How to Enhance Edge AI Vision with the Katana SoC Using Multi-Modal Sensing

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Uni-modal Computer Vision

Vision Based AI Inferencing

- Image Classification
- Object Detection
- Tracking
- Identification

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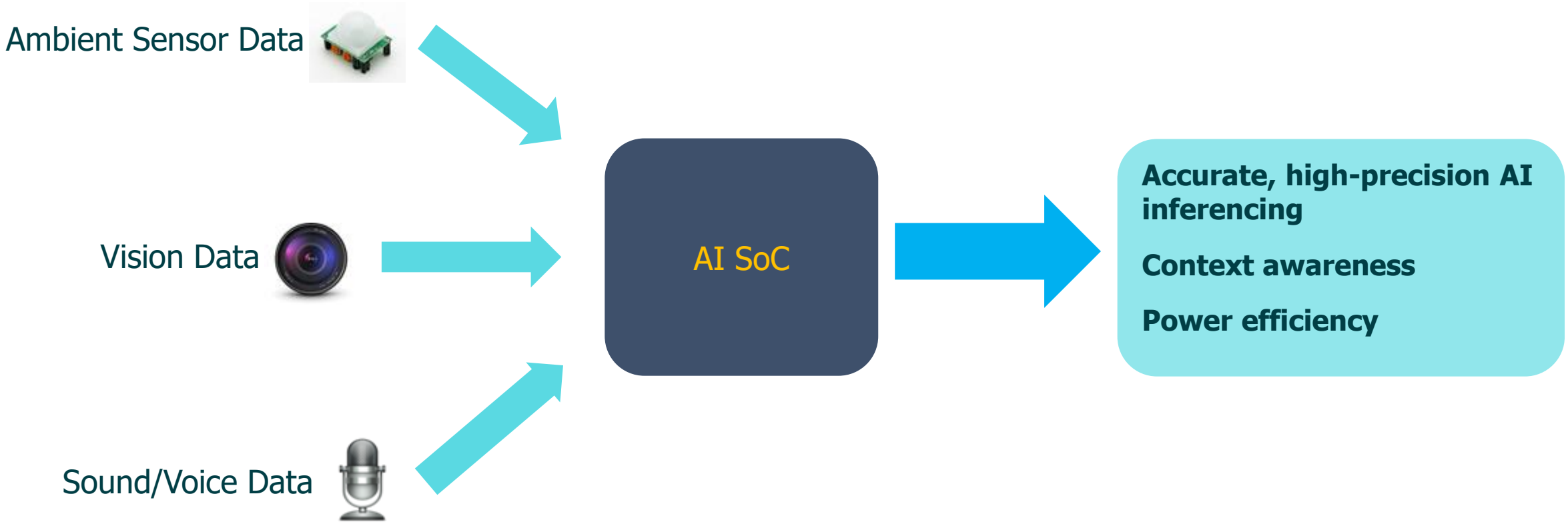
Output decisions are limited in context

