seeed studio

Seeed Studio XIAO Use Case

Seeed Studio XIAO Series: Small in Size, Big on Features

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Seeed Studio XIAO Series

Extremely Compact Development Boards That Can Act as Functional Modules in Your Designs

The XIAO is a series of ready-for-production development boards featuring a compact design, thumb-sized form factor, powerful processors, and rich peripherals. As a complete microcontroller with all SMD components placed on the same side of the board, it is also a functional module that can act as a building block for larger compute systems. This serves to simplify the process of designing and building complex electronic systems by providing a pre-integrated and tested platform. By adopting XIAO, you can focus on creating the unique features and functions of your system, without having to worry about the time and effort involved in integrating and testing the individual components.

Seeed Studio XIAO Comparision Table

	XIAO SAMD21	XIAO RP2040	XIAO RP2350	XIAO nRF52840	XIAO nRF52840 Sense	XIAO ESP32-C3	XIAO ESP32-C6
Short Description	Universal With Strong Stability and Compatibility	Compatible with the Raspberry Pi RP2040 ecosystem	Compatible with the Raspberry Pi RP2350 ecosystem	Ultra-low power consumption. Bluetooth 5.0. Suitable for consumer-grade product applications	Advanced Version of XIAO nRF52840 With Onboard Microphone And 3-Axis IMU	With WiFi and BLE, Budget-Friendly Risc-V	With WiFi-6, BLE, Zigbee, and Thread for Matter
Recommended Application	Oceanic Observation; Healthcare Device; MIDI / Audiovisual Control; UAVs; Light Controller; Digital Sinage; Digital Relay Timer; Scooter; Tracker	Mechanical Keyboards; HDMI; Geotechnical Sampling Tools; Environmental Detection Tools	Smart Control; Human Interface Devices; Education; Robotics; Wearables	Smart Home Device; Elderly Care Device	AR / Virtual Reality; Creative Therapy Devices; Biomechanics Body Movement Sensor; Sports Data Collection	Smart Agriculture; Smart Home Solution	Secure and Connected Smart Home; Space-limited and Battery-Powered Wearables; Wireless IoT Scenarios
Chip	Microchip SAMD21	Raspberry Pi RP2040	Raspberry Pi RP2350	Nordic nRF52840	Nordic nRF52840	Expressif ESP32C3	Expressif ESP32C6
Architecture	Cortex-M0+ running up to 48MHz	Dual-core Cortex-M0+ running up to 133 MHz	Dual ARM Cortex-M33 running up to 150 MHz with FPU switchable RISC-V using dual Hazard3 RISC-V cores	Cortex-M4 running up to 64 MHz	Cortex-M4 running up to 64 MHz	RISC-V running up to 160 MHz	Two RISC-V processors high-performance one running up to 160 MHz low-power one running up to 20 MHz
RAM	32 KB SRAM	264 KB SRAM	520kB SRAM 2MB Flash	256 KB RAM	256 KB RAM	400 KB SRAM	512KB SRAM
Flash & ROM (chip)	256KB	X	X	1MB	1MB	4MB	4MB
Flash (onboard)	X	2MB	X	2MB	2MB	X	X
Built-in Sensors	X	X	X	X	IMU, Microphone	X	X
PWM/Analog Pins	11/3	11/4	19/3	11/6	11/6	11/4	11/7
I2C/UART/SPI	√	√	√	√	√	√	√
Bluetooth	X	X	X	√	√	√	√

Seeed Studio XIAO Comparision Table

	XIAO SAMD21	XIAO RP2040	XIAO RP2350	XIAO nRF52840	XIAO nRF52840 Sense	XIAO ESP32-C3	XIAO ESP32-C6
WiFi	X	X	X	X	X	√	√
Reset Button	X	√	√	√	√	√	√
Boot Button	X	√	√	X	X	√	√
User LED	√	√	√	√	√	X	√
Battery Charge LED and Chip	X	X	√	√	√	√	√
Low Power Mode	X	X	50μA	5μA	5μA	44μA	15μA
Programming Languages							
Arduino	√	√	√	√	√	√	√
PlatformIO	√	√	√	√	√	√	√
CircuitPython	√	√	√	√	√	√	√
MicroPython	√	√	√	√	√	√	√
Zephyr	√	√	√	√	√	√	√
MicroBlocks	√	√	√	√	√	√	X
SKU	102010328	102010428	102010550	102010448	102010469	113991054	113991254

Seeed Studio XIAO Comparision Table

	XIAO ESP32-S3	XIAO ESP32-S3 Sense	XIAO RA4M1	XIAO MG24	XIAO MG24 Sense	XIAO nRF54L15	XIAO nRF54L15 Sense
Short Description	With WiFi and BLE, High Performance	Advanced Version of XIAO ESP32-S3 with OV3660 Camera and Microphone	Renesas 32-bit ARM Cortex-M4 MCU, compatible with Arduino IDE	Matter, Open Thread, Zigbee, Bluetooth Low Energy (BLE 5.3), Bluetooth Mesh, Proprietary 2.4 GHz	Advanced Version of XIAO MG24 with Six-axis acceleration sensors and Microphone	Ultra low power consumption with BLE 6.0, Matter, Thread and Zigbee protocols.	Advanced Version of XIAO nRF54L15 with Six-axis acceleration sensors and Microphone
Recommended Application	Robotics; Low-Power Networking; Smart Watch; Smart Thermostat	Image Recognition; Speech Recognition; TinyML	Smart Control; Education; Robotics; Wearables	Smart Home Automation; Remote Sensing and Control; Environmental Monitoring	TinyML Applications; Smart Home Automation; Remote Sensing and Control; Environmental Monitoring	Next-Gen Wearables; Secure Smart Home Hubs; Industrial IoT (IIoT) Sensors; Advanced Prototyping	Next-Gen Wearables; Secure Smart Home Hubs; Industrial IoT (IIoT) Sensors; Advanced Prototyping
Chip	Expressif ESP32S3	Expressif ESP32S3	Renesas RA4M1	Silicon Labs EFR32MG24	Silicon Labs EFR32MG24 Sense	Nordic nRF54L15	Nordic nRF54L15
Architecture	Dual-core Xtensa LX7 running up to 240 MHz	Dual-core Xtensa LX7 running up to 240 MHz	Cortex-M4 running up to 48 MHz with FPU	ARM Cortex-M33 running up to 78 MHz	ARM Cortex-M33 running up to 78 MHz	Arm® Cortex®-M33 128 MHz RISC-V 128 MHz Coprocessor	Arm® Cortex®-M33 128 MHz RISC-V 128 MHz Coprocessor
RAM	512 KB SRAM 8MB PSRAM	512 KB SRAM 8MB PSRAM	32 KB SRAM	256kB RAM	256kB RAM	256kB RAM	256kB RAM
Flash & ROM (chip)	384KB	384KB	256KB	1536KB+4MB	1536KB+4MB	1.5 MB Non-volatile Memory (NVM)	1.5 MB Non-volatile Memory (NVM)
Flash (onboard)	8MB	8MB	X	X	X	X	X
Built-in Sensors	X	OV2640 camera/OV3660, Microphone	X	X	Six-axis acceleration sensors, Microphone	X	Six-axis acceleration sensors, PDM Microphone
PWM/Analog Pins	11/9	13/11	19/14	22/18	22/18	16/6	14/6
I2C/UART/SPI	√	√	√	√	√	√	√
Bluetooth	√	√	X	√	√	√	√
WiFi	√	√	X	X	X	X	X

Seeed Studio XIAO Comparision Table

	XIAO ESP32-S3	XIAO ESP32-S3 Sense	XIAO RA4M1	XIAO MG24	XIAO MG24 Sense	XIAO nRF54L15	XIAO nRF54L15 Sense
Reset Button	√	√	√	√	√	√	√
Boot Button	√	√	√	X	X	X	X
User LED	√	√	√	√	√	X	X
Battery Charge LED and Chip	√	√	√	√	√	√	√
Low Power Mode	14μA	26.5mA	45μA	1.95μA	1.95μA	0.6μA	0.6μA
Programming Languages							
Arduino	√	√	√	√	√	X	X
PlatformIO	√	√	√	√	√	√	√
CircuitPython	√	√	X	X	X	X	X
MicroPython	√	√	X	X	X	X	X
Zephyr	√	√	√	√	√	√	√
MicroBlocks	√	√	X	X	X	X	X
SKU	113991114	113991115	102010551	102010590	102010610	101991421	101991422
More: https://wiki.seeedstudio.com/SeeedStudio_XIAO_Series_Introduction/							

Seeed Studio Fusion One-Stop Shop Agile Manufaturing and Hardware Customization, Has You Covered All From Ideas Prototypes to Large Scale Production

What can Seeed Studio Fusion do for you?

- Provide complete Original Equipment Manufacturing (OEM) services for a wide variety of electronic hardware, lifting your design from idea to reality.

- Bring your product concept to the market with Seeed Studio's industrial capabilities, from design, manufacturing, testing, certification, global distribution, and the Seeed co-create licensing program.

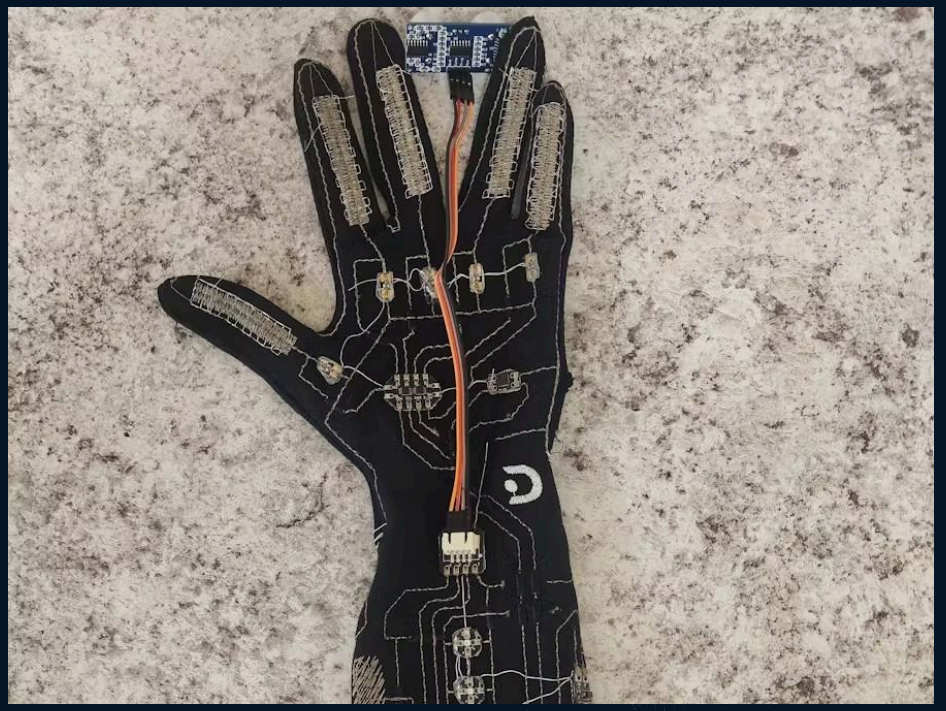
- Offer the entire package from PCB manufacture, parts procurement, turn-key assembly, mechanical parts manufacture, packaging services, quality inspections down to shipping provisions, structural and certification such as FCC, CE, Telec, and manufacturing for enclosures and hardware, etc. Complete with dedicated account managers and expert engineers, Seeed can help you realize your ideas economically and efficiently.

In a nutshell, whether you are prototyping or looking for a mass production partner or based on open source product customization requirements and other design manufacturing services, Seeed Studio Fusion service is catered to your needs starting with a simple online platform.

As a series of highly versatile functional modules that has been widely adopted by product designers, XIAO Series shows its limitless possibilities in a range of amazing designs. Here are some reference designs powered by XIAO and Seeed Studio Fusion's agile manufacturing service. Check them out below for inspiration!

Yendor Flex Glove
Embroidered E-Textile Interface

By Rodney Trusty



Introduction:

The Yendor Flex Glove is a machine-embroidered smart glove combining textile design with embedded electronics. It uses conductive thread flex sensors, an IMU, and feedback via LEDs, vibration, and sound. Built with Digital Fiber Studio, it integrates washable components like an ADC, buzzer, and haptic motor. The project showcases gesture-based input and introduces novel techniques such as embroidered PCBs, bridges, and layout-aware stitching—advancing the field of e-textile engineering.

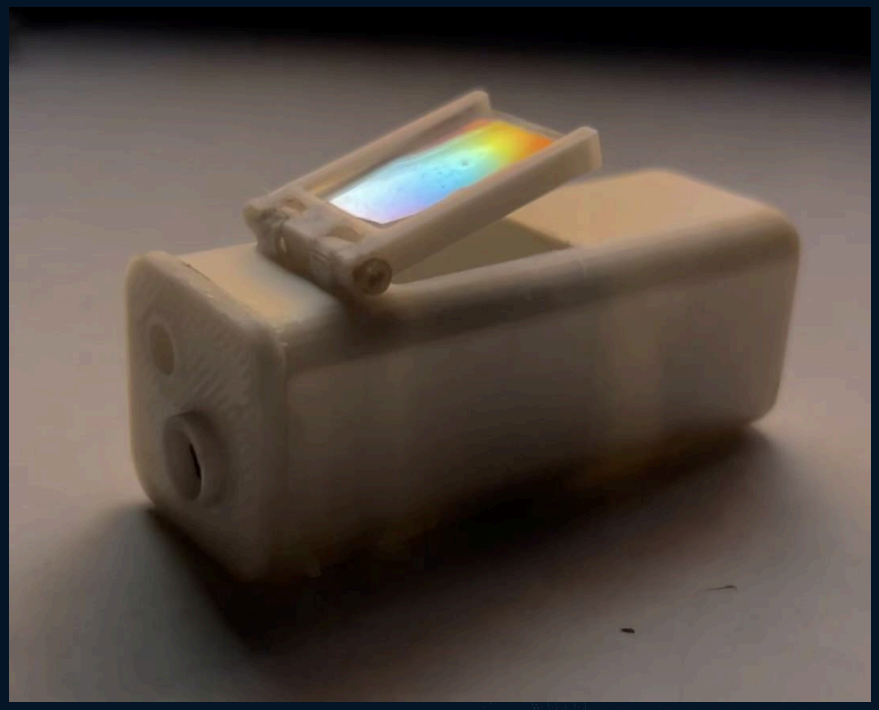
Keywords:

Smart gloves;
E-textiles;
Machine-sewn PCB;

>>Read more details.

TPGmini v2
Tiny AR Wearable Companion

By Nguyễn Minh HIỂN



Introduction:

TPGmini v2 is a compact AR wearable that upgrades regular glasses into a smart assistant. It features a single-button interface for switching between apps like Gemini AI, Live Transcription, and a retro Camera. With an OLED display and mirror for HUD visuals, it runs on the XIAO ESP32-S3 Sense for real-time AI and transcription. Built on the open-source miniOS, it supports developer-made micro-apps for creative and accessible use cases.

Keywords:

AR wearable;
Smart glasses;

>>Read more details.

Vibe AI
Wearable Nutrition Tracker

By Jacob Trebil

Introduction:

Vibe is a pendant-sized wearable that uses AI and computer vision to passively track meals. Powered by the XIAO ESP32-S3 Sense, it captures food images and sends them via Bluetooth to a mobile app, where Vision LLMs analyze nutrition. Designed for seamless habit-building, it supports encrypted data and minimal user interaction. Vibe v2 will be even smaller and more efficient, with added features like hydration and workout tracking.

Keywords:

AI wearable;
Nutrition tracking;

>>Read more details.

Open Source Smart Health Ring

By Peter Machona

Introduction:

This prototype ring continuously tracks heart rate and blood oxygen levels for sickle cell patients using the MAX30105 sensor and XIAO ESP32-C3. It streams real-time data via WebSocket to a web dashboard, with options for PDF reporting. The GitHub repository includes firmware, server code, and setup guides, with planned features like offline mode and mobile app.

Keywords:

Healthcare;
Health wearable;

>>Read more details.

WatchThis
Wearable Point-and-Ask Assistant

By Cathy Mengying Fang, Patrick Chwalek, Quincy Kuang, and Pattie Maes

Introduction:

WatchThis is a wrist-mounted wearable that uses computer vision and GPT-4o to answer questions about real-world objects. Users flip up the camera, point, and tap to trigger image capture and contextual queries like “What is this?” or “Translate this.” Built with Arduino-compatible C++, it responds in ~3 seconds and supports custom prompts via an onboard WebApp. Ideal for translation, navigation, and smart home control, it’s designed for intuitive, gesture-driven interaction.

Keywords:

AI wearable;
Vision AI;
Vision Language Model;

>>Read more details.

Open Hardware Summit Badge 2025 E-Textile Assembly Guide

By Rodney Trusty

Introduction:

This tutorial walks through assembling the 2025 Open Hardware Summit badge as an embroidered e-textile circuit. It uses a XIAO ESP32-C3 microcontroller, two WS2812B-2020 LEDs, and a female SAO connector sewn onto conductive traces. Components are stitched with conductive thread—no soldering required—with USB or coin cell battery power. The guide covers orientation tips, thread trimming, and includes an Arduino sketch for RGB LED blinking.

Keywords:

Wearable badge;
E-textile circuit;
Open Hardware Summit;

>>Read more details.

Environment Audio Monitoring Wearable

By Solomon Muhunyo Githu

Introduction:

Vibe is a pendant-sized wearable that uses AI and computer vision to passively track meals. Powered by the XIAO ESP32-S3 Sense, it captures food images and sends them via Bluetooth to a mobile app, where Vision LLMs analyze nutrition. Designed for seamless habit-building, it supports encrypted data and minimal user interaction. Vibe v2 will be even smaller and more efficient, with added features like hydration and workout tracking.

Keywords:

AI wearable;
Nutrition tracking;

>>Read more details.

Infrared Thermometer Ring

By Gokul K B

Introduction:

This wearable infrared thermometer ring uses the Seeed Studio XIAO ESP32-C3 and MLX90614 sensor to deliver fast, contactless temperature readings from 2–5 cm away, displayed on an OLED screen mounted atop the ring; designed for food service workers, it enables hands-free temperature checks while handling items, with customizable alerts for preset temperature ranges, a built-in battery management system for USB charging, and a compact 3D-printed enclosure that integrates the sensor, display, and power switch into a sleek, finger-worn form factor.

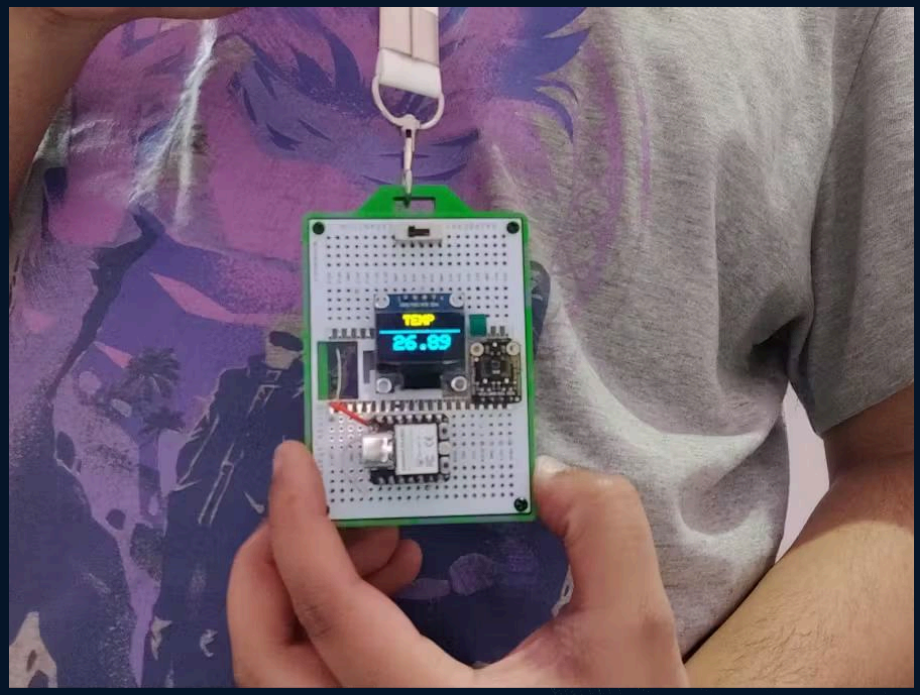
Keywords:

Wearable Ring;
Infrared thermometer;
Smart Sensing;

>>Read more details.

Temperature Card

By Arnov Sharma



Introduction:

The Temperature Card is a wearable ID-style device built around the Seeed Studio XIAO ESP32-C3, an SSD1306 OLED display, and an SHT40 temperature sensor; it reads live temperature data and displays it on screen, powered by a small 3.7V LiPo cell connected to the XIAO's battery terminals, with the entire setup assembled first on a breadboard and then transferred to a custom prototyping board housed in a 3D-printed enclosure that includes a slot for an ID strap and a slide switch for power control—making it a compact, portable temperature meter ideal for everyday wear.

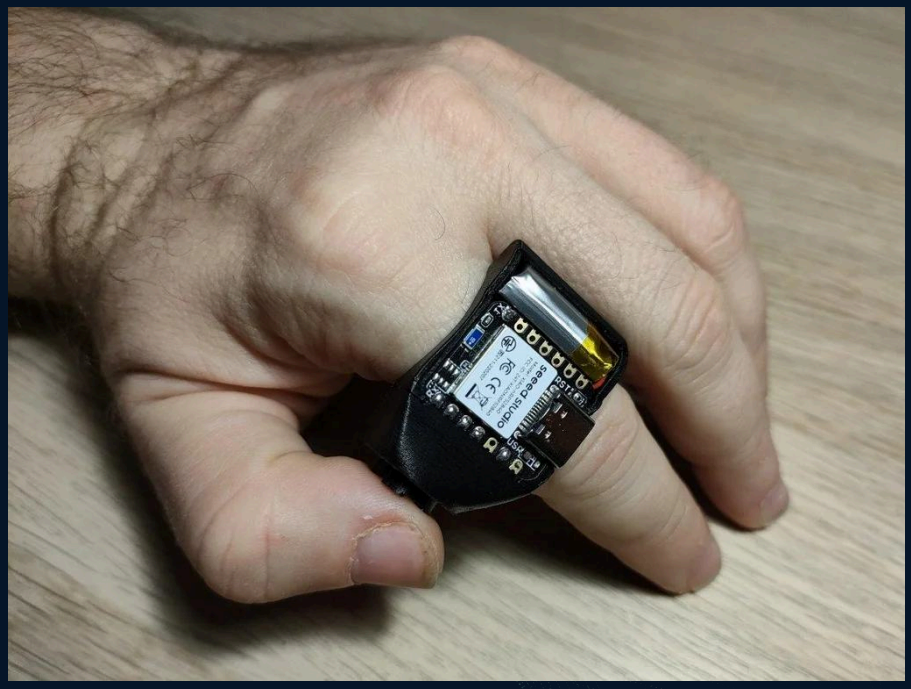
Keywords:

Temperature sensor;
Wearable ID badge;

>>Read more details.

