110110144	114110247	114110268
Production Module	Jetson Nano 4G	Jetson Xavier NX 16GB	Jetson Orin Nano 8GB	Jetson Orin NX 8GB	Jetson Orin NX 16GB	Jetson AGX Orin 64GB
AI Performance	0.5TOPS	21TOPS	40 TOPS	70 TOPS	100 TOPS	275 TOPS
Storage	16GB eMMC 5.1 1*M.2 Key M Connector	16GB eMMC 5.1 2* 2.5"/3.5" SATA HDD/SSD (SATA III 6.0Gbps)	M.2 Key M PCIe Gen4.0 SSD (M.2 NVMe 2280 SSD 128G Included)	1* M.2 Key M (128G NVMe SSD Included)	M.2 Key M PCIe Gen4.0 SSD (M.2 NVMe 2280 SSD 128G Included) 2* Drive Bays to support 2.5" SATA HDD/SSD (SATA III 6.0Gbps)	1* M.2 Key M (128G NVMe SSD Included) 2* Drive Bays to support 2.5'' SATA HDD/SSD
Networking	1* RJ45 GbE (10/100/1000Mbps)	1* RJ45 GbE (10/100/1000Mbps) 1* RJ45 2.5 GbE	1* LAN1 RJ45 GbE PoE (PSE 802.3 af 15W) 1* RJ45 GbE (10/100/1000Mbps); 1* LAN1 RJ45 GbE PoE (PSE 802.3 af 15W) 1* LAN2 RJ45 1* RJ45 GbE (10/100/1000)	1* RJ45 GbE (10/100/1000Mbps)	1* LAN0 RJ45 GbE (10/100/1000Mbps) 4* LAN RJ45 GbE PoE (PSE 802.3 af 15 W, 10/100/1000Mbps)	1* LAN1 RJ45 GbE; 1* LAN2 RJ45 10GbE
USB	4* USB 3.0 Type-A 1* USB 2.0 Type-C for Device Mode	2* USB 3.1 Gen 2 Type-A Connector 1* USB 2.0 Type-C for Device Mode 1* USB Type-C for RP2040 Coprocessor	3* USB 3.2 Gen1 1* USB 2.0 Type-C for Device Mode 1* USB 2.0 Type-C for Debug UART & RP2040	4* USB 3.2 Type-A (10Gbps) 1* USB2.0 Type-C (Device Mode)	4* USB 3.2 Gen1 1* USB 2.0 Type-C for Device Mode 1* USB 2.0 Type-C for Debug UART & RP2040	4* USB3.2 1* USB2.0 Type C (Device mode) 1* USB2.0 Type C For Debug UART
Display	1* HDMI 2.0 Type-A 1* DP	1* HDMI 2.0 Tpye-A 1* DP 1.4	1* HDMI 2.0 Tpye-A	1* HDMI 2.1	1* HDMI 2.1 Type-A	
Fan	1* Fan Connector for Module	1* Fan Connector for Module 1* Fan Connector for Device	Fanless, Passive Heatsink 1* Fan Connector (5V PWM)	1* 4 pin Fan Connector (5V PWM)	Fanless, Passive Heatsink 1* Fan Connector (5V PWM)	1* 4-pin Fan header
M.2	1* M.2 Key E (Disabled)	1* M.2 Key B Support 4G/5G (Module Optional)		1* M.2 Key M 1* M.2 Key E	1* M.2 Key B Support 4G/5G (Module Optional)	1* M.2 Key B Support 4G/5G
PCIe	-	1* Mini PCIe for 4G/LoRa		-	1* Mini PCIe for 4G/LoRa	1* Mini PCIe for 4G/ LoraWAN
Multifunctional Header / IO	2* CSI (2-lane 15pin) 1* 40-Pin Header (GPIO,I2C,I2S,SPI,USRT)	-	2* CSI (2-lane 15pin) DI/DO/CAN RS232/422/485 TPM 2.0 Header	2* CSI (2-lane 15pin) 1* 40-Pin Header (GPIO,I2C,I2S,SPI,USRT) 1* 12-Pin Control and UART header	4*DI,4*DO,3*GND_DI,2*GND_ DO,1*GND_ISO,1*CAN 1* DB9 (RS232/RS422/RS485)	1* RS232/422/485 4* isolated DI/DO 1* CAN TPM 2.0 Header GMSL2/FPD LINKIII (optional)
Power Adapter	DC Barrel Jack 12V/2A	DC Barrel Jack 12V/5A	19V Power Adapter (without Power Cord)	DC 12V/5A (Barrel Jack 5.5/2.5mm)	24V /5A Power Adapter (Without power cord)	24V Power Adapter (without power cord)
Dimensions	130 x 120 x 50mm	159 x 124 x 233mm	159 x 155 x 57mm	130 x 120 x 58.5mm	194.33 x 187 x 95.5mm	194.33 x 187 x 95.5mm

reTerminal, reCamera, reSpeaker

Harness AI to revolutionize human-computer interaction and data acquisition

reTerminal

Low-Power | 5+ Years Supply

Raspberry Pi Approved Reseller | Raspberry Pi Design Partner

A 5-inch Hand-size Raspberry Pi CM4-powered HMI for Home and Industry

SKU 110070048, 110070108

Price from:

$209

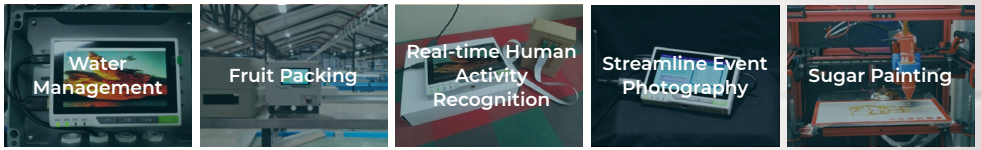
Features

- **Raspberry Pi All-in-One Board**
  RPi CM4, WiFi&Bluetooth, IPS Touch Screen, pre-installed Linux
- **Rich Interfaces**
  USB, Ethernet, HDMI, micro-SD, MIPI camera interface, 40-pin GPIO
- **Neat AI and Automation Assistance**
  Built in light&proximity sensor, accelerometer, buzzer, RTC, and programmable buttons
- **Industry-ready Modular Design**
  DC Jack, PoE, UPS, LoRaWAN, RS485/232, CAN, SATA2.0

Supported Software

aws, Azure, balena, Buildroot, FRIGATE, MENDER, Node-RED, yocto PROJECT

Applications



reTerminal DM

Industrial-Grade *Low-Power* *5+ Years Supply*

Raspberry Pi Approved Reseller Raspberry Pi Design Partner

A 10.1-inch Raspberry Pi CM4-powered Integrated Device Master, Industrial-grade HMI/ PLC/ Panel PC All-in-one

SKU 114070201, 114070221

Price from:

$389

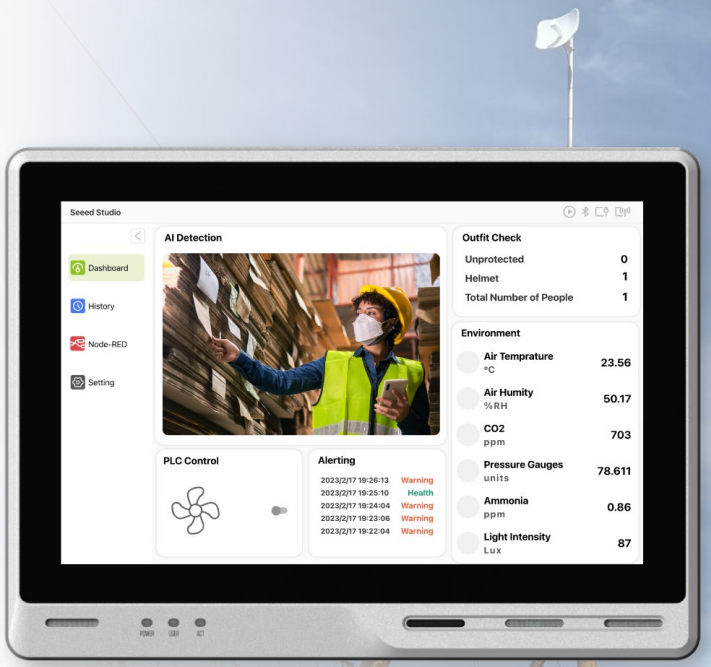
Features

- 10.1'' HMI, PLC, Panel PC and Gateway in one
  Perfect for distributed hub device with build-in camera
- Low code programming for event-driven applications
  Natively integrated Node-RED for flow based editing and one click deploy, compatible with all software runs on Raspberry Pi
- Rugged design for harsh working environment
  IP65 front panel, -10~50°C Operating Temperature
- Hybrid Connectivity
  Support 5G, 4G LTE, LoraWAN, Wifi, BLE, RS485/232, CANBUS
- Open-source design in software and hardware
  Welcome customization or derivatives

Supported Software

aws Azure balena FRIGATE Ignition EDGE machinechat® N3uron Node-RED

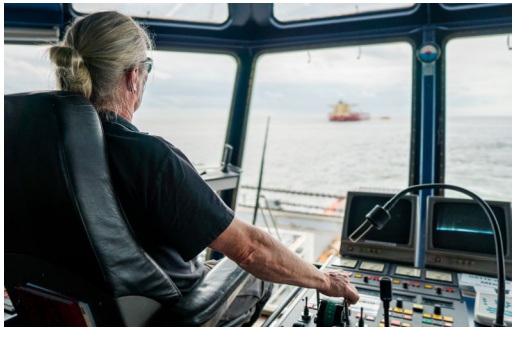
Applications



Strict electromagnetic protection allows it to work in complex electromagnetic environments. With strong vibration and impact resistance, it can be used on boats, tractors and other agricultural machinery vehicles.

EMC Protection	ESD	EN61000-4-2, Level3	Contact discharge: ±6kV; Air discharge; ±8kV
	EFT	EN61000-4-4, Level2	Power:1kV/5kHz; Signal:1kV/5kHz
	Surge	EN61000-4-5, Level2	Line-Line: 0.5kV / Line-PE: 1kV
Shock & Vibration	Mechanical shock	IEC 68-2-27	50G, half sine, 11ms
	Vibration	IEC 68-2-64	5-500HZ, X/Y/Z, 1hour

Application Scenarios



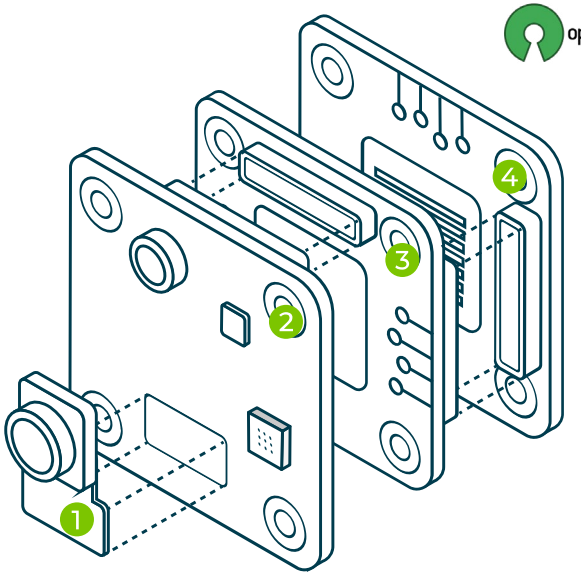
Devices		reTerminal	reTerminal DM
			
MSRP		$209	$389
Description		A 5-inch hand-size HMI with integrated modular design. Flexible with high expandability for home and industry.	10.1-inch Integrated Device Master, HMI, PLC, Panel PC and Gateway in one, perfect for distributed hub device.
	CPU	Raspberry Pi CM4	Raspberry Pi CM4
	Storage	up to 8GB RAM; up to 32GB eMMC	8GB RAM; 32GB eMMC
	Display	5-inch 720x1280 LCD, Capacitive touch	10.1-inch 1280 x 800, 10-point Capacitive
	Camera	x	Supported (optional)
Wireless	Wi-Fi	2.4 GHz, 5.0 GHz IEEE 802.11 b/g/n/ac	2.4 GHz, 5.0 GHz IEEE 802.11 b/g/n/ac
	Bluetooth	Bluetooth 5.0, BLE	Bluetooth 5.0, BLE
	Cellular	Expansion Board Supported (optional)	Mini-PCIe for 4G (optional)
	LoRa	Expansion Board Supported (optional)	Mini-PCIe for LoRaWAN (optional)
	Zigbee	x	x
Interface	Ethernet	1000M RJ45 *1	1000M RJ45 *1; 1000M RJ45 *1 (optional)
	HDMI	Micro HDMI *1	HDMI 2.0 *1
	USB	USB2.0 Type A *1; USB Type C *1	USB2.0 Type A *2; USB3.0 *2 (optional)
	RS BUS	Expansion Board Supported (optional)	RS485*1 > Terminal Block; RS485*1 > DB9 (optional) RS-232 *1 > Terminal Block; RS-232 *1 > DB9 (optional)
	CAN BUS	Expansion Board Supported (optional)	CAN-BUS *1 > Terminal Block
	PCIe	PCIe 1-lane Host *1	Mini-PCIe *2
	M.2 socket	Expansion Board Supported (optional)	Support M.2 2280 NVME SSD card
	Digital IO	/	DI *4 > Terminal Block; DO *4 > Terminal Block
Power	Power Range	5V DC	12-24V DC
	PoE	Expansion Board Supported (optional)	IEEE 802.3af Standard (optional)
	UPS	Expansion Board Supported (optional)	/
Extra features	RTC	RTC	RTC
	Watch Dog	/	Hardware Watch Dog
	Security	ATECC608A	ATECC608A (optional)
	Operation Temperature	0 to 60 °C	-10 to 50 °C
	Ingress Protection	/	Front Panel IP65
Certification		RoHS, CE, FCC, REACH, TELEC	
Warranty		2 Years	

reCamera NEW

A programmable AI camera

Accelerate your product from prototype to mass production

open source



Features

- **Modulized Design**
  Quickly modify the parts and realize your idea.
- **Plug & Play**
  Shipped with reCamera OS, quickly setup with built-in web UI.
- **One-step to Product**
  Compact design, suitable for any kind of application and mass production.
- **Continous Training**
  Continous collecting new data during deployment and retraining with Sensecraft AI platform.