High accuracy requires **Always-ON** systems

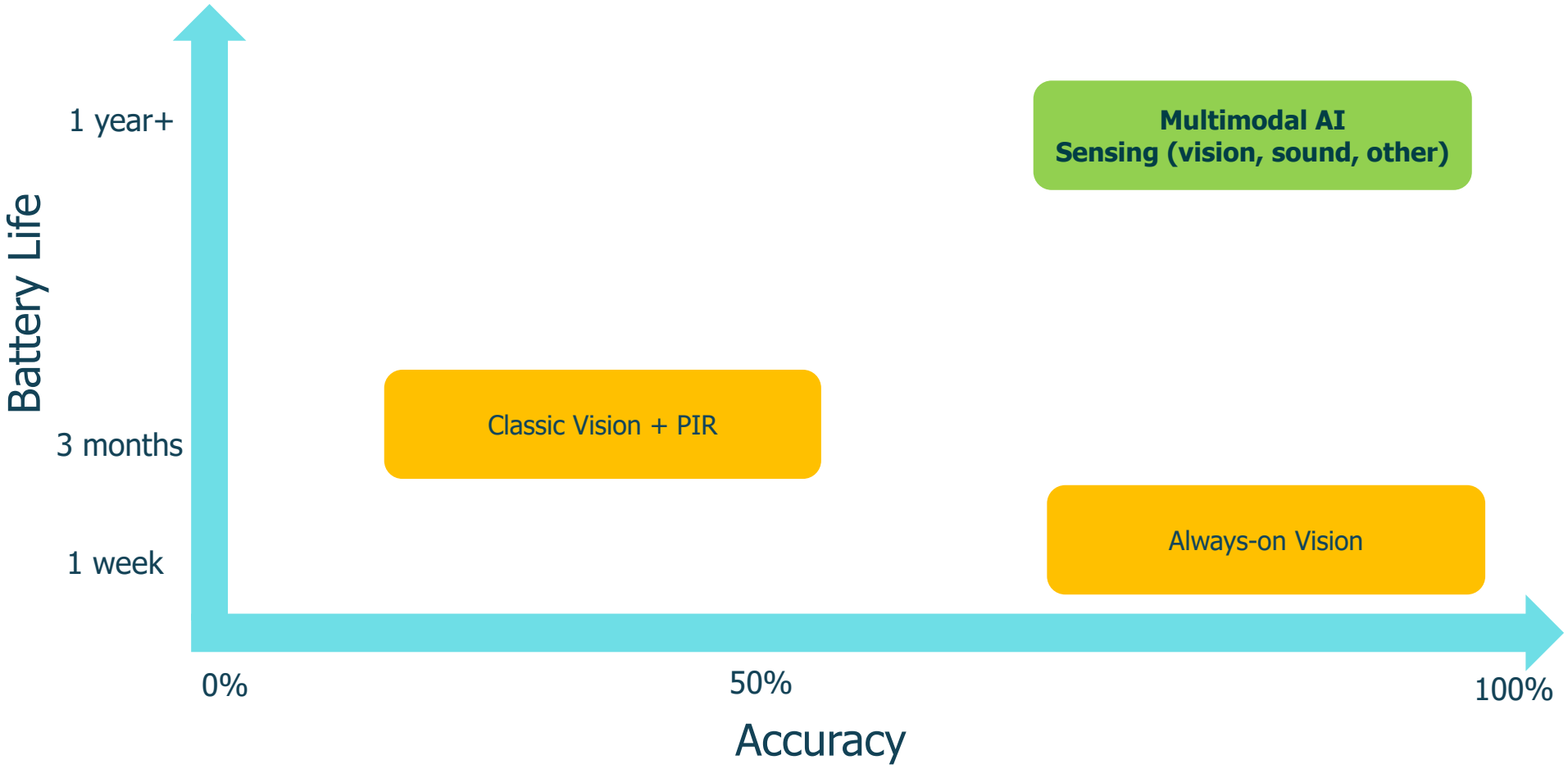
High power consumption / need continuous line-power

Barrier to scale to 100's or 1000's of vision sensors per premise

What is Multimodal Sensing in Edge AI Vision?