Mouse Ring V2

By rafgaj78



Introduction:

This compact Bluetooth-enabled ring functions as a wearable mouse controller using a joystick with four directional inputs and a push button to emulate left/right clicks and scroll actions; built around the Seeed Studio XIAO nRF52840 and programmed in CircuitPython, it features two operating modes, deep sleep wake-up via joystick press, and improved ergonomics over the original version, with a minimal 3D-printed design sized for ring diameters from 19 to 24mm, a custom PCB, and a 90mAh LiPo battery—ideal for VR headset users seeking intuitive, hands-free mouse control.

Keywords:

Wearable mouse;
Ring wearable;

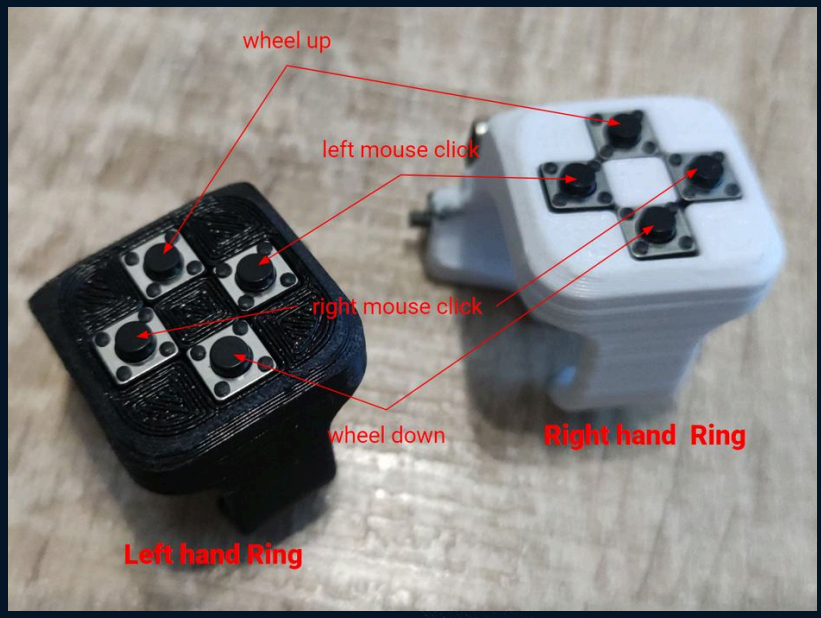
>>Read more details.

Ring With Mouse Buttons & Wheel

By rafgaj78

Introduction:

This Bluetooth-enabled wearable mouse controller is built around the Seeed Studio XIAO nRF52840 and features four tactile buttons for left click, right click, scroll up, and scroll down, all integrated into a 3D-printed ring form factor with separate designs for left and right hands; powered by a 50mAh LiPo battery with USB charging and LED indicators, it's designed to enhance VR immersion—especially in flight simulators like DCS World—by pairing with Leap Motion and The Fingers software to eliminate the need for a traditional mouse, with simple CircuitPython-based programming and basic soldering and assembly required.



Keywords:

Wearable mouse;
Ring wearable;

>>Read more details.

Artyom's Wristwatch From Metro

By Donut Studio

Introduction:

Inspired by the Metro game series, this wearable wristwatch replicates Artyom's iconic gadget using four yellow 7-segment displays, a blue LED, and a light-dependent resistor for auto-brightness control—all driven by a Seeed Studio XIAO nRF52840 microcontroller with deep sleep support and optional BLE features. The build includes a custom PCB, DS1302 RTC, TM1637 display driver, and a CR927 coin cell battery, housed in a 3D-printed case with acrylic cover and backpack strap mounts. Designed for realism and daily use, it features multiple modes (time, date, timer), a startup animation, and a sleep/wake system triggered by button presses.

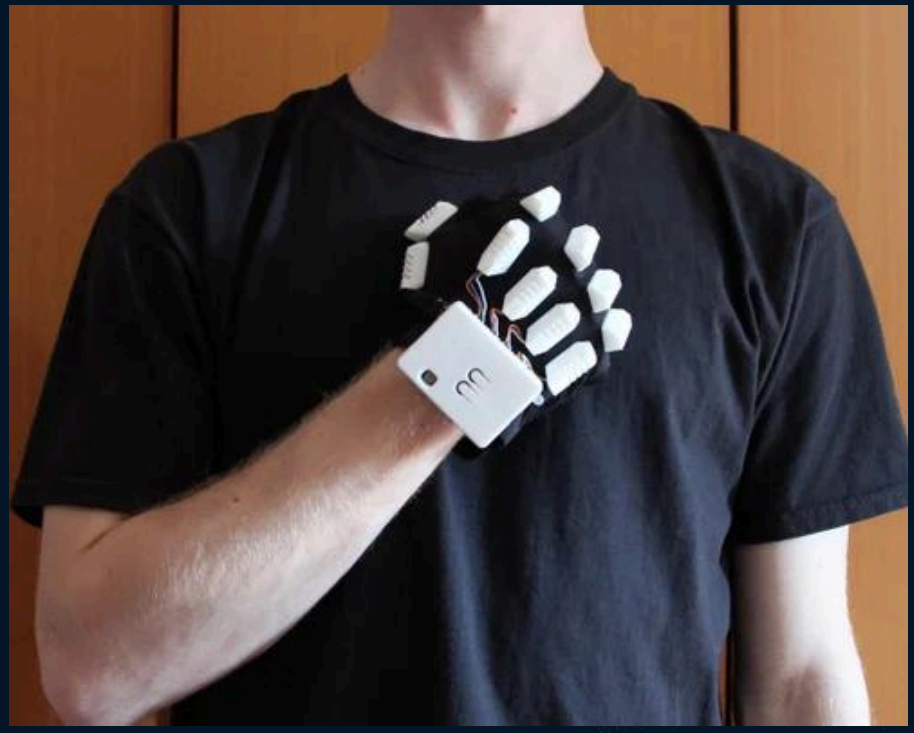
Keywords:

Wearable watch;
Nutrition tracking;

>>Read more details.

The Data Glove
Control Bluetooth Devices With Gestures

By Donut Studio



Introduction:

This gesture-controlled wearable uses the Seeed Studio XIAO nRF52840 and five SS49E Hall sensors mounted on a bicycle glove to detect finger movements via magnetic field changes, enabling Bluetooth-based control of devices like media players or presentation software; the system includes an IR receiver, vibration motor, buttons, and LED for feedback, all integrated into a custom PCB with a 3D-printed enclosure, and programmed using Arduino-compatible sketches that support gesture recognition, haptic alerts, and multiple interaction modes—making it a versatile, hands-free interface for smart environments.

Keywords:

Wearable glove;
Gesture-controlled;

>>Read more details.

BLE Data Glasses

By Markus Opitz

Introduction:

These DIY smart glasses use the XIAO nRF52840 Sense, a 0.49" OLED display, and a 150mAh LiPo battery to project data into the user's eye via a mirror and lens. Controlled by a custom MIT App Inventor app, it supports overlays and alerts, with mirrored visuals corrected in software. The 3D-printed frame weighs just 24g—offering a low-cost alternative to commercial smart eyewear.

Keywords:

AI wearable;
Smart glasses;

>>Read more details.

Cardiogram
Portable ECG Device for Daily Use

By Protyasish Majumder, Arpan Das, Tanish Sen, and Jaagrav Seal

Introduction:

Cardiogram is a wearable ECG device built around the XIAO ESP32-C3 and Heart Bioamp Candy sensor, designed for continuous heart health tracking. It streams real-time data to a SwiftUI iOS app via BLE, displaying metrics like BPM and supporting dual-mode operation (standby/streaming). Housed in a custom 3D-printed enclosure and powered by a 500mAh LiPo battery, the device includes filtering to reduce electrical noise and offers a low-cost, open-source alternative to commercial ECG monitors.

Keywords:

Wearable ECG monitor;
Real-time heart health;
BPM tracking;

>>Read more details.

Key Finder

By Hamid

Introduction:

This Bluetooth-enabled key finder uses the XIAO nRF52840 to connect with smartphones and trigger sound and light alerts via a buzzer and LED. Paired with apps like NRF Connect, it supports remote activation and manual reset through a built-in button. Developed in Arduino IDE and built on a custom Seeed Studio Fusion PCB, the firmware includes BLE sync, command handling, and power-saving logic—offering a simple, customizable solution with future potential for SOS signaling and sensor upgrades.

Keywords:

BLE key finder;
NRF Connect;

>>Read more details.

LED Choker

By Ted

Introduction:

This wearable LED choker repurposes high-density 120 LED/m strips bonded to a 15mm leather strap using Barge glue, with precise hole spacing (8.48mm) to accommodate flex and maintain alignment across the full length; powered by four 300mWh LiPo batteries and controlled by a Seeed Studio XIAO-S3—chosen for its compact size and built-in LiPo charge controller—the build delivers about two hours of runtime and showcases a minimalist, punch-tape-inspired aesthetic, making it a creative reuse of leftover components from a previous project.

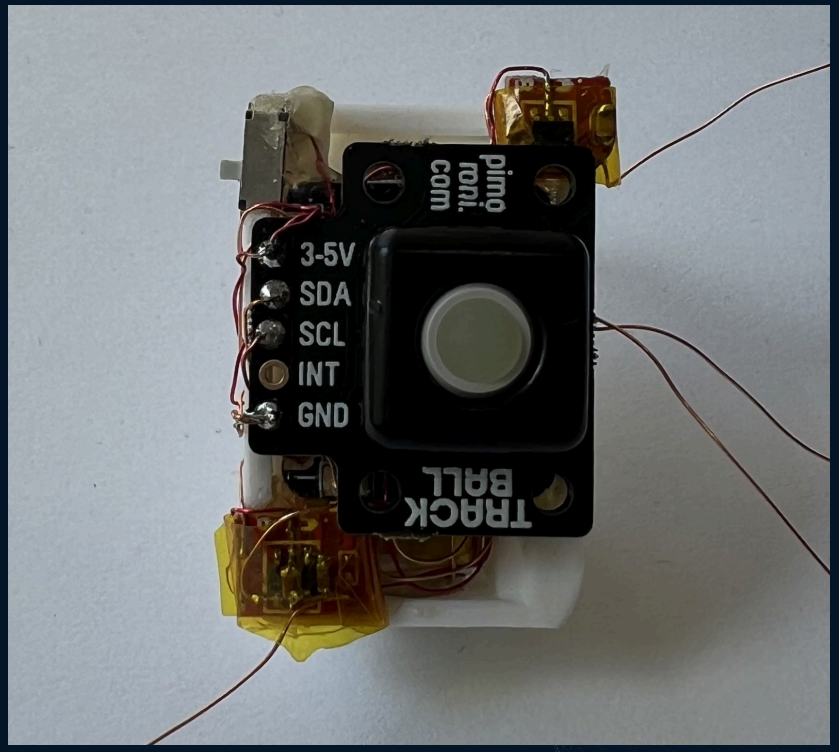
Keywords:

LED wearable;
Light-up fashion;

>>Read more details.

ErgO: Neural-Network Powered Keyboard-Mouse Ring

By Sophia



Introduction:

ErgO is a compact ring worn on the pointer finger that uses gesture and touch input to control Bluetooth devices. Built around the Seeed Studio XIAO nRF52840 for its small size and onboard power management, it features two touch sensors for tap detection, a Pimoroni Trackball for thumb-controlled cursor movement, and a LiPo battery with a slide switch—all housed in a custom 3D-printed ring base. The result is a sleek, wearable interface for minimal and futuristic control.

Keywords:

Smart ring;
Gesture control;
Touch sensors;

>>Read more details.

SmartCardX
An Interactive Business Card

By Rishabh Jain

Introduction:

SmartCardX transforms the traditional business card into a credit-card-sized interactive badge powered by the XIAO ESP32-C6. It features a 17×9 WS2812B LED matrix for animations and games, NFC and QR code for contact sharing, a 5-button interface, and an MPU6050 IMU for motion-based input. With Wi-Fi connectivity for real-time weather and time display, all packed into a sleek 85×55 mm PCB, it's a programmable showcase of personality and tech for developers and designers.

Keywords:

Interactive business card;
NFC & QR;

>>Read more details.

uPhone
AI Wearable for Social Interaction

By Cayden Pierce

Introduction:

uPhone is a necklace-style AI device that displays real-time translation, navigation, and shared information outward to conversation partners. It features a round RGB touchscreen and a gesture-controlled glove powered by XIAO ESP32-S3, using magnets and Hall effect sensors for app switching via BLE. Built to foster connection and reduce tech isolation, uPhone transforms face-to-face conversations into collaborative, informed experiences

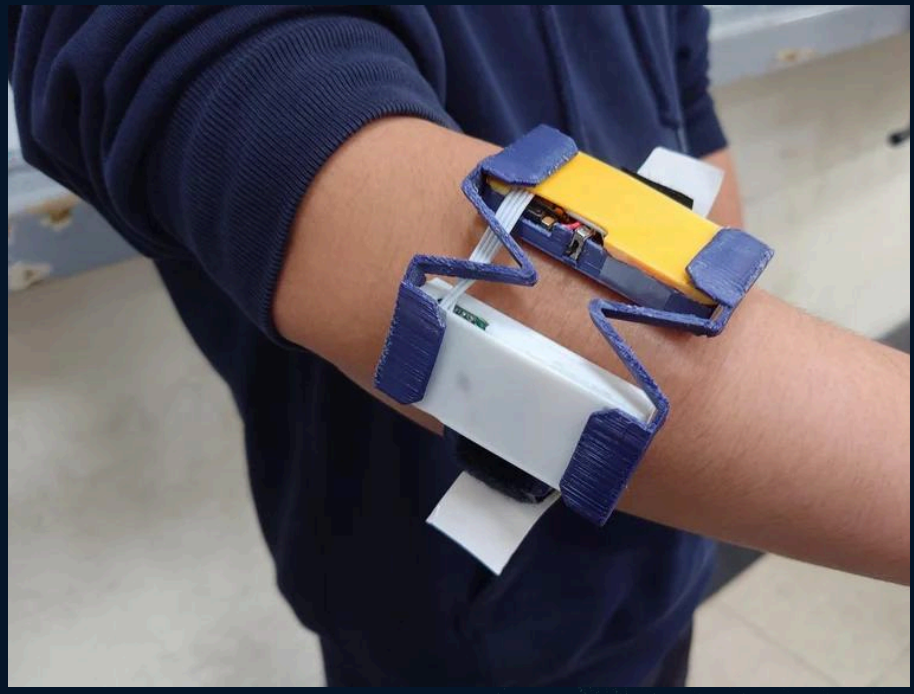
Keywords:

AI wearable;
Real-time translation;

>>Read more details.

Wearable Device for FoG (Freezing of Gait) in Parkinson's

By tobychui



Introduction:

FoG is a common symptom among Parkinson's patients, disrupting the natural ability to walk. This lightweight wearable provides external rhythmic stimuli—like vibrations or light cues—to help the wearer "reset" their walking pattern and reduce the severity of FoG. The XIAO RP2040 drives the logic, offering low power and compact size ideal for continuous use. This project demonstrates how low-cost hardware can improve mobility and independence.

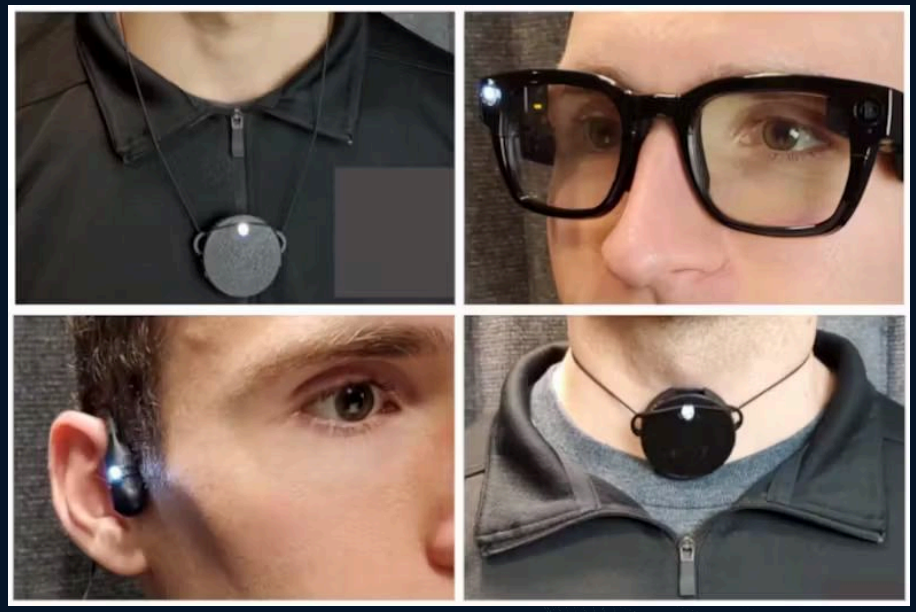
Keywords:

Health wearable;
Mobility aid;

>>Read more details.

MeMic
Privacy-Aware AI Wearable Recorder

By Cayden Pierce, Wazeer Deen Zulfikar, and Pattie Maes



Introduction:

MeMic is a wearable voice recorder that activates its microphone only when the wearer speaks, ensuring privacy in continuous audio logging. It detects speech through vibrations captured by the onboard IMU, processed locally on the XIAO nRF52840 Sense using a custom algorithm that filters motion signals and triggers recording when voice-like acceleration is detected. A RGB LED indicator lights up during active recording, providing transparency. Tested in pendant and smart glasses form factors, MeMic aims to make AI wearables more socially acceptable by mitigating always-on listening concerns.

Keywords:

Wearable voice recorder;
Motion-triggered recording

>>Read more details.

OpenGlass
$20 AI-Powered Smart Glasses

By Nik Shevchenko

Introduction:

OpenGlass transforms any ordinary glasses into smart eyewear using affordable off-the-shelf components. It features a XIAO ESP32-S3 Sense housed in a 3D-printed mount, alongside a compact Li-ion battery, enabling capabilities like life recording, people recognition, object identification, and text translation. These functions are powered by software that connects to Groq and OpenAI APIs. Fully open-source and the project supports community contributions.

Keywords:

AI wearable;
Smart glasses;

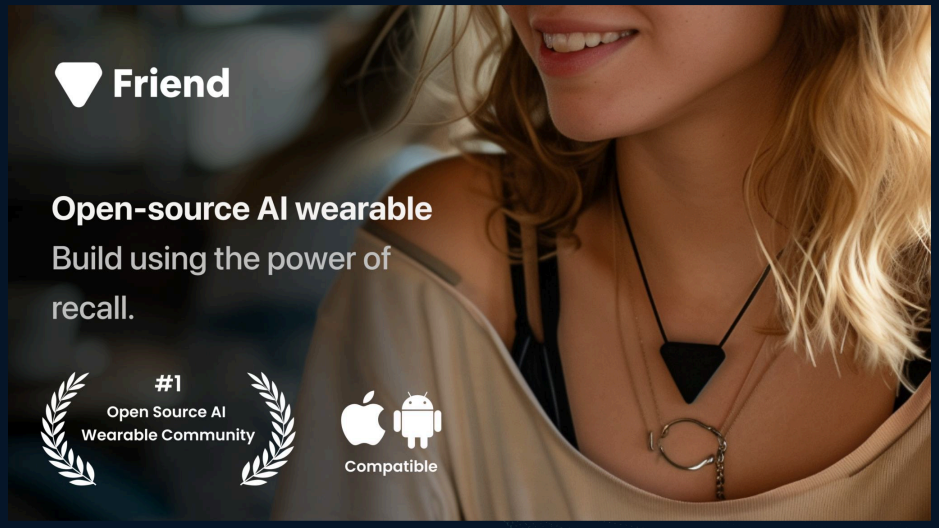
>>Read more details.

Friend Now as Omi AI Open Source AI Wearable Recorder

By Nik Shevchenko and Based Hardware

Introduction:

Friend is an AI-powered voice recorder that captures conversations hands-free and transcribes them in real time. It uses onboard TinyML on the XIAO nRF52840 Sense to detect speech and sends audio via Bluetooth to a mobile app. There, Deepgram and OpenAI Whisper handle transcription, producing accurate, time-stamped summaries and task lists. Compact and energy-efficient, the device features a rechargeable battery and switch for daily wear. With an open-source design and step-by-step build guide, users can customize and contribute via GitHub.



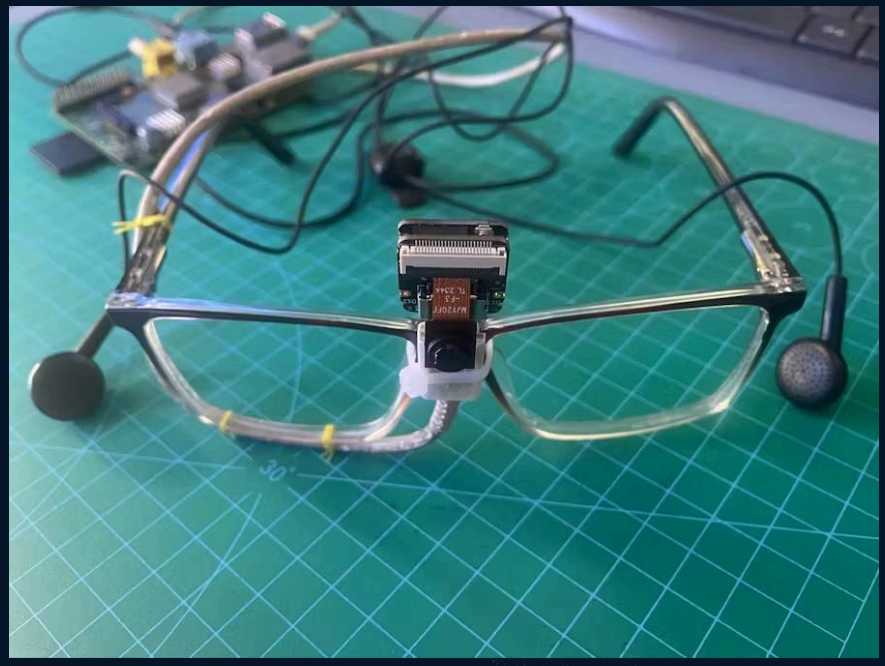
Keywords:

AI wearable;
TinyML speech detection;

>>Read more details.

Third Eye for Blind

By Md. Khairul Alam



Introduction:

Third Eye is a vision-to-speech aid for visually impaired users, combining edge AI and object detection to describe surroundings through headphones. Using a custom-trained Edge Impulse model, the XIAO ESP32-S3 Sense detects everyday objects and sends results via UART to a Raspberry Pi, which converts them to spoken feedback using Festival TTS. The setup includes Arduino library deployment, camera pin remapping, and speech-driven alerts like “chair on the left” or “bed ahead”—all optimized for low-cost accessibility.

Keywords:

Festival TTS;
AID wearable;

>>Read more details.

BLE Smartwatch for Sun Damage Risk Prediction

By Kutluhan Aktar

Introduction:

Overexposure to sunlight can lead to serious health risks, from dehydration to skin cancer. This AI-enabled smartwatch measures UV Index, temperature, pressure, and altitude to predict sun damage risk—especially helpful for sensitive groups like children and the elderly. Built around our XIAO nRF52840 for BLE communication and AI inference, it uses an OLED display and microSD card for data visualization and logging. The goal? To warn users of harmful UV exposure before symptoms occur.

