WALC 2024
Applied AI

About the Track & Syllabus

Prof. Marcelo J. Rovai
rovai@unifei.edu.br

UNIFEI - Federal University of Itajuba, Brazil
TinyML4D Academic Network Co-Chair

Marcelo Rovai is an educator and professional in the field of engineering and technology, holding the title of Professor Honoris Causa from the Federal University of Itajubá, Brazil. His educational background includes an Engineering degree from UNIFEI and an advanced specialization from the Polytechnic School of São Paulo University (POLI/USP). Further enhancing his expertise, he earned an MBA from IBMEC (INSPER) and a Master's in Data Science from the Universidad del Desarrollo (UDD) in Chile.

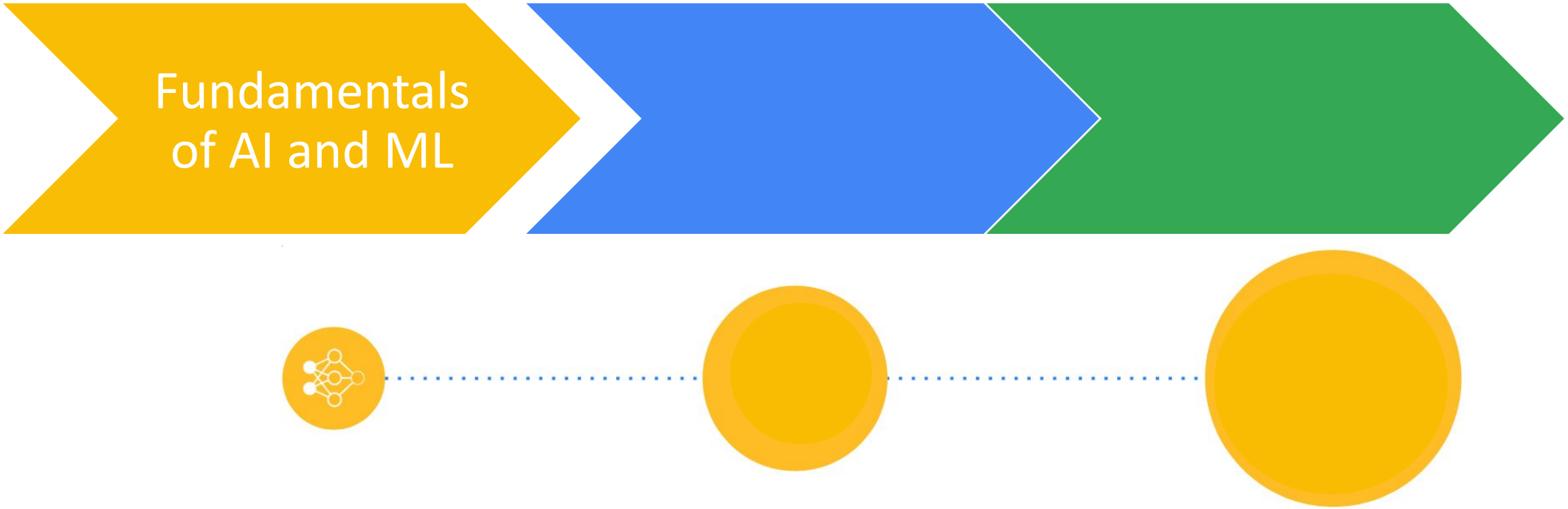
With a career spanning several high-profile technology companies such as AVIBRAS Airspace, ATT, NCR, and IGT, where he served as Vice President for Latin America, he brings a wealth of industry experience to his academic endeavors. He is a prolific writer on electronics-related topics and shares his knowledge through open platforms like Hackster.io.

In addition to his professional pursuits, he is dedicated to educational outreach, serving as a volunteer professor at UNIFEI and engaging with the TinyML4D group as a Co-Chair, promoting EdgeAI education in developing countries. His work underscores a commitment to leveraging technology for societal advancement.

