SILICON LABS
CONNECTED INTELLIGENCE

2026 tech talks
WEBINAR SERIES

Hands-on Edge AI: Developing Embedded AI/ML Applications

AI/ML

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Agenda

01 What is ML at the Edge?

02 Application Examples

03 Partner Ecosystem and Use Cases

04 Software Tools and Pipeline

05 Demo – Voice Controlled Light

06 Silicon Labs ML Portfolio and Kits

07 Other Resources

Artificial Intelligence(AI) and Machine Learning(ML) at the Tiny Edge

Why is ML the future of Smart IoT?

Highly Secure due to local Edge Processing

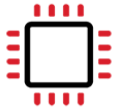
Cost reduction due to absence of cloud infra

Enables Offline Mode Operation

Uses very low network bandwidth

Higher transfer speeds and lower latency

Silicon Labs' ML Capabilities



Leading Edge Portfolio

High Performance Compute

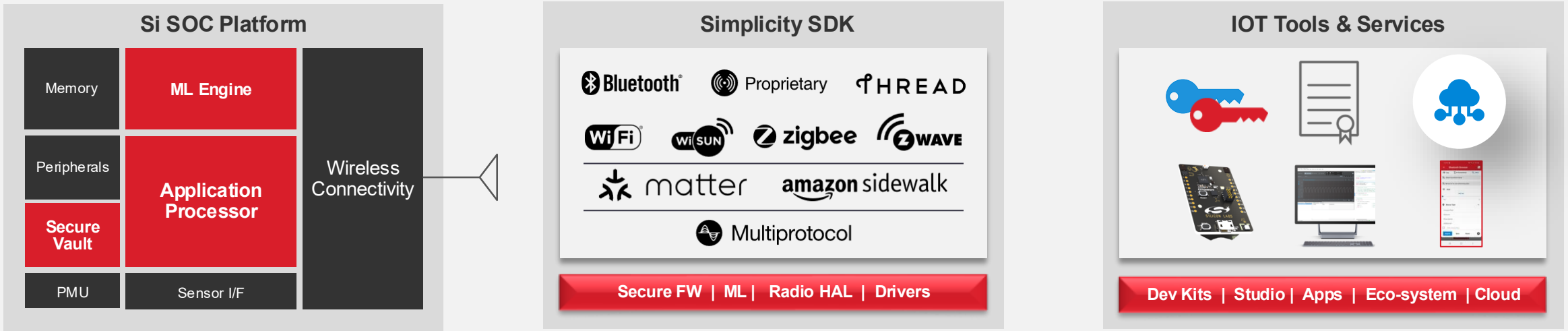
Robust PSA L3 Security

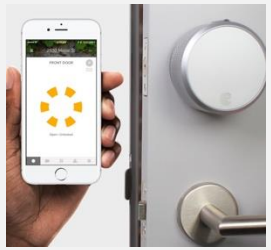
Dedicated Tools and Partner Network

Faster Inferencing with HW acceleration

More battery life with efficient compute

How Silicon Labs enables the IOT





Secure

Battery Life

Intelligent

Interoperable

Cost Sensitive

Rugged

Upgradeable

Machine Learning Application Examples

SENSOR

RAM: 64kB –
Ops/s: 5M-40M

Signal Processing (time series, low-rate data)

- Predictive/Preventative Maintenance
- Anomaly detection (e.g. air quality, abnormal usage, leak detection)
- Accelerometer use-cases e.g., fall detection, pedometer, step counting

ML SDK	Magic Wand IMU
PoC	Seizure Detection, Smart toothbrush, Motor control, anomaly detection, etc.
Partner	Air Quality Detection, Mine Gas Detection, IMU applications

AUDIO

RAM: 128kB – 1MB+ (voice)
Ops/s: 40M-1G w /hardware accelerator

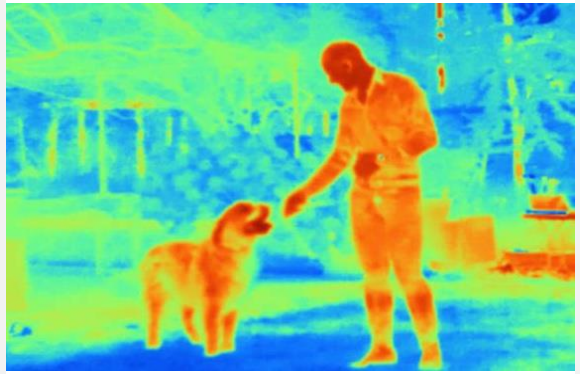
Audio & Voice

- Security applications e.g., Glass break, scream, shot detection
- Cough detection
- Always-on key-word detection
- Voice assistant
- Echo & noise suppression