Keywords:

AI wearable;
UV Index monitoring;

>>Read more details.

DIY LED Earrings
Wearable Light-Up Accessory

By Alison Yang

Introduction:

These beginner-friendly earrings use the XIAO SAMD21 and WS2813 LEDs to create glowing, programmable accessories. Designed by Alison Yang and inspired by MakeFashion and Geek Mom Projects, each board features seven LEDs, pink string accents, and hidden power bank support. Programmed via Arduino IDE, the earrings showcase creative soldering and wearable flair—ideal for parties, DIY showcases, and future upgrades like dynamic color effects.

Keywords:

LED earrings;
Wearable fashion;

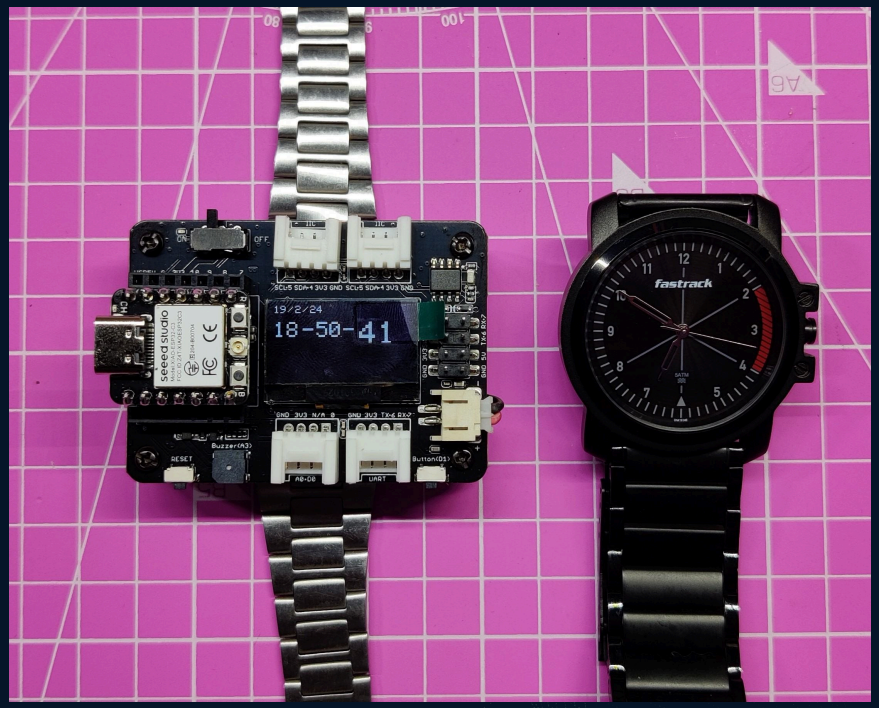
>>Read more details.

DIY Digital Watch – Minimalist Timepiece

By Arnov Sharma

Introduction:

This compact digital watch repurposes a vintage Casio frame using the XIAO ESP32-C3 and its expansion board, paired with a 0.96" OLED screen and RTC module for persistent timekeeping. Powered by a 100mAh LiPo battery and housed in a 3D-printed holder, it's lightweight, portable, and beginner-friendly. With built-in I2C integration and display libraries like Adafruit SSD1306 or u8g2, the project blends simplicity and reuse—making it a great entry point for wearable tech enthusiasts.



Keywords:

DIY digital watch;
Wearable tech;

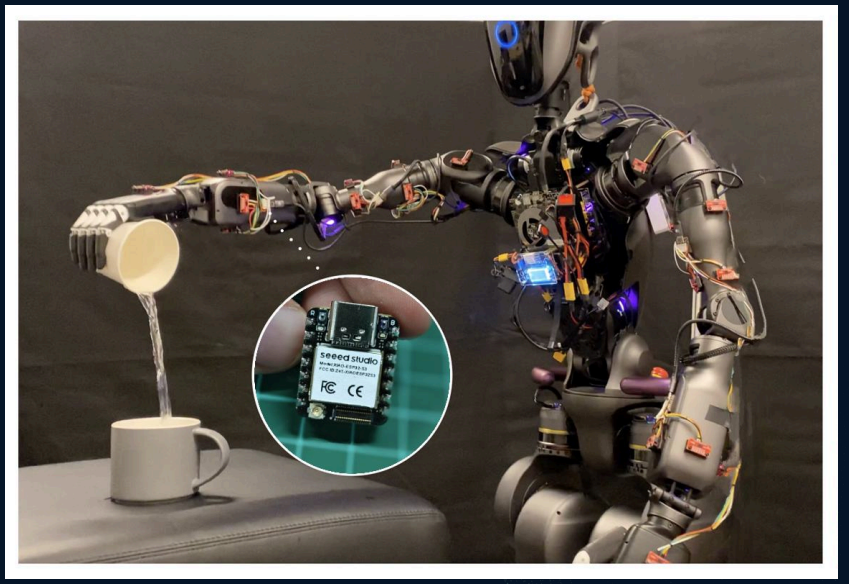
>>Read more details.

ARMOR: Egocentric Perception for Humanoid Robots

By Daehwa Kim , Mario Srouji, Chen Chen, and Jian Zhang

Introduction:

ARMOR is an innovative wearable sensor system for humanoid robots like the GR1, combining XIAO ESP32-S3 microcontrollers and SparkFun VL53L5CX ToF sensors to create a real-time egocentric depth sensing network. The sensors stream data to a Jetson Xavier NX, then to a high-performance Linux machine with RTX 4090, allowing a transformer-based policy (ARMOR-Policy) to generate safe, nimble trajectories.



Keywords:

Humanoid robotics;
Egocentric depth sensing;

>>Read more details.

Zippy: World's Smallest Power-Autonomous Bipedal Robot

By Steven Man

Introduction:

It is the world's smallest power-autonomous bipedal robot, standing just 3.6 cm tall! Zippy packs high-speed agility, passive dynamic walking, and open-loop control — all powered by our XIAO nRF52840. With a single DC motor, 3D-printed limbs, and mechanical ingenuity, Zippy walks without sensors or complex feedback systems, making it ideal for micro-scale environments.

Keywords:

Humanoid robotics;
Nutrition tracking;

>>Read more details.

ESP-ROLL: Self-Balancing Spherical Ball Robot

By Max Imagination

Introduction:

ESP-ROLL is a 3D-printed, camera-equipped spherical robot that rolls smoothly across surfaces without wheels or balance sensors. Powered by the XIAO ESP32-S3 Sense, it integrates custom PCBs, LED lighting, and motion-triggered video recording, with real-time FPV control via Wi-Fi. Encased in a transparent ornament shell, this compact bot offers a playful, low-cost robotics experience—perfect for makers exploring embedded vision and wireless control.

Keywords:

Spherical robot;
FPV control;

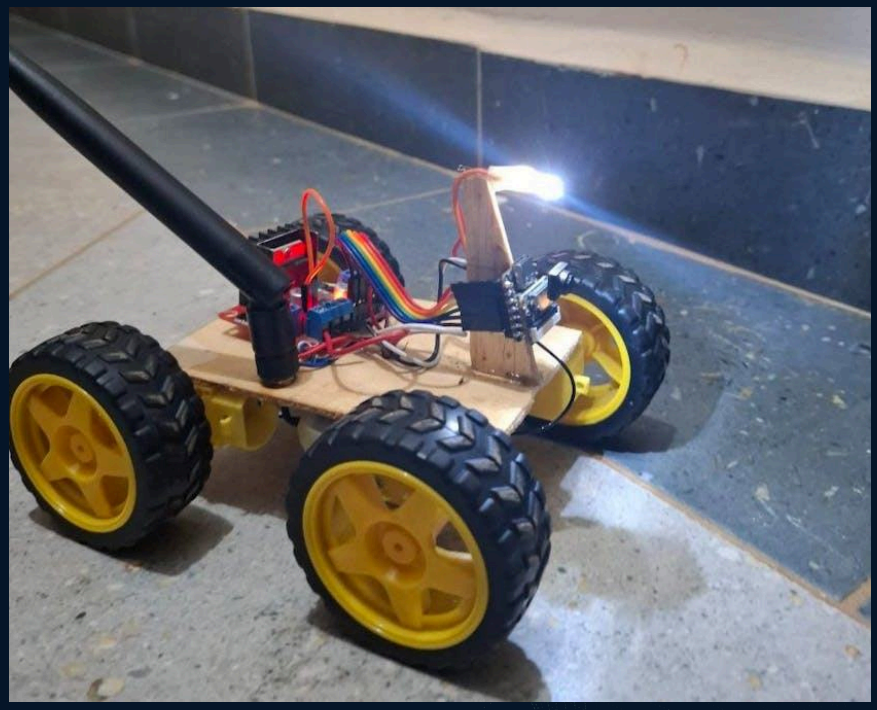
>>Read more details.

FPV Robot Car with XIAO ESP32-S3 Sense

By Nickson Kiprotich

Introduction:

The FPV Robot Car is a remotely controlled car with live video streaming, powered by the XIAO ESP32-S3 Sense microcontroller. It features a motor driver, LED, and Wi-Fi antenna, operating as an access point for web-based joystick control and real-time video feed. Developed using Arduino IDE, the project blends robotics, AI, and IoT, with future plans for autonomous navigation and advanced sensors.



Keywords:

FPV robot car;
Wi-Fi control;

>>Read more details.

ESP32-Powered 4x4 RC Rover Fully 3D Printed and Wi-Fi Controlled

By Gokul KB

Introduction:

This fully 3D-printed RC rover uses the XIAO ESP32-C3 to deliver true 4×4 drive via four DC motors and a custom motor driver PCB. Operating as a Wi-Fi hotspot, it enables browser-based joystick control without external apps. A voltage booster enhances performance, while the compact design blends mechanical engineering and wireless electronics—making it a standout DIY build for robotics, RC, and IoT enthusiasts.

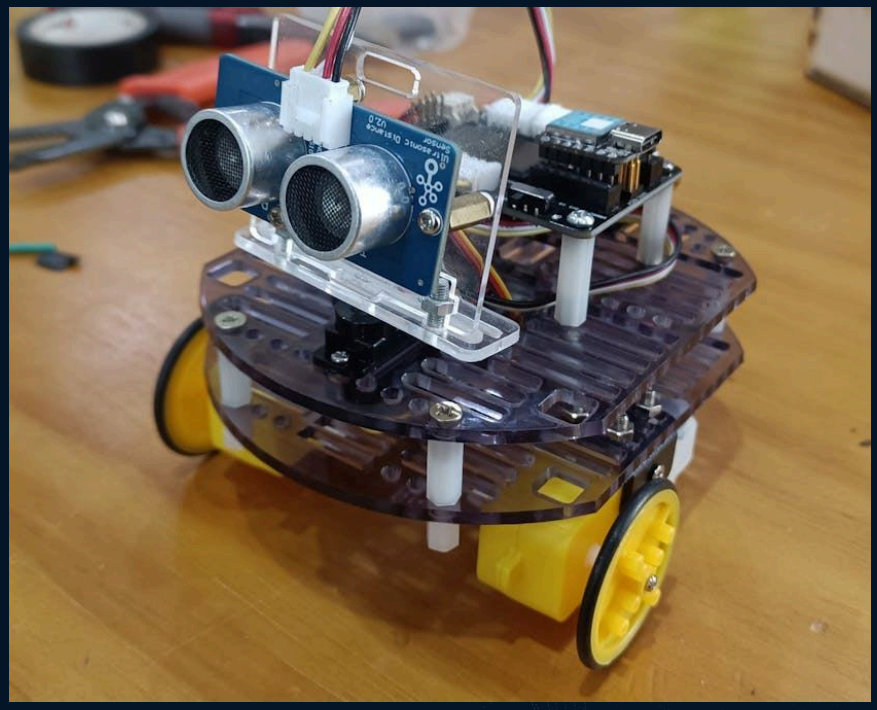
Keywords:

FPV robot car;
Wi-Fi control;

>>Read more details.

Seeed Studio XIAO Expansion Board Ultrasonic Obstacle Avoidance Robot

By xuliang



Introduction:

This compact autonomous robot uses the Seeed Studio XIAO Expansion Board to control TT DC motors and a servo-mounted ultrasonic sensor for obstacle detection and avoidance. Built on a mini round chassis with a Grove-I2C Mini Motor Driver and powered by a rechargeable battery, it runs simple Arduino code to move, stop, retreat, and turn based on sensor input. Designed for beginners, it's a hands-on introduction to robotics and sensor-based navigation.

Keywords:

Obstacle avoidance robot;
Autonomous movement;

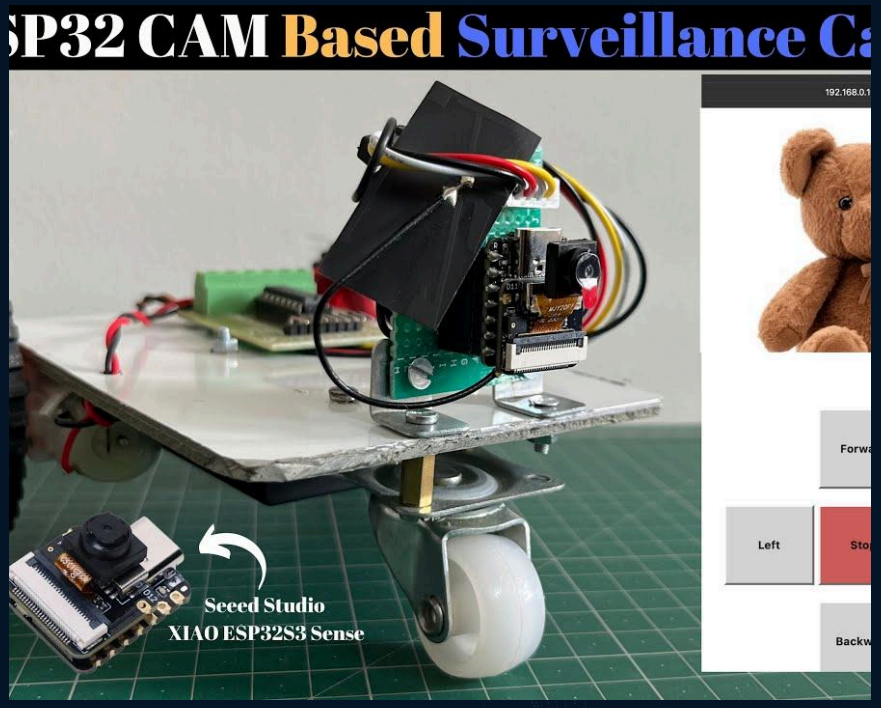
>>Read more details.

Small Robot Car with Camera

By Just Do Electronics

Introduction:

This beginner-friendly robot car uses the XIAO ESP32-S3 Sense to enable remote control and live video streaming. The tutorial guides users through hardware assembly, circuit wiring, and Arduino-based coding, with resources like schematics and a code link for easy replication. Designed for electronics enthusiasts, it blends robotics, embedded vision, and IoT—making it a great entry point into remote-controlled systems.



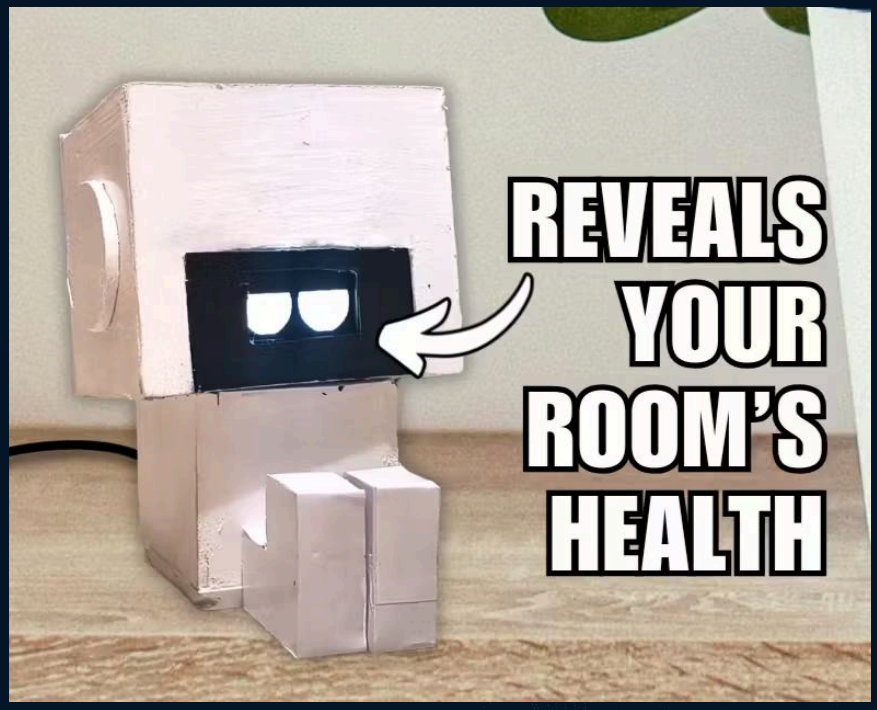
Keywords:

DIY robot car;

>>Read more details.

Gus: A Smart Robot Whose Eyes Indicate Your Room's Health

By Makestreme



Introduction:

Gus is a DIY smart robot that monitors air quality, temperature, and humidity using expressive OLED eyes that change based on environmental conditions. Powered by the XIAO ESP32-S3 Sense and built from foam board, Gus reacts visually—appearing sleepy when air quality is poor—to encourage healthier surroundings. With integrated sensors, step-by-step instructions, wiring diagrams, and open-source code, it's a fun and educational project that blends electronics, coding, and fabrication into an interactive desktop companion.

Keywords:

Air quality monitor;
Environmental sensing;

>>Read more details.

Assistant Based on Grove Vision AI Module V2

By Jaime Andres Rincon Arango

Introduction:

This AI-powered assistant supports physical rehabilitation and health monitoring for elderly users through edge computing and embedded machine learning. It recognizes objects, tracks human movement, and provides interactive exercise guidance using human pose detection and multi-class classification. With expressive OLED facial animations, servo-driven mobility, and cloud-connected analytics, the system offers a versatile, open-source companion for improving well-being through smart interaction and personalized tracking.

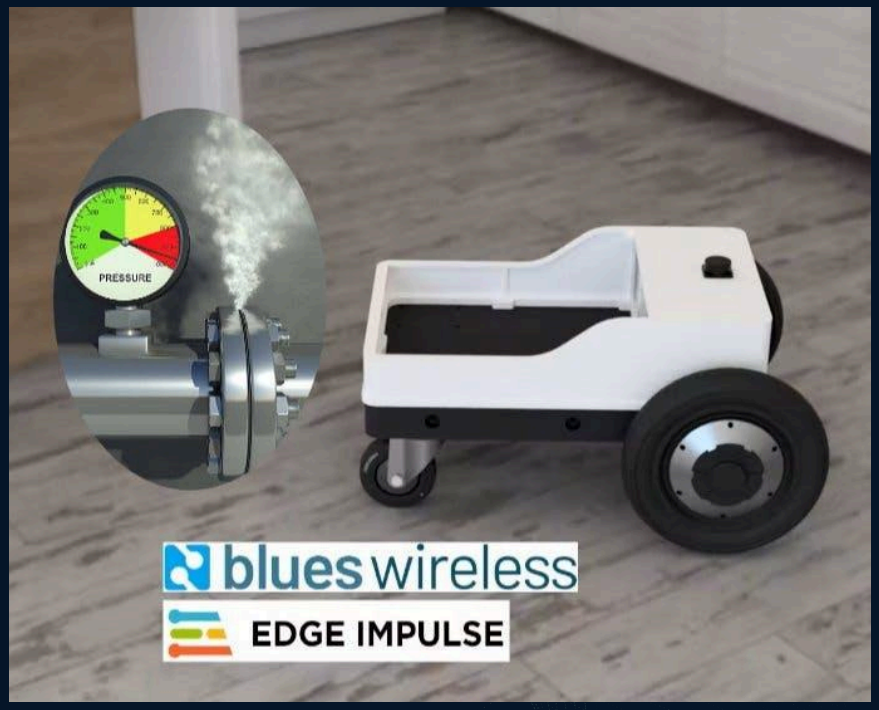
Keywords:

Elderly health monitoring;
AI rehabilitation assistant;

>>Read more details.

Web Browser Operated Robot for Gas Leak Detection

By Ivan Arakistain



Introduction:

This remote-controlled robot repurposes an old hoverboard with BLDC motors and battery to detect hydrogen gas leaks using onboard sensors and Edge Impulse-based machine learning. Powered by the XIAO nRF52840 Sense and connected via Blues Wireless cellular modules, it analyzes air quality in real time and alerts users to anomalies. The project includes full schematics, firmware modification guides, and a web-based interface for live control and monitoring—making it a robust DIY solution for environmental anomaly detection.

Keywords:

Hydrogen gas detection;
Environmental anomaly monitoring;

>>Read more details.

DIY Mini FPV Tank

By techiesms

Introduction:

This 3D-printed FPV tank uses the XIAO ESP32-S3 to deliver smartphone-controlled mobility and real-time video streaming via Wi-Fi. The tutorial walks users through chassis assembly, wiring, and programming, with resources including 3D design files, circuit diagrams, and Arduino-based code. Compact and camera-equipped, the tank offers an engaging entry point into remote-controlled robotics and embedded vision for DIY and IoT enthusiasts.

Keywords:

FPV tank robot;
Smartphone control;

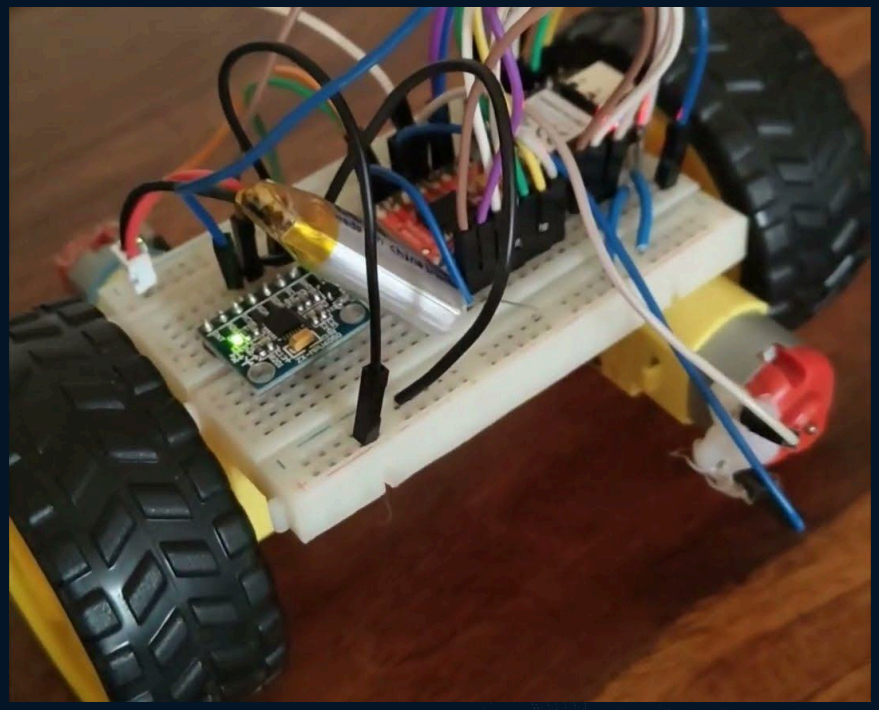
>>Read more details.

