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AIML-201

ML Development Tools & Building and Voice Application

Dan Kozin | August 2023

Agenda

- **Picking the right Machine Learning Tool.**
  - Learn how to pick the right Machine Learning tool based on your skills and application
- **Building a Voice Controlled Application**
  - Watch how we use two different Machine Learning tools to build a voice application

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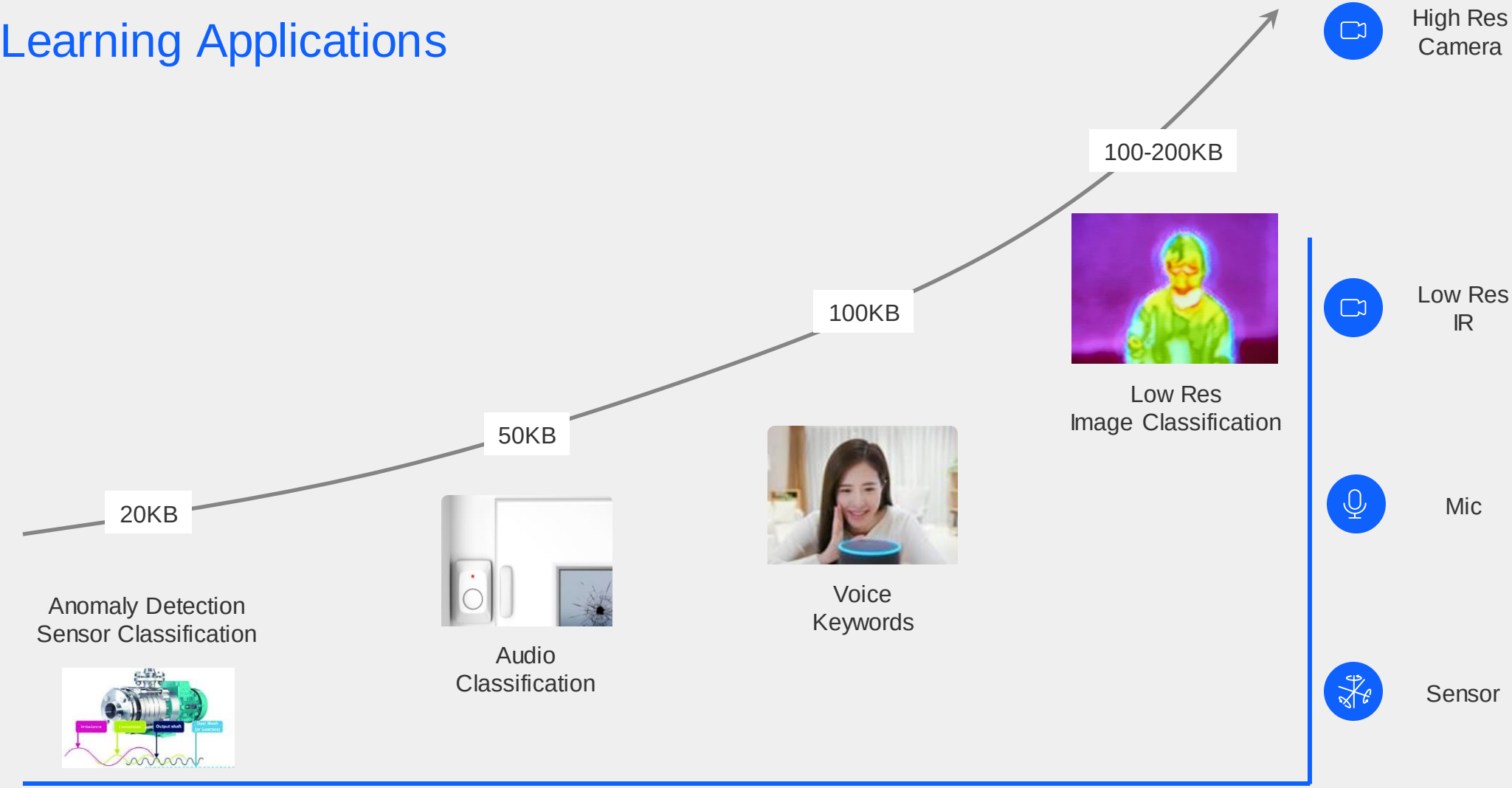
Picking the right Machine Learning Tool

Machine Learning Applications



Model Building Is Application Dependent

Machine Learning Tools

Customers should choose what tool is best for them

Machine Learning Development Tools – many options!