ML SDK	Voice Control Light, Audio Classifier
Ref Des	Glass Break Detection
Partner	Occupancy Detection, Wake-word Detection, Voice ID for Doorlock

VISION

RAM: 512kB – 1MB+
Ops/s: 200M-1.5G+ w /hardware accelerator



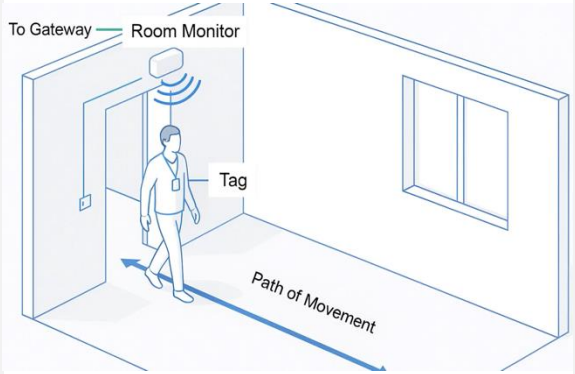
Low-resolution vision

- Wake-up on object detection (always-on), classification
- Presence detection
- People counting, people-flow counting
- Movement detection

ML SDK	Rock-paper-scissor image classification
Example	People flow counting
Partner	People flow counting, Gesture Recognition, Face detection