Self-Balancing Robot

By Harshith Aradhya

Introduction:

This compact self-balancing robot uses the Seeed Studio XIAO RP2040 to demonstrate real-time stabilization, motor control, and sensor integration. Designed for DIY robotics enthusiasts, it maintains balance while moving using embedded techniques explored in the tutorial. With a short video showcasing its smooth motion dynamics, the project offers a hands-on introduction to embedded systems and control theory in a minimalist form factor.



Keywords:

Motion stabilization;
Embedded systems;
Motor control;

>>Read more details.

TN-24 V2.0: Emotionally Intelligent Desktop Robot

By Nickson Kiprotich

Introduction:

TN-24 V2.0 is a 3D-printed, OLED-faced desktop robot companion that reacts with emotion, wiggles when ignored, and can be remotely controlled through a browser interface. Originally made from cardboard, the new version features a sleek body and enhanced interactivity.

Keywords:

Desktop companion;
Human-robot interaction;

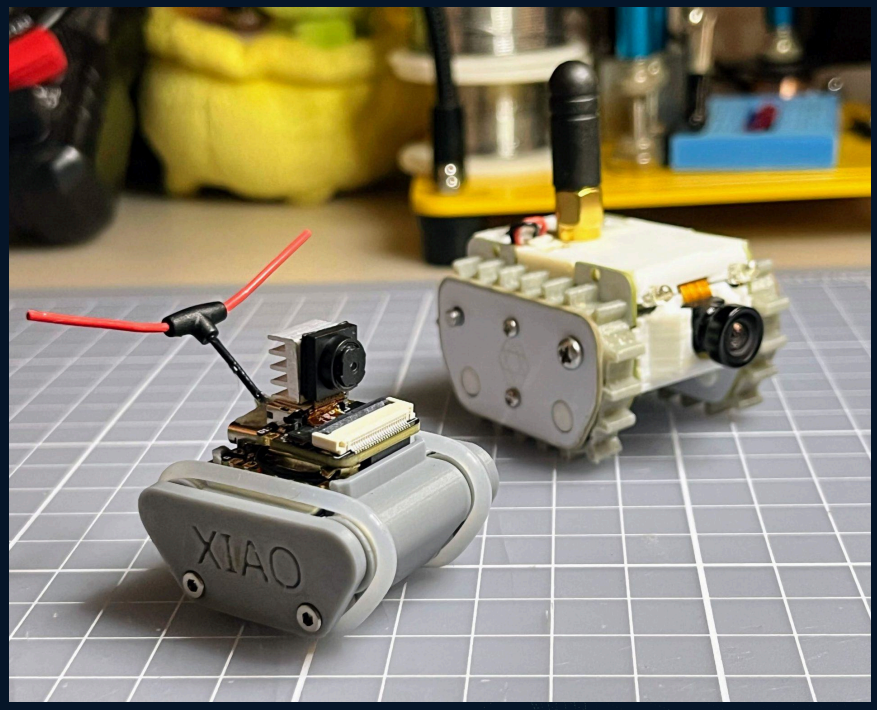
>>Read more details.

XIAO Camera NanoTank

By moononournation

Introduction:

This project showcases how to build a miniature tank powered by the XIAO ESP32-S3 and an external camera module. The robot offers Wi-Fi control and live video streaming capabilities. The tutorial includes detailed build instructions, part sourcing links, and a walkthrough for getting your tank up and running. A great starting point for anyone looking to explore remote-controlled vision robotics.



Keywords:

FPV tank robot;
DIY robotics;

>>Read more details.

3D-Printed Screw-Propelled Robot with Video Feed

By Gokul KB

Introduction:

Inspired by screw-propelled vehicles used in extreme terrain like swamps and snow, this fully 3D-printed design brings the concept to a hobbyist scale. Using minimal components, the robot is easy to build and doesn't rely on complex mechanics like ball bearings. The XIAO ESP32-S3 Sense handles wireless control and real-time video streaming, making it a perfect experiment for terrain exploration.

Keywords:

Screw-propelled robot;
Extreme terrain mobility;

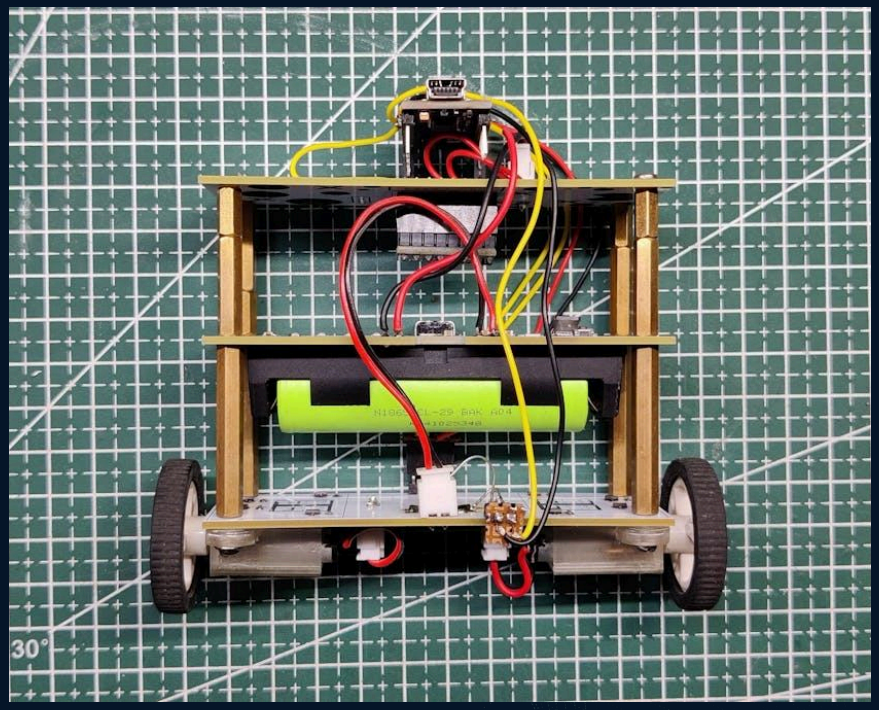
>>Read more details.

Mini Self-Balancing Robot

By Arnov Sharma

Introduction:

This compact self-balancing robot is built on a three-layer architecture: motor control, battery management, and sensing with the XIAO ESP32-C3. It integrates an MPU6050 gyro/accelerometer to maintain balance and uses a 3V gear motor powered by a 3.7V 2200mAh lithium cell with an IP5306 Boost Module. The project is still in development, but it's an excellent example of a minimalist balancing bot setup.



Keywords:

DIY robotics;
Motor control;

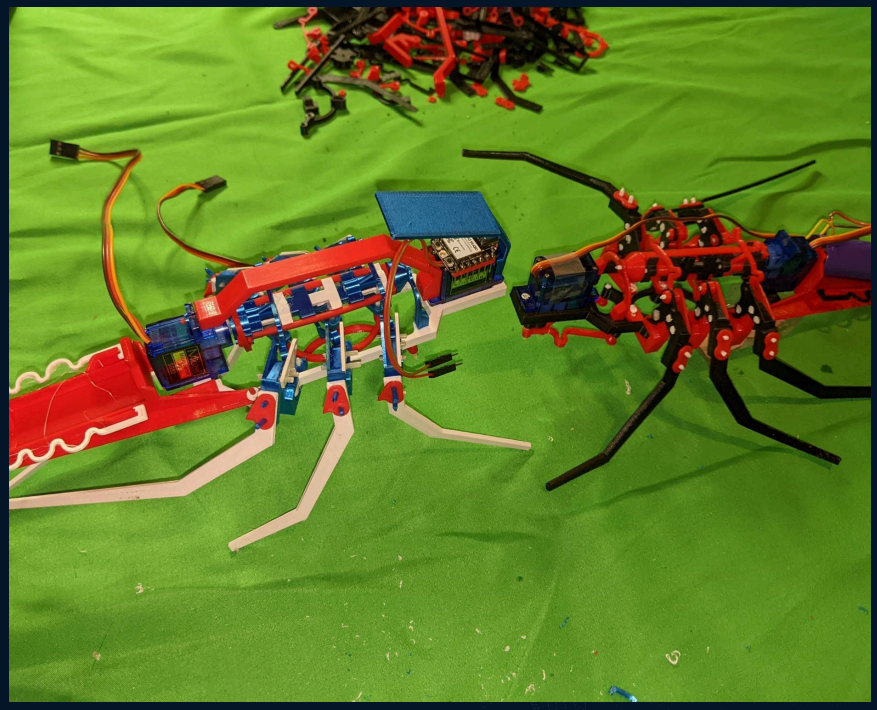
>>Read more details.

Sumo-Style Hexapod Wrestling Robots

By Andrew Benson

Introduction:

This innovative project turns robotics into a game with affordable hexapod robots designed for sumo wrestling. The design emphasizes minimal components and an accessible BOM, making it ideal for beginners. Users can gain hands-on experience in mechanical design, electronics, and programming while engaging in a fun, competitive learning experience.



Keywords:

Hexapod sumo robots;
Mechanical design;

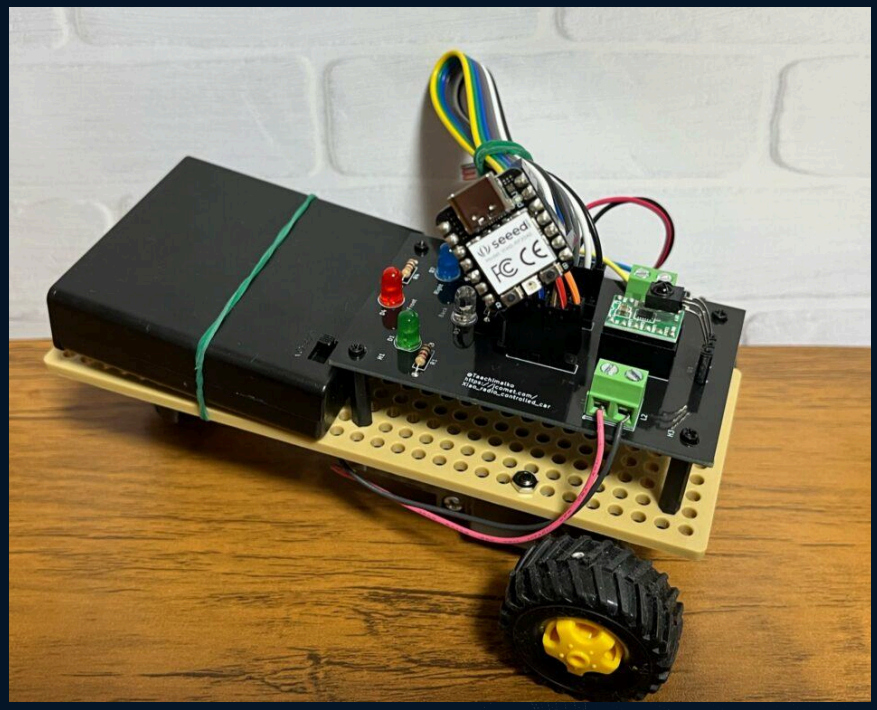
>>Read more details.

Radio-Controlled Cars

By TaachimalKo

Introduction:

This RC car project highlights the wireless capabilities of the XIAO RP2040. Controlled via a smartphone app over Bluetooth, the car includes a custom PCB with a motor driver, voltage regulator, and Bluetooth module—all designed in Eagle. The system delivers responsive control within a 30-meter range, making it a solid reference for mobile robotics and app integration.



Keywords:

Bluetooth RC car;
Mobile robotics;

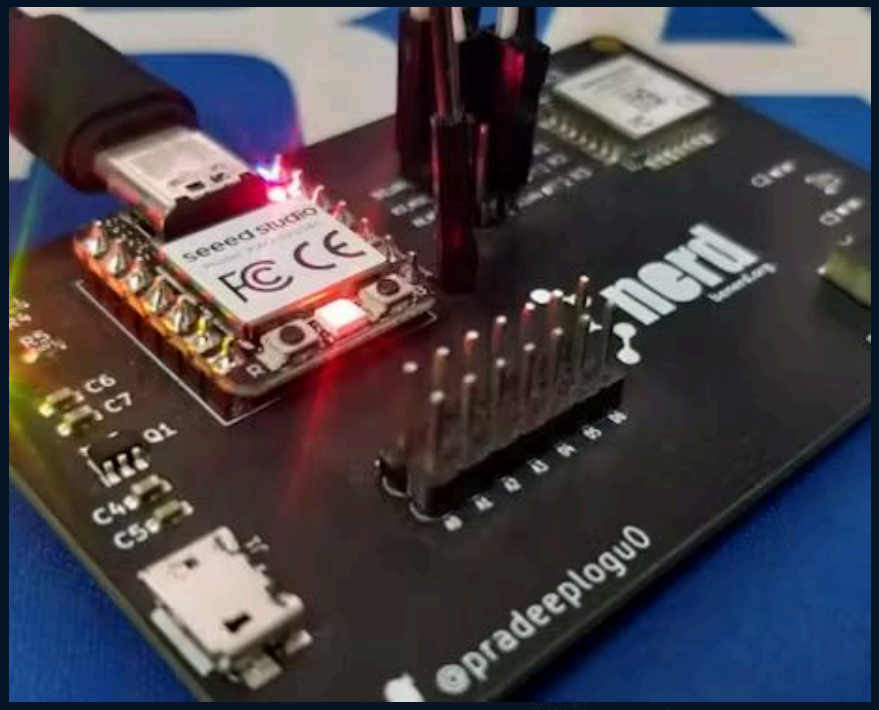
>>Read more details.

Solar PV Monitoring System

By Pradeep

Introduction:

This LoRa®-enabled solar monitoring system uses the XIAO RP2040 to collect photovoltaic data from a wattmeter, BH1750 light sensor, and Grove temperature/humidity sensor. Data is wirelessly transmitted via the Wio-E5 module and uploaded to the Qubitro cloud using a Notecard. Designed with Fusion PCBA, the project showcases a compact, low-power solution for clean energy tracking—ideal for IoT developers exploring sustainable tech and remote sensing.



Keywords:

Smart home;
LoRa® wireless transmission;

>>Read more details.

ESP-DIVE — DIY RC Submarine with FPV Camera

By Max Imagination

Introduction:

This open-source project showcases a fully functional RC submarine powered by the XIAO ESP32-S3 Sense. It features FPV video streaming, wireless charging, and motor control via DRV8833 and servo modules. The build integrates custom PCBs, waterproofing techniques, and a wide array of components including LiPo batteries, sensors, and 3D-printed parts. Designed for underwater exploration, it balances affordability, modularity, and creative engineering.

Keywords:

FPV underwater camera;
Waterproof electronics;

>>Read more details.

Dusk to Dawn Auto Night Lights

By drmpf

Introduction:

This smart lighting system uses a BLE ambient light sensor and BLE-to-BLE bridge to automatically switch lights on at dusk and off at dawn—no internet, GPS, or time zone settings required. Powered by the XIAO ESP32-C3, it's demonstrated in two forms: a retrofit hallway switch and a battery-powered relay for lamps, both offering manual override and over 4 years of battery life. With schematics, setup instructions, and Arduino code included, it's a low-maintenance, privacy-friendly solution for reliable home automation.

Keywords:

BLE ambient light sensor;
Smart home automation;

>>Read more details.

A Smart Lamp That Uses Sleep Cycles to Improve Sleep Quality

By Arpan Mondal

Introduction:

This health-focused smart lamp uses the XIAO ESP32-C3, IR proximity sensor, and WS2813 addressable LEDs to simulate a sunrise effect based on the user's sleep cycle. By estimating sleep onset, it calculates an optimal wake-up time and gradually brightens to align with natural rhythms. Featuring a foam board body with faux wood finish and a repurposed laptop diffuser for soft lighting, the project blends creative fabrication with embedded automation. Full 3D print files, wiring diagrams, and Arduino code make it an accessible build for DIYers exploring wellness tech and ambient design.

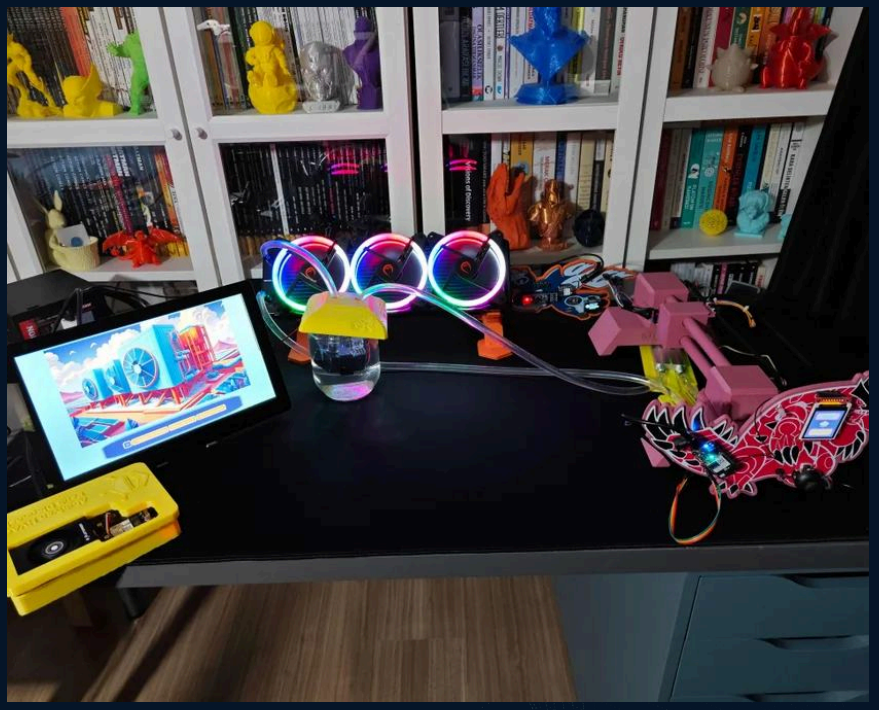
Keywords:

Smart lamp;
Simulated sunrise;

>>Read more details.

AI-driven Sound & Thermal Image-based HVAC Fault Diagnosis

By Kutluhan Aktar



Introduction:

This advanced AIoT system identifies faults in water-based HVAC setups using dual anomaly detection: thermal imaging and sound classification. Powered by a LattePanda Mu compute module and the XIAO ESP32-C6, it integrates the MLX90641 thermal camera, I2S MEMS microphone, and a custom CNC router for component scanning. Models trained via Edge Impulse enable detection of failing fans and thermal irregularities in cooling blocks. A dedicated web dashboard manages data flow, inference, and alerts—delivering a robust, real-time diagnostic solution for industrial-grade HVAC systems.

Keywords:

HVAC fault detection;
AIoT diagnostics;

>>Read more details.

Hollow Clock V

By shiura

Introduction:

Hollow Clock V is a refined 3D-printed timepiece featuring a sleek 7mm-thin ring, ratchet-assisted timekeeping, and crystal oscillator precision powered by either RP2040 or XIAO ESP32-C6. It uses magnet-coupled hands, build plate texturing, and a tool-free slide-off ring for manual adjustment. A worm and bevel gear system driven by a 28BYJ-48 stepper motor delivers compact mechanical elegance. With detailed 3D files, Arduino code (including precompiled binaries), and clear assembly instructions, it's a rewarding build for makers exploring creative mechanical design and embedded precision.

Keywords:

Creative mechanical design;
Crystal oscillator ;

>>Read more details.

Hive Helper

By Timothy Lovett

Introduction:

Hive Helper is a custom PCB-based smart display featuring a 2.9" ePaper screen and multichannel gas and flame sensors, designed to integrate seamlessly with Home Assistant. Powered by the XIAO ESP32-C3 and housed in a sleek 3D-printed enclosure, it monitors temperature, humidity, and air quality with real-time feedback via ESPHome. With Grove I²C/ UART expansion ports and detailed setup instructions—including wiring, enclosure design, and YAML config—it's a reliable, elegant solution for enriching smart home dashboards with local environmental data.

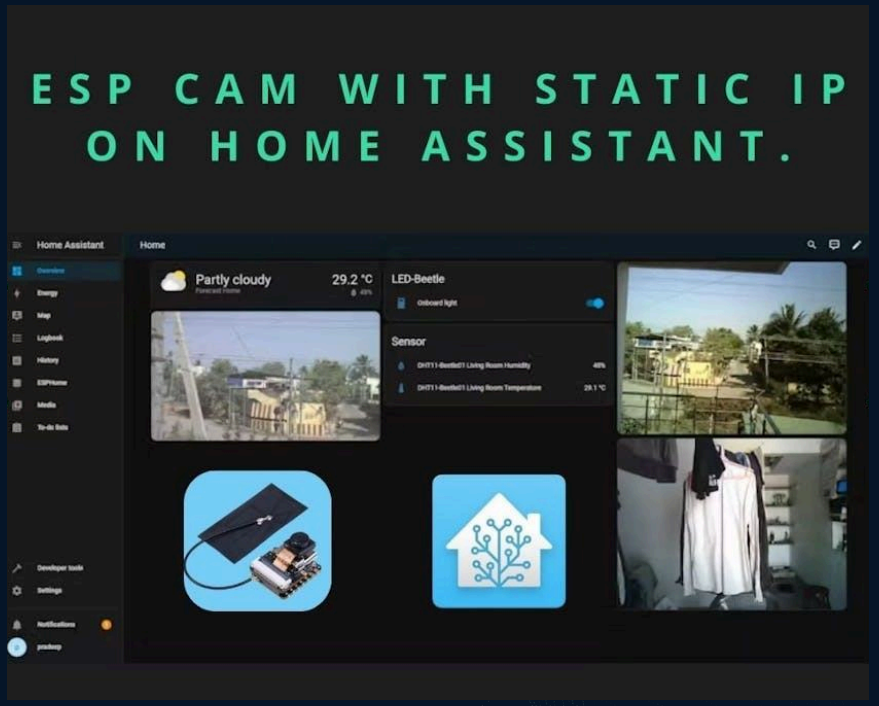
Keywords:

ePaper display;
ESPHome integration;

>>Read more details.

Static IP Address

By Pradeep



Introduction:

This tutorial walks users through assigning a static IP address to the XIAO ESP32-S3 Sense, ensuring consistent access to hosted services and web interfaces on local networks. It covers how to extract current network parameters and modify the Arduino sketch to set static IP, gateway, subnet mask, and DNS. With integration tips for ESP32-CAM streaming, web-based control, and Home Assistant, the project is ideal for DIY smart home and IoT developers seeking dependable device connectivity.

Keywords:

Home Assistant integration;
Web-based control;

>>Read more details.