What will We learn?

What will We learn?

Part 1 (2 days)

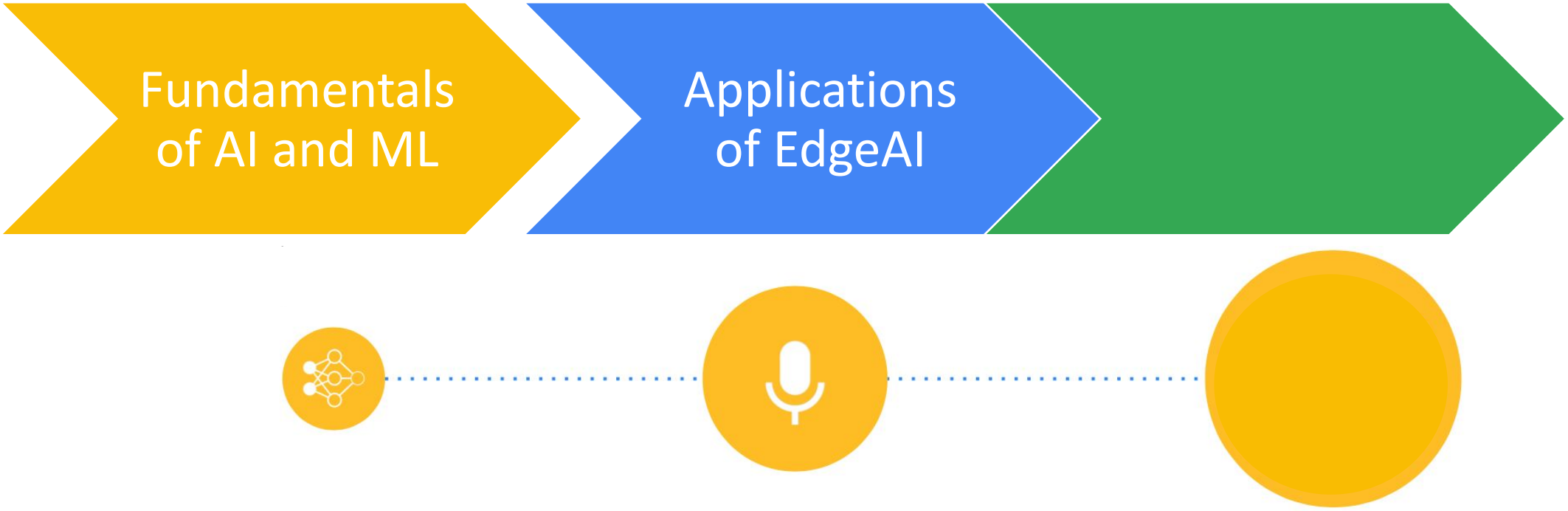


Part 1 is all about talking about what is the language of **Artificial Intelligence (AI)** and **Machine Learning (ML)**

What will We learn?