RADIO SIGNALS

RAM: 256kB –
Ops/s: 200M-1.5G w /hardware accelerator

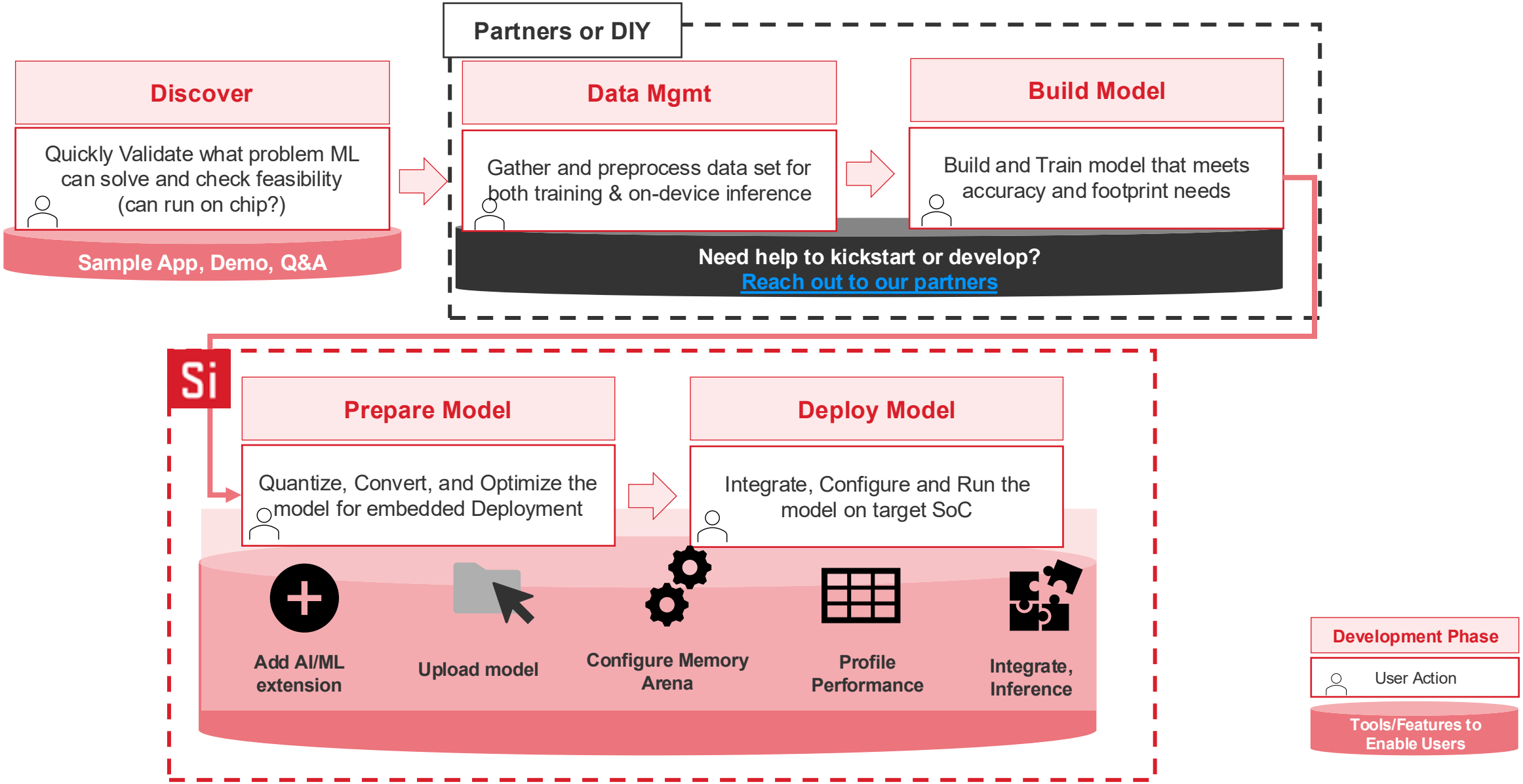


Locationing & Wireless Sensing

- Tire Positioning via Direction Finding (MVP)
- RTLS
- Presence Detection
- Motion Detection

ML SDK	
Alpha Demo	Under NDA only
Partner	Unikie Tire Positioning, Emanate

ML Software Pipeline



Partner Software and Tool Support

ML Expert

SDK with Sample Apps

SILICON LABS
Machine Learning SDK

Start with Developer Journey page

TensorFlow

TFLite Flatbuffer

TFLite-micro Interpreter

CMSIS-NN Kernels | Silicon Labs HW-based Kernels

Cortex M | ML HW Accelerator

Low-code / AutoML

GUI Developer Tools

EDGE IMPULSE

SensiML™

ModelCat

TFLite-micro Interpreter

CMSIS-NN Kernels | Silicon Labs HW-based Kernels

Cortex M | ML HW Accelerator

ML Solutions

Solution Libraries

Wake Word / Voice Command — sensory

Wide variety of applications — AIZIP

Anomaly Detection — Micro.ai

System Integrators

Capgemini | embedUR | JABIL

AITAD | UNIKIE | KLIKA·TECH GLOBAL IOT SOLUTIONS

SIGMA Connectivity | digica Intelligent Software | endava

Cortex M (& MVP)

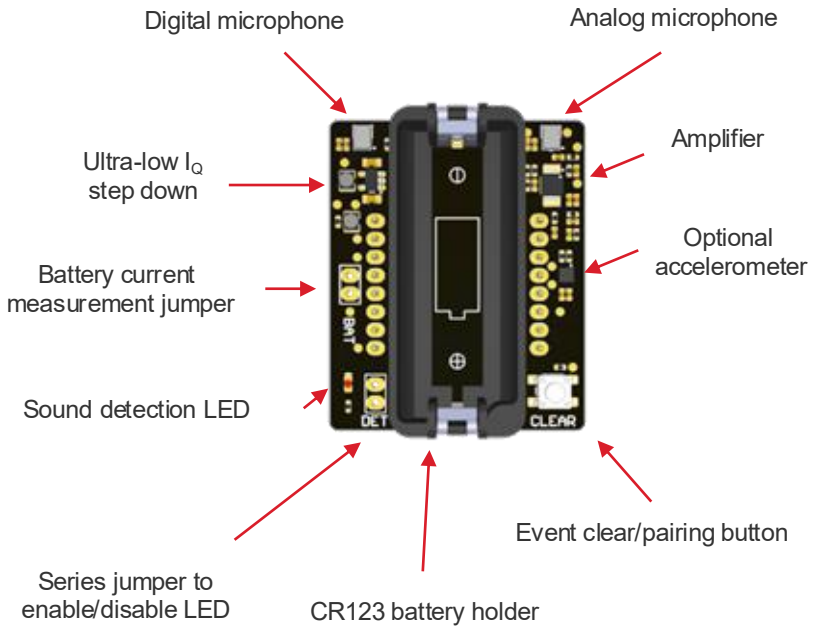
Glass Break Sensing for Security Applications with AIZIP