Sensing Environmental Conditions in My Garden

By Spencer and Yvonne

Introduction:

This smart garden monitor uses the XIAO ESP32-S3, Grove SEN54, and Wio-E5 LoRa module to track soil moisture, air quality, temperature, and humidity in a rooftop setting. Data is transmitted via LoRaWAN to The Things Network and visualized on Datacake through webhook integration. With modular sensor expansion via an I²C hub and AT command-based LoRa configuration, the system offers scalable, low-power environmental monitoring. Developed during a personal internship, it reflects a hands-on commitment to enhancing urban gardening through real-time data insights.

Keywords:

Rooftop garden monitor;
Datacake visualization;

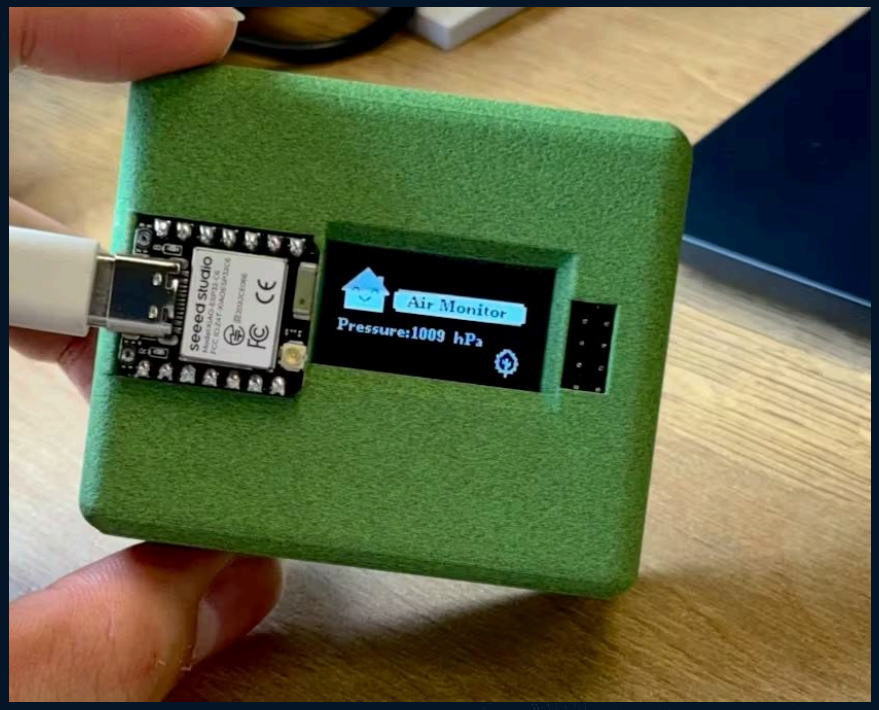
>>Read more details.

DIY Zigbee Air Pressure Sensor

By Jason

Introduction:

This smart atmospheric pressure monitor uses the XIAO ESP32-C6 and Grove BMP280 sensor to deliver live barometric readings and historical trend visualization via Home Assistant. Featuring a custom OLED UI and Zigbee Home Automation integration, the device offers reliable, local sensing with potential for future appliance automation based on pressure thresholds. The tutorial includes circuit diagrams, Arduino code, and Home Assistant configuration—making it a practical and elegant addition to any smart home setup.



Keywords:

Zigbee Home Automation;
Smart home sensing;

>>Read more details.

Smart Room Heater Plug

By Arnov Sharma

Introduction:

This DIY smart plug transforms a conventional room heater into a Wi-Fi-enabled device using the XIAO ESP32-C3 and a custom AC relay driver board. Designed for both winter heating and summer cooling, it features a thermally durable 3D-printed enclosure, isolated 240V-to-5V power conversion, and a compact XIAO Relay Board with an AO3400 MOSFET. A web-based interface allows control from any device, while the tutorial covers PCB design, surface-mount soldering, plug-socket integration, and antenna placement—making it a robust blueprint for practical home automation.

Keywords:

Wi-Fi control;
mart heater;

>>Read more details.

Temperature Prediction using a TinyML LSTM model

By MJRoBot (Marcelo Rovai)

Introduction:

This project uses a TinyML LSTM model to forecast one-hour-ahead temperatures based on 14 years of historical weather data from Lo Barnechea, Chile. The data is preprocessed in Python, and the model is trained in TensorFlow, converted with TFLite, and deployed onto a XIAO ESP32-S3 using the Edge Impulse Python SDK. Emphasizing sequence learning for time-series data, the tutorial covers everything from data collection and model design to optimization, deployment, and inference testing—making it a compelling example of embedded AI for environmental forecasting.

Keywords:

TinyML temperature prediction;
LSTM time-series model;

>>Read more details.

Tiny Internet Clock

By Gokul KB

Introduction:

This beginner-friendly project builds a compact internet-connected clock using the XIAO ESP32-C3 and a 0.91" OLED display. It fetches real-time data from NTP servers over Wi-Fi and updates the time every second. Housed in a sleek 3D-printed enclosure designed in Fusion 360, the build includes step-by-step guidance on modeling, printing, wiring, and Arduino code setup—covering Wi-Fi credentials, GMT offset, and display handling. It's a great introduction to embedded UI design and network-based timekeeping.

Keywords:

NTP time sync;
Wi-Fi timekeeping;

>>Read more details.

Programmable Mist Makers

By David Yang

Introduction:

This open-source project turns recycled containers and a custom PCB into a programmable ultrasonic mist maker using the XIAO ESP32-C6 and a piezoelectric disc. Developed for the Open Hardware Summit 2025, it showcases mist generation via high-frequency vibration and highlights key subsystems like tapped-inductor voltage amplification, PWM control, and safe battery or USB-powered operation. With detailed circuit design, prototyping steps, and custom Arduino libraries, it introduces mist as a novel medium for artistic expression, ambient effects, and IoT experimentation.

Keywords:

Ultrasonic mist maker;
Recycled container;

>>Read more details.

DIY Flap Clock

By drtonis

Introduction:

Inspired by the Vestaboard, this project features a Wi-Fi-connected mechanical flap display built using 3D-printed components, stepper motors, and wooden panels. The XIAO ESP32-C3 handles network connectivity and real-time updates, creating a unique smart display for home decor.

Keywords:

Wi-Fi smart decor;
Vestaboard,;

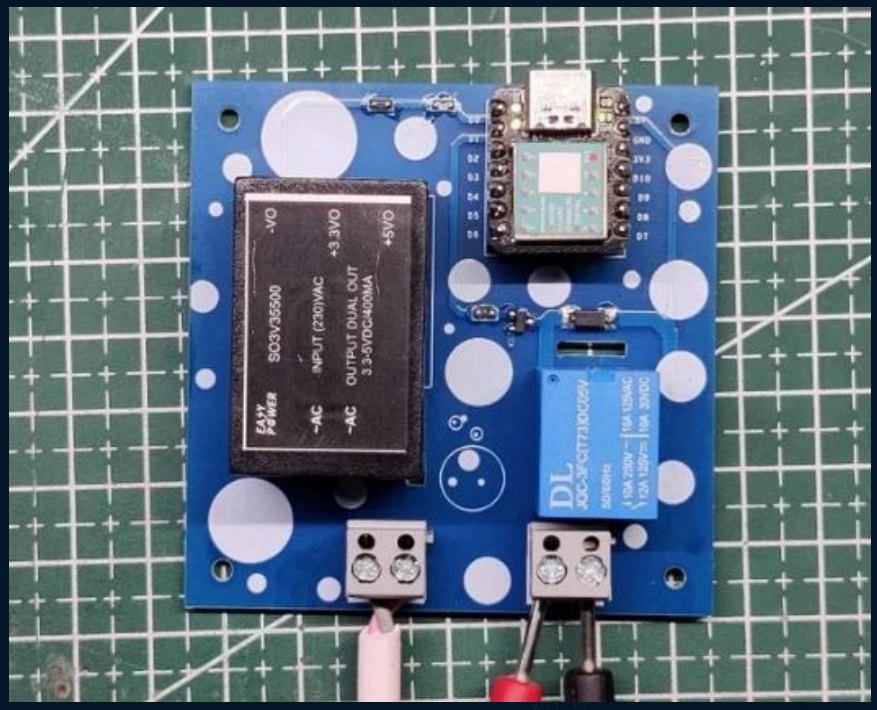
>>Read more details.

Home Automation Board

By Arnov Sharma

Introduction:

This custom PCB-based home automation board uses a single SPDT relay, an isolated power supply, and XIAO SAMD21 to control smart loads. It supports all XIAO variants, including ESP32C3 and ESP32S3, and is ideal for modular and scalable smart home setups.



Keywords:

Home automation;
Isolated power supply;

>>Read more details.

TachoStats PC Hardware Performance Monitor

By Tallman Labs

Introduction:

Built with the round display for XIAO and a capacitive touch controller, this stylish PC hardware monitor fits neatly into a 3D-printed enclosure. It's an elegant way to visualize real-time system stats on your desk.

Keywords:

Round display;
Capacitive touch controller;

>>Read more details.

PhatStats PC Performance TFT Display

By Tallman Labs

Introduction:

PhatStats is a smart monitor for GPU stats. It pulls data via serial from a PC and displays it on an ILI9341 TFT display. It's ideal for DIYers wanting custom dashboards on dedicated microcontroller displays.

Keywords:

GPU performance monitor;

>>Read more details.

Gas/Smoke Detector, Alarm System With Real-Time Leakage Monitoring

By technolab creation

Introduction:

This compact safety device leverages an MQ-02 gas sensor and the XIAO RP2040 to detect leaks and trigger alarms. It offers real-time monitoring in a small footprint, ideal for kitchens, garages, or workshops

Keywords:

DIY home safety;
Gas leak detector;

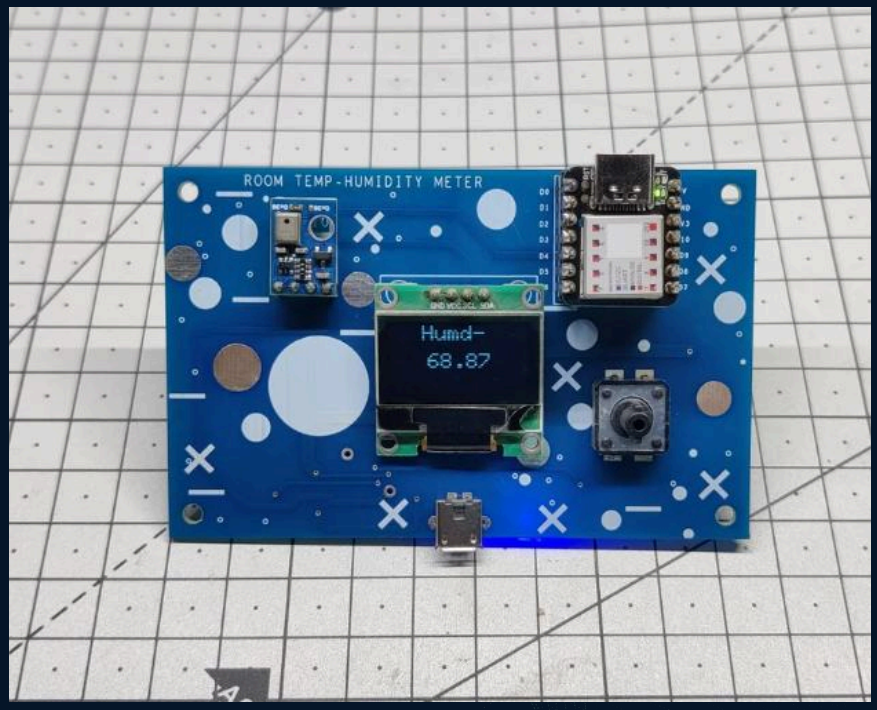
>>Read more details.

Room Temperature and Humidity Meter

By Arnov Sharma

Introduction:

A room temperature and humidity meter that measures current room temperature and humidity and displays the readings on an SSD1306 OLED Screen. AHT10 is being used here to get the Temperature and humidity data, and the whole setup is driven by an XIAO SAMD21. This whole meter is powered through the onboard 18650 lithium Cell through a power management IC Setup that boosts the 3.7V of the lithium Cell to 5V for the MCU, display, and sensor to work.



Keywords:

Portable environmental sensing;
DIY electronics;

>>Read more details.

6-Channel Temperature Meter

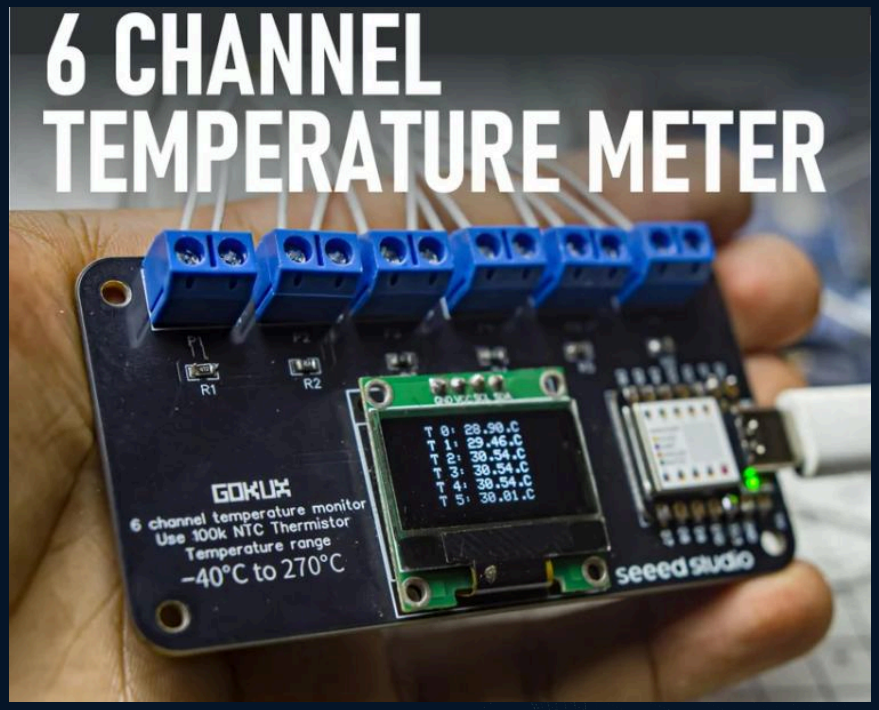
By Gokul KB

Introduction:

Designed as a cost-effective thermal camera alternative, this monitor uses NTC thermistors and an OLED to display temperatures from six different points—perfect for labs or experimental setups.

Keywords:

Temperature monitor;



>>Read more details.

XIAO Power Meter with INA219

By Gokul KB

Introduction:

This micro power meter uses the INA219 sensor to measure current and voltage over I2C. The XIAO's size and simplicity make it ideal for embedding in low-power, high-accuracy monitoring setups.

Keywords:

Energy monitoring;
LED Lights;

>>Read more details.

Automate Lighting Using Relay and Zigbee

By Keliang Zhang

Introduction:

Add seamless Zigbee lighting control to your smart home with this sleek setup powered by the XIAO ESP32-C6. Paired with a Grove relay and integrated into Home Assistant, it lets you wirelessly toggle an LED strip from your browser. Housed in a custom 3D-printed enclosure and optimized for low power consumption, this compact build blends smart functionality with modern DIY design.

Keywords:

Zigbee lighting control;
Home Assistant integration;

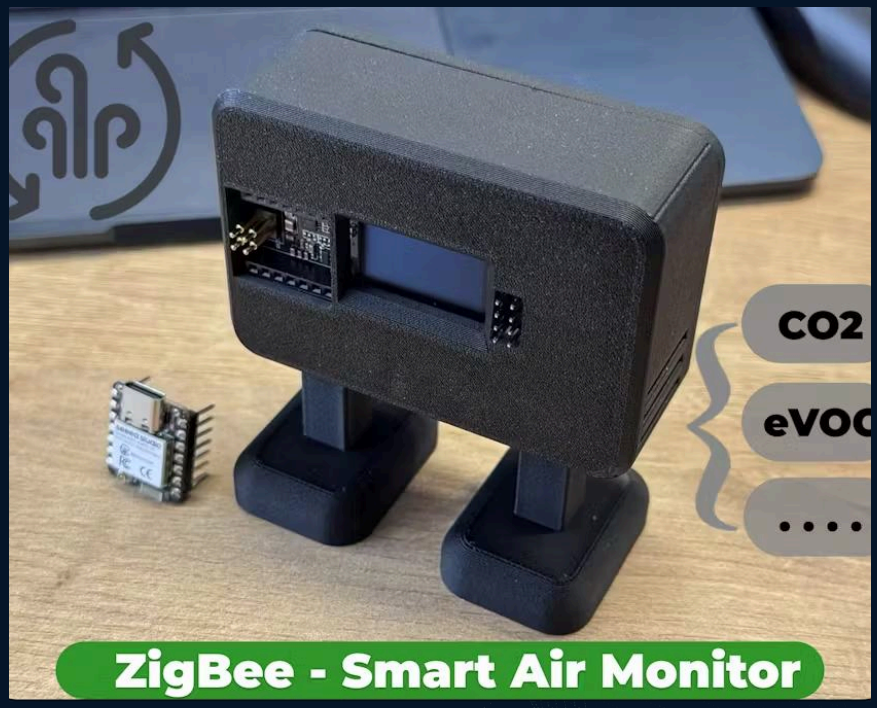
>>Read more details.

Easy DIY Zigbee Smart Air Monitor

By Jason

Introduction:

Monitor your indoor air like a pro with this DIY Zigbee Smart Air Monitor powered by the XIAO ESP32-C6. Packed into a stylish robot-inspired shell, it tracks CO_2 and TVOC levels using the Grove SGP30 sensor and seamlessly integrates with Home Assistant for real-time and historical data display. With low power consumption, sleek OLED readouts, and a custom PCB, it's an ideal project for smart home enthusiasts who value both function and aesthetics.



Keywords:

Zigbee air monitor;
OLED display;

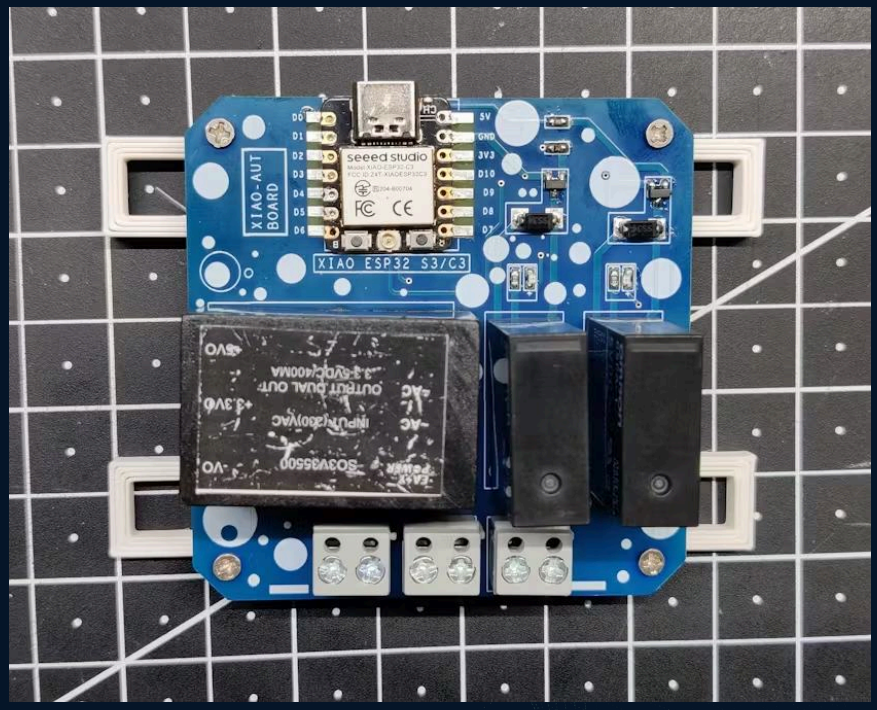
>>Read more details.

Home Automation Shield

By Arnov Sharma

Introduction:

Control your home appliances like a pro with this dual-relay automation shield built for the Seeed XIAO ESP32 C3/S3. Featuring onboard AC-to-DC power conversion, Wi-Fi connectivity, and an intuitive web interface, it allows you to toggle two AC or DC devices straight from your browser. With custom PCBs, a compact 3D-printed stand, and support for both SMD and THT components, it's a robust DIY solution for smart living.



Keywords:

Web interface;
Smart home DIY;

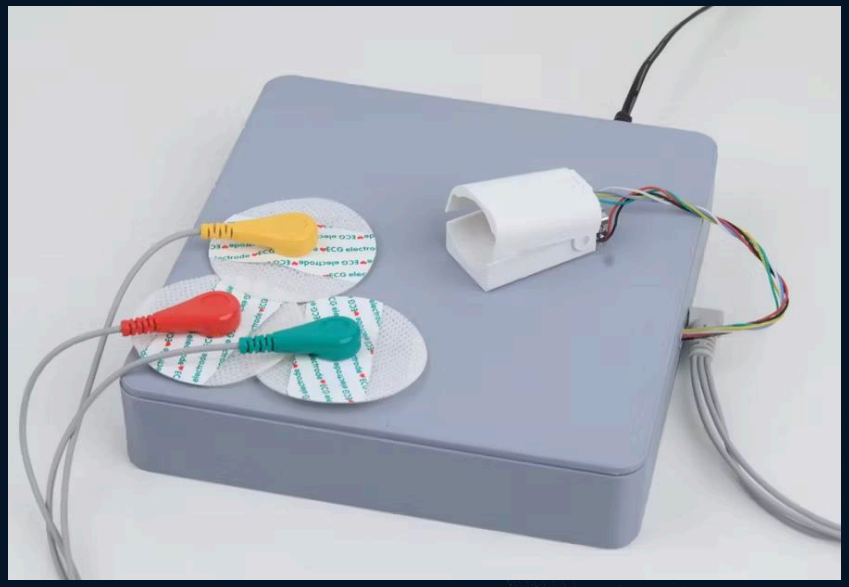
>>Read more details.

Internet Connected Patient Monitoring with Cellular IoT

By Arun Varghese

Introduction:

This advanced patient monitoring system combines an STM32 microcontroller with SpO_2, ECG, and temperature sensors to transmit real-time vitals via cellular IoT. A finger probe powered by the XIAO nRF52840 Sense runs a TinyML model for motion anomaly detection, enabling gesture-based alerts. With RTOS for stable operation and a Blues Notecard for secure cloud transmission to KaaIoT and visualization via Notehub, the system supports remote decision-making and nurse assistance—making it a powerful prototype for connected healthcare.