Part 1

Part 2

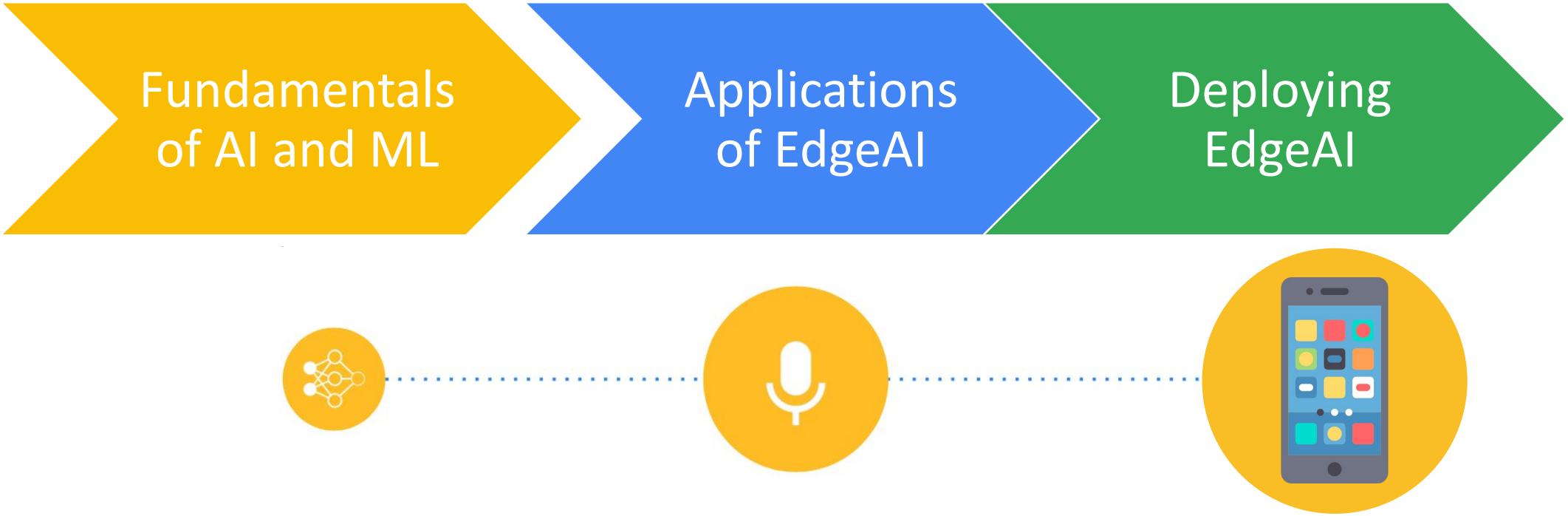


In Part 2, we will get a sneak peek into the variety of different **EdgeAI (Embedded Artificial Intelligence)** and applications, as keyword spotting (“Alexa”), gesture recognition, chatBots, understand how to leverage the sensors, and so forth.

What will We learn?

Part 1

Part 2



In Part 2, we will **also** learn how to deploy models on real devices such **as smartphones and microcontrollers**. Along the way, we will explore the challenges unique to and amplified by EdgeAI (e.g., preprocessing, post-processing, and dealing with resource constraints).

How are we going to get there?

Lectures and Hands-on Learning

- **Lectures/Labs**
  - Jesus Lopez (AI / Ethics)
  - Diego Mendez (ML/DL)
  - Marcelo Rovai (EdgeAI)
  - Stanley Arciniegas (Hands-On Labs)
- **Software**
  - Python
  - Machine Learning (TensorFlow)
  - Programming environment
    - Google Colab
    - Edge Impulse Studio
- **Hardware**
  - SmartPhone
  - PC