1

Camera Module

Compatiable with Pi Camera Module

5MP
Auto Focus

2

Sensor Board

Customize your sensor and light surrounding camera

Microphone
Visible&IR Light
IR Cut
Dual Camera

3

Core Board

Minimum system with all the necessary pheriphrals

SG2002
1GHz
RAM 256MB
Onboard EMMC
1 Tops @ Int8
WIFI & BLE

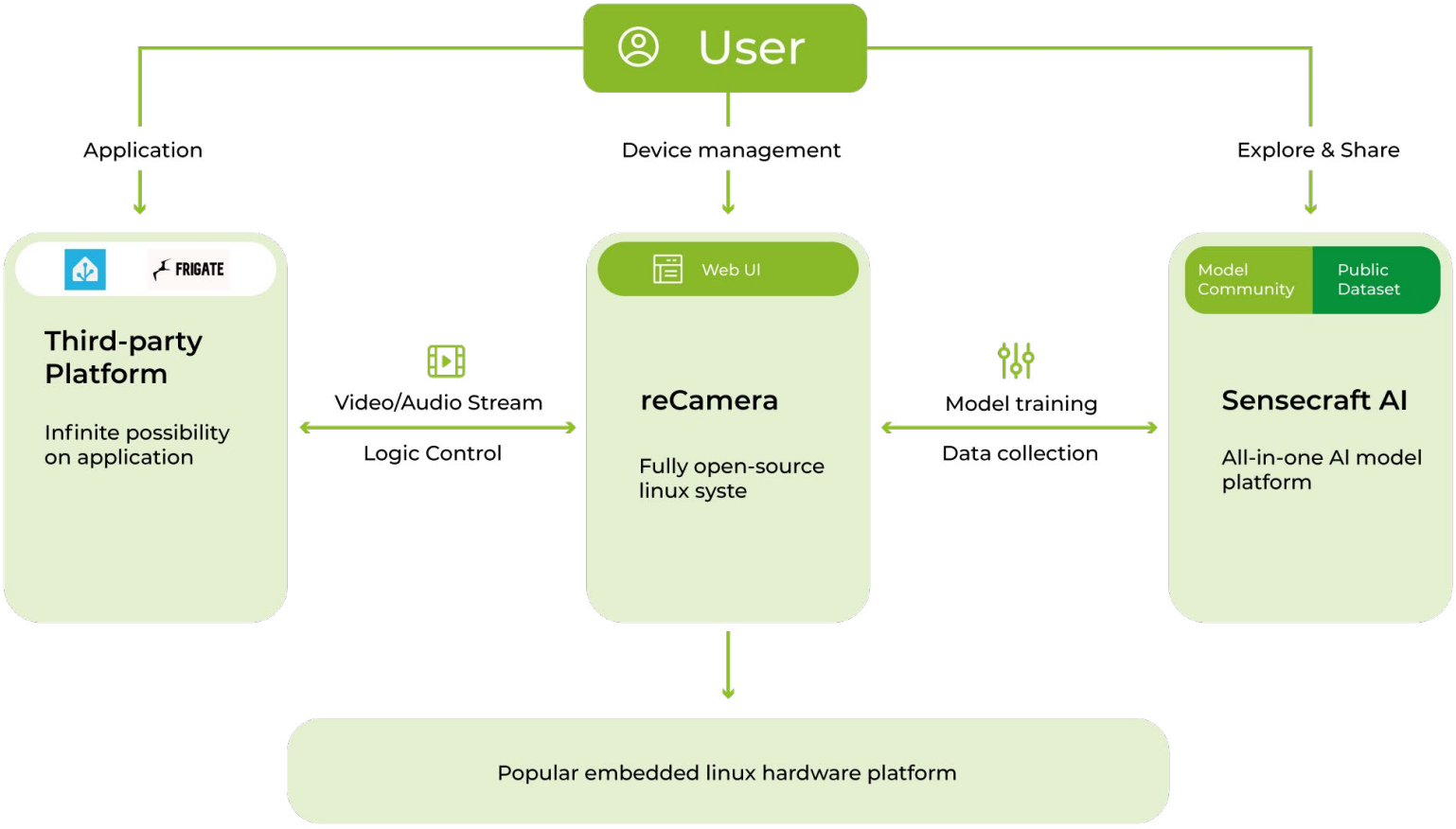
4

Base Board

Define the interfaces and your product from factor

100MB Ethernet
USB 2.0 Type-c
TF Card Slot
Speaker
CAN
DSI
POE

reCamera & SenseCraft AI



ReSpeaker USB 2-Mic Array NEW

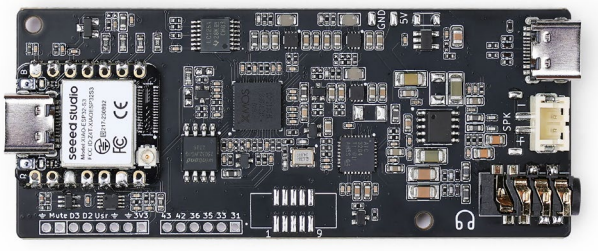
SKU 107990273

The ReSpeaker USB 2-Mic Array is a voice interface device designed for capturing voices in noisy environments. It features the XMOS XU316 for advanced voice processing, reducing the number of required microphones and costs. It supports two audio connectivity modes: USB plug-and-play and I2S, making it easily integrated into various computing hosts and embedded systems. Additionally, it can connect to Home Assistant through the onboard XIAO ESP32 WiFi module, serving as a voice input device for smart home use.

ReSpeaker USB 2-Mic Array

Features

- Improved audio quality through noise suppression, echo cancellation and AGC.
- 2 High Performance Digital Microphones
- Supports Far-field Voice Capture
- Speech Algorithms On-Chip
- Sensitivity: -26 dBFS (Omnidirectional)
- Acoustic Overload Point: 120 dBSPL
- SNR: 64 dB
- Power Supply: 5V DC from USB Type C
- 3.5mm Audio Jack Output Socket
- Compatible with Linux, macOS, and Windows
- 1 programmable RGB LED via XIAO module



ReSpeaker 2-Mic Voice Assistant Kit

Applications

ReSpeaker USB Array

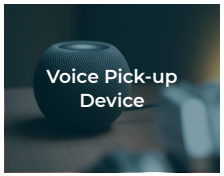
SKU 107990193

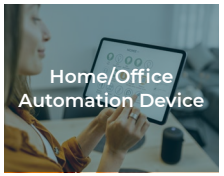
ReSpeaker USB Array is an plug and play microphone array with 4 PDM mics. it's a hardware-based solution for creating or adding voice-interface to your projects. The board is a far-field microphone array device capable of detecting voices up to 5m away even with the presence of background noise. The onboard hardware-enabled algorithms are powered by the XMOS XVF-3000.

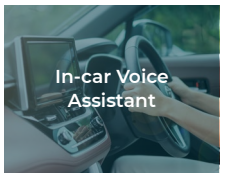
Features

- Plug & Play (No driver required), compatible with Windows , Mac, Linux and Android that support OTG.
- Voice Pick-up device, Far-field voice pick-up up to 5m and supports 360° pick-up pattern
- Acoustic algorithms implemented: DOA(Direction of Arrival), AEC(Automatic Echo Cancellation), AGC(Automatic Gain Control), NS(Noise Suppression)
- Built-in audio jack, which allows for plugging in headphones or speakers (speaker not included)
- Power Supply: 5V DC from Micro USB
- 3.5mm Audio Jack Output Socket
- Compatible with Linux, macOS, and Windows

Applications







4

Software Suites

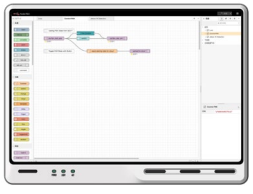
Integrated no code tools to orchestrate them all.

SenseCraft

https://sensecraft.seeed.cc/

Automate device deployment and MLops in the field

Sense Craft edge Builder




Gateways


PLC Controller


reComputer


reServer

deploy

LoRaWAN | 2G / 4G |
Bluetooth | Wi-Fi4G

Sense Craft node Builder


AI Sensors


Wireless Sensors


DTU


Tracker


Indicator

deploy

Firmware Payloads

Edge AI

alwaysAI · cochl. · cogniteam · CVEDIA · EDGE IMPULSE · Home Assistant · Hugging Face · ISARSOFT · lumeo · Nota AI · NVIDIA TAO · Node-RED · ONNX · PyTorch · roboflow · TEKNOIR · TensorFlow Lite · ultralytics

Depin

Flux · helium · IoTeX · WEATHER XM

Open source projects

ChirpStack · Node-RED · Local Jarvis

SenseCraft

Mobile App / Web toolkit

- Enable 3 steps quick configuration and easy deployment.No code, No touch, No complexity.
- Fleet management.
- Secure device up to date, not just on the cloud, but also at edge locations.
- Flexible API.
- On-premise deployment support. Remote data access, visualization.

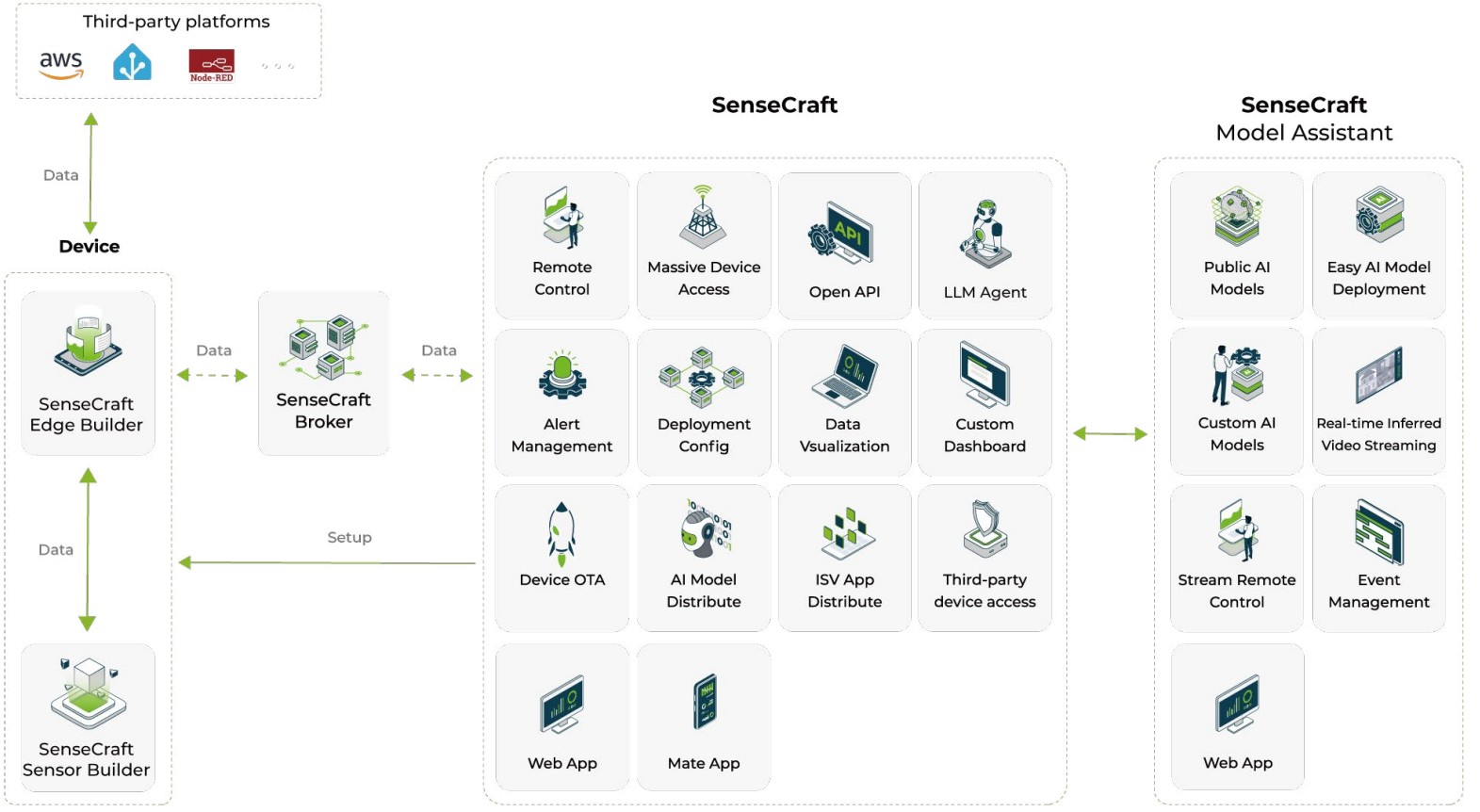
SenseCraft Model Assistant

- Only 3 steps to deploy AI models to devices.
- Build active community and model sharing mechanisms to maximize the value of models.
- Offline Available, ensuring data privacy and security.