To make sense, we segment the tools:

1. **By Developer Skill**
2. **By Use Case**

Machine Learning Developer Skills

Three segments for skills required by tool. Users self determine which segment they want to use.

EXPERT

Programming all details

TensorFlow & Python expertise

EXPLORER

Curated end-to-end workflow

Familiar with ML concepts

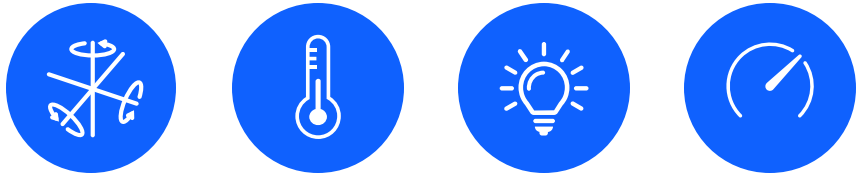
SOLUTIONS

Black box solution

NO Machine Learning knowledge

Machine Learning Use Cases

Sensor Classification



Sensor signal processing is the use of low data rate sensors, like accelerometers, gyroscopes, air quality sensors, temperature sensors, pressure sensors, etc. These use cases can be found in many types of markets, such as preventive maintenance, medical devices, smoke detectors, etc.

Audio Classification

Audio pattern matching uses a microphone to detect different sounds. The types of sounds detected can be a very wide range of non-speech related sounds – such as squeaky bearing, jingling keys, breaking glass, water running, animal sounds, etc.

Voice Keywords

Voice commands is a specific sub-set of audio patterns that are the recognition of a small set of spoken words. This is also referred to as keyword spotting. It can be used in a variety of use cases, such as waking up a voice service (I.e. Alexa), or using voice activation for smart home devices or appliances. A keyword spotting application may also support different languages.

Low-Resolution Vision

Low resolution vision uses a camera with resolution around 100x100 to detect objects for presence detection, people counting, video wake-up or more.

Machine Learning Tools available

Machine Learning Tools by Skill and Use Case

	EXPERT	EXPLORER	SOLUTIONS
Low-Rate Sensors	TensorFlow	EDGE IMPULSE, SensiML, Micro.ai Anomaly Detection	sensory Voice Command
Audio Signature	TensorFlow, SILICON LABS Machine Learning Toolkit	EDGE IMPULSE, SensiML	
Voice Keywords	TensorFlow, SILICON LABS Machine Learning Toolkit	EDGE IMPULSE, SensiML	
Low-Resolution Vision	TensorFlow, SILICON LABS Machine Learning Toolkit	EDGE IMPULSE	

ML Solution Developers

AITAD

AIZIP

KLIKA·TECH GLOBAL IOT SOLUTIONS

Intelligent Agent Neuton

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Building a Voice Controlled Application