TinyML4D/WALC_2024 at ma

https://github.com/Mjrovai/TinyML4D/tree/main/WALC_2024

New Chrome available

main

TinyML4D / WALC_2024 /

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README.md

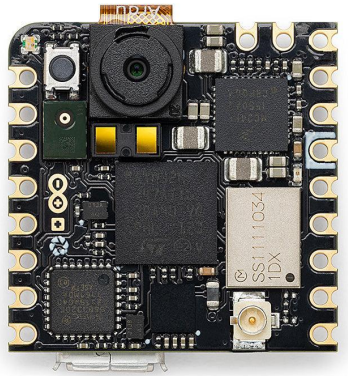
WALC_2024-Applied_AI

WALC 2024 - Track 3 – Inteligencia Artificial Aplicada

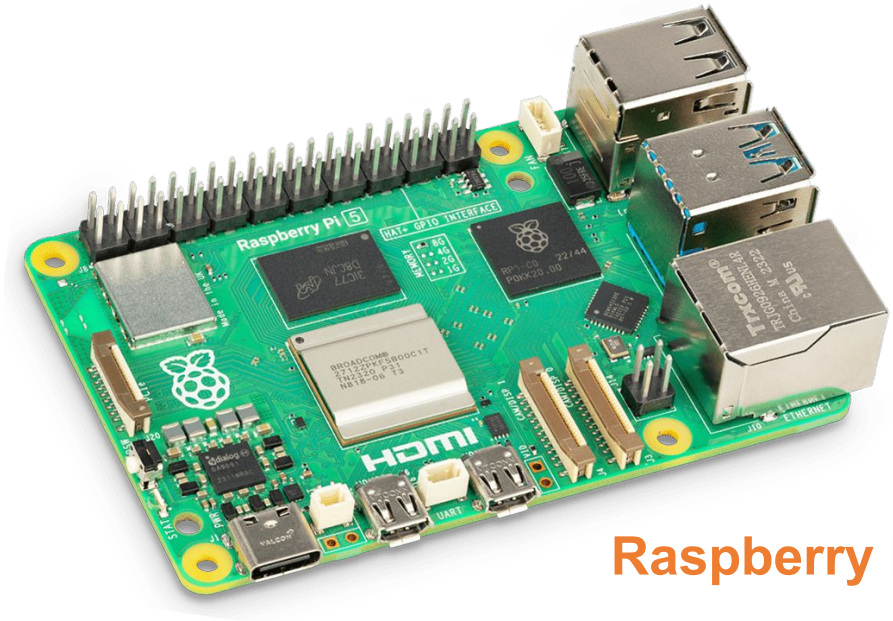
Hardware

SmartPhone

Seeed XIAO
ESP32S3

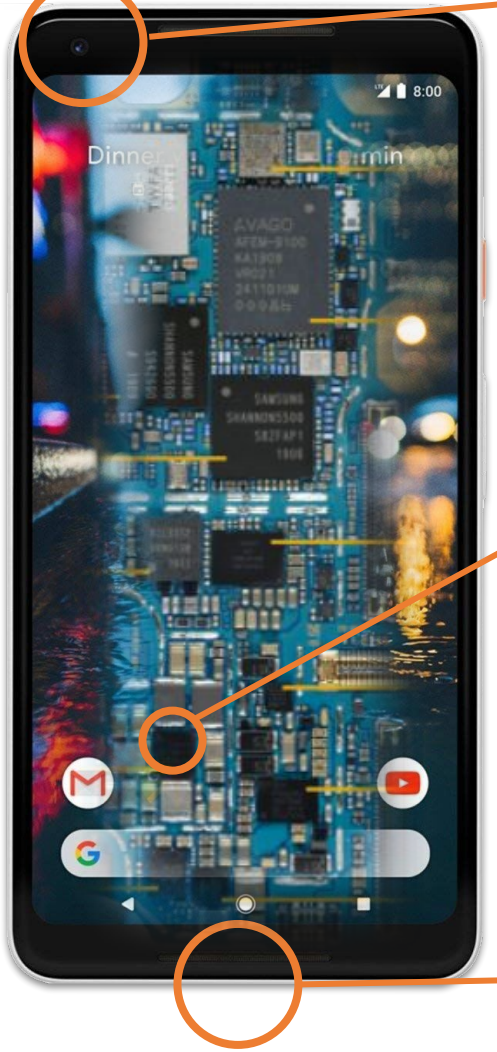


Arduino
Nicla Vision



Raspberry Pi

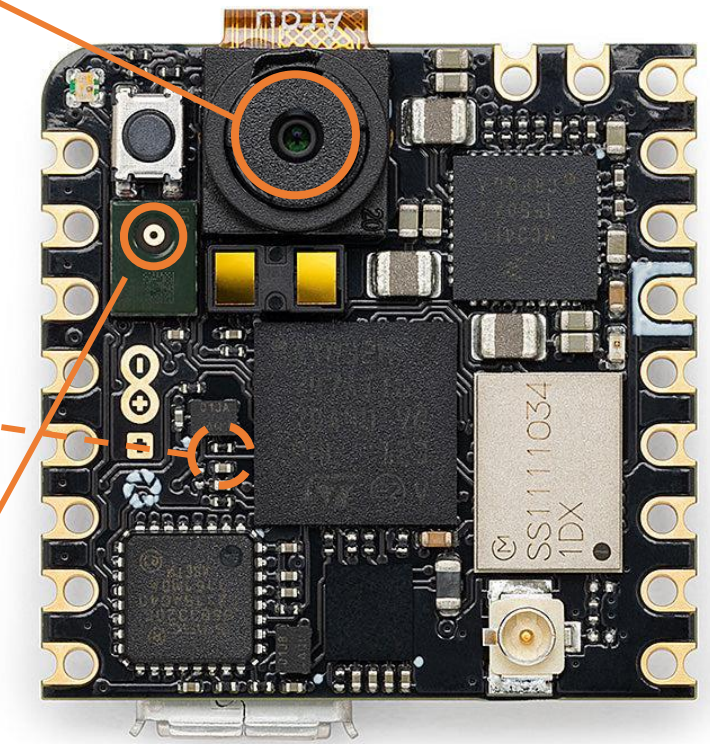
Edge Device & Sensors



Camera

Accelerometer