SenseCraft Under the hood

We work closely with software partner to enable easier and more powerful solutions for customer of any skillsets. All firmware on devices are open source, and you have full control on your data flow for edge center systems.

1. the open source client firmware for MCU/ Linux based devices
2. one stop management tool available in mobile and web
3. MLops service for on-site data collection and model distribution

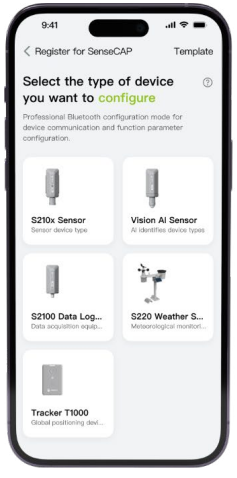


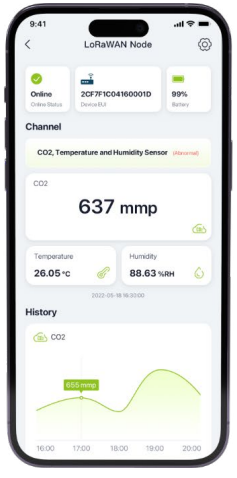
SenseCraft mobile app / web toolkits

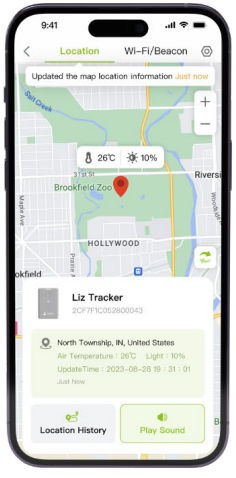
One stop management tool available in mobile and webextensibility

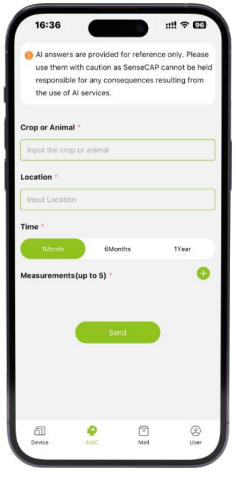
SenseCraft provides convenient and practical applications for IoT device control and management, which can help users to realize remote monitoring and control of a series of IoT devices and provide data monitoring, alarm, and visualization functions, allowing users to manage IoT devices more conveniently

Download QR Code









Customized services

Application — IoT Web, IoT Mobile

Enterprises have their your private cloud

Multiple Database — MySQL, MongoDB, redis, influxdb

Multiple Network Server — The Things Network, helium, ChirpStack, MQTT

Multiple deployments — Local Physical Device(Reserver), Local Virtual Machine, Cloud Servers

Source Code: https://github.com/Seeed-Studio/SenseCraft-Web-Toolkit

White label your own platform and App. Build your brand.

SenseCraft - Sensor Builder

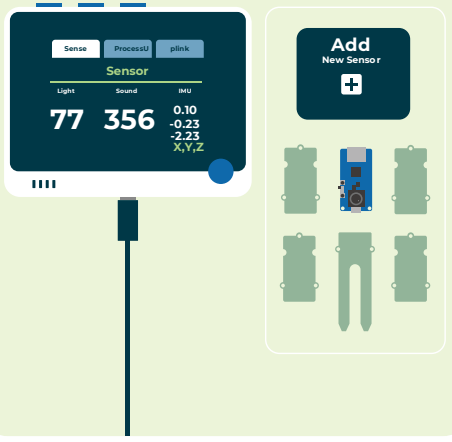
https://github.com/Seeed-Studio/SenseCraft-Wio

The open source client firmware for MCU based devices

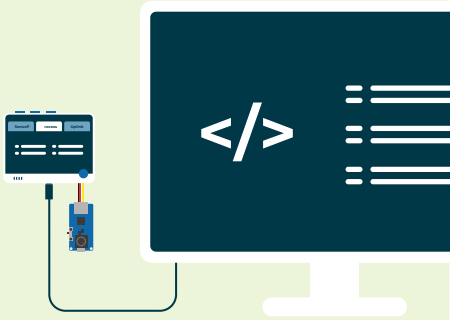
SenseCraft is an open source software platform to build smart sensors with no-code. It delivers a complete out-of-the-box solution to sense the real- world, process data and send the data to the cloud in the easiest and fastest way possible with no coding experience at all! It is now compatible with Wio Terminal, and we hope it will be open and inclusive to support hardware platforms such as M5 Stack, XIAO and MCU with screen on the basis of community contribution.With this toolkit, we'll break down the process of displaying sensor data into 3 actions:

- Sense: Connect all the sensors to supported hardware platform.
- Process: Data handling and Machine Learning.
- Uplink (Network): Sending data to the clould via WiFi/ LoRaWAN.

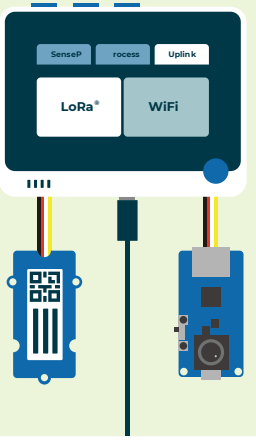
1 Sense
Built in & Add on



2 Process
Data Handling & Machine Learning



3 Uplink
Network Connectivity



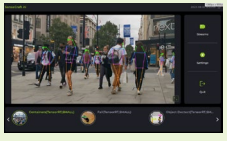
* The LoRa® Mark is a trademark of Semtech Corporation or its subsidiaries.

SenseCraft - Edge builder

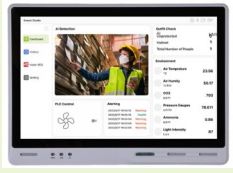
The open source client firmware for Linux based devices

- **Hardware:**Compatible with popular hardware platforms such as NVIDIA Jetson, BeagleBone, and Raspberry Pi.
- ISV: Supports expanding the functionality of the device by adding ISV applications to meet industry needs.

Application Examples



AI



HMI

Blockchain

Supported Hardwares and Functions

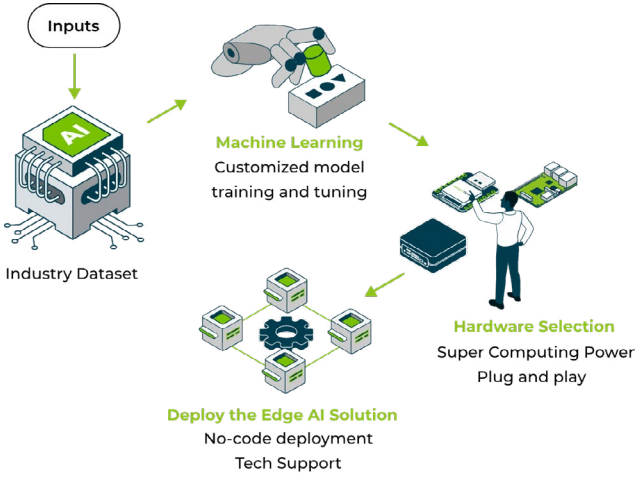
SenseCraft - Model Assistant

https://sensecraft.seeed.cc/ai/

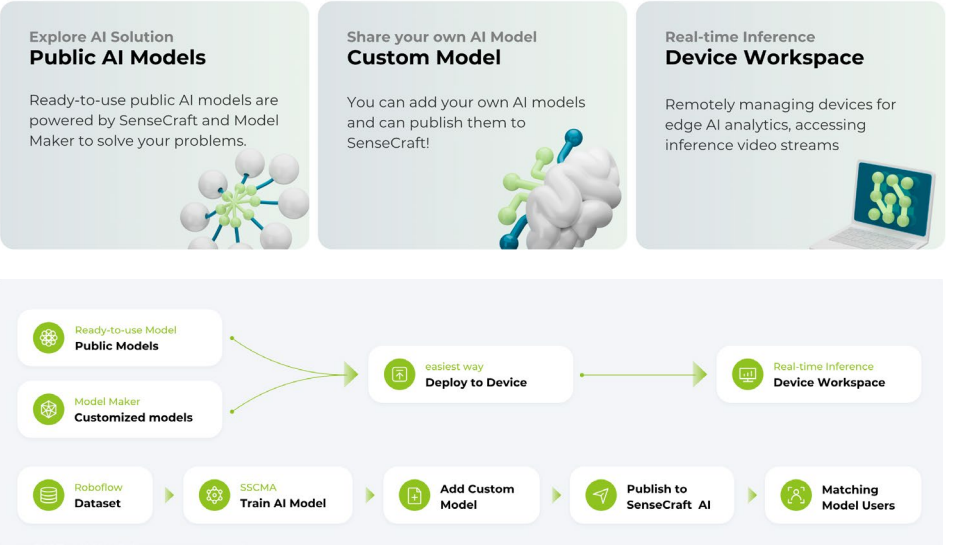
MLops service for on-site data collection and model distribution

SenseCraft Model Assistant is an AI platform dedicated to simplifying the training, distribution, and deployment of AI models. With just a few clicks, you can easily deploy models and say goodbye to tedious configuration and coding. It supports users to upload and share self-trained models, build a shared model library, and promote collaboration and innovation among AI enthusiasts. Currently supports computer vision algorithms (such as target detection, image classification, image segmentation, and pose) and LLM, making it possible to realize high-speed and accurate inference on low-cost hardware, unlocking the powerful potential of AI in edge devices.

Build Your Own AI Solutions



Key Functions



SenseCraft - DePIN Suite

Deploy web3 hardware and diagnosis with ease

SenseCAP Hotspot App

APP Store | Google Play | APP Center

Decentralized Sensors

WEATHER | IoTeX

Community powered weather network

Decentralized IoT Platform

Helium WXM Weather Station

DePIN Dev Kit

Decentralized Compute

Flux

SenseCAP M4 Square

Decentralized Sensors

helium

People-Powered Networks

~200K

SenseCAP M1 Hotspot

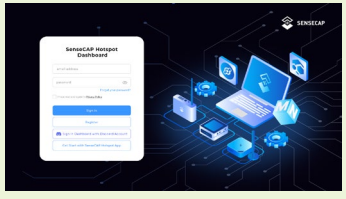
SenseCAP M2 Hotspot

Decentralized VPN Network

SenseCAP M4 Square

SenseCAP M1 Hotspot

Power By



SenseCAP Hotspot App/Dashboard

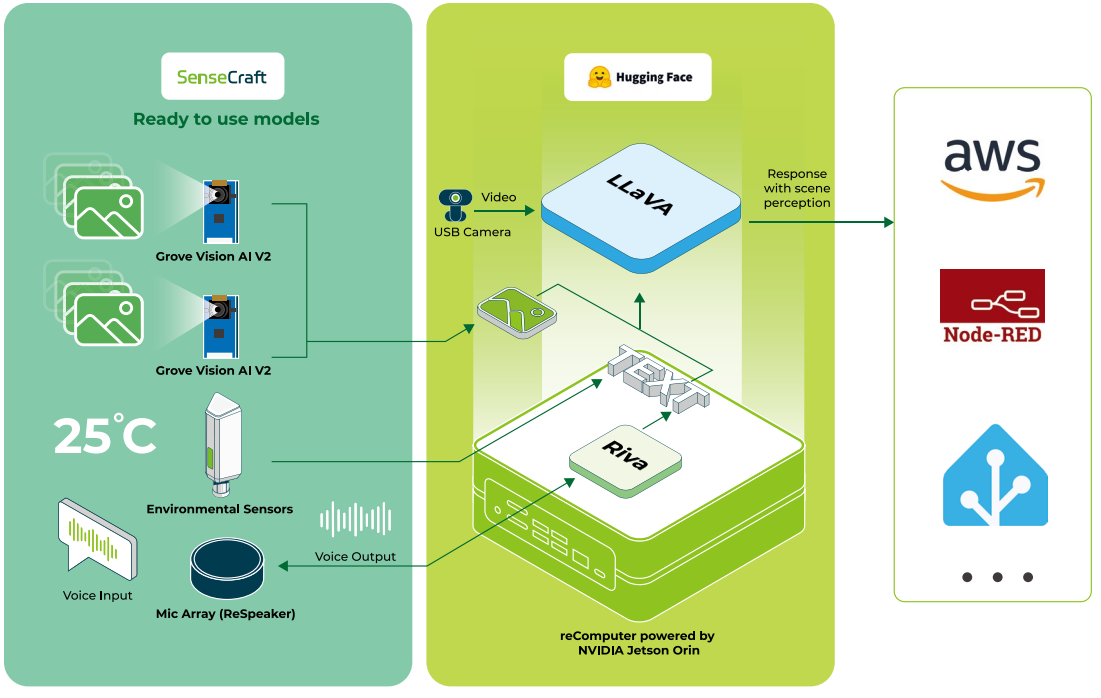
SenseCraft Device Managemnt

Firmware payloads : Local LLM based projects

Upgrade no-code system with generative AI interaction

Combining tinyML with Generative AI at the edge represents a forwar
d thinking approach to harnessing the potential of AI technologies for real-
world applications. Leveraging tinyML's capability to efficiently process sensor data (vision, voice, soun
d, environmental) directly on edge devices, it serves as a trigger for activating more powerful, local Gen
erative AI models like LLMs on NVIDIA Jetson.

https://github.com/Seeed-Projects/LocalJARVIS



Advanced Edge AI
(AI-Processing McU + Powerful GPU)

- Ultra-Efficient, Lower Bandwidth: processing heavy workload filter only by key frame event, focusing on crucial data.
- Simplifies deployment an easy Setup: support battery power and wireless.
- Superior ROI: Delivers greater cost savings and performance benefits

Firmware payloads : growing ISV partnerships

https://www.seeedstudio.com/blog/ecosystem

AI ISV partners specialize in training models, designing applications, and scaling for deployment, thereby accelerating project development and implementation. Solution partners deliver comprehensive, integrated hardware and software solutions to end customers.