- Battery operated single SoC runs the complete application including radio, ML sensing
- Turnkey solution, algorithm from partner AIZIP, SW licensing by partner
- ML sensing method outperforms traditional sensing algos, especially in avoiding false positives, see video
- Reference design + SW example with FG28 but applicable with many OPNs
- 3yr+ battery life (CR123)

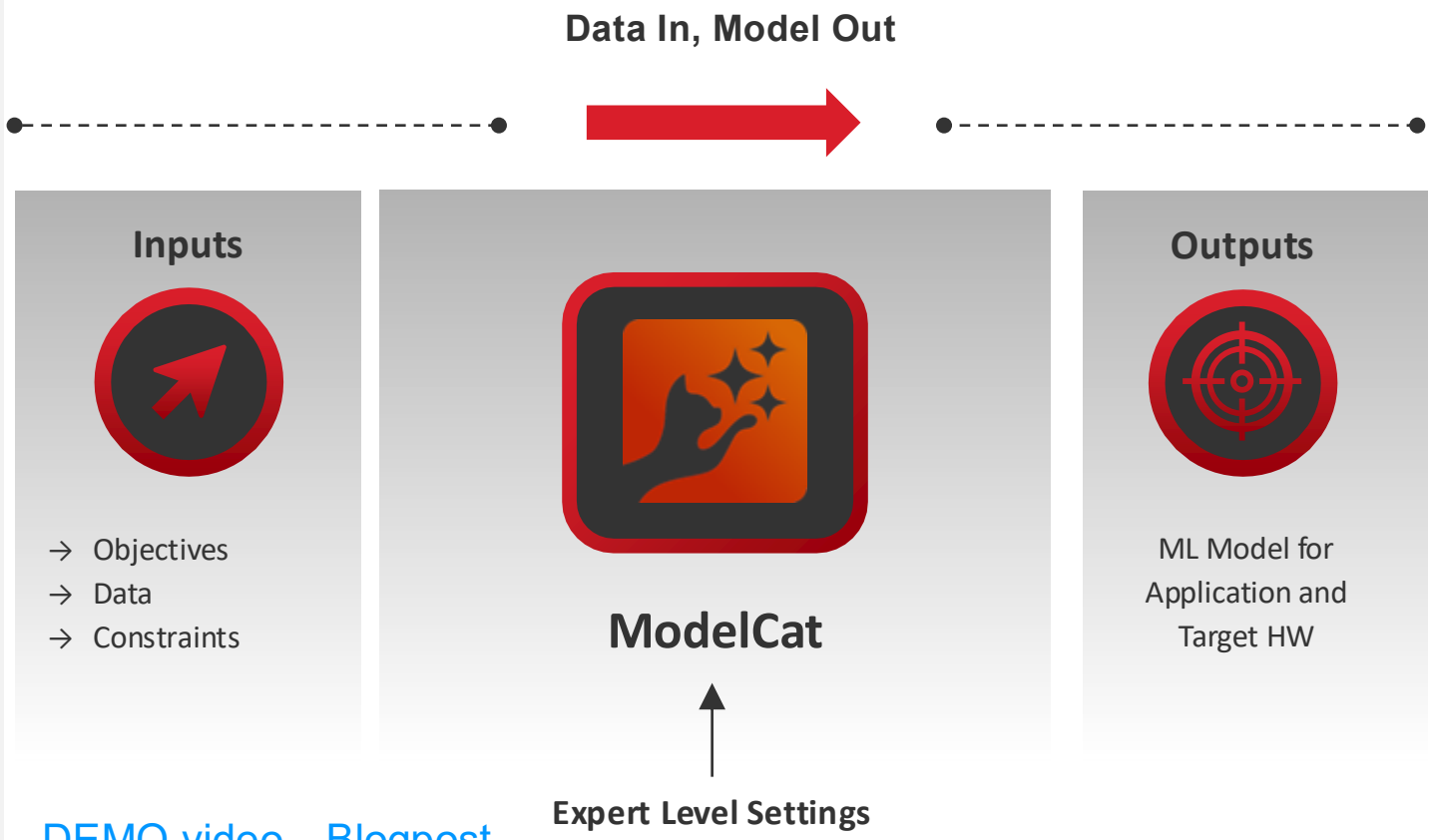
DEMO video

Blogpost

Glass Break sensor reference design with FG28 - Available for customer testing



AI Models for Vision Applications on MCUs with ModelCat AI



- ML based Vision solutions on resource constrained SoCs such as xG24/xG26
- Easy solution creation for low-resolution vision use cases like people counting, face detection and image classification, pattern recognition
- Device 'capability-aware' ML model creation overcomes the gap between complex ML and Embedded Systems with AI-in-the-Loop technology
- Ported to MG26 MVP accelerator, demo available

Competitive to faster MCUs

Model	Inference Time (ms)	Energy/Inference (mJ)	Average Power During Inference (mW)
Hand Gesture Recognition	123.7	2.49	20.1
Face Detection (Most accurate)	299	6.03	20.2
Face Detection (Medium)	102.4	2.23	21.8
Face Detection (Fastest)	58.9	1.25	21.2

BLE Positioning with ML, demo from Unikie

A Tire Pressure Monitoring System (TPMS) using BG24 tracks tire position so that pressure is correctly maintained even if position is changed