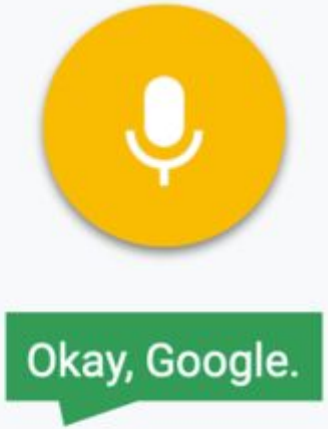
Gyroscope



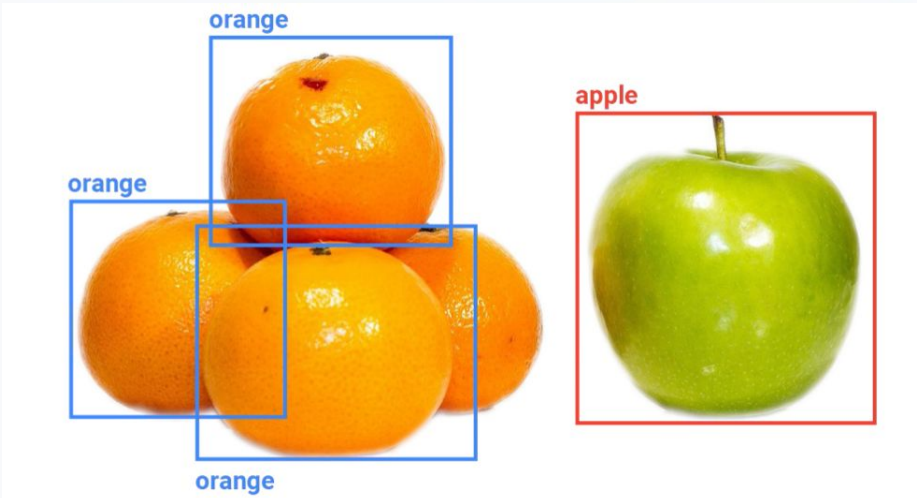
Microphone

Hands-on Activities

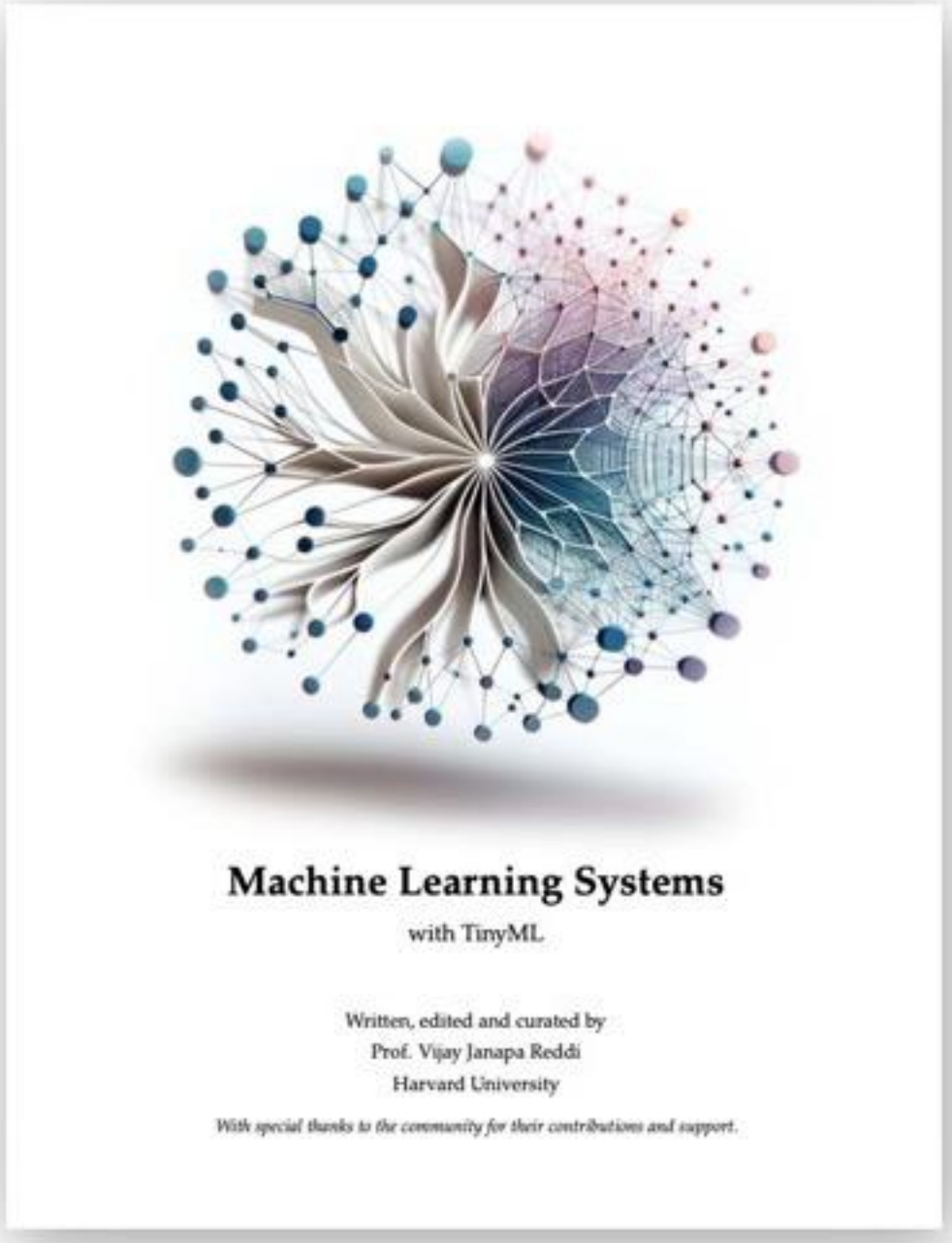
Speech

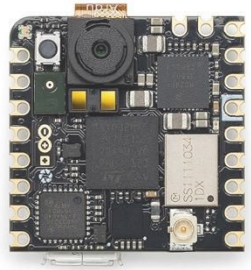


Vision



IMU

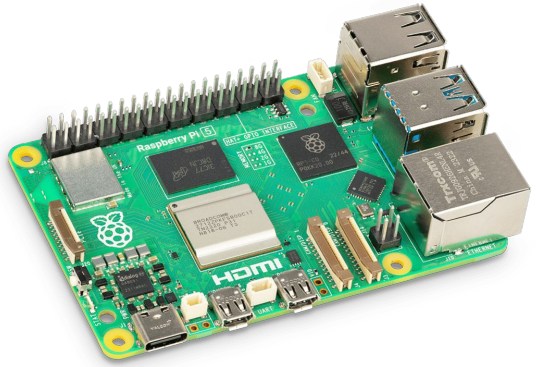