Balena

Balena provides a full technology stack to help customers develop, provision, deploy, and manage IoT fleets at any scale. It delivers balenaCloud, a comprehensive cloud-based device deployment and management infrastructure, to allow developer deploying container-based AI/ML applications to fleet of devices.

Application:

container-based AI application deployment, fleet managementSupported

Hardware:

All Seeed Studio's NVIDIA compatible carrier boards and devices, Official NVIDIA dev kit.

Edge Impulse

Edge Impulse is the leading development platform for machine learning on edge devices, free for developers and trusted by enterprises. Edge Impulse made ML development is easier, accelerate ML solution development using low-code to advanced integrations with the support from an expert.

Application:

Embedded Machine Learning, Computer Vision.Industry:Industry 4.0, Manufacturing, Retail.

Supported Hardware:

All Seeed Studio's NVIDIA compatible carrier boards and devices, Official NVIDIA dev kit.

Lumeo

Lumeo is an open and flexible video analytics platform to bring intelligence and automation to market through vision AI. The no-code platform lets clients harness AI with their existing cameras and infrastructure to make sense of video data for alarm monitoring, customer experience, marketing, compliance, physical security, and many more use cases.

Application:

Video Analytics

Supported Hardware:

All Seeed Studio's NVIDIA compatible carrier boards and devices, Official NVIDIA dev kit.

NOTA AI

Nota AI is a forward-thinking tech startup dedicated to revolutionizing AI model optimization based on Python for target edge devices. The company's cutting-edge platform, NetsPresso provides an efficient workflow for creating AI models, including seamless model training, compression, framework transition, and benchmarking.

Application:

Hardware-aware AI model optimization and edge AI

Supported Hardware:

All Seeed Studio's NVIDIA compatible carrier boards and devices, Official NVIDIA dev kit.

roboflow

Roboflow is an end-to-end computer vision platform that streamlines the process between data labeling and training custom models, and deploy them in any edge device or server.It also provides the roboflow inference server, which is the easiest way to use and deploy computer vision models to perform object detection, classification, and instance segmentation and utilize foundation models like CLIP and SAM.

Application:

Computer Vision

Hardware:

All Seeed Studio's NVIDIA compatible carrier boards and devices, Official NVIDIA dev kit.All Seeed Studio's NVIDIA compatible carrier boards and devices, Official NVIDIA dev kit.NVIDIA dev kit.

YOLOv8

YOLOv8 is a family of state-of-the-art object detection, classification, and segmentation models trained on the COCO and ImageNet dataset, and exports to ONNX, CoreML and TFLite. It also delivers Ultralytics HUB to enhance seamless AI model training and deployment without any code.

Application:

Object Detection, instance segmentation, image classification, pose estimation

Supported Hardware:

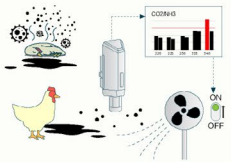
All Seeed Studio's NVIDIA compatible carrier boards and devices, Official NVIDIA dev kit.

Solutions and Case Studies

Micro Environment Monitoring

Environmental variables directly impact poultry productivity. A constant frequent monitoring network is critical to ensure chickens' welfare and reduce mortality. Seeed wireless sensors and controllers enable remote data access and timely intervene for optimal enviroment.

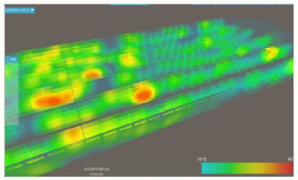
Temp x Egg production Heat leads to increased stress level and reduced egg production. Coordinate the temp sensors with cooling system to maintain the comfort.



Air x Food intake High level of CO2&NH3 can cause respiratory problems and affect food intake. Turn on the ventilation system timely to bring fresh air.

Light x 24hr rhythm Control the duration of light and dark to help chicken develop healthy growth rhythms and immune system.

Usage:
identify the hot spots for livestock
Perceived Temp is calculated based on temp, humi & wind speed. with our distributed sensor network, it's able to be illustrated accurately on heatmap.



Upgraded Poultry Farms with AI and IoT

Sustainable Food Supply Chain and Safety

Chicken farms are becoming massive in size, and getting more difficult to manage. AI and IoT are used to can help monitor and finetune the environment for livestock.

Automate Workflows

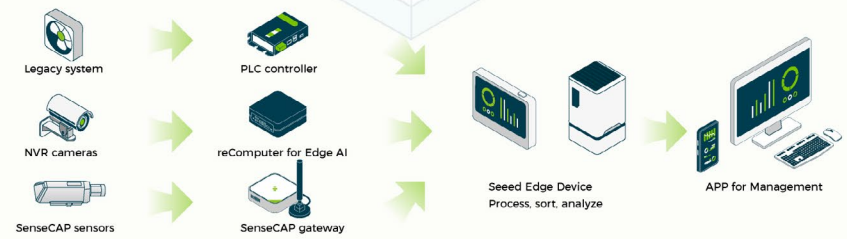
A rule-based system that can work independently reduces human errors and eliminates many time-consuming and repetitive tasks, such as turn on the feeders on 9:00 AM everyday, send warning when 31℃.reTerminal DM is the latest edge devices to coordinate legacy systems for automated workflow with adaption.

Usage:
Generate the checklist and execute the inspection when there is an alarm without manual entries.

Anomaly Detection with AI

Early detection of anomalies can help to identify issues before becoming serious, allowing fast action to reduce losses. Add AI enabled visual analysis to your existing farm cameras using reComputer for edge to enable timely detection.

Usage:
Intelligent diagnosis of livestock

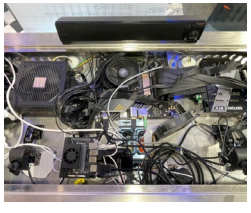


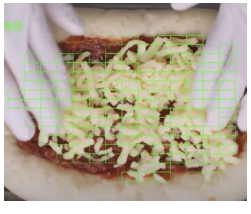
- Robust product design, sustained performance under harsh condition of animal farms. Maintenance-free for the whole animal farming life cycle.
- Designed for rapid large scale deployment and easy network upgrade.
- RESTful API ready to integrate with other systems.

Revolutionizing Pizza Production with Edge AI

Machine Learning | Open Source Hardware

GOPIZZA has developed an innovative automated pizza-making system that utilizes the NVIDIA Jetson Nano developer kit for edge AI inferencing. By employing computer vision to recognize pizza topping combinations, the system guides in-store operations and controls product quality. It consists of an automatic topping selection table, ovens that monitor the baking process, and a final product inspection station. This setup streamlines store operation management, reducing the required number of employees from four to one while ensuring consistent, high-quality pizzas. This revolutionary smart kitchen technology has the potential to allow pizza restaurants of all sizes to optimize their operations and reduce their workforce requirements.





https://www.seeedstudio.com/blog/2023/05/25/automated-pizza-making-system-and-consistent-high-quality-food-production-with-intelligent-guidance/

Digitalizing Fruit Packing with Raspberry Pi-Powered HMI

Machine Learning | Open Source Hardware

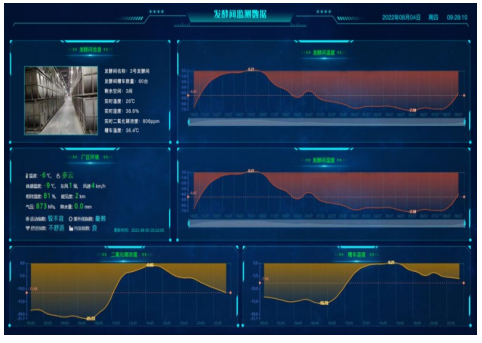
NoSoft, a leading automation solution provider for fruit packhouses and exporters in South Africa, deployed 450 customized reTerminal units with their smart packing software in multiple fruit packhouses to reduce labor costs and improve packing efficiency. Together with the whole system, reTerminal enables functions such as labeling, bin tipping, carton verification, pallet weighing, and data collection.To meet the demands of semi-automated packhouses in harsh environments, NoSoft wanted to offer their clients an HMI that meets environmental requirements with a durable design. With the surge in demand for HMIs, they sought ODM services based on reTerminal (an all-in-one Raspberry Pi CM4-powered HMI device with a touch screen) to obtain high-performance HMIs that satisfy their requirements.

https://www.seeedstudio.com/blog/2022/10/08/odm-services-for-smart-packing-the-reterminal-for-semi-automated-packhouse/

Empowering Baijiu Fermentation Control with Smart Sensing Technology

Advanced Sensor | Wireless

Seeed Studio has revolutionized the traditional Baijiu brewing industry in Shanxi, China, by introducing an Intelligent Fermentation Control Platform at a state-owned distillery. This solution, integrating SenseCAP S2103 CO2, Temperature, and Humidity Sensors, along with LoRaWAN technology, automates and optimizes the fermentation process crucial for Baijiu production. Unlike the previous manual and inefficient methods, this advanced system provides real-time monitoring and control over the fermentation conditions, significantly improving the quality, consistency, and sustainability of Baijiu production. The technology enables precise adjustments based on the fermentation tanks' internal environment, ensuring optimal yeast growth and alcohol yield. With this digital transformation, the Baijiu manufacturer can now achieve higher production efficiency, reduce energy consumption, and support sustainable practices, aligning with several Sustainable Development Goals and marking a significant leap towards Industry 4.0 in the brewing sector.

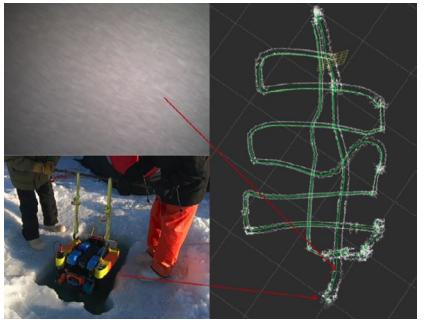


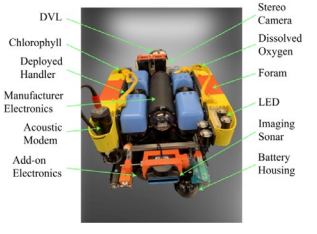
https://www.seeedstudio.com/blog/2023/08/29/sensecap-devices-enabling-sophisticated-fermentation-control-in-baijiu-distillery

Enhanced Under-ice Sensing ROV with NVIDIA Jetson-Powered Mini PC

Open Science | Machine Learning | Open Source Hardware

The EdgeAI2Wild project, spearheaded by the Smart Ocean Systems Laboratory at the University of Rhode Island, focuses on developing an affordable, portable ROV for under-ice sensing to monitor the Arctic's changing environment due to climate change. Utilizing the BlueROV-2 platform, enhanced with an NVIDIA Jetson-powered mini PC and a suite of sensors for improved navigation and data collection, this initiative aims to advance the study of biogeochemical processes beneath sea ice. Field tests conducted in Utqiagvik, Alaska, demonstrate the ROV's capability to navigate and collect data under ice, offering new insights into the impacts of climate change on the Arctic. By integrating advanced technologies like the Robotic Operating System (ROS) and visualizing tools such as RViz, the project showcases the potential of accessible, high-performance tools for environmental research and monitoring, aligning with the global need for innovative solutions to environmental challenges.