Battery Life vs. Accuracy



2x AA Batteries

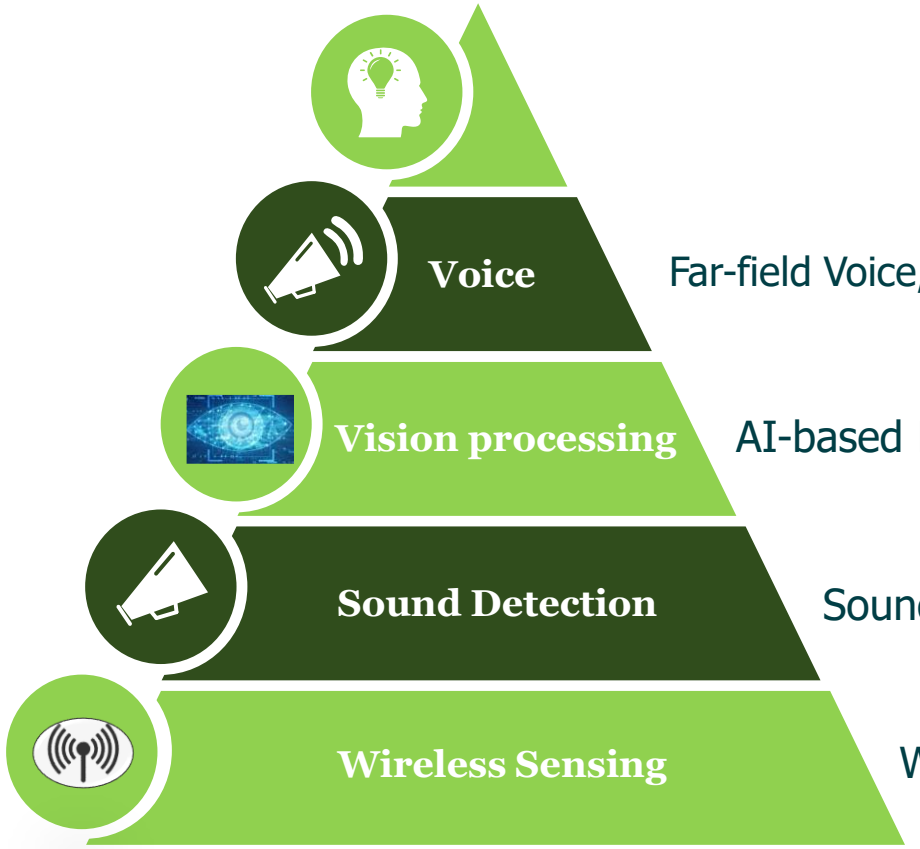
15 mA Active Current

300 uA Idle Current

30 uA Sleep Current

Multi-Layered Sensor System Development

Always-on AudioVisual AI sensing



Far-field Voice, Noise Cancellation & Other Audio Algorithms

AI-based Low-power Vision

Sound Event Detection AI models

Wireless Channel-based Presence Detection

Wireless Security Camera

Traditional PIR-based camera systems are susceptible to false detections

Frequent wakeups of powerful processor reduce battery-life

False detections lead to poor user experience

New Katana-based Multi-modal Architecture

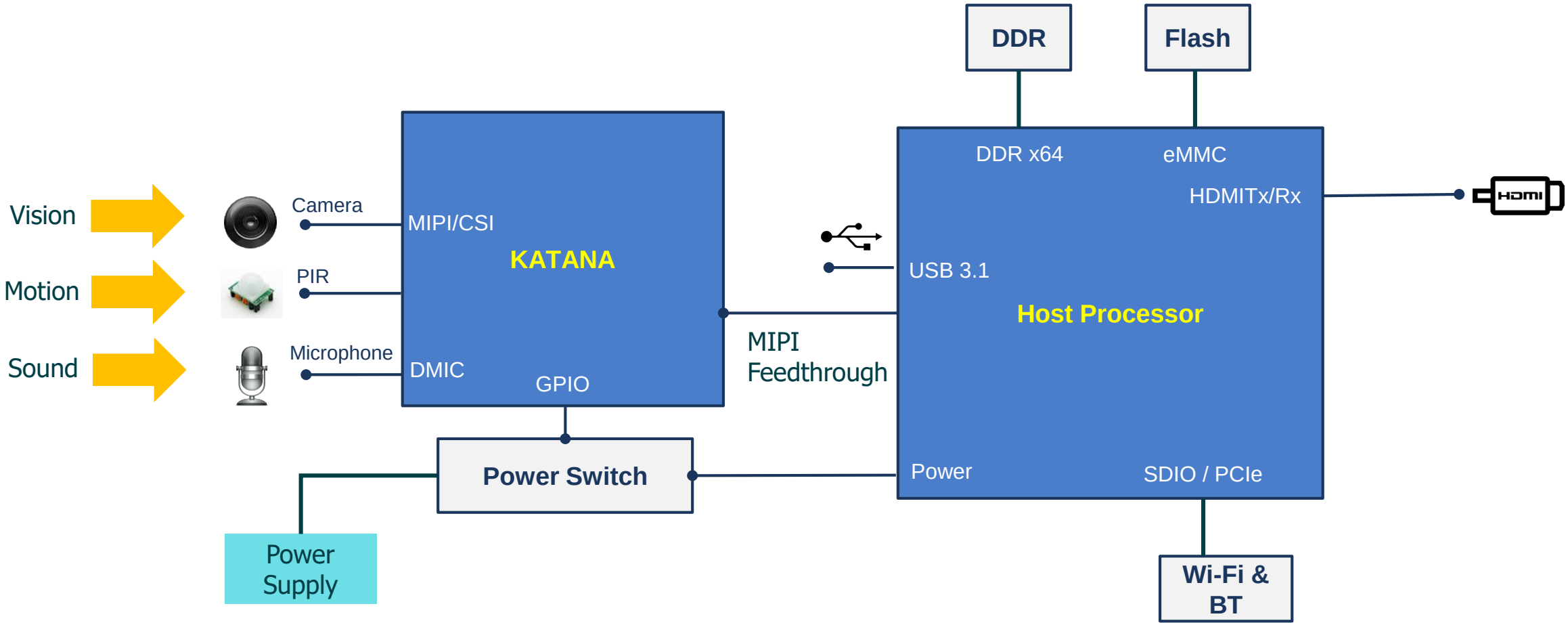
Low-powered Katana performs AI qualification of event