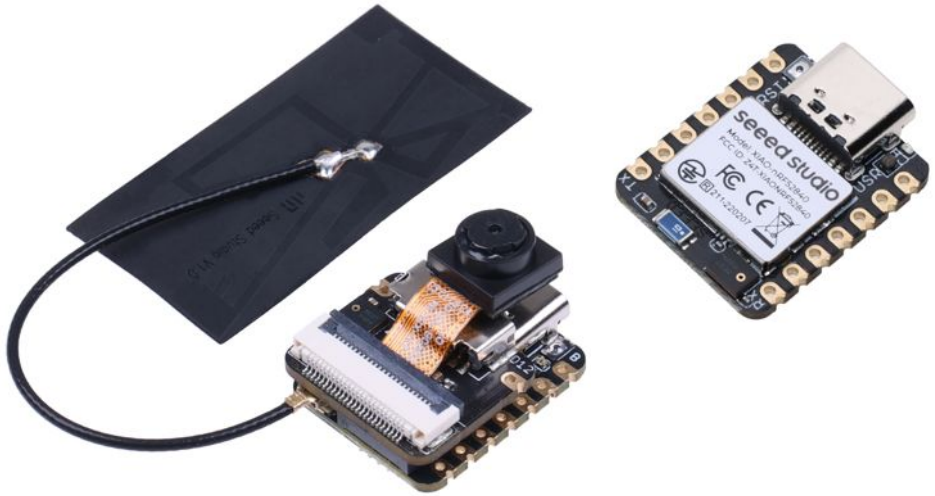
Nicla Vision

XIAO ESP32S3

Raspberry Pi



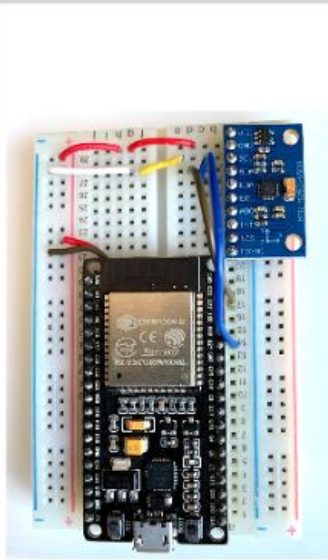
Seeed Studio **XIAO**

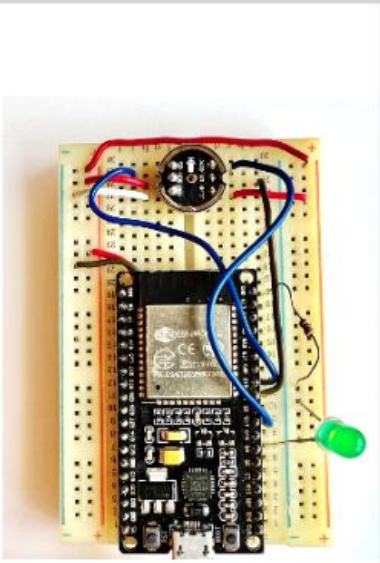


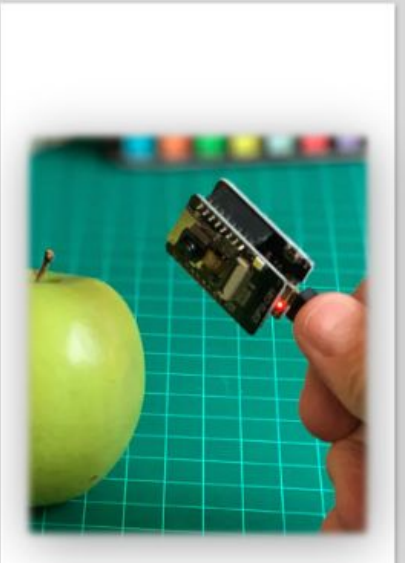
More MCUs…

ESP32-TinyML

Exploring TinyML with ESP32 MCUs.