Keywords:

Blues Notecard;
TinyML;

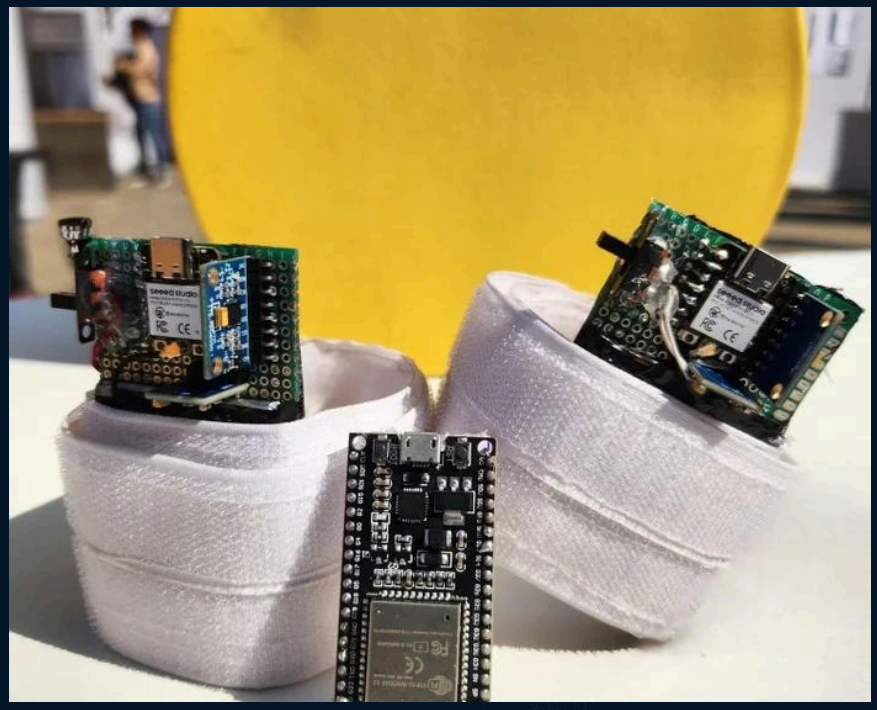
>>Read more details.

MotionSpike: Wearable Game-Controlled

By TECH TRONICS

Introduction:

MotionSpike is a dual-player wearable system that merges movement-based gameplay with biometric tracking for fitness, therapy, and education. Each wristband uses MPU6050 and MAX30102 sensors to collect motion, heart rate, and SpO_2 data, transmitting it via UDP Wi-Fi to an ESP32 hub for dashboard visualization and game interaction. Housed in custom 3D-printed enclosures and powered by Python-based gesture detection, the system delivers real-time feedback and supports interactive rehabilitation and activity-based learning.



Keywords:

Real-time activity feedback;
Fitness & therapy tech;

>>Read more details.

Spira — a Pocket-Friendly Spirometer

By Jaagrav Seal

Introduction:

Spira is a compact, smart spirometer designed to help users consistently exercise their lungs. Built around the XIAO MG24 Sense and a differential pressure sensor (MPX10DP), it features a custom 3D-printed casing for portability, a low-pass filter to reduce ADC noise, and a power circuit that supports battery charging even when powered off. A companion SwiftUI iOS app (in development) will offer BLE connectivity, reminders, and gamified breathing exercises—making Spira a sleek and functional wellness tool for respiratory health.

Keywords:

Lung exercise tracker;
SwiftUI iOS app;

>>Read more details.

Servo Shoulder Support (Partial Exoskeleton)

By Markus Opitz

Introduction:

This wearable exoskeleton helps elderly users with limited shoulder mobility by interpreting hand movements via a BLE-enabled wrist unit powered by the XIAO nRF52840 Sense. A 40kg servo lifts the arm through a fully 3D-printed mechanical structure featuring a ball bearing-supported servo arm and adjustable neck brace. The ESP32-based main control unit, equipped with dual buck converters, manages power delivery from an 18V battery pack. Designed for autonomous wearing, the system offers practical movement support through modular assembly of the servo, hinge, shoulder rest, and battery case.

Keywords:

Shoulder exoskeleton;
Elderly mobility aid;

>>Read more details.

Robot Arm, Like a Doctor

By Jaime Andres Rincon Arango

Introduction:

This proof-of-concept project integrates the myPalletizer robotic arm with biosignal monitoring tools to enable remote medical check-ups. Using pre-programmed movements, the arm captures PPG and phonocardiography signals via a heart rate sensor and a modified digital stethoscope, both powered by XIAO microcontrollers. Data is visualized on the reTerminal and securely stored in AWS DynamoDB for remote access and analysis. A PyBullet-based teleoperation simulator showcases future remote control capabilities, laying the foundation for autonomous eHealth systems with planned ECG and blood pressure integration.

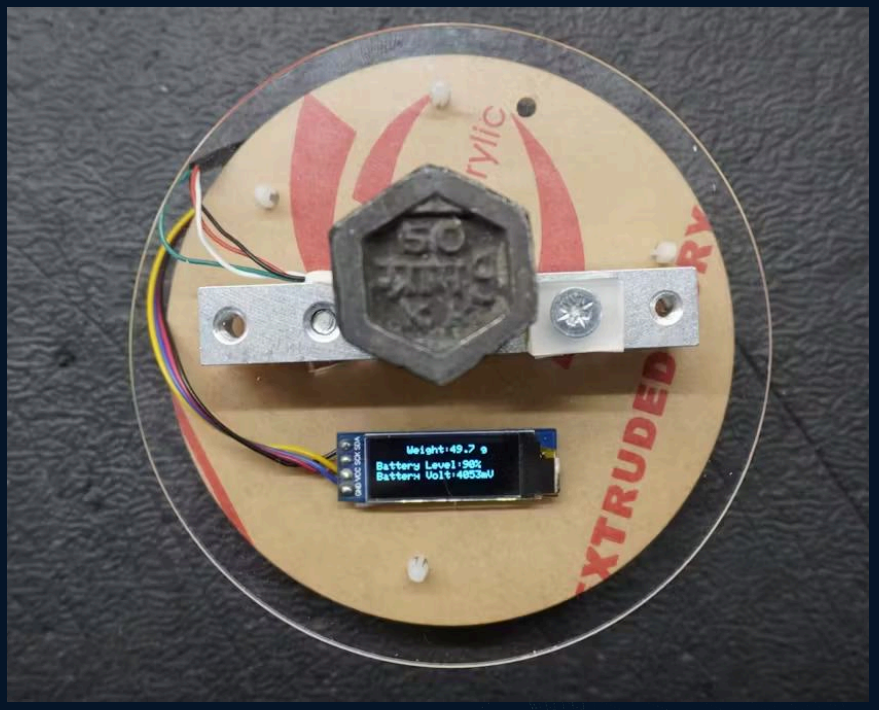
Keywords:

Robotic medical check-up;
myPalletizer arm;

>>Read more details.

Portable Weighing Scale with Battery Indicator

By vinay y.n



Introduction:

This compact digital weighing scale combines the HX711 load cell amplifier and BQ27441 fuel gauge to deliver precise weight readings and real-time battery status on a 0.91" OLED screen. Powered by the XIAO ESP32-C3's internal charging system, it eliminates external circuitry while enabling BLE/Wi-Fi expansion. The custom PCB supports easy load cell swapping for different weight ranges and integrates charging, switching, and status indicators—making it a versatile, portable tool for makers and field use. Step-by-step instructions guide users through PCB design, calibration, and Arduino code setup.

Keywords:

OLED display;
Load cell swapping;

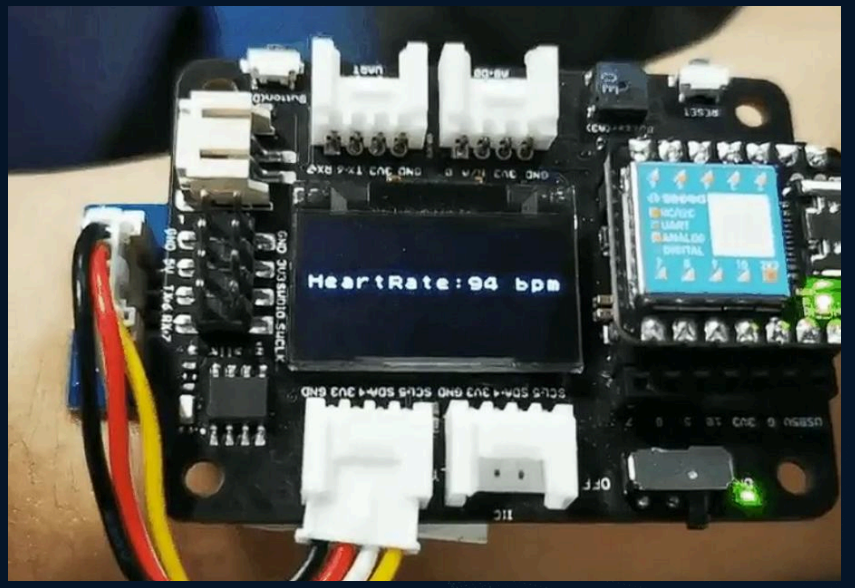
>>Read more details.

Seeed Studio XIAO Expansion Board – Heart Rate

By SeeedStudio

Introduction:

This beginner-friendly heart rate monitor uses the Seeed Studio XIAO Expansion Board and its expansion board to measure pulse via a Grove finger-clip sensor. With an I²C interface for minimal wiring and an SSD1306 OLED screen driven by the U8g2 library, it displays BPM values in real time. Built using the Arduino IDE, the project includes clear instructions for hardware setup, library installation, and working code—making it an ideal entry point for health-focused DIY electronics and sensor integration.



Keywords:

DIY health electronics;
Heart rate monitor;

>>Read more details.

Assistant Based On Grove Vision AI Module V2

By Jaime Andres Rincon Arango

Introduction:

This compact companion robot leverages Edge AI and human pose detection to support elderly users with physical rehabilitation and health tracking. Built around the Grove Vision AI V2 and XIAO SAMD21, it controls 12 servo motors for expressive movement, displays animated feedback on an OLED screen, and classifies hand gestures and exercises using a trained ML model. Data is processed locally or transmitted via ESP32 to a cloud server for further analysis. The system also enables gesture detection, food/object recognition, and remote model updates via a Flask-based web server and Intel Neural Compute Sticks—making it a versatile platform for autonomous eHealth applications.

Keywords:

Human pose detection;
Companion rehab robot;

>>Read more details.

Personal Trainer Using TinyML

By Ricardo Magno

Introduction:

This wearable fitness tracker uses a dumbbell-mounted XIAO nRF52840 Sense with built-in IMU to identify gym exercises like biceps curls, bench presses, and lateral raises. Motion data is transmitted via BLE to an Android app and processed using a Dense Neural Network trained through Edge Impulse, achieving ~85% classification accuracy. Housed in a 3D-printed case with battery support, the system offers real-time exercise visualization and feedback—making it a powerful tool for smart workouts, form tracking, and personalized training.

Keywords:

TinyML personal trainer;
Real-time fitness feedback;

>>Read more details.

Cyberpunk Mask

By r Lintey

Introduction:

This DIY wearable merges futuristic aesthetics with functional air quality monitoring, built into a modified 3M mask. Powered by a XIAO microcontroller, it uses a Grove air sensor to detect pollution levels and dynamically adjusts RGB lighting, servo-actuated vents, and a fan for responsive airflow control. A relay and servo system open/close vents based on sensor input, while a laser-cut enclosure houses the electronics. Running on custom Arduino code, the mask delivers real-time feedback through color-coded alerts—making it a striking blend of style and environmental awareness.

Keywords:

RGB lighting control;
Servo-actuated vents;

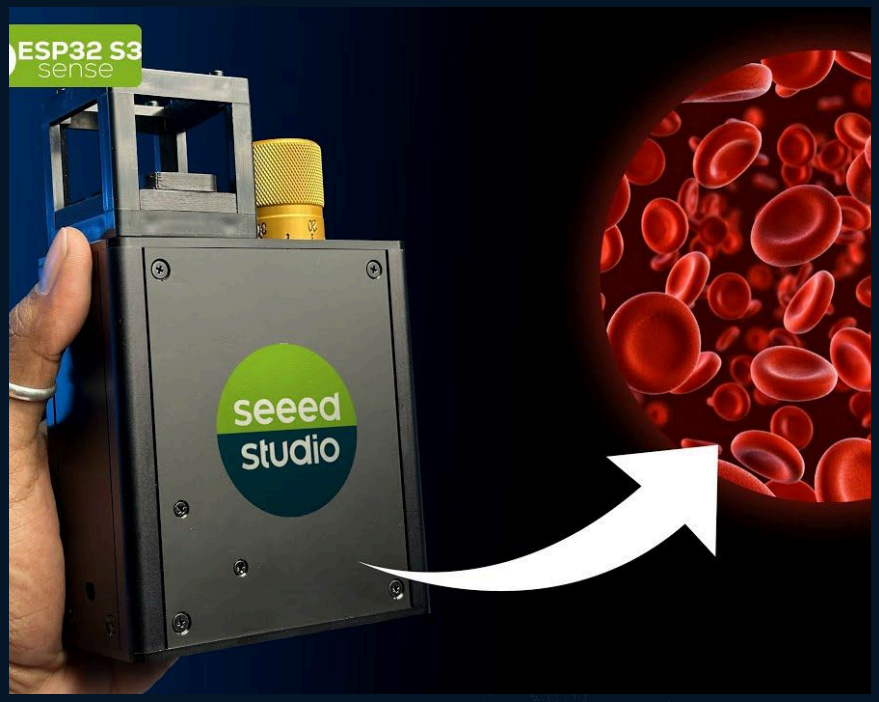
>>Read more details.

AI Microscope for Real-Time Sample Analysis

By techiesms

Introduction:

This open-source AI microscope combines the XIAO ESP32-S3 Sense with real-time image recognition to create a compact, low-cost diagnostic tool. Designed by OpenUC2 and Seeed Studio, it can analyze blood cells, microplastics, and biological samples using embedded AI inference. Its modular architecture supports customization and upgrades, making it ideal for classrooms, makerspaces, and research labs. By merging IoT and computer vision, the project showcases how accessible hardware can democratize scientific imaging and empower hands-on learning in diagnostics and microscopy.



Keywords:

Blood cell & microplastic analysis;
IoT diagnostics;

>>Read more details.

Wireless Heartbeat Monitor

By Tiago Santos

Introduction:

This wearable heart rate monitor uses the XIAO nRF52840 and a pulse sensor to collect heartbeat data and transmit it wirelessly via Bluetooth. Designed for fitness tracking and sleep monitoring, it sends real-time BPM readings to a nearby receiver with an OLED display. Its compact form factor and BLE connectivity make it ideal for low-power, on-body health applications, offering a simple yet effective solution for continuous heart health awareness.

Keywords:

OLED BPM display;
Fitness tracking;

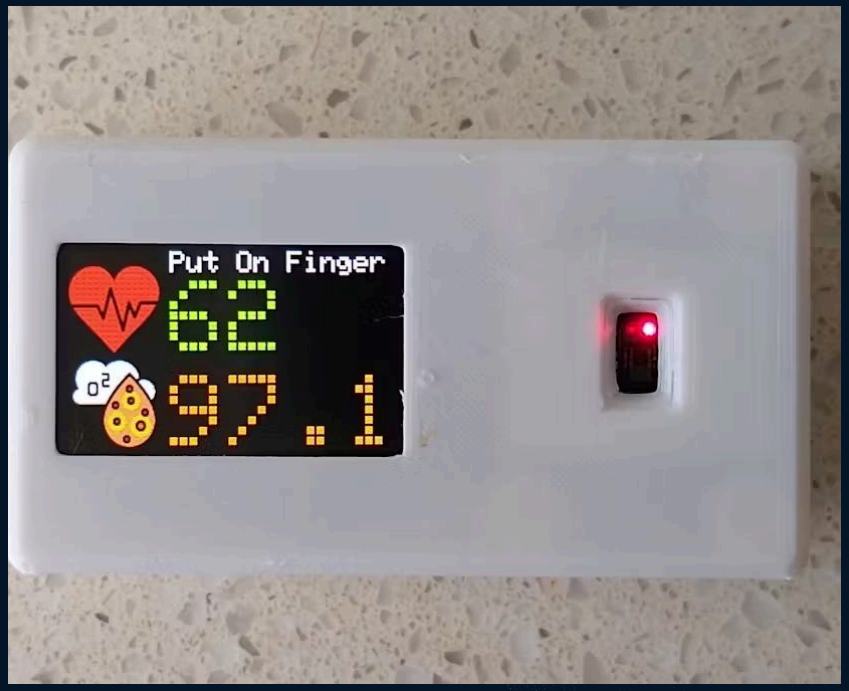
>>Read more details.

Blood Oxygen & Heart Rate Meter

By John Bradnam

Introduction:

Using a pulse oximeter sensor, OLED display, and the XIAO SAMD21, this non-invasive device measures both SpO_2 and heart rate to monitor overall health. It's ideal for respiratory tracking, exercise recovery, or early illness detection. A mobile app syncs with the device for remote viewing and data logging. This compact tool is a great example of accessible, real-time health monitoring.



Keywords:

Pulse oximeter sensor;
OLED display;

>>Read more details.

XIAO 2-Channel Wi-Fi AC Energy Meter

By CNX Software

Introduction:

The XIAO 2-Channel Wi-Fi AC Energy Meter (XIAO-2CH-EM) is a pre-calibrated, plug-and-play solution for accurate AC energy monitoring. Built around the XIAO ESP32-C6, it uses non-invasive CT clamps to track bi-directional current flow—ideal for EV charging, solar generation, or whole-home usage. With built-in ESPHome support, real-time telemetry, and Home Assistant auto-discovery, it delivers up to 40A current tracking without rewiring. STL files for its enclosure and open-source configs make it highly customizable, offering a reliable alternative to DIY ESP32+PZEM setups or cloud-dependent power rings.

Keywords:

ESPHome integration;
DIY power monitoring;

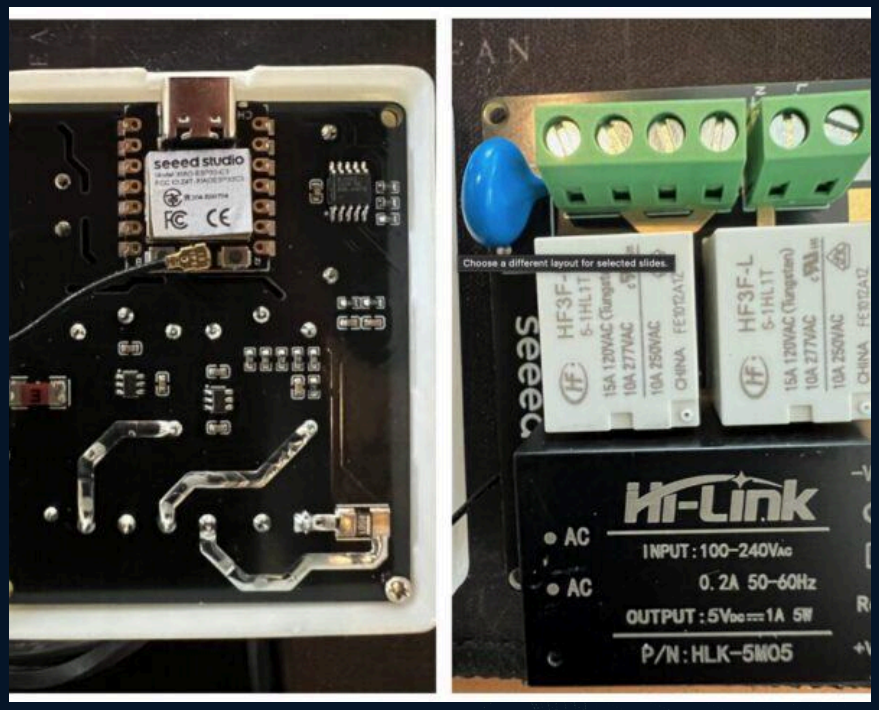
>>Read more details.

Seeed Studio 2-Channel Wi-Fi AC Relay

By CNX Software

Introduction:

The Seeed Studio 2-Channel Wi-Fi AC Relay is a no-code smart switch designed for seamless Home Assistant integration via ESPHome. Featuring two independently controllable AC channels and built-in power metering, it comes pre-flashed for instant setup. In a hands-on review by CNX Software, the device was tested for smart light automation using an Aqara Cube and praised for its reliable dual relay operation, OTA update support, and intuitive web dashboard. While it lacks per-channel energy tracking, its all-in-one design and native Wi-Fi connectivity make it a robust, ready-to-use solution for smart home control.



Keywords:

ESPHome pre-flashed;
Home Assistant integration;

>>Read more details.

Solar Power Gauge

By Ben Krejci

Introduction:

This project builds a real-time solar output dial using an automotive stepper gauge, XIAO ESP32-C3, and L293D H-Bridge Driver. It shows current kW generation in a custom 3D-printed enclosure, calibrated via ESPHome with a reset script to combat motor drift. The tutorial offers printable files, config setup, and Home Assistant integration, ideal for smart energy monitoring.

Keywords:

Solar output dial;
Home Assistant integration;

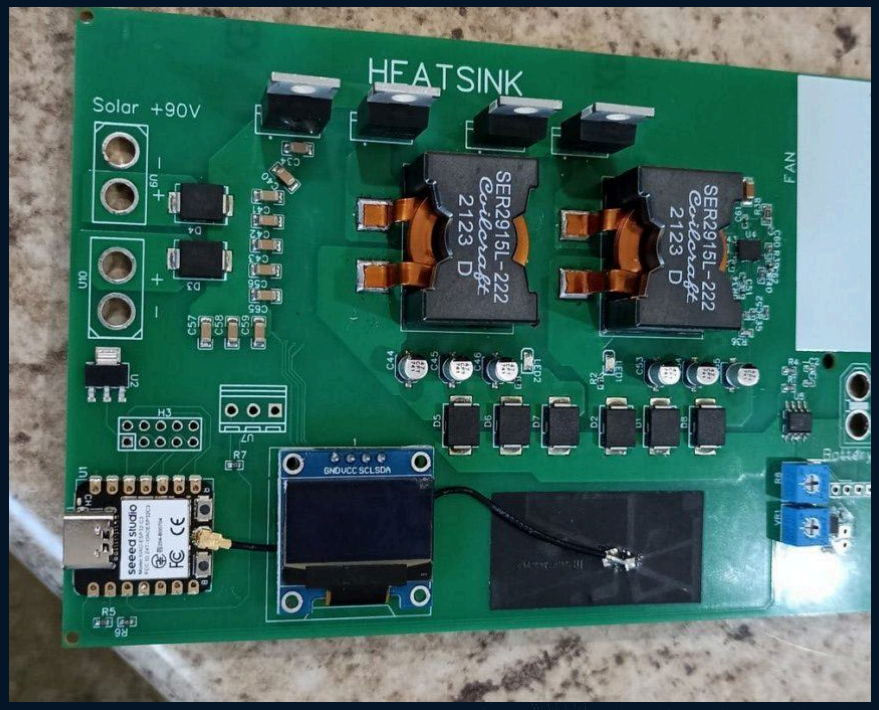
>>Read more details.

Solar Charge Controller

By Dieter

Introduction:

An open-source upgrade to traditional PWM charge controllers, this solar charge controller features dual synchronous buck converters for high-efficiency power handling. It supports input voltages up to 90V and displays performance metrics on a 128×64 OLED screen. The XIAO ESP32-C3 handles data acquisition and control logic, making the design ideal for custom solar systems.