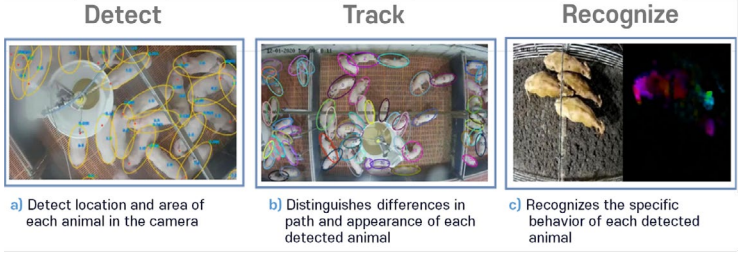
Field operation: Top-left panel shows the under-ice camera image; Bottom-left photo shows the ROV deployment; right panel depicts the ROV trajectory from the online odometry.The image was taken at the Great Lake Research Center, Michigan Technological University.

https://www.seeedstudio.com/blog/2022/06/09/edgeai2wild-integrate-bluerov-2-with-nvidia-jetson-for-an-affordable-under-ice-sensing-rov/

Precise Livestock Management with Machine Learning at the Edge

Machine Learning | Open Source Hardware

Intflow has developed the EdgeFarm solution, which utilizes Seeed's reComputer edge AI devices and on-site cameras to optimize livestock productivity by perceiving livestock injuries and diseases. Each camera captures real-time data of piglets, including eating habits, exercise, fighting frequency, and weight gain. Intflow is expanding its business, using reComputer J1010 to provide AI inference capabilities for every 8 IP cameras, with AI algorithms optimized through NVIDIA TensorRT to process multiple cameras simultaneously. Seeed Studio supports EdgeFarm's global expansion in terms of hardware and fulfillment.

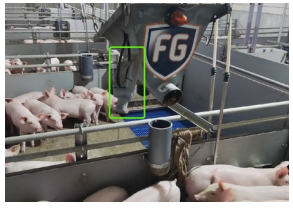


https://www.seeedstudio.com/blog/2022/07/01/edge-ai-at-the-farm-precise-livestock-management-helps-farmers-optimize-livestock-productivity/

Live Streaming Pig Farming on Helium Network with SenseCAP

Advanced Sensor | Wireless

Stal Data, a Netherlands-based company, provides technology solutions for farmers. They use Helium gateways and SenseCAP sensors to monitor parameters such as CO2 concentration, temperature, humidity, and ammonia concentration in pig barns. This process is shown to the public through live streaming to optimize the barn environment and improve the health and growth of pigs.SenseCAP sensors have advantages such as water resistance, ammonia resistance, vibration resistance, long battery life, and good portability. By measuring temperature and humidity, Stal Data found that the rear of the barn was 5 degrees higher than the front, so they added a ventilator to make the temperature uniform. By monitoring CO2 concentration, they can check the minimum ventilation of the ventilation system and ensure that the CO2 concentration does not exceed 3000ppm. Monitoring ammonia concentration is also important for pig health, with concentrations needing to be below 8ppm for piglets and 15ppm for pigs over 30kg.



https://www.seeedstudio.com/blog/2022/07/20/have-you-ever-seen-a-pig-live-stream-%f0%9f%98%b2-iot-application-on-helium-network-with-sensecap-s210x-series/

Smart Poultry Farming Accelerates Sustainable Animal Husbandry

Advanced Sensor | Wireless

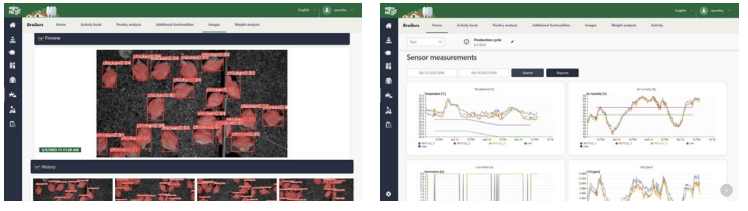
The Smart Poultry Farming Project demonstrates how SenseCAP LoRaWAN gateways and sensors are sustainably transforming the traditional animal husbandry industry through IoT technologies. Kinghoo AgroTech collaborated with Seeed to deploy SenseCAP Wireless LoRaWAN series products as an IoT solution in poultry farms in Hebei Province, China.The main reasons why Kinghoo AgroTech chose SenseCAP products are their watertight, dustproof, and robust design, low-power consumption, long battery life, long-distance transmission, and simple installation. SenseCAP LoRaWAN sensors are wireless, easy to disassemble and reinstall, and can be temporarily removed while cleaning and disinfecting poultry farms, reducing manual workload. Since the pilot project, it has been scaled up in various farms across China since January 2020.

https://www.seeedstudio.com/blog/2021/09/28/welcome-to-the-future-sensecap-lorawan-devices-deployed-for-poultry-farming-accelerate-sustainable-animal-husbandry/

Enhancing Production Efficiency and Animal Welfare with AIoT Technologies

Advanced Sensor | Wireless

To address the challenges of inefficient practices, animal health, and consumer demands for transparency in poultry farming industries, DunavNET collaborated with Axceta and deployed the poultryNET, an IoT/AI-based solution powered by Seeed Studio SenseCAP LoRaWAN devices in the Montreal area in the poultry barns of Sollio Agriculture. poultryNET combines edge and cloud functionalities, utilizing SenseCAP LoRaWAN sensors and video cameras to monitor environmental conditions, chicken behavior, and operational parameters, which improves animal welfare, production efficiency, and establishes a traceable food supply chain. The project reduced mortality rates, improved feed conversion ratios, and empowers farmers with real-time guidance and decision support to optimize poultry production, offering a promising approach to enhance efficiency and profitability in poultry farming.

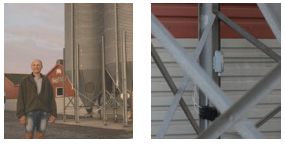


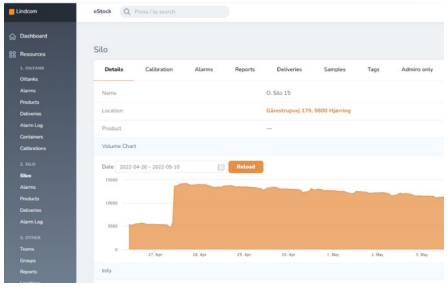
https://www.seeedstudio.com/blog/2023/10/13/smart-poultry-farm-in-canada-enhancing-production-efficiency-and-animal-welfare-with-aiot-technologies/

Remote Real-Time Monitoring for Silos with SenseCAP LoRaWAN Devices

Advanced Sensor | Wireless

The Danish company Lindcom has selected Seeed Studio's SenseCAP S2100 LoRaWAN Data Logger for its existing sensor systems to remotely monitor the content within silos, oil tanks, and slurry tanks. The SenseCAP S2100 is being deployed at existing and new installation sites. Lindcom has also taken advantage of Seeed Studio's SenseCAP S2103 LoRaWAN Data Logger and Sensors to develop a brand new sensor system for remote real-time monitoring of air quality.SenseCAP sensors and data loggers offer a groundbreaking, easy-to-install, and durable design while being more cost-efficient compared to traditional gateways. Furthermore, the LoRaWAN-compatible SenseCAP sensors and data loggers open up new doors in IoT connectivity with lower hardware costs.Lindcom's MultiSense Oil system enables end users, suppliers, and transporters to monitor the content of individual oil tanks, provides access to consumption history, and automatically generates forecasts for the next oil delivery. Seeed Studio's SenseCAP technology has enabled Lindcom to improve the company's existing sensor systems and expand its product portfolio, comprising state-of-the-art remote real-time monitoring of parameters crucial to suppliers', transporters', and end users' logistics, productivity, health, and learning abilities.





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https://www.seeedstudio.com/blog/2023/03/13/sensecap-lorawan-devices-provide-remote-real-time-monitoring-for-silos-in-denmark/

Rice Pest and Disease Monitoring Solution to Ensure a Bountiful Harvest

Advanced Sensor | Wireless

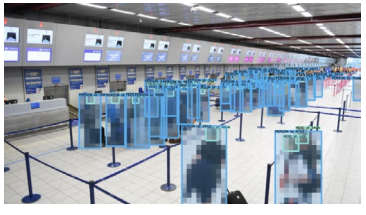
The Rice Pest & Disease Monitoring and Forecasting solution by Seeed Studio, in collaboration with Chengdu Yunyi Technology Co., has been implemented in Guangxi, China, to address the critical issue of pests and diseases in rice cultivation. Utilizing advanced technology like the SenseCAP weather station, pH and dissolved oxygen sensors, and a 4G sensor hub, this system collects real-time environmental data to predict and prevent potential outbreaks, thus enhancing rice field management. This approach not only facilitates timely interventions such as irrigation, fertilization, and pesticide application but also leverages historical data for predictive analysis, offering a proactive solution to maintain crop health and yield. Deployed in a significant rice-producing region, the project aligns with Sustainable Development Goals, aiming to improve food security, support smart agriculture practices, and promote technological innovation for better crop management and efficiency.

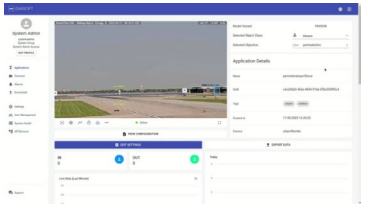
https://www.seeedstudio.com/blog/2023/08/30/rice-pest-and-disease-monitoring-solution/

Improving Airport Operation Efficiency and Safety with Enhanced Video Analytics

Machine Learning | Open Source Hardware

Isarsoft delivered an AI-powered video analytics solution for airports, fully supported by the NVIDIA Jetson Orin NX edge device, to maintain constant operation, improve efficiency, and enhance surrounding safety. The solution utilizes a data-driven management system to create shorter routes for passengers, saving valuable time and improving accessibility. Additionally, airport infrastructure can be expanded and improved based on in-depth analysis of different areas and occupancy statistics. The solution also offers luggage analysis capabilities to shorten waiting times at baggage carousels and identify misplaced luggage. Outside the airport, Isarsoft's solution provides perimeter protection through the Object Flow application. It identifies and detects objects, measures volume and density, and analyzes key performance indicators (KPIs) such as speed, trajectory, and dwell time using various maps. Creating lines within the Object Flow application is significant. Marking areas or zones with lines enables further processes and actions. This is a valuable tool to measure pedestrian or vehicle flow, enabling enhanced analysis and insights.





https://www.seeedstudio.com/blog/2023/06/29/video-analytics-solution-in-airports-for-operation-efficiency-improving-and-safety-enhancement/

Improving Customer Satisfaction with Vision AI

Machine Learning

The retail operation management solution, running Lumeo people recognition model and region of interest method through NVIDIA Jetson Orin Nano, collects intricate customer behavior data, including the number of consumers gazing at shop windows or entering stores, visitor trajectories, and the most frequented areas within the store. Retailers can analyze shopper flow, gauge dwell times, calculate conversion rates, and make data-driven decisions to improve customer experiences. The system also offers proactive customer service management through real-time video analysis, tracking the number of customers being served, automatically detecting queues, and precisely calculating waiting times. This helps retailers optimize staff resource allocation, enhance customer satisfaction, and ensure a seamless and personalized shopping experience.

https://www.seeedstudio.com/blog/2023/09/28/vision-ai-helps-improve-customer-satisfaction-learn-from-your-customers-behavior-and-respond-fast/

Empowering Retail Industry with NVIDIA Jetson-Powered Sentiment Analysis

Machine Learning

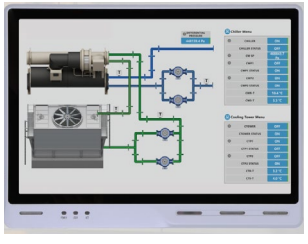
Brands need to deeply understand customers, but passive solutions like facial analysis are difficult to deploy in stores. Zenus and Seeed provide an all-in-one solution powered by NVIDIA Jetson to simplify the process and meet needs. The device connects to cameras, processes video, and sends metadata to the cloud to generate actionable reports. Users can access real-time metrics like foot traffic, demographics, and sentiment analysis, used to calculate conversion rates, predict sales, understand target audiences, and see what works and why.Seeed supports the Zenus AI camera with the A206 carrier board. The board provides multiple NVIDIA SOM-compatible interfaces, allowing Zenus smart devices to capture high-quality images via standard interfaces like CSI and USB for processing by NVIDIA SOMs, enabling advanced facial analysis at the edge and delivering valuable insights into consumer behavior.

https://www.seeedstudio.com/blog/2021/12/03/sentiment-analysis-in-the-retail-industry-becomes-more-accessible/

Revolutionizing Smart Building with Intelligent Control Systems

Open Source Hardware

A well-established Chinese smart building solution provider with 15 years of experience collaborated with Seeed to develop an intelligent control system for multi-story office buildings using Raspberry Pi-powered EdgeBox-RPi-200 and reTerminal DM. The system employs adaptive control methods to provide a comfortable and constant environment. Challenges faced include large-scale deployment, high stability requirements, openness, 24/7 operation, and high power efficiency demands. Seeed's Raspberry Pi-driven HMI and edge controllers offered nearly the same stability and control performance as the customer's current product at a lower cost, while the open-source system allowed customers to easily and quickly port software. Customers highly praised the product design and expressed satisfaction with the system's stability and performance.