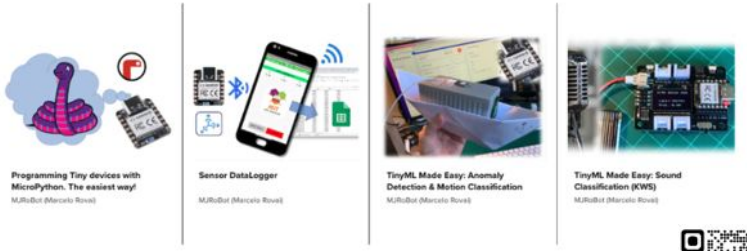






Seeed-XIAO-BLE-Sense

KWS, Anomaly Detection & Motion Classification and Micropython - Exploring the Seeed XIAO BLE Sense.



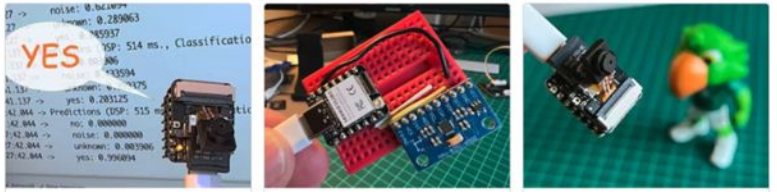
Programming Tiny devices with MicroPython. The easiest way!
MJRoBot (Marcelo Rovai)

Sensor DataLogger
MJRoBot (Marcelo Rovai)

TinyML Made Easy: Anomaly Detection & Motion Classification
MJRoBot (Marcelo Rovai)

TinyML Made Easy: Sound Classification (KWS)
MJRoBot (Marcelo Rovai)

XIAO-ESP32S3-Sense



TinyML Made Easy: KeyWord Spotting (KWS)
MJRoBot (Marcelo Rovai)

Exploring Machine Learning with the new XIAO ESP32S3
MJRoBot (Marcelo Rovai)

TinyML Made Easy: Image Classification
MJRoBot (Marcelo Rovai)

Tentative Agenda

- Monday
  - About the Track & Syllabus – M Rovai
  - EdgeAI - Introduction – M Rovai
  - Artificial Intelligence Overview – J Lopez
  - Tools Setup - M Rovai
- Tuesday
  - Introduction to Machine Learning – D Mendez
  - Introduction to Neural Networks – D Mendez
    - DNN – Regression – D Mendez
    - DNN – Classification – D Mendez
    - ML Metrics – D Mendez
  - Introduction to Convolutions– M Rovai
  - Image Classification using Convolutions (CNN) – M Rovai
  - Preventing Overfitting & DL Wrap-Up – M Rovai
  - Image Classification Hands-On - S Arciniegas

Tentative Agenda

- Wednesday
  - Object Detection – M Rovai
  - Audio Apllications – M Rovai
  - KWS Hands-On - S Arciniegas
- Thursday
  - Time Series Applications – M Rovai
  - Motion Classification – M Rovai
  - Anomaly Detection – M Rovai
  - Motion Classification Hands-On - S Arciniegas
- Friday
  - AI Ethics – J Lopez
  - Generative AI – M Rovai
  - The future of the Edge AI – M Rovai
  - Applied AI Track Wrap-up – M Rovai

Questions?


TINYML4D


WALC 2024
Online
11 al 15 de Noviembre
27°
Taller sobre
Tecnologías de Redes Internet
para América Latina y el Caribe
Fundación
EsLaRed
Organización General