Keywords:

Solar charge controller;
Smart energy management;

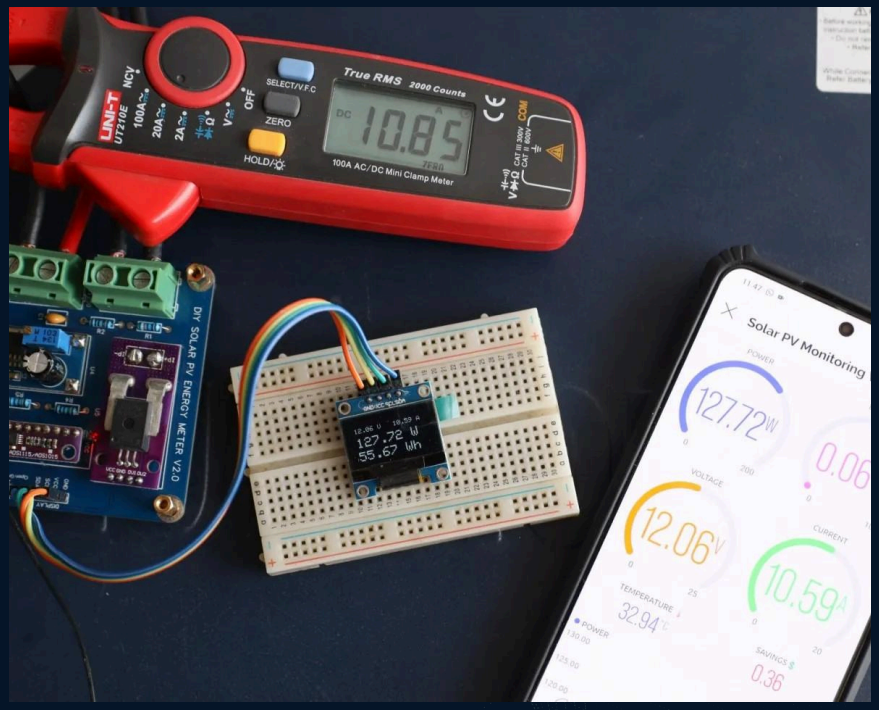
>>Read more details.

DIY Solar Panel Monitoring System

By Open Green Energy

Introduction:

Monitor your solar PV system with this versatile DIY solution. It tracks voltage, current, temperature, and energy generation, helping optimize output and detect system inefficiencies. The XIAO ESP32-C3 enables real-time data collection and transmission, while Grove sensors simplify environmental input monitoring. Ideal for beginners and solar enthusiasts alike.



Keywords:

Solar PV monitoring;
DIY solution;

>>Read more details.

Li-ion Cell Charger

By Arnov Sharma

Introduction:

This DIY Li-ion charging system combines the TP4056 charging IC with the XIAO ESP32-S3 to monitor battery voltage in real time via an SSD1306 OLED screen. A voltage divider circuit enables analog pin readings, while a DC-DC buck converter delivers a stable 5V output from a 12V input. The custom PCB supports a standard 18650 battery holder, manual power switching, and USB ports for powering external devices. With step-by-step instructions covering PCB fabrication, 3D-printed housing, and voltage calculations, the project offers a compact, functional solution for battery management and portable power delivery.

Keywords:

USB power output;
Real-time voltage monitoring;

>>Read more details.

DIY Smart Multipurpose Battery Tester

By Open Green Energy

Introduction:

This compact battery tester uses the XIAO ESP32-C3 to charge, discharge, and analyze lithium-ion cells, including internal resistance testing. It features a dedicated charging circuit, current sensing, OLED display, and a standard battery holder—all housed in a custom PCB. With four testing modes and remote monitoring via Wi-Fi, the system provides real-time insights into battery health and capacity. The tutorial covers PCB assembly, firmware programming, and safety precautions, making it a practical tool for makers, repair technicians, and energy enthusiasts.

Keywords:

OLED display;
Current sensing circuit;

>>Read more details.

Real-Life Pokédex with AI Voice & Vision Recognition

By abe's projects

Introduction:

This imaginative build turns a childhood fantasy into a working gadget by combining computer vision, AI voice cloning, and custom 3D printing. Powered by the XIAO ESP32-S3 Sense, the device uses its onboard camera to identify physical Pokémon toys and responds with synthesized narration in classic Pokédex style. The project showcases embedded AI's potential for interactive storytelling and nostalgic tech, blending real-time inference with playful design. While not flawless, it's a standout example of how microcontrollers can bring fictional interfaces to life.

Keywords:

AI voice cloning;
Computer vision;

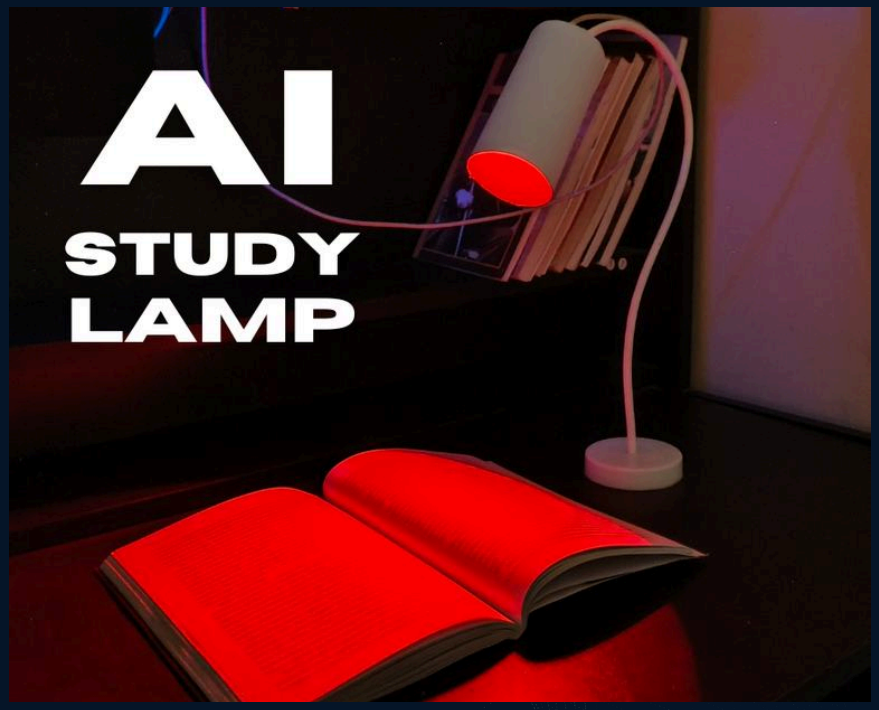
>>Read more details.

AI Study Lamp That Helps You Reduce Distractions

By Arpan Mondal

Introduction:

This smart study lamp uses a Grove Vision AI module trained to detect smartphones, helping users stay focused by reacting to distractions in real time. When a phone enters the camera's view, the lamp shifts from warm white to deep red using a WS2812B LED strip—signaling the user to refocus. Controlled by a XIAO ESP32-S3, the system reverts to warm lighting once the distraction is removed. The build includes step-by-step guidance for AI model training, Arduino programming, LED integration, and custom lamp assembly, making it a creative blend of ambient tech and behavioral nudging.



Keywords:

Grove Vision AI module;
Smartphone distraction detection;

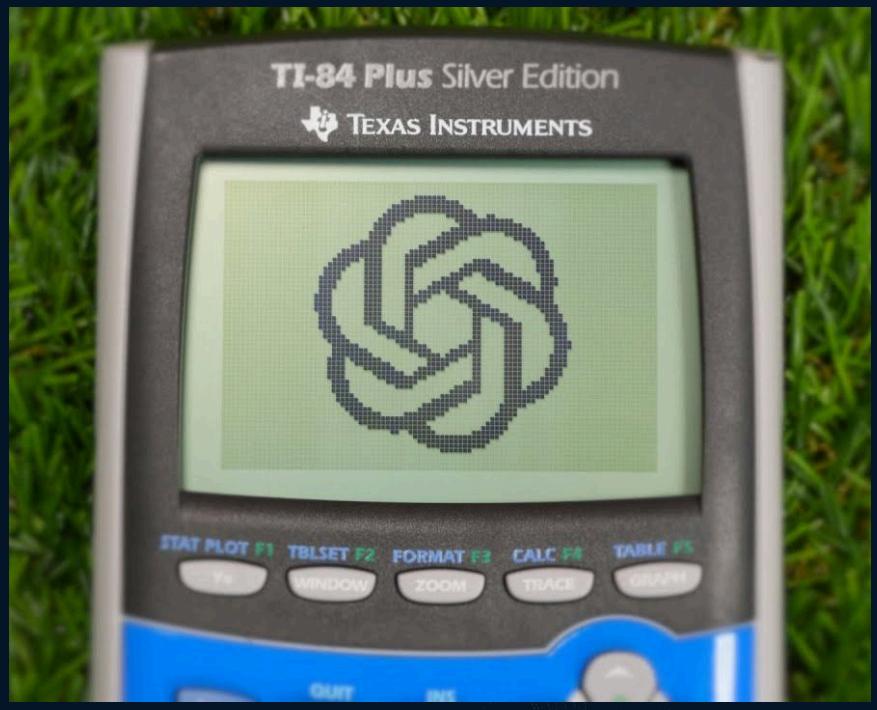
>>Read more details.

The Ultimate Cheating Device

By ChromaLock

Introduction:

This satirical DIY mod transforms a standard TI-84 calculator into a covert test-day assistant by embedding a XIAO ESP32-C3 microcontroller and connecting it to the internet. Dubbed the “TI-32,” the project bypasses anti-cheating mechanisms and enables access to AI tools like ChatGPT, turning the calculator into a stealthy knowledge hub. It showcases bold hardware hacking, microcontroller integration, and ethical gray zones in academic tech. While not intended for real-world use, it creatively explores the boundaries of embedded connectivity and the risks of modifying everyday tools for unintended purposes.



Keywords:

ChatGPT integration;
DIY electronics;

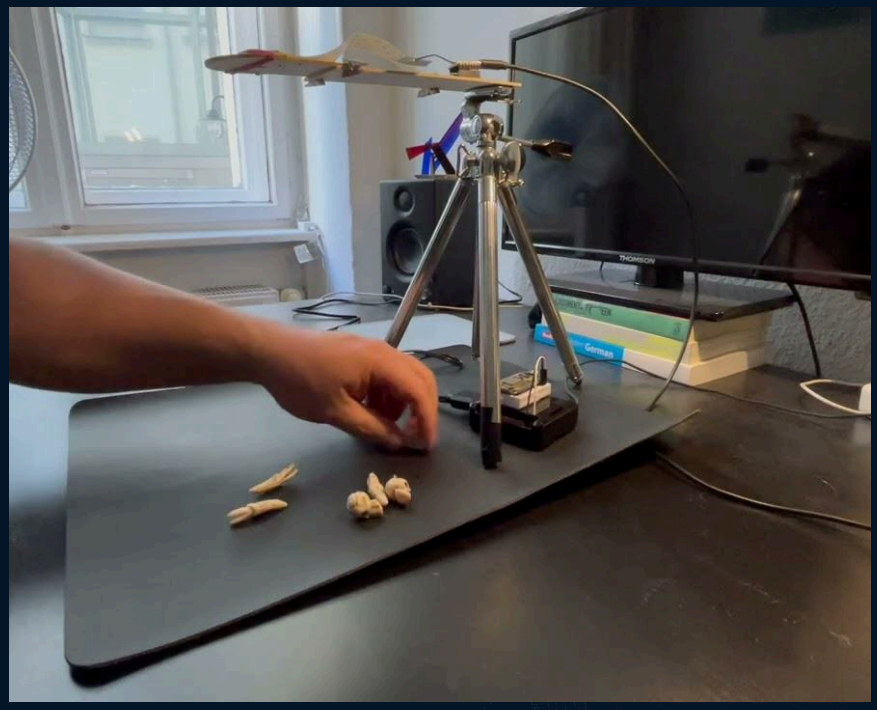
>>Read more details.

Skulls — Composing Music with Computer Vision

By Lucidbeaming

Introduction:

This experimental build turns object recognition into generative sound by identifying plastic skulls and teeth using a custom-trained YOLOv5 model on the Grove Vision AI Module V2. Controlled by a XIAO ESP32-C3 and communicating via MQTT to a Raspberry Pi running FluidSynth, the system triggers musical responses based on visual input. The AI model was trained on 176 manually processed images, with annotation and conversion handled through Roboflow and Google Colab. Despite documentation hurdles, the project highlights the expressive potential of embedded vision and sound synthesis in human-machine artistic interfaces.



Keywords:

Generative music with AI;
MQTT communication;

>>Read more details.

Transferscope — Real-World Textures for Instant AI Image Generation

By Christopher Pietsch

Introduction:

Transferscope is a handheld creative tool that captures real-world textures and instantly transforms them into new images using Stable Diffusion. Built with a Raspberry Pi Zero 2, HyperPixel screen, and a single-button XIAO RP2040 controller, it offers tactile AI prompting without complex inputs. The device detects edges, sends visual data to a GPU server, and uses Kosmos-2 for interpretation and Stable Diffusion for image generation—all within seconds. Encased in a custom 3D-printed shell with a camera and Li-ion battery, it's designed for spontaneity and artistic exploration. Planned upgrades include haptics, accelerometers, and a metal enclosure for enhanced interaction.

Keywords:

Real-world texture capture:

>>Read more details.

AI Candy Dispenser

By Bruno Santos

Introduction:

This playful build turns speech into sweets using voice recognition and sentiment analysis. Powered by the XIAO ESP32-S3 Sense and a XIAO Round Display, the device records a 5-second phrase and sends it to a remote server for transcription via Whisper and classification via BART-MNLI. If the sentiment is positive about candy, the dispenser activates. Housed in a 3D-printed shell, the system runs on Arduino code and supports Docker-based deployment for both GPU and CPU setups. It's a whimsical showcase of embedded AI, combining voice, vision, and reward logic in a delightfully interactive form.

Keywords:

Sentiment analysis;
Whisper transcription;

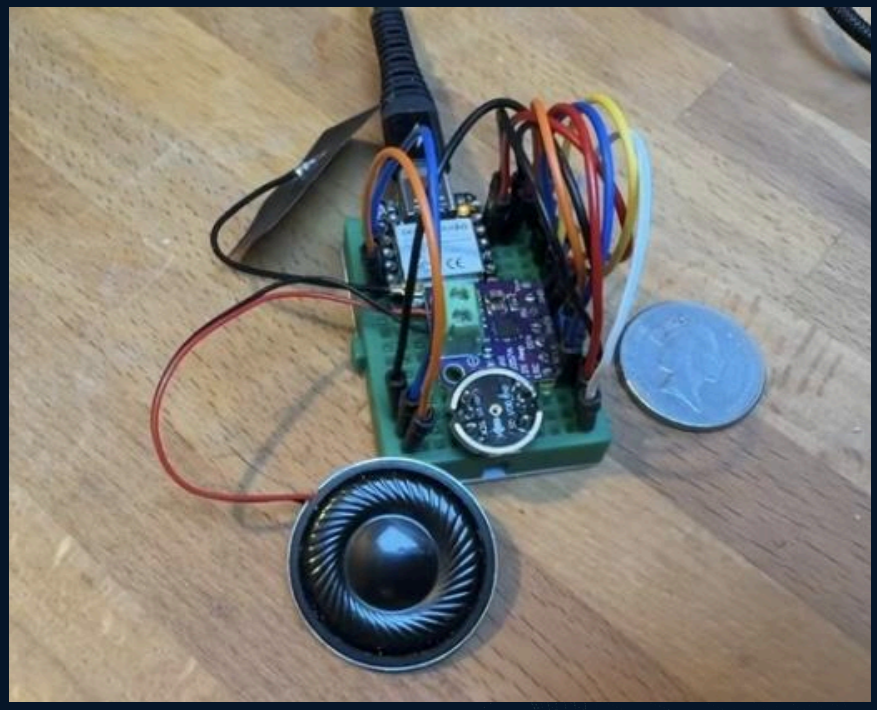
>>Read more details.

MiniMe — ChatGPT-Powered Digital Doppelgänger

By Michael Merrifield

Introduction:

MiniMe is a voice-activated AI companion that mimics its creator using speech recognition, personalized ChatGPT responses, and voice cloning. Housed in a tiny 3D-printed box, it transcribes speech via OpenAI's Whisper, enriches queries with biographical context, and replies using ElevenLabs voice synthesis. All audio I/O is handled through I2S modules and a 3W speaker, powered entirely by the XIAO ESP32-S3.



Keywords:

Voice cloning (ElevenLabs);
Whisper transcription;

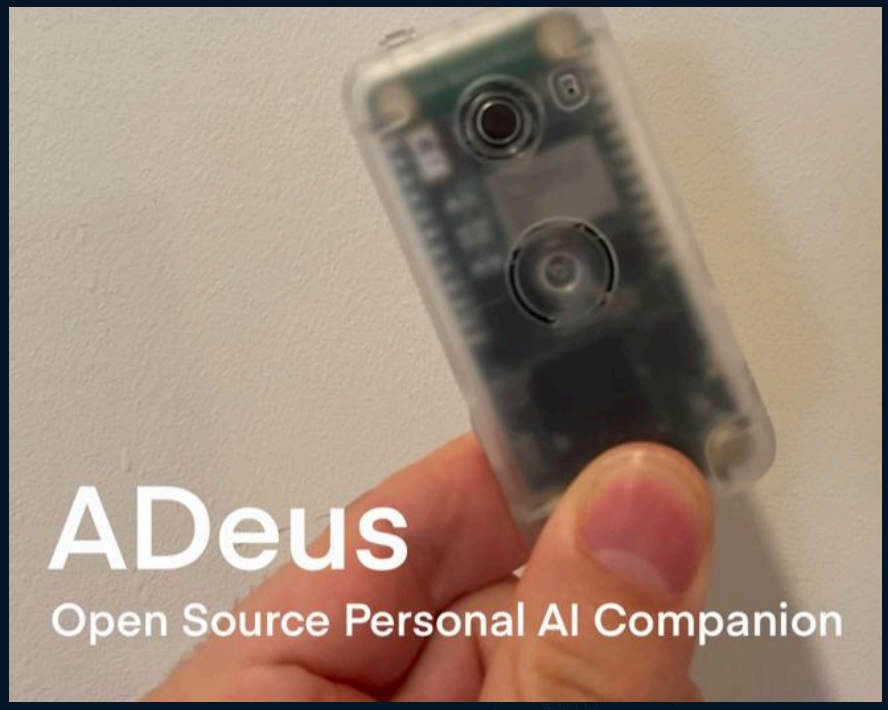
>>Read more details.

ADeus — Open Source Personal AI Companion

By Adam Cohen Hillel

Introduction:

ADeus is a privacy-focused AI companion that captures voice input via a wearable device and delivers context-aware responses through a mobile or web app. Built around the XIAO ESP32-C3 and INMP441 microphone, it stores transcripts securely using Supabase, an open-source Firebase alternative. The assistant runs personalized interactions with large language models while ensuring full user control over data. Hardware setup involves soldering a mic and battery to the XIAO board, with firmware configured via ESP-IDF and Arduino. ADeus supports builds on ESP32C3, Coral AI, and Raspberry Pi Zero W, offering a modular, open-source platform for ethical AI wearables.



Keywords:

Supabase secure storage;
Context-aware responses;

>>Read more details.

Dual AI Camera Hummingbird Detection and Capture

By Ralph Yamamoto

Introduction:

Using Grove Vision AI V2 and XIAO ESP32-S3 Sense, this device detects hummingbirds and snaps photos at a feeder. Images are saved to an SD card and served via Wi-Fi. A custom model trained with Edge Impulse enables accurate detection, though SSCMA library issues remain. Housed in a 3D-printed mount and powered by a USB battery, it's a smart, remote wildlife monitor.

Keywords:

SenseCraft AI deployment;
Wi-Fi web server;

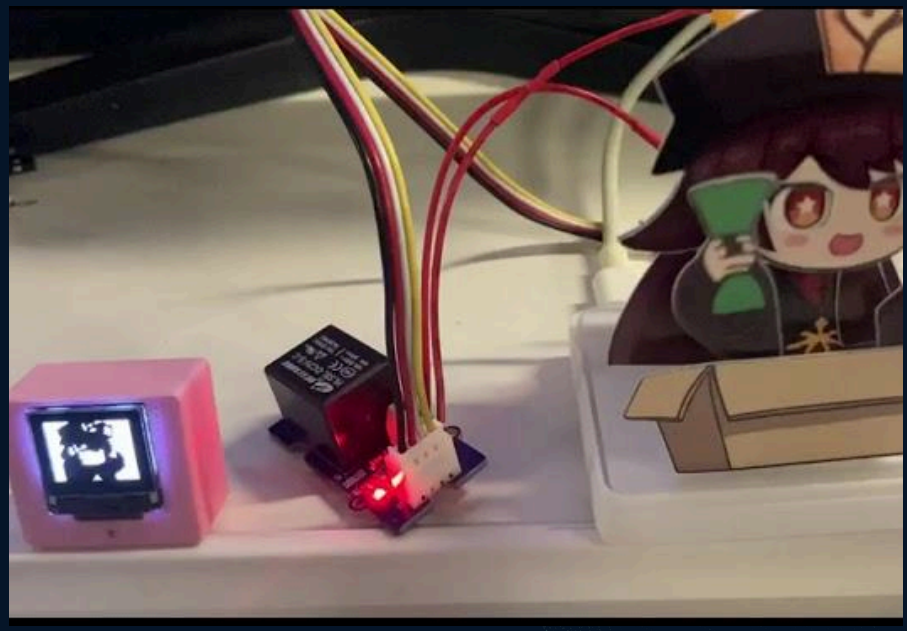
>>Read more details.

Voice-Controlled Animation and Toy

By Billtheworld

Introduction:

This playful demo uses XIAO nRF52840 Sense boards and Edge Impulse to recognize keywords like “HuTao” or “shake,” activating a toy via relay or displaying animated GIFs on a 0.66" OLED screen. Voice data is collected as WAV files, trained into a lightweight model, and deployed for real-time control. The build includes 3D-printed components and Arduino code for speech-driven animation and servo response.



Keywords:

Edge Impulse model;
OLED display;

>>Read more details.

AI Scarecrow Makes Noise When It Sees Birds

By Makestreme

Introduction:

This quirky scarecrow uses Grove Vision AI V2 and a XIAO ESP32-S3 to detect pigeons and emit randomized tones (2kHz–20kHz) via a PAM8403 amp and 3W speaker. Housed in a hardboard cutout, it triggers only on bounding box detections to reduce false alarms. While effective at first, pigeons gradually adapted—highlighting the limits of AI deterrents.