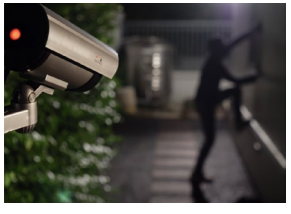


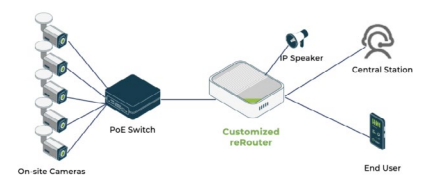
https://www.seeedstudio.com/blog/2023/06/30/revolutionizing-smart-buildings-with-raspberry-pi-powered-intelligent-control-systems/

Enhancing Security Monitoring with Advanced Visual Alarm Solutions

Open Source Hardware

Our partner is a leading system integrator specializing in advanced visual alarm monitoring solutions. They decided to upgrade their devices using our Raspberry Pi CM4-powered reRouter to accommodate the growing customer base and expanded coverage area that requires more cameras and computing power while supporting the Linux operating system for easy software migration.We customized the reRouter to include PoE and 3.5mm audio capabilities, making it more versatile in the visual alarm monitoring system. The reRouter acts as a bridge by binding alarm inputs and cameras, pairing cameras with existing alarm panel zones, converting video analytics alarm signals for central station response, and providing remote talk-down capability.Hundreds of reRouters have been delivered to the partner for further deployment in end-users' home, commercial, industrial, and educational security scenarios. Both the end customer and partner highly value our expertise and collaboration.



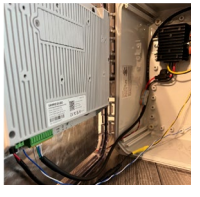


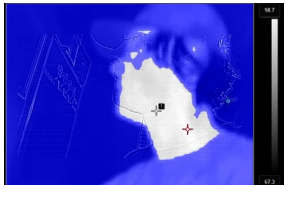
https://www.seeedstudio.com/blog/2023/06/08/a-safer-tomorrow-rerouter-is-enhancing-security-monitoring-solution/

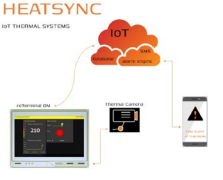
Innovating Fire Detection and Prevention System for Industrial Safety

Open Source Hardware

An innovative engineer from Texas, Jordan Broome, has developed a unique approach to fire monitoring and prevention for extensive industrial applications. He integrated Seeed Studio's Raspberry Pi-powered device, reTerminal DM, into a fire detection system. The system employs an ethernet-based thermal camera to identify the highest temperature spot in the video frame every 500 milliseconds, displaying the current temperature and plotting a running chart of the temperature over the past minute. When temperatures surpass a user-defined threshold, the application activates the reTerminal DM's internal buzzer, sends a notification to a server resulting in an SMS alert, and triggers outputs. This empowers end-users to implement customized automated responses tailored to specific safety requirements. The reTerminal DM, with its robust build quality, IP65 protection rating, wireless connectivity capabilities, and an ideally sized 10.1-inch display, was an obvious choice for the project.





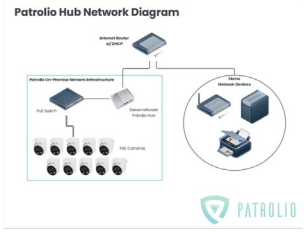


https://www.seeedstudio.com/blog/2023/12/08/raspberry-pi-powered-unique-approach-to-fire-monitoring-and-prevention-for-extensive-industrial-applications/

Improving Neighborhood Safety with Seeed reRouter-Powered Security Solution

Open Source Hardware

Patrolio, a US-based company, collaborated with Seeed Studio to deploy a community security solution powered by Seeed reRouter, ensuring a smarter and more responsive approach to crime prevention and community safety. The solution utilizes reRouter to process video streams in real-time, making them suitable for analysis by Patrolio servers. The reRouter then securely transmits the video to the servers and receives commands to control the deterrence functionality of the cameras.
The reRouter is an ideal choice due to its twin Ethernet ports, which allow the cameras to operate in isolation from the rest of a customer's network. This enables the reRouter to send only relevant video to Patrolio while protecting the cameras from unauthorized access. The reRouter combines all the necessary functions into a single reliable device, eliminating the need for separate appliances and firewalls to provide network isolation.The solution has successfully deterred potential criminals before they have a chance to act, vividly demonstrating how it can prevent intrusions in real-time.

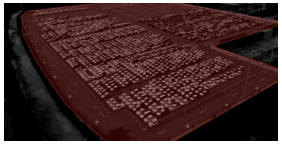


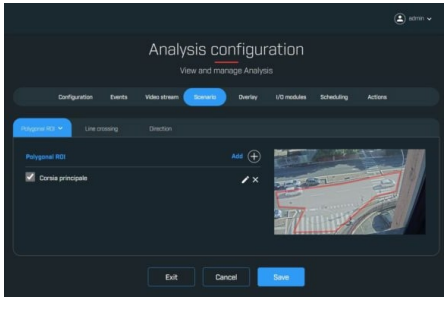
https://www.seeedstudio.com/blog/2023/02/23/making-neighborhoods-safer-with-patrolios-service-and-seeed-rerouter/

Transforming Automotive Dealer Warehouse Security with AI-Driven Video Analytics

Machine Learning

Prassel, an Italian software solutions provider, collaborated with Seeed Studio to deploy a successful intruder detection system across 20 warehouses and logistics facilities of a large automotive dealer. The system, called MagicBox, leverages Seeed's reComputer J2021 (powered by NVIDIA Jetson Xavier NX) and Prassel's expertise to provide an AI-driven video analytics solution. MagicBox offers sophisticated algorithms, including object detection, line crossing, privacy masking, and smoke and fire detection. The reComputer J2021 provides high AI performance and rich I/O options for fast and accurate video analytics.The system has reduced intrusion attempts by 90%, provided timely alerts to prevent tampering and intrusion attempts, and streamlined investigations by quickly detecting contextual evidence. Unified management of intrusion events across 20 sites made it easier to identify critical areas for video analytics.



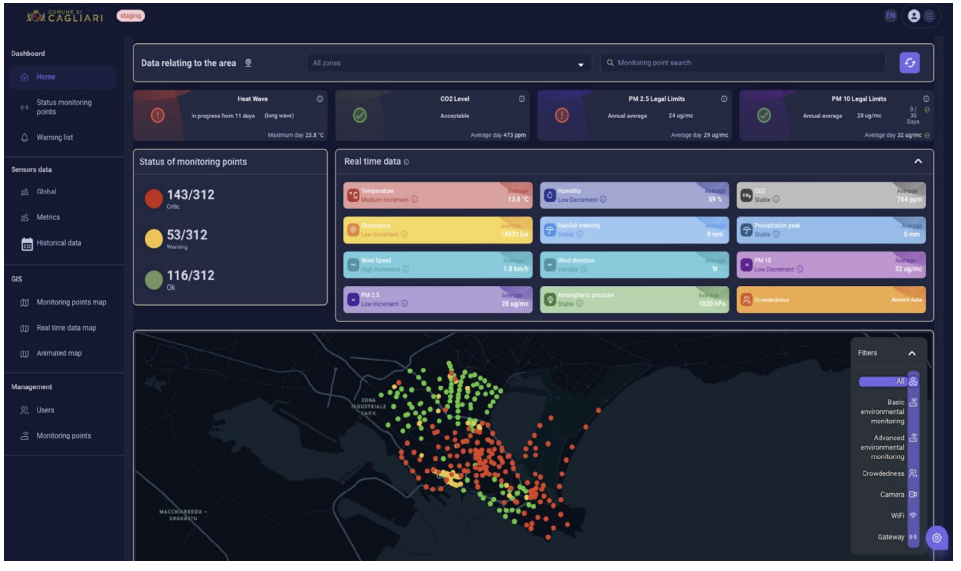


https://www.seeedstudio.com/blog/2023/02/15/ai-driven-video-analytics-for-automotive-dealer-warehouse-security/

Mitigating Urban Heat Waves in Smart City with SenseCAP LoRaWAN Devices

Advanced Sensor | Wireless

To combat urban heat waves in Cagliari, Italy, a Smart City Project was initiated, deploying over 500 SenseCAP sensors across more than 300 locations. Partners WiData and Abinsula collaborated with the University of Cagliari and Fastweb, using technology such as the SenseCAP S1000 weather sensor and SenseCAP S2100 LoRaWAN DTU. This initiative facilitates urban heat island monitoring, enabling local administration to undertake building color changes and green space planning to alleviate the heat island effect. The deployment aims to provide comprehensive microclimate data for city governance and academic research, fostering a more sustainable urban environment. Utilizing LoRaWAN technology for its low power, wide area networking capabilities, the project integrates a vast environmental monitoring network. Real-time data collected is vital for urban planning, enhancing green areas, and promoting lighter building facades in heat-affected zones. The project's success not only aids in mitigating urban heat but also supports the expansion of public WiFi and security measures, contributing to a safer, more connected, and environmentally friendly city.



https://www.seeedstudio.com/blog/2023/04/25/smart-city-500-sensecap-lorawan-devices-deployed-to-mitigate-urban-heat-island-in-cagliari-italy/

Open Hardware and Co-Create

Seeed Fusion Service elevates your innovative ideas to products and solutions for various verticals.

With the full range of **open-source modules** and **industry-grade devices**, expertise in product **design**, experience in **production**, and resources in glocal **community** and **marketing**,

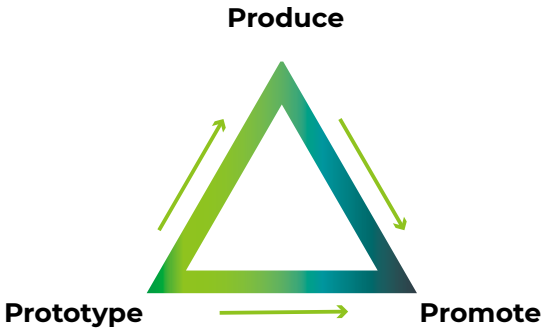
Seeed is your go-to partner from 0 to ∞. Co-create with Seeed Fusion, you can leverage Seeed's capabilities in **Prototype**, **Produce**, and **Promote**, ranging from custom design, manufacturing to selling, covering the full product lifecycle from idea to delivery and iteration!

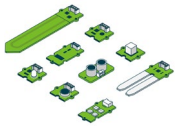
Co-Create with Seeed Fusion

Fast Track from Idea to Market

Seeed Fusion Service offers one-stop services catering to your needs, from **design** & **customization** to **production** and **promotion**. Focus on your strengths, co-create and co-grow with Seeed Fusion!

Open Source · AI · Hardware





Prototype - Design and Customization for Diverse Needs

- Full spectrum services - from light to deep customization
- Open reference design - lower threshold for rapid prototyping
- Professional expertise - proven product design experience

Produce - From Small-batch to Mass Production

- Instant online quotation & lead time for PCB & PCBA
- Professional experts - guaranteed services for scale-up
- Designated engineers & professional project management

Promote - Rich Resources for Marketing and Promotion

- Online store serving half a million direct customers worldwide
- 200+ global and local distributors via online/ offline channels
- Dedicated resources to create contents with active communities

Co-create and launch your ideas with Seeed Studio

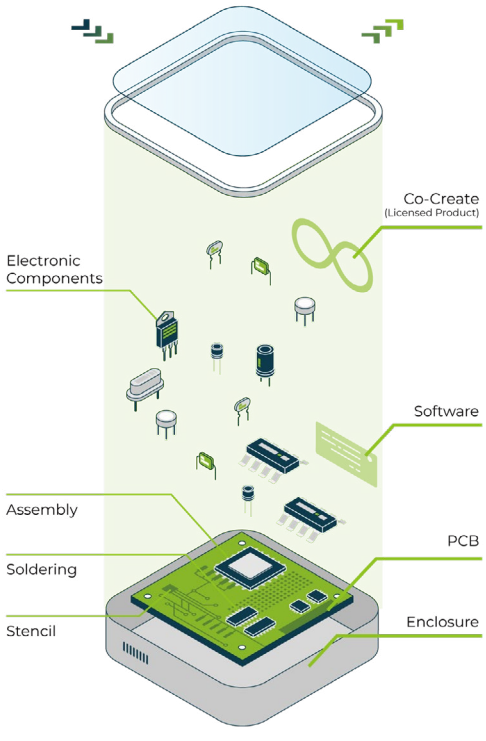
The easiest way to amplify on your ideas and talents

https://www.seeedstudio.com/odm.html

Fusion Prototype

Design and Customization for Diverse Needs

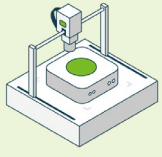
With 100+ in-house engineers, 16+ years experience in product design and production, Seeed Fusion is your go-to choice for AI & IoT hardware design and customization.