If it is a significant event, wakes up application processor

Application processor performs HD Video streaming to the Cloud

- ➢ Significant extension of battery-life
- ➢ Far-improved user experience

Low-power Co-processor System Architecture



Fall Detection System for Ambient Assisted Living

Wearable (pendant/watch) Fall Detection systems are inaccurate

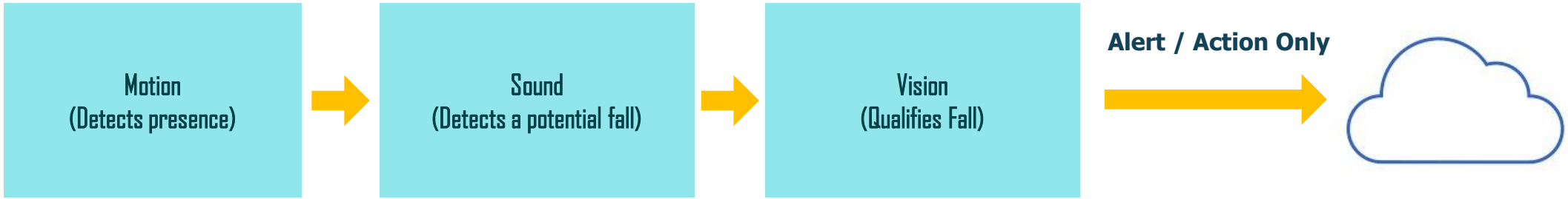
Don’t work unless they are charged-up and in use