Keywords:

Bird detection model;
High-frequency audio;

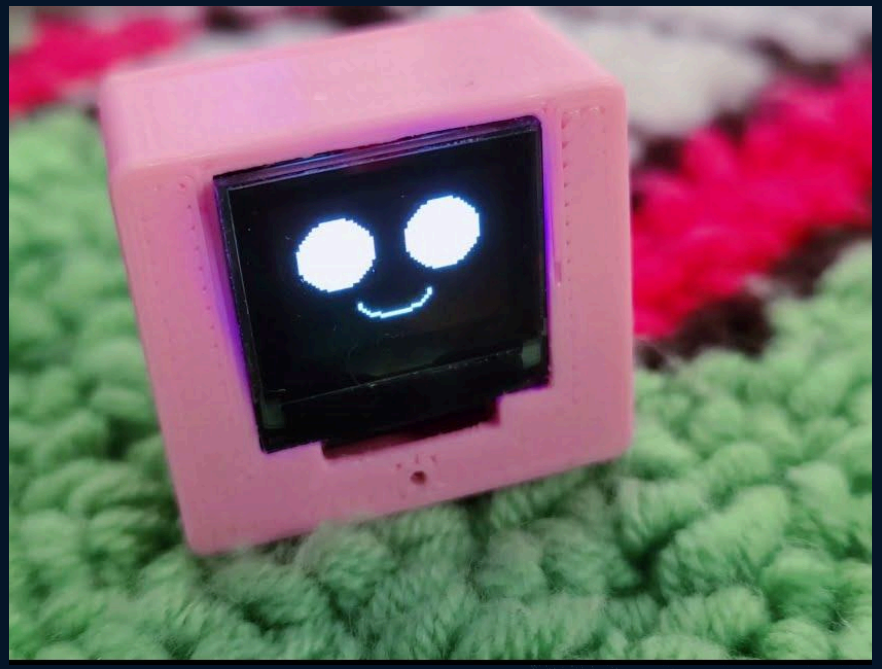
>>Read more details.

Speech Recognition Powered by Edge Impulse

By Seeed Studio

Introduction:

This video showcases a TinyML speech recognition demo using the XIAO nRF52840 Sense with Edge Impulse. The ultra-compact setup enables local voice command detection, featuring onboard sensors and BLE connectivity for real-time response. Optimized for low-power applications, it's perfect for voice-controlled devices, smart wearables, and hands-free interfaces. The demo highlights just how accessible embedded AI has become, making speech recognition viable even on small, battery-powered microcontrollers.



Keywords:

TinyML speech recognition;
Low-power AI;

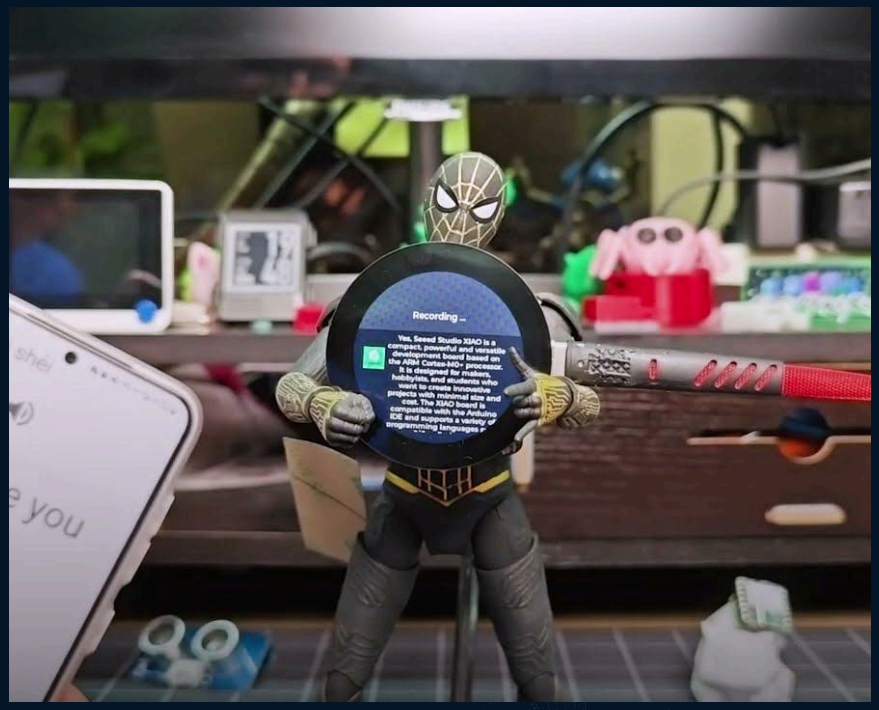
>>Read more details.

Miniature ChatGPT Voice Assistant

By Seeed Studio

Introduction:

This super-compact voice assistant uses the onboard microphone of the XIAO ESP32-S3 Sense to capture speech, which is then transcribed via Google Cloud's speech-to-text API and processed by ChatGPT for real-time conversational feedback. Answers and transcriptions are displayed on a circular screen, creating a tiny yet responsive voice interface. This fusion of embedded AI and cloud services demonstrates how ultra-portable devices can deliver intelligent interactions—perfect for smart home control, on-the-go assistants, or wearable tech.



Keywords:

Miniature voice assistant;
Smart home control;

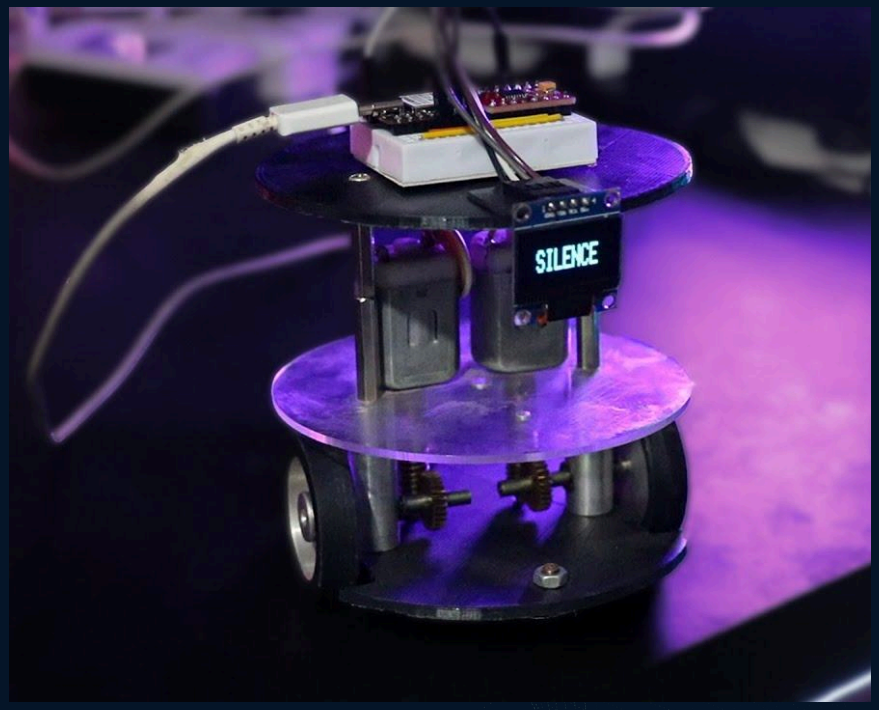
>>Read more details.

Building a Voice Recognition Robot

By CiferTech

Introduction:

This voice-controlled robot uses the onboard microphone of the XIAO nRF52840 Sense to interpret spoken commands via the micro_speech library. Once recognized, the commands are displayed on a vintage screen while the robot responds in real time—demonstrating a simple but effective application of offline voice recognition. The project highlights the potential of low-power embedded AI in educational robotics and interactive design.



Keywords:

Embedded AI demo;
Low-power microcontroller;

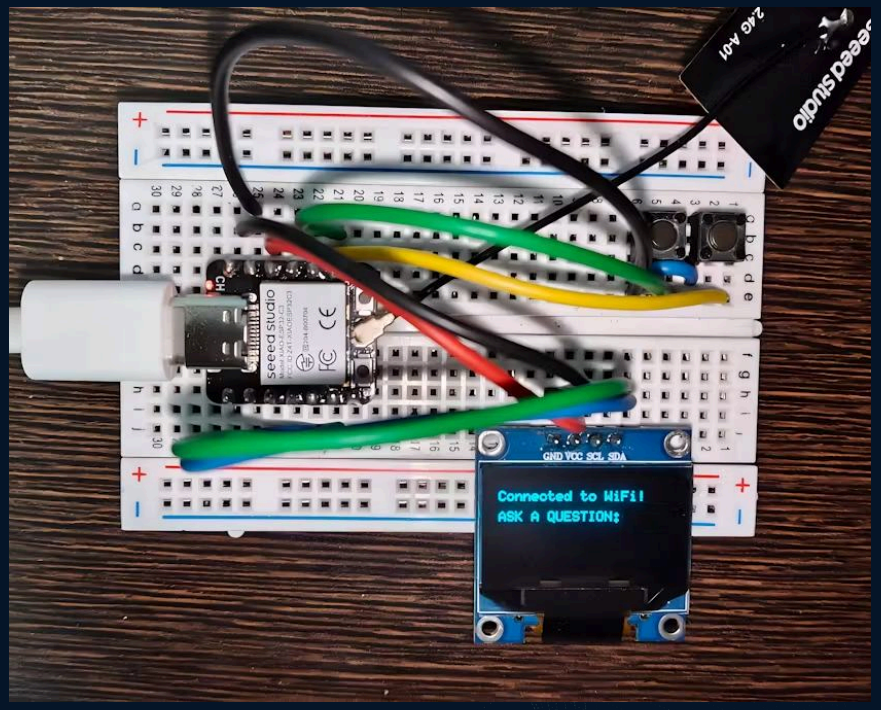
>>Read more details.

Gemini on Display — Pocket AI Assistant

By IoT HUB

Introduction:

This compact terminal uses the XIAO ESP32-C3 to send queries to Google Gemini and display responses on a 0.96" OLED screen. Featuring clean formatting, button-controlled scrolling, and animated UI, it's a sleek showcase of embedded AI. Expandable with voice input, SD card logging, or multitasking menus.



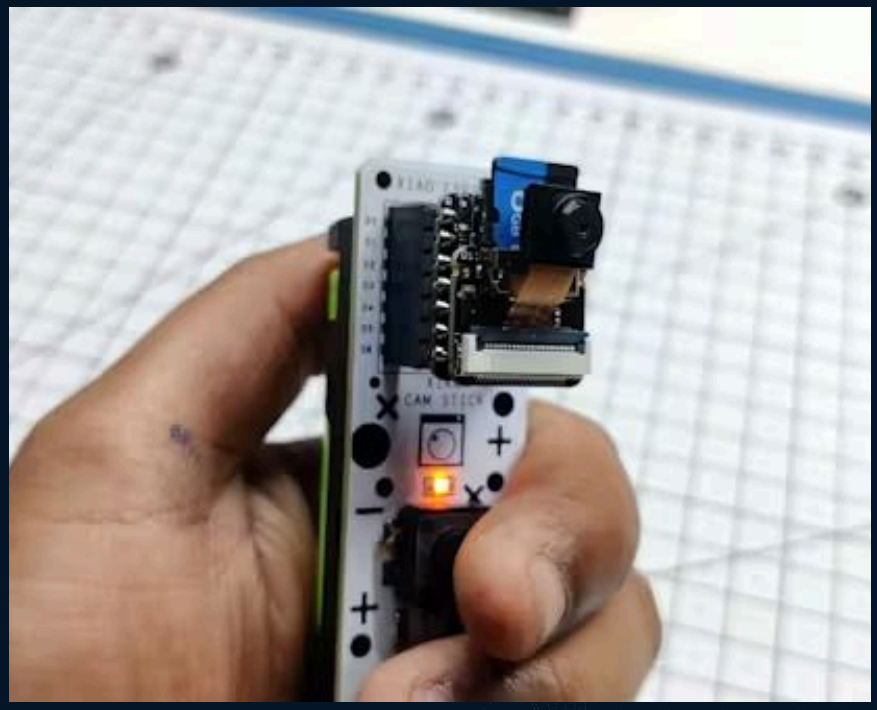
Keywords:

OLED display;
Voice input;

>>Read more details.

XIAO ESP32 S3 Handheld Camera Pocket Edition

By Arnov Sharma



Introduction:

A portable pocket edition of the XIAO ESP32-S3 handheld camera has been developed to meet the growing demand for compact photography tools. Leveraging the XIAO ESP32-S3 development board and custom PCB services from Seeed Studio Fusion, Arnov created a travel-friendly camera for enthusiasts, photographers, and creators. It integrates a central processor, Wi-Fi module, radiofrequency circuit, memory, sensors, and other components to enable high-speed image processing and storage. Arnov designed the circuit, wrote the code, and used 3D printing to build the housing. Despite challenges, this versatile device aims to inspire DIY innovation in the photography community.

Keywords:

Pocket Camera;
Seeed Studio Fusion;

>>Read more details.

Neonatal Incubator Monitoring using Blues & Qubitro

By Pradeep

Introduction:

The design uses hardware components including the Blues Notecard (Cellular), Blues Notecarrier-A, Seeed Studio XIAO nRF52840 Sense, and a 60GHz mmWave sensor for breathing and heartbeat detection. It also features environmental sensors—temperature, humidity, barometer, and eCO2/CO2—to monitor conditions inside the incubator. A microcontroller processes the data and sends it to a cloud server via the Blues Notecard. Powered by Blues Notehub, the server stores data and offers a web interface for remote monitoring by doctors and parents. The system can send alerts via email or SMS if parameters exceed safe thresholds.

Keywords:

Environment Monitoring;

>>Read more details.

SenseCAP Sensor Builder, an Open-Source Tool to Build RS485 Sensors With Grove

By Seeed Studio

Introduction:

Powered by Seeed Studio XIAO RP2040 dual-core ARM M0+ processor, with a USB-C port for easy code uploading, this design can convert 500+ existing Grove sensors to MODBUS RS485 industrial-grade sensors. You can easily finish the upgrade from maker/Arduino products to industrial-level products. Six popular environmental Grove sensors are already fully compatible with native firmware. It is compatible with your data logger and IoT platform. An IP66 waterproof rate outdoor enclosure with a customized mounting panel is included, suitable for pole and wall installation.

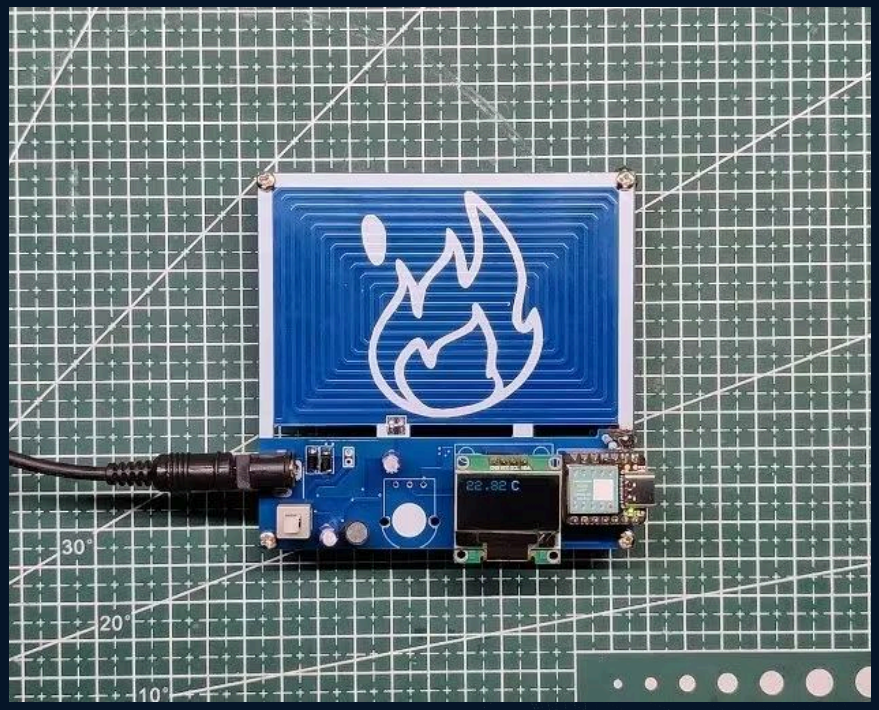
Keywords:

Industrial Sensor Converter;
Environmental Sensing Tool;

>>Read more details.

PCB Hotplate Powered by XIAO SAMD21

By Arnov Sharma



Introduction:

The temperature of the heating coil is displayed on an OLED screen. The XIAO SAMD21 board, measuring just 20.3mm × 17.8mm, powers the system. PCBs are used to create coils directly on the board layer, which then function as heating elements. When electricity passes through a material with resistance, heat is generated. By designing 1mm-wide coils on the PCB with a resistance of 2.2 ohms, current can flow through them to produce heat. PCB design and fabrication are straightforward and efficient, enabling quick production.

Keywords:

Laboratory Device;
Melting&Heating Device;

>>Read more details.

Current Measuring Tool Using XIAO ESP32C3 & ACS758 Sensor

By Open Green Energy

Introduction:

This design demonstrates how to accurately measure current using the XIAO ESP32-C3 and ACS758 sensor—an essential capability for electronic projects and power monitoring applications. The XIAO ESP32-C3 reads current data through code, delivering precise measurements. The designer also shares practical tips for sensor calibration and performance optimization, making the project valuable for hobbyists, students, and professional engineers alike.

Keywords:

Electrical Maintenance & Troubleshooting;

>>Read more details.

Ultra Small Ethernet Powered by XIAO RP2040 & WIZNET W5100S

By Alan

Introduction:

The product designer set out to create an ultra-small, efficient board by combining the XIAO series with the WIZNET W5100S Ethernet chip. Having previously worked with RP2040-based projects and the Ethernet-enabled W5100S-EVB Pico, the designer aimed to build a more compact and streamlined solution. The XIAO RP2040 was chosen for its minimal footprint, while the W5100S chip was selected for its SPI compatibility and reliable Ethernet connectivity. The resulting board is tailored for embedded systems and IoT applications that demand network access with minimal size and maximum efficiency.

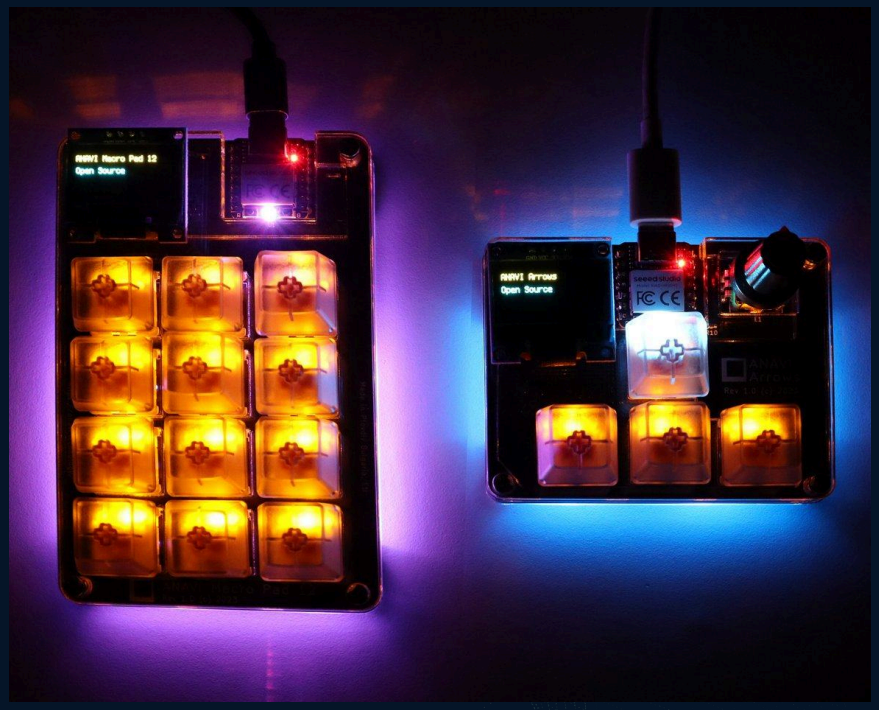
Keywords:

IoT;
Industrial Control Systems;

>>Read more details.

ANAVI Macro Pad 12 & Arrows Powered by XIAO RP2040

By Anavi Technology



Introduction:

The Anavi Macro Pad 12 and Arrows are customizable, programmable keypads designed for makers, developers, and anyone needing quick access to frequently used commands. The Macro Pad 12 features 12 programmable keys, while the Arrows version includes four arrow keys and eight programmable keys. Both versions are compatible with multiple operating systems and support the popular QMK firmware. They are easy to assemble and come with pre-soldered components, making them beginner-friendly. Open-source and modular by design, they allow for customization and expansion with various add-ons. The project is currently featured on Crowd Supply, where backers can pre-order and support the development of open-source hardware.

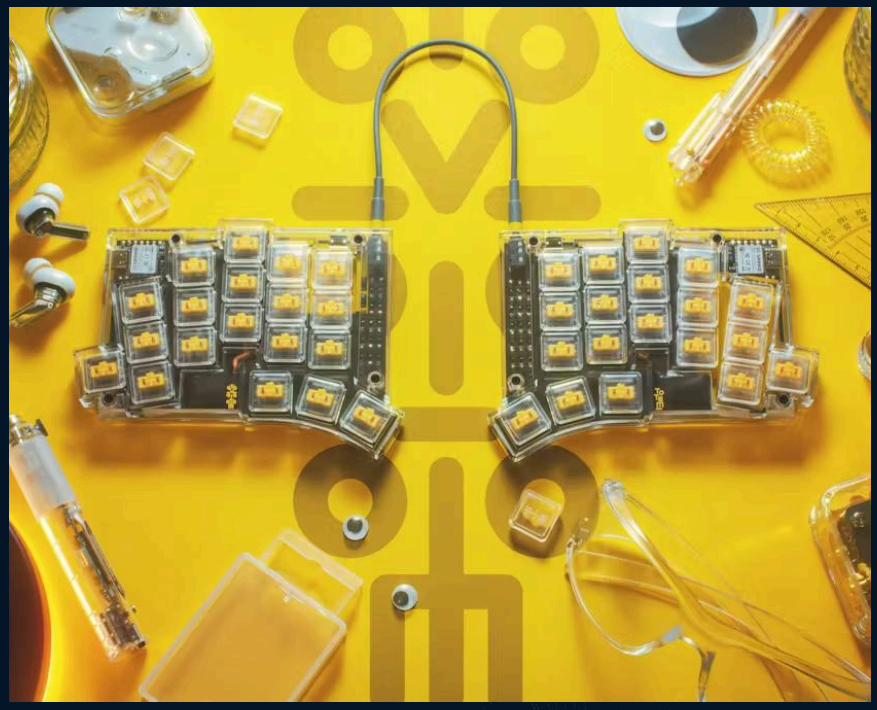
Keywords:

Mechanical Keyboards;

>>Read more details.

TOTEM: A Tiny Splitkeyboard With Splay Powered by XIAO RP2040

By Geist



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Keywords:

Mechanical Keyboards;

>>Read more details.

GOMU GOMU NO MI With XIAO RP2040

By Arnov Sharma

Introduction:

The project utilizes custom PCBs, WS2812B addressable LEDs, and a XIAO RP2040. Two PCBs are used: the bottom board houses the RGB LEDs and the XIAO module, while the top board features an etched layer resembling the gum-gum fruit design. This top layer diffuses the LED glow, creating a vibrant, illuminated effect across the entire setup.

Keywords:

Seeed Studio Fusion;
Custom PCB;

>>Read more details.

TinyML Case Studies

XIAO Series Online Flyer

XIAO Series Getting Started

Wikis/Pin Usage/Feature Usage/Supported Platform

XIAO Series Open Source Materials

(Schematic/KiCAD/Eagle and More!)

Seeed Studio

Seeed Studio XIAO Use Case

CONTACT US

HEADQUARTERS

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

X.FACTORY

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

Japan Office

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