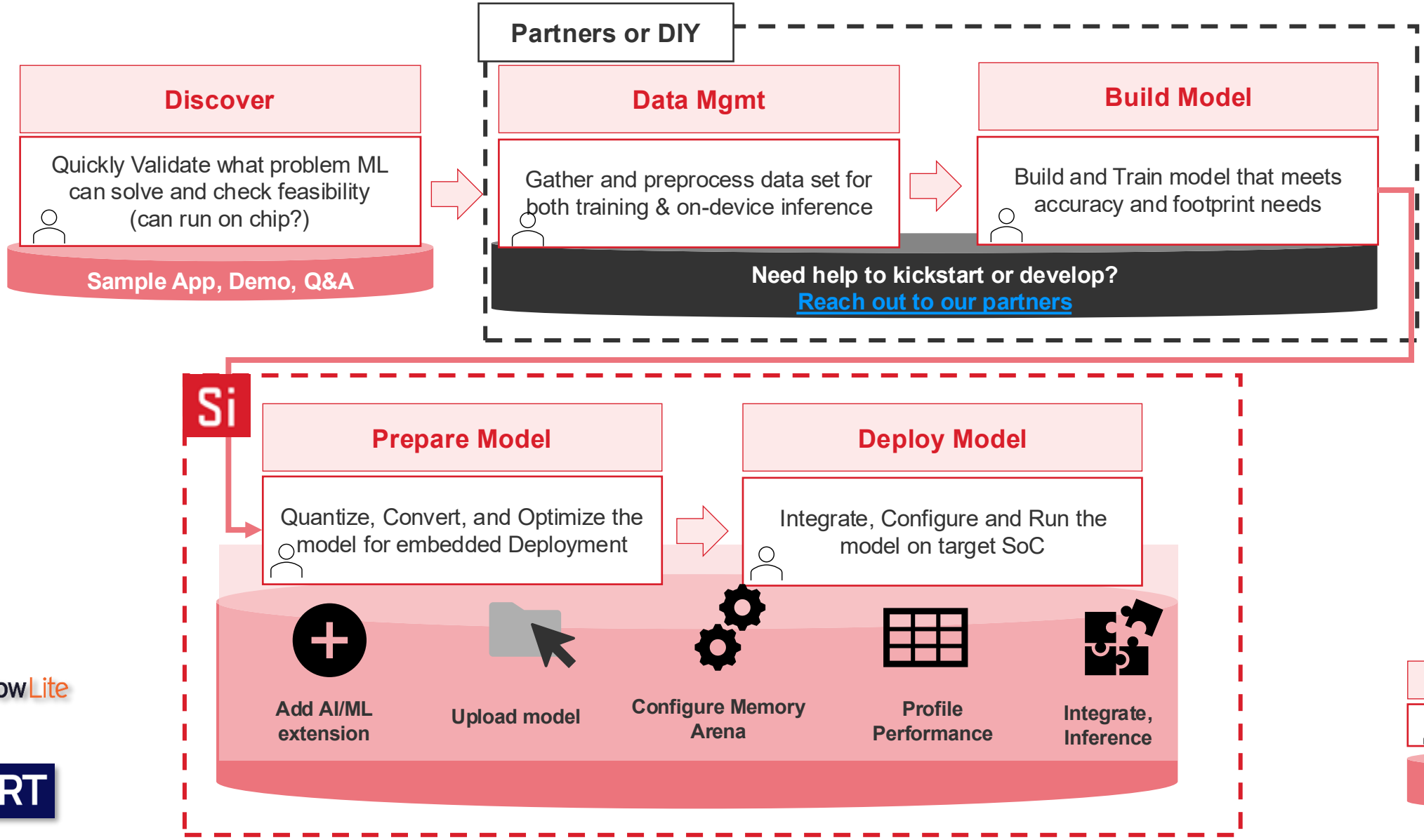
DEMO Video

Blogpost

UNIKIE

- **Unikie and Silicon Labs Partnership**
- **Production-ready on-device AI solutions from the partner**
- **Car Demo:**
  - BG24+BG22 Tire Pressure Monitoring System (TPMS) with ML based positioning, using 2x2 antenna
  - Very fast and low resource consuming, low memory solution
- **Applications beyond TPMS**
  - Real-time locationing for tags in a space
  - Smart doorlocks: resolution for inside our outside problem
  - Local positioning-based applications such as indoor navigation and tracking
  - Smart access control and proximity-based control systems for personalized device behavior

ML Software Pipeline



AI/ML on Wireless Gecko Series in Production

EFR32 SERIES 2 SOCS

EFR32xG24	EFR32xG26	EFR32xG28	SiWx917
			
78MHz CortexM33 **AI/ML accelerator** 1.5MB / 256kB 2.4 GHz radio 20 dBm TX Power Secure Vault - Mid Secure Vault - High	78MHz CortexM33 **AI/ML accelerator** 3MB / 512kB 20 dBm TX Power Secure Vault - Mid Secure Vault - High	78MHz CortexM33 **AI/ML accelerator** 1MB / 256kB Sub-GHz radio 20 dBm TX Power Secure Vault - Mid Secure Vault - High	180 MHz CortexM4 **AI/ML accelerator** 8MB / 672kB 19 dBm TX Power Secure Vault - Mid Secure Vault - High

Starter Kits
xG24-DK2601B Developer kit
xG26-DK2608A Developer Kit
xG28-EK2705 Explorer Kit
SiWx917-DK2605 Developer Kit

Broad Range of Sensors
- Inertial Sensor
- 2 Digital Microphones
- PIR sensor
- Pressure Sensor
- Relative Humidity and Temperature Sensor
- UV and Ambient Light Sensor
- Hall-effect Sensor

Ready to demonstrate ML
- Examples on GitHub