Associated “old person” stigma reduces use, limits adoption

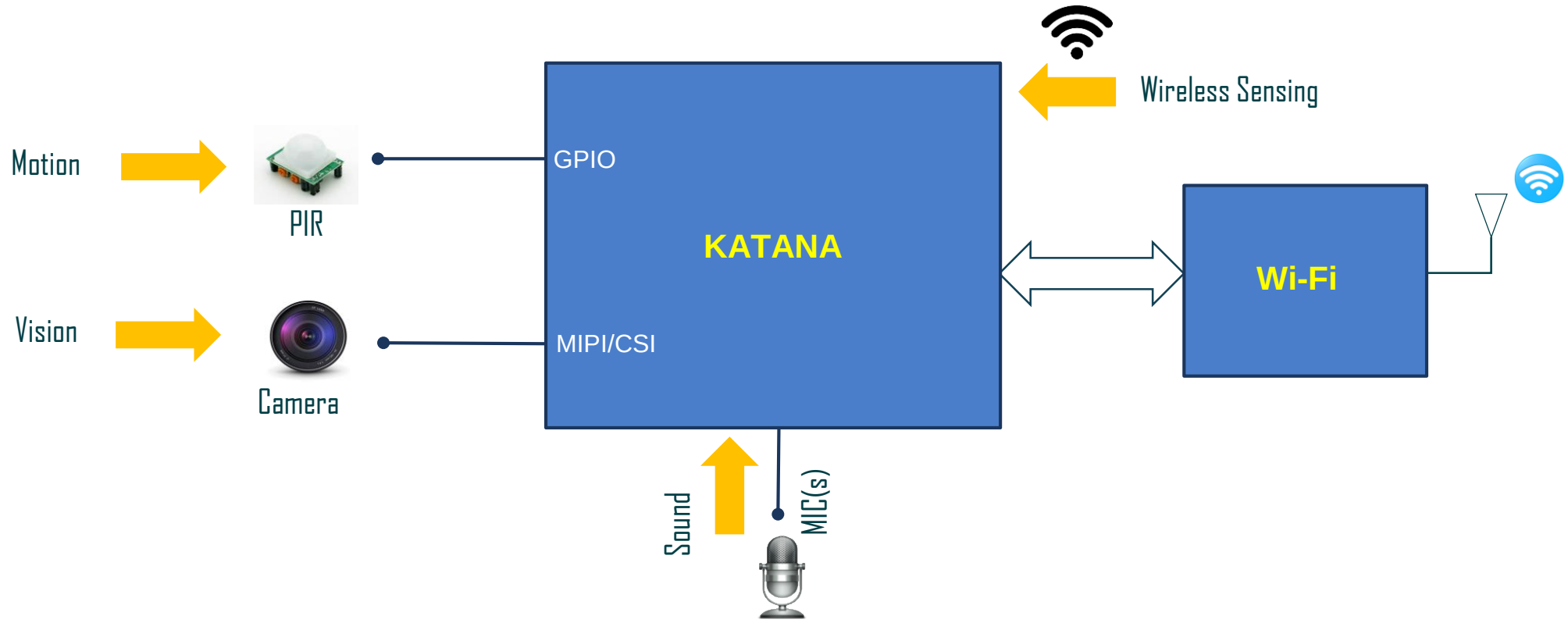
Frequently misplaced and lost

Edge AI Vision based systems are accurate, non-intrusive and secure

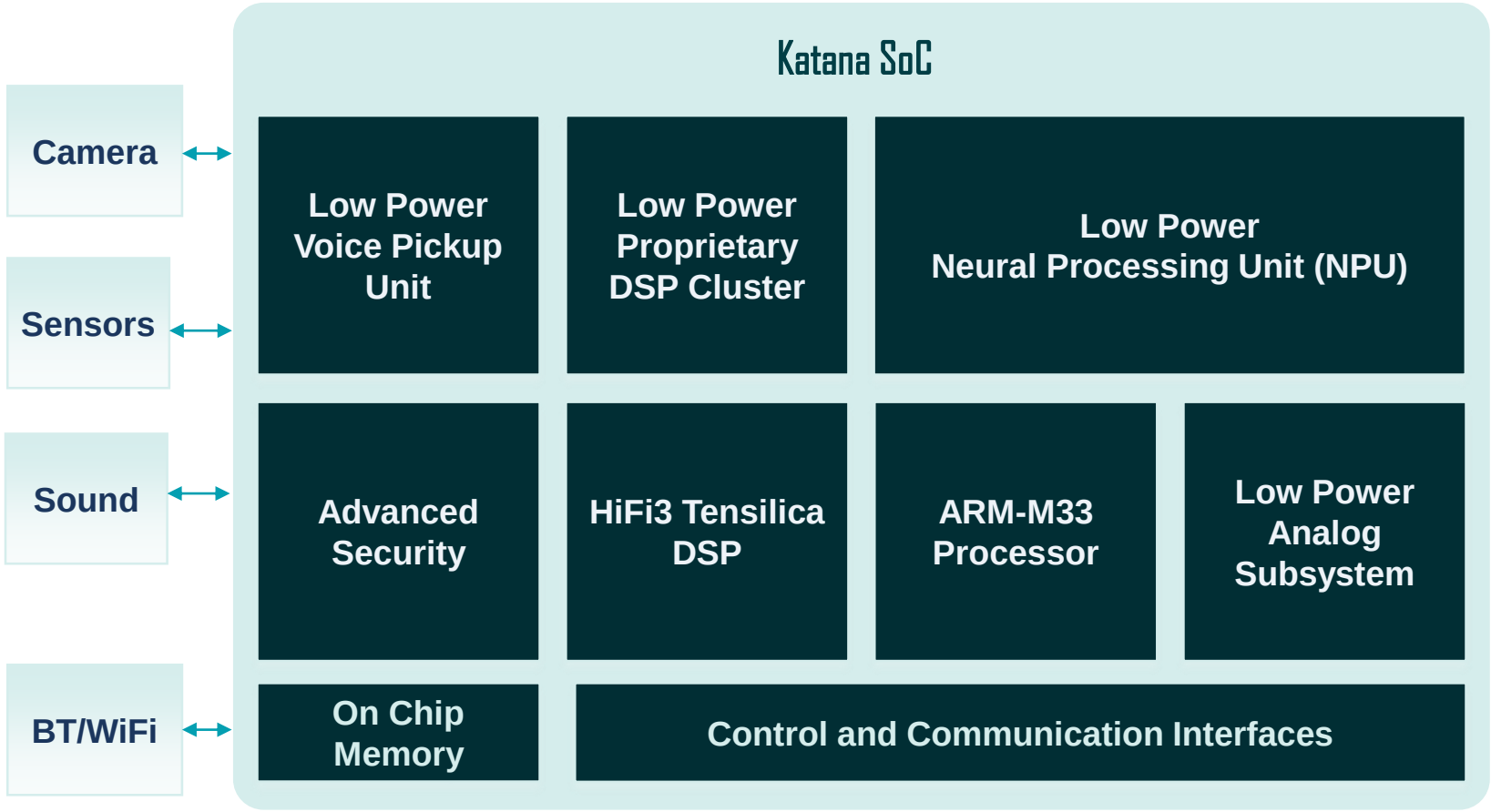
FALL DETECTION SYSTEM



Fall Detection System Architecture

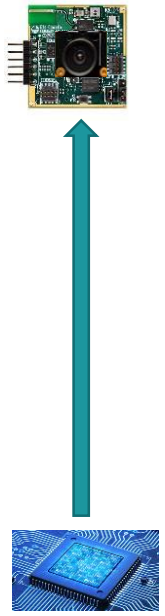


Katana SoC Architecture



Full Solution Stack for Edge AI

KATANA™ Edge AI Models	Retrainable / customizable Multi-modal Validated & tested in real-world scenarios
Reference pre-processing/post-processing software	Easily portable to end application Optimized to improve performance and memory usage
TENSAI™ Flow Compiler	Memory optimization High speed & efficiency
KATANA™ Edge AI SOC	Unique hybrid multicore SoC Ultra-Low power inference



- Image classification
- Sound classification
- Object detection
- Person detection
- Predictive maintenance
- Keyword recognition

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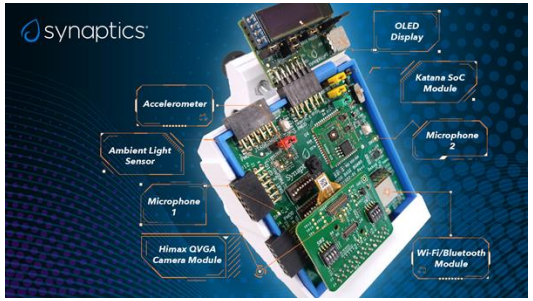
Resources



Katana EVK + SDK

Available – Q2 2022

Contact: https://synaptics.com/contact/synaptics-sales

[Innovative AI-Driven People Detection and Counting - YouTube]

[AI-Driven Meter Reading For Industrial IoT - YouTube]

Conclusion

Multi-modal sensing makes AI Inferencing at the edge more accurate and power efficient

Current devices may use two or multiple chips for performing two or more types of sensing

Katana SoC, with its multi-core architecture, performs multi-modal edge sensing & inferencing at ultra-low-power levels

Thank You

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