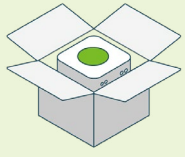
Light Customization

Order online

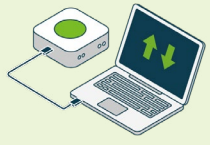
Instant quotation & lead time | NO MOQ, starting from 1 unit | Quality assurance



Logo Customization
(3 ~ 14 days)



Packaging Customization
(3 ~ 29 days)



Firmware Flashing
(3 ~ 7 days)

Deep Customization

Talk with experts

Full-stack engineering support | Open reference design | DFM services | Professional project management

Functions Adding & Trimming

Firmware Development

Robustness Improvment

Certifications

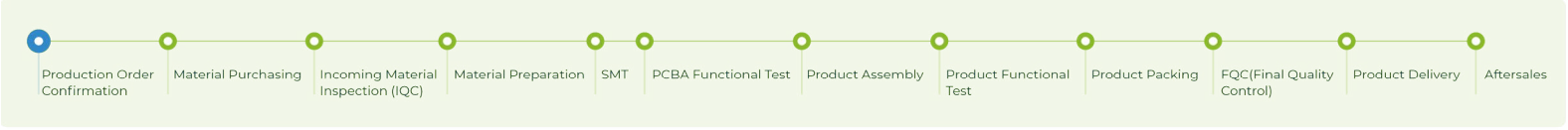
Contact us => Get quotation => Design verification => Golden samples => Pilot run => Mass production

beagleboard.org ESPRESSIF MICROCHIP NORDIC SEMICONDUCTOR NVIDIA Raspberry Pi SEMTECH

Fusion Produce

From Small-batch to Mass Productionits

Seeed Fusion Produce turns designs into solid products from **1 to 10,000+**! With expertise in electronics, mechanical engineering, packaging, and certification, we ensure **top-notch quality** at every step in the **supply** chain and **manufacturing**. Whether it's a **small or large-scale production**, we offer efficient **fulfillment** to bring your vision to life and exceed your expectations.



30000+
SKU

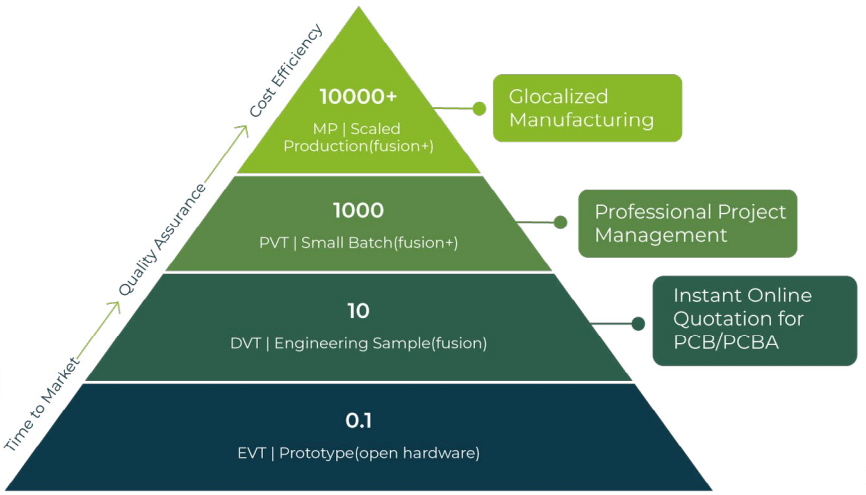
20+
Types of Test Items

6000+
Number of Functional Test Plans

50M+
Shipments

Agile

- Cellular Manufacturing
- Flexible Manufacturing
- Prototype/3d , Production Lead Time/7d
- Open Part Library (OPL) Platform



Professional

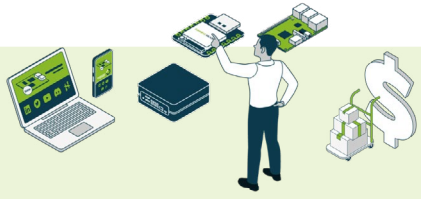
- Wind Tunnel Laboratory
- Digital Production Management
- Multifunctional Testing
- ISO 9001 Quality Management System

Fusion Promote

Rich Resources for Marketing and Promotion

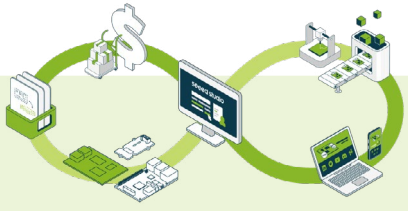
Fusion Promote ushers your products into **vibrant communities** and **vast markets**! You can get **creative content** and **invaluable feedback** by engaging with active online/ offline communities. Our powerful **sales networks** with Seeed **online shop**, global & local **distributors** can promote your products to wider potential customers, serving various verticals, with exponential growth.

What can you get from Fusion Promote?



Solid resources and efforts for marketing and promotion

- Fusion Gallery to test the water and receive feedback
- Seeed online shop to reach half a million direct customers
- 200+ online/ offline distributors to serve global & local needs
- Active engagement with online and offline communities
- Dedicated team to generate and promote user cases
- Suggestions and recommendations for bundled solutions



Hassle-free full product lifespan management

- Global inventory management at warehouses
- Distribution management and joint marketing efforts
- Shipment arrangements to customers and distributors
- Pre-sale promotion and after-sale customer support
- Continuous professional support for product iteration

LinkedIn · Discord · GitHub · hackster.io AN AVNET COMMUNITY · YouTube · 柴火创客 CHAIHUO MAKERS

ARROW · Digi-Key ELECTRONICS · DISTRELEC · Farnell AN AVNET COMPANY · MOUSER ELECTRONICS · RS · seeed studio

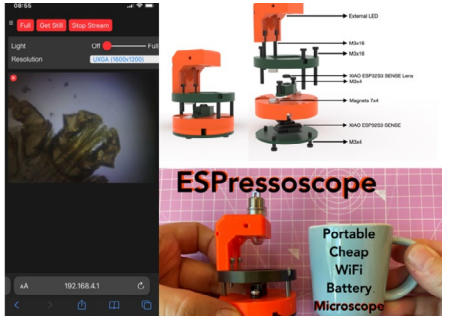
Co-create Cases

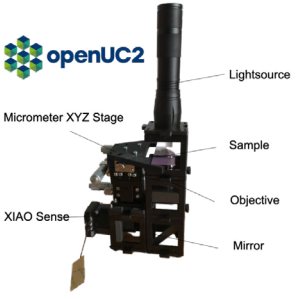
ESPressoscope - Open Source Microscope

Open Source Hardware

Microscopy is a vital tool in various scientific fields, but high-quality microscopes are often expensive and bulky. In September 2023, an open-source microscope called ESPressoscope, developed by Benedict Diederich and Vittorio Saggiomo, caught the attention of the community. This espresso cup-sized microscope, powered by the XIAO ESP32S3 Sense, can observe tardigrades, zooplankton, and microplastics.Seeed Studio partnered with OpenUC2, founded by Benedict, to create an affordable open-source modular microscopy toolkit. The UC2 modular optics kit is based on a concept where optical and electronic elements are mounted in 50 mm cubes, which can be aligned in 3D to construct complex beam paths. The system is open source, allowing users to download, build, and modify it immediately.This kit aims to provide rapid prototyping capabilities and limitless customization options, making it accessible to a broader community, including educational institutions and research laboratories. Seeed Studio and OpenUC2 also hope to make it a tool in underserved regions, with Benedict and his team currently engaged in a malaria detection project in Nigeria.

https://www.seeedstudio.com/blog/2023/11/03/bring-optics-to-life-extend-perception-network-to-the-microscopic-level/





Crazyflie 2.1 Micro-Quadcopter

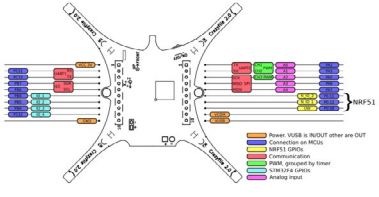
SKU 114991551

Open Source Hardware

The Crazyflie 2.1 is a compact, 27g open-source micro-quadcopter that offers improved performance, durability, and radio capabilities compared to its predecessors. It features low-latency/long-range radio, Bluetooth Low Energy (BLE), and a flexible expansion interface for various decks, allowing control via mobile apps or computer using the Crazyradio PA.

The drone is powered by STM32F405 and nRF51822 microcontrollers, and includes an onboard LiPo charger, IMU, and pressure sensor. With a flight time of up to 7 minutes and a maximum payload of 15g, the Crazyflie 2.1 is suitable for education, research, and swarming applications.

Users can customize the open-source software, firmware, and clients to fit their needs. The platform can be enhanced with expansion decks like the LED-ring for light painting, Flow deck v2 for assisted flying, and Multi-ranger deck for obstacle avoidance and mapping. The Crazyflie 2.1 is a versatile and adaptable micro-quadcopter for developers, researchers, and hobbyists.



https://www.seeedstudio.com/crazyflie-V2-1-p-2894.html

Quantum Tiny Linux Development Kit

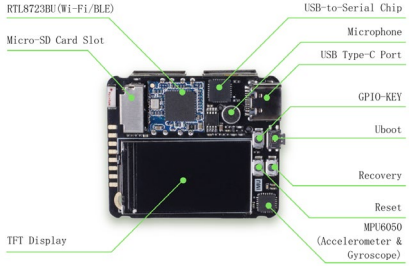
SKU 114992462

Open Source Hardware

The Quantum Tiny Linux Development Kit is an ultra-small (40mm x 35mm) and highly integrated Linux development board that runs Ubuntu Core on a quad-core Allwinner H3 SoC. The kit consists of the Quark-N System on Module (SoM) and the Atom-N expansion board, which are connected through an M.2 interface.

The Quark-N SoM features a quad-core Cortex-A7 CPU, Mali400 MP2 GPU, 512MB LPDDR3 RAM, 16GB eMMC storage, and various interfaces such as Ethernet, SPI, I2C, UART, and GPIO. The Atom-N expansion board adds USB ports, wireless connectivity (Wi-Fi and Bluetooth), onboard peripherals (microphone, motion sensor, buttons, and TFT display), and a micro-SD card slot.

This Linux development kit is suitable for a wide range of applications, including personal servers, intelligent voice assistants, robotics, image processing, and smart home hubs. Seeed Studio provided the designer, Zhihui, with comprehensive services from engineering design to mass production and product promotion, leveraging their expertise in electronic design and manufacturing to bring the product to market.



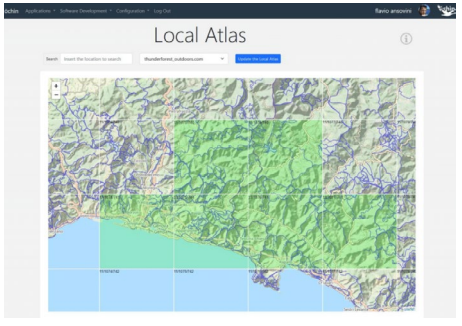
https://www.seeedstudio.com/Quantum-Mini-Linux-Development-Kit-p-4749.html

Öchìn CM4 Carrier Board

SKU 103100163

Open Source Hardware

Öchìn CM4 is a tiny carrier board for the Raspberry Pi Compute Module designed for applications where a powerful machine with low consumption and small dimensions are required. The small form factor makes it interesting for applications with space and weight restrictions such as in robotics, home automation and IoT. Öchìn CM4 is now available to purchase worldwide thanks to Seeed Studio Fusion Licensed Products Program.



https://www.seeedstudio.com/blog/2024/04/01/low-consumption-ochin-cm4-carrier-custom-board-applied-in-robotics-drones-home-automation-and-iot-manufactured-by-seeed-fusion-pcba/

Loko GPS Tracker

Open Source Hardware

Loko is a cutting-edge GPS tracker by Tomi Piriyev that leverages the Seeed Wio-E5 module for tracking drones, animals, and equipment in remote locations without cellular networks. Unique for its reliance on a LoRaWAN radio transmitter, it offers long-range communication up to 10km and supports up to 30 devices per unit. The device boasts over 30 days of battery life and requires no monthly fees. Chosen for its simplicity and low power consumption, the Wio-E5 module facilitates rapid development and simplifies certification processes. The collaboration with Seeed Fusion for PCB assembly significantly reduced costs and development time. Loko represents a major advancement in GPS technology, providing reliable tracking in areas where traditional trackers fail, thanks to its innovative use of LoRa technology.

https://www.seeedstudio.com/blog/2024/04/01/loko-the-tiniest-gps-tracker-with-built-in-lora-e5-module-can-track-any-wild-animals-and-drones-with-seeed-fusion-pcba/

Community Driven, Ecosystem Builder

At Seeed Studio, we're dedicated to catalyzing digital transformation across industries through collaborative AIoT solutions with our vibrant community and partners. Within this dynamic ecosystem, we collaborate with chip providers, embedded software partners, ML/CV experts, cloud and network partners, and a global community of enthusiasts and innovators.

But our commitment doesn't stop there. We're passionately engaged in driving positive global impact, addressing diverse challenges such as climate action, education, agriculture, etc. Together, we're making a difference that matters.