- Many sample applications and demos from partners
- Plug&Play Sensor extensions with Sparkfun Qwiic
- CR2032 coin cell battery

TensorFlow Lite

Common Machine Learning software and tools on our Wireless SoC portfolio
Use cases are dependent on RAM and wireless stack

Machine Learning Development Kits

xG26/24 DEV KIT

- Wireless SoC with multi-protocol radio based on EFR32xG26/xG24
- ARM® Cortex-M33 with TrustZone, 512/256 kB RAM and 3200/1536 kB Flash, 80 MHz
- AI/ML Hardware Accelerator
- Broad Range of Sensors
  - 6-axis Inertial Sensor
  - 2 Digital Microphones
  - Pressure Sensor
  - Indoor Air Quality and Gas Sensor
  - Relative Humidity and Temperature Sensor
  - UV and Ambient Light Sensor
  - Hall-effect Sensor
- Link

sparkfun ELECTRONICS

xG26/24 EXPLORER KIT

- Based on EFR32xG26/xG24 2.4 GHz Wireless SoC
- +10 dBm, 1536 kB flash, 256 kB RAM, QFN48
- Two LEDs and two push buttons
- Reset button
- USB connector for power and debug connection
- On-board SEGGER J-Link debugger
- Virtual COM port
- Packet Trace Interface (PTI)
- Breakout pads for GPIO access and connection to external hardware
- Third-party add-on connectors
  - mikroBUS socket
  - Qwiic® connector
- Link

sparkfun ELECTRONICS

qwiic

mikro BUS

xG28 EXPLORER KIT

- Based on EFR32xG28, 1024 kB flash and 256 kB RAM
- Two LEDs and two push buttons
- Reset button
- USB connector for power and debug connection
- On-board SEGGER J-Link debugger
- Virtual COM port
- Packet Trace Interface (PTI)
- Breakout pads for GPIO access and connection to external hardware
- Third-party add-on connectors
  - mikroBUS™ socket
  - Qwiic® connector
- Link