Basic Machine Learning Development Workflow

Train

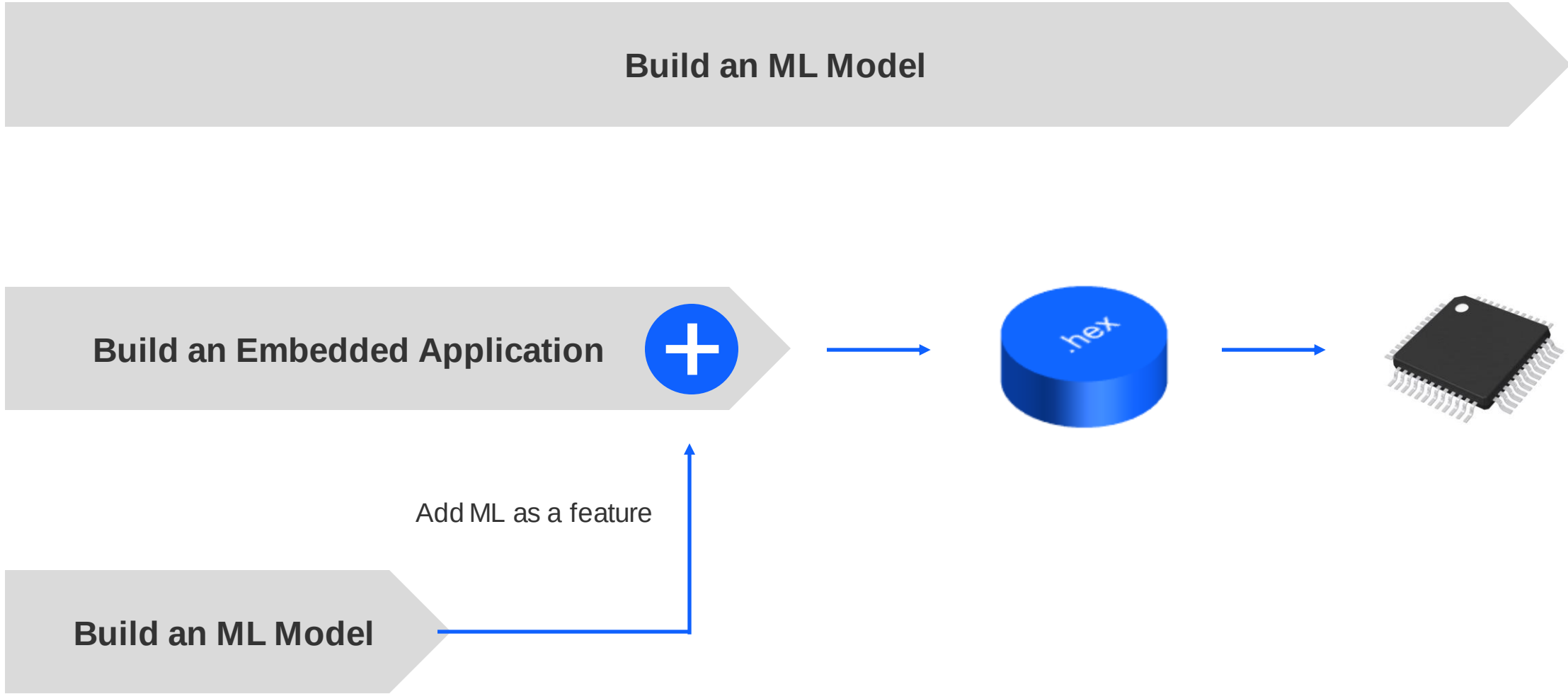
Inference

Build a Wireless Application

Add ML as a Feature

Build an ML Model

Basic Machine Learning Development Workflow

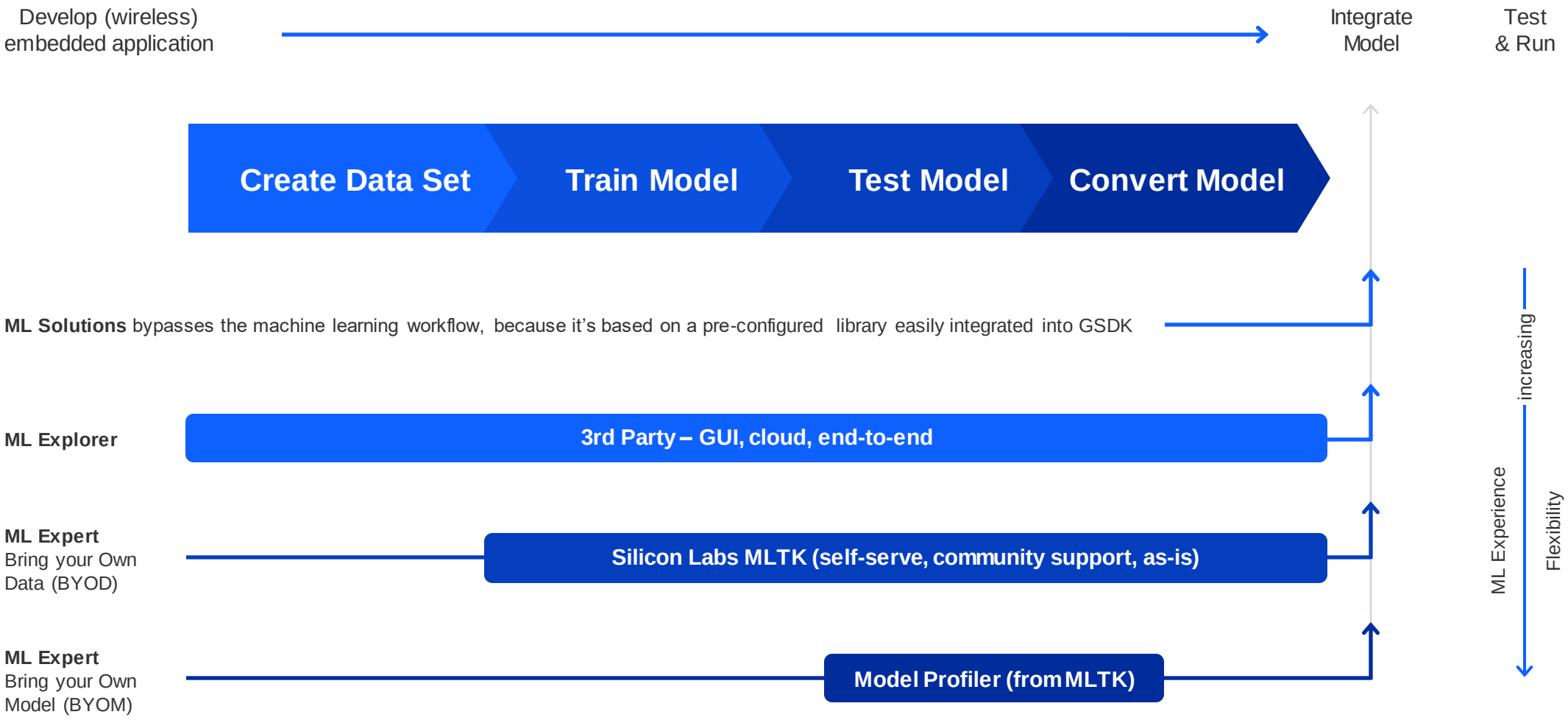


Basic Machine Learning Development Workflow

Build an ML Model

Create Data Set → **Train Model** → **Test Model** → **Convert Model**

Machine Learning Tools Workflow



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ML Expert Using Silicon Labs MLTK

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ML Solutions Using Sensory

How to get started?

- **Get a xG24 Dev Kit**
  - Low-cost development board
  - On-board sensors and debugger
  - 20-bit ADC
  - AI/ML hardware accelerator

- **Develop the base wireless application**
  - Supports Bluetooth, Zigbee, and Matter
- **Visit silabs.com ML Landing Page**
  - Learn more about ML options
- **Develop ML as a Feature**
  - Select ML Development Tools
- **Integrate, Test and Deploy your product!**

Developing ML as a Feature

- **Expert**
  - TensorFlow
  - Silicon Labs MLTK
- **Explorer**
  - SensiML
  - Edge Impulse
  - Micro.AI (anomaly detection)
- **Solutions**
  - Sensory
  - Or Design Partners

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Thank you!

silabs.com/ai-ml