Growing Partnerships

Chip providers

arm · Microchip · NVIDIA · Semtech · Sensirion The Sensor Company · ST life.augmented · Texas Instruments · 30+

Embedded SW

AWS IoT · balena · Linux · Ignition Edge · FreeRTOS · Zephyr · 15+

ML / CV

AIXON · alwaysAI · CVEDIA · lumeo · roboflow · ultralytics · 20+

Cloud and Network

Actility · aws · helium · Microsoft · Tago IO · traXmate tracking everything everywhere · 40+

Community

Arduino · beagleboard.org · Home Assistant · Raspberry Pi · TinyML

Vibrant Online Community

Hackster:

2,599 Published Projects
20,300 Members

https://www.hackster.io/seeed/

GitHub:

511 Followers
470 Repositories

https://github.com/Seeed-Studio

Seeed Studio Discord:

7,714 Members

https://discord.com/invite/QqMgVwHT3X

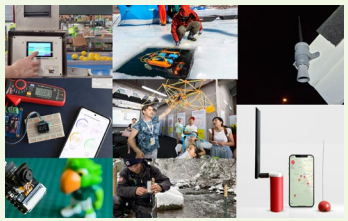
SenseCAP Discord:

27,565 Members

https://discord.gg/4mKVXNNrgY

At Seeed Studio, we believe in the power of community-driven innovation. We take pride in our thriving online community, where innovation knows no bounds. Tap into a wealth of knowledge and expertise from **industry professionals, mentors, and fellow developers,** and even share your projects, ideas, and insights with a global audience.

In our commitment to nurturing talent and fostering collaboration, we've introduced the **Seeed Contributor Program**, bringing together seasoned developers dedicated to community engagement and knowledge sharing.



Seeed Contributor: NEW

12 Contributors
17 On-going· Projects

https://github.com/orgs/Seeed-Studio/projects/6/views/1?pane=issue&itemId=35179519

YouTube:

13,500 Followers **458** Videos

https://www.youtube.com/@SeeedStudioSZ

X:

66,927 Followers

https://twitter.com/seeedstudio

Facebook:

45,019 Followers

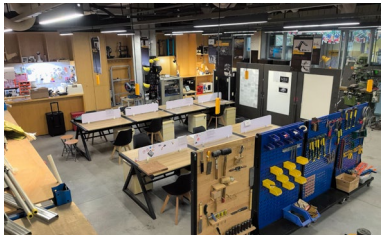
https://www.facebook.com/seeedstudiosz

LinkedIn:

32,855 Followers

https://www.linkedin.com/company/seeedstudio/

Active Offline Community



Chaihuo Makerspace

The first makerspace in Shenzhen and the second in China, a vibrant community hub where makers come together to share projects, connect with leaders in various fields, improve skills, and participate in community activities.

Become a member:

https://www.seeedstudio.com/chaihuo-makerspace

- 12,600+ Registered Members
- 850 Innovative Projects
- 1,370 Community Events
- 28 Countries Members
- 720 ㎡ Co-Working Space

Maker Faire Shenzhen

Showcase your innovative ideas, meet like-minded makers, and explore the specific applications of cutting-edge technologies in various industries at one of the largest maker innovation events in the world.

Get on board:

https://www.shenzhenmakerfaire.com/

- 560,900 Visitors
- 112 Country Participants
- 680 Grobal Exhibitors
- Top 7 Globally Recognized Featured Level Events
- Happen every November

Maker Camp in Shenzhen

Delving into Shenzhen's thriving tech ecosystem, participants will have the opportunity to understand the intricacies of manufacturing processes and supply chain management, learning how to harness these resources to create innovative projects, and sharing their knowledge to empower the maker community.

Register now:

https://www.seeedstudio.com/blog/2024/01/15/introducing-maker-camp-in-shenzhen/

- 32 Global University Students
- 10 Research Backgrounds
- 6 Countries

Seeed Ranger

The Seeed Ranger program is crucial in expanding our community's impact and visibility through organizing workshops, participating in exhibitions, and creating engaging content. Plus, it offers a wide range of benefits for the rangers!

Apply now to become a Seeed Ranger:

https://www.seeedstudio.com/blog/2023/09/15/join-the-seeed-ranger-program-empowering-developers-and-building-communities/

- 2 Rangers
- 11 Workshops
- 250+ Participants
- 5 Countries

Seeed Studio for SDGs

Over the years, Seeed Studio has been providing all types of AIoT, IIoT, edge computing, open source hardware products and Seeed Fusion services to help businesses, nonprofit organizations, conservationists, citizens, and makers in accelerating the SDGs.

Partnered with global communities, we have developed a comprehensive program of events and activities, including but not limited to 11 Scale-up projects, 7 contests, 6 innovation workshops, 2 webinars, etc., to support initiatives that promote sustainability and social responsibility.

If you're from NGOs, UN agencies, academia, and foundations working on project related to SDGs 2030, Open Innovation, Decentralized Tech, Equitable Equality, and Sustainable Communities, please don't be shy to contact us for collaborations!

Contact Us:
https://docs.google.com/forms/d/e/1FAIpQLSe-ZzStBrhH-VQHqwLH2DpJBwqcRZ4aVHCCMzqRFGSO1Nmbbg/viewform?usp=sf_link
Learn more:
https://www.seeedstudio.com/blog/sdg/

Tech for SDG

Smart Citizen

Deployed in: USA, Mexico, Brazil, Argentina, Chile, Puerto Rico, Colombia and more.
An open source hardware and software platform that enables local citizens to collect data in urban areas. This project contributes to SDG 3, 4, 5, 6, 9, 10, 11, 12, 13, 16, and 17.

FarmBeats for Student Program

Deployed in: Global
This program is to facilitate technological empowerment of young people to learn about AI, Machine learning, and IoT in agriculture. . This project contributes to SDG 2, 10, 4, 1, 5, 9, 8, 6, 7, 12, 11, 13 and 17.

Smart Black Soldier Fly Farming

Deployed in: Tanzania
A resource-efficient and low-cost protein production method by monitoring and optimizing BSFs' living environment. This project contributes to SDG 1, 2, 9, 11, 12, 13, 15, and 17.

Marine Litter Detective

Deployed in: Hong Kong
A GPS-tracking device for monitoring marine pollutants, such as plastics and oil spills. This project contributes to SDG 3, 4, 6, 9, 11, 12, 13, 14, 16, and 17.

Code Jumper Kit

Deployed in: USA, Canada, Australia, UK, India
Innovative educational tool designed for students with visual difficulties to enhance their computer coding and programming skills. This project contributes to SDG 1, 4, 5, 8, 9, 10, 16, and 17.

Animal Behavior Analysis & Habit Pattern Tracking

Deployed in: US, Australia
Leverages computer vision AI models to optimize zoo management, identify and tracks animals within their enclosures. This project contributes to SDG 9, 11, 13, 15, and 17.

Carbon Sequestration Monitoring

Deployed in: Liberia
Monitor climate and greenhouse gas data in rainforests for climate research. This project contributes to SDG 4, 9, 11, 13, 15, and 17.

Protei - Open Source Ocean Cleaning Robot

Deployed in: Global
This is a wind-powered and automated sailing fleet robot designed to resolve the world's oil spill issues caused by the Deepwater Horizon Disaster in the Gulf of Mexico. This project contributes to SDG 6, 14, 11, 15, 3, 1, 7, 9, 8, 12, 13 and 17.

Open Wiki Platform

Introduction of Our Wiki Platform

- Preserve all Seeed Studio Wiki with clear categorization
- Provide multiple interactions for the viewers
- Discover supported by powerful search engine
- Exhibition supported by functional structure Doc Docusaurus

Make It Better in Your Ways

- Anyone is able to edit pages anytime on GitHub
- Create the local website less than five minutes
- All files added / changed will be respected
- Welcome to Seeed Studio Contributors Program

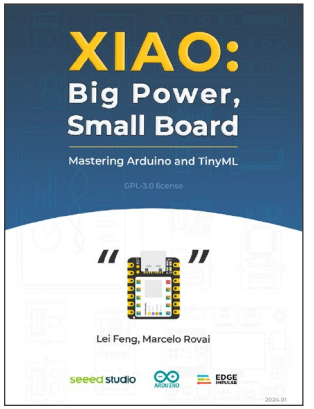
Learning Resources

Microsoft IoT for Beginners Curriculum

IoT | 24 lessons

Azure Cloud Advocates at Microsoft are pleased to offer a 12-week, 24-lesson curriculum all about IoT basics. Each lesson includes pre- and post- lesson quizzes, written instructions to complete the lesson, a solution, an assignment and more. Our project-based pedagogy allows you to learn while building, a proven way for new skills to 'stick'. The projects cover the journey of food from farm to table. This includes farming, logistics, manufacturing, retail and consumer - all popular industry areas for IoT devices.

https://microsoft.github.io/IoT-For-Beginners



XIAO: Big Power, Small Board—— Mastering Arduino and TinyML

tinyML | 21 lessons

From the expansive boards of the past, Arduino has come a long way and entered the Seeed Studio XIAO series: thumb-sized yet power-packed, opening a vast horizon for innovation. “XIAO: Big Power, Small Board” dives deep into these capabilities, guiding readers from the basics of Arduino to intricate miniaturized projects. Whether readers want to illuminate an LED or delve into Embedded Machine Learning (tinyML) with XIAO boards and Edge Impulse Studio, this book covers them. Need for prior knowledge? No worries! This book takes a hands-on, project-based approach, ensuring readers grasp the concepts while implementing them. By the end, they will be adept with XIAO and inspired by many user-created projects showcasing the endless possibilities this small board offers.

https://mjrovai.github.io/XIAO_Big_Power_Small_Board-ebook

Three-stage training for No-Code Programming

No-Code | 5 lessons

A multi-stage guide to building custom low-cost devices for biological research: using no-code programming to integrate advanced sensors, electronic controllers and wireless communications.

https://www.biomaker.org/training-programme

No-Code Programming to Get Started With tinyML

No-Code | tinyML | 5 lessons

The No-code Programming tinyML course introduces beginners to Embedded Machine Learning using Wio Terminal and Codecraft. Through seven step-by-step projects, students learn to train and deploy neural network models on microcontrollers for motion recognition, gesture recognition, wake-up words, smell detection, and more, without requiring prior programming or electronics knowledge.

https://tinkergen.github.io/No-code-Programming-to-Get-Started-with-TinyML/#/

micro:bit Associated Course Materials - BitWearable kit

No-Code | 5 lessons

This coursework is developed based on students' cognitive development and learning ability. It builds scenes taken from real life which stimulate students to look deep at a problem. With the combined use of micro:bit, BitWear and MakeCode, students will be able to create realistic solutions for those real-world problems.

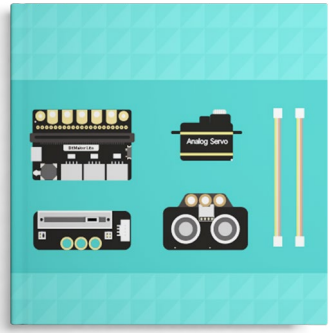
https://make2learn.tinkergen.com/course/?sku=604190001

A Guide to RC Car Project for micro:bit - BitCar & BitPlayer

No-Code | 14 lessons

This course teaches students how to use micro:bit, BitCar, BitPlayer hardware, and Microsoft MakeCode software to gradually learn how to make remote-controlled cars.

https://make2learn.tinkergen.com/course/?sku=604190004

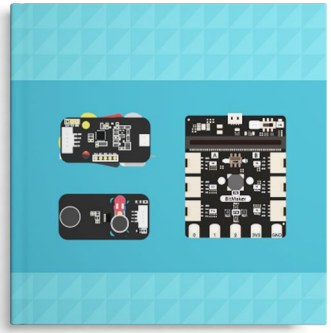


Beginner's Guide: micro:bit projects with the BitStarter Kit

No-Code | 12 lessons

It utilizes three technological tools, including the micro:bit which works with a self-made expansion board, the easy-to-use electronics and a graphical programming software, MakeCode, to steer students to complete creative projects independently and discover scientific and intriguing adventures which adopt both the software and hardware knowledge.

https://make2learn.tinkergen.com/course/?sku=604190002



Advanced Guide: micro:bit projects with the BitGadget Kit

No-Code | 12 lessons

This course is designed based on the cognitive development, learning capabilities, and interests of students, incorporating real-life applications for an engaging learning experience. Utilizing the BitGadget Kit, which includes sensors, motors, a speaker, and colorful lights, students can create fun and exciting micro:bit projects. The kit comprises a BitMaker and up to 9 different Grove modules. All modules are plug-and-play and easily programmable with the Microsoft MakeCode editor, allowing students to enjoy the process of making projects that light up, move, and produce sounds.

https://make2learn.tinkergen.com/course/?sku=604190003

GameGo-Game Programming Courses Beginner's Guide

No-Code | 16 lessons

This is a collection of game programming tutorials to develop kids' graphical programming skills with TinkerGen's GameGo and Microsoft MakeCode Arcade as teaching tools. Games always hold an irresistible fascination for a lot of kids. In our courses, the process of learning game programming serves as a series of 'wizard lessons', from which kids will unlock their wizard gears step by step to become a more powerful and stronger 'wizard' in the end.

https://make2learn.tinkergen.com/course/?sku=604182001

https://make2learn.tinkergen.com/course/?sku=604182007 Español

GameGo-Game Programming Courses Intermediate Learners' Guide

No-Code | 16 lessons

The GameGo Game Programming Intermediate Learners' Course covers several key concepts in game development, including functions, animation, game extensions, level design, and sprite arrays. By analyzing and practicing classic game examples such as Angry Birds, Ping Pong Duel, and Dungeon Secrets, students enhance their game design and programming skills, laying the foundation to become proficient game developers.

https://make2learn.tinkergen.com/course/?sku=604182003

Seeed Studio

Catalog V1.0

April. 2024

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