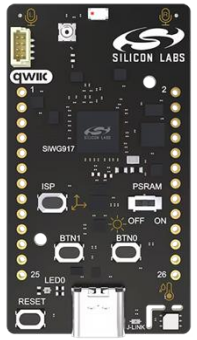
sparkfun ELECTRONICS

qwiic

mikro BUS

SiWx917 DEV KIT

- Based on SiWG917
- 8 MB Flash, 8 MB external PSRAM, 7x7 QFN, -40°C to +85°C
- Integrated on-chip antenna
- RF: Front-end design based on external RF Switch and BPF, RF connector for conducted RF measurements
- On-board sensors: Temperature Sensor, Humidity Sensor, 6-axis inertial sensor, 2 x Digital Microphones, Ambient Light Sensor
- Qwiic Connector: For compatibility with Sparkfun's expansion hardware (Sensors, Camera, LCD, etc)
- USB Port: Board Power, Serial Communication (ISP Bootloader)
- On-board Debugger: SWD, VCOM
- Link



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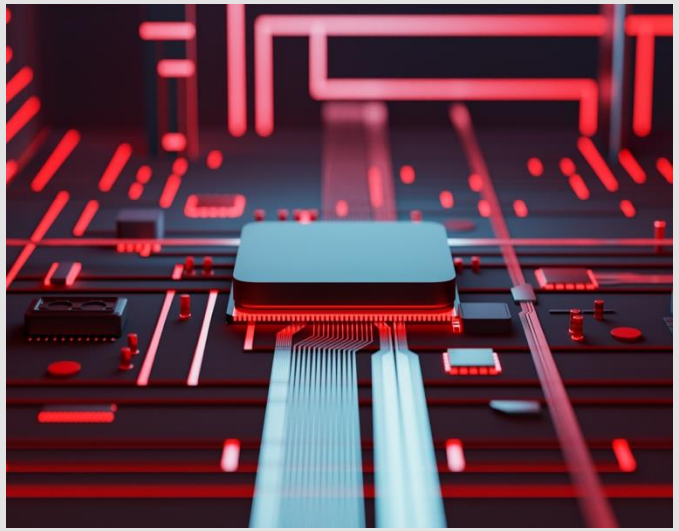
qwiic

Learn More About Silicon Labs Machine Learning



GETTING STARTED

AI/ML Webpage

Visit site

Developer Journey

Visit site

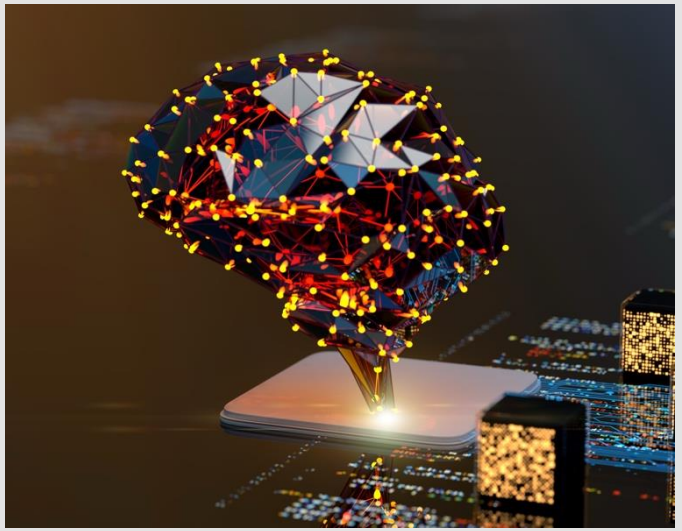
FOR MORE INFORMATION

ML Model Profiler

Visit site

Works With AI/ML content - 2025

Visit site



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https://community.silabs.com/