tinyML® Trailblazers

Ultra-low power machine learning at the edge success stories

tinyML Success Stories with Thierry Moreau
Co-Founder and VP Technology Partnerships, OctoML

INSPIRE-EDUCATE-ILLUMINATE

www.tinyML.org
Thank you, tinyML Strategic Partners*, for committing to take tinyML to the next Level, together

* as of March 28, 2022; several more under final reviews
Executive Strategic Partners
Arm AI Virtual Tech Talks

The latest in AI trends, technologies & best practices from Arm and our Ecosystem Partners.

Demos, code examples, workshops, panel sessions and much more!

Fortnightly Tuesday @ 4pm GMT/8am PT

Find out more:
www.arm.com/techtalks
The leading edge ML platform

www.edgeimpulse.com
Advancing AI research to make efficient AI ubiquitous

A platform to scale AI across the industry

- **Perception**
  - Object detection, speech recognition, contextual fusion

- **Reasoning**
  - Scene understanding, language understanding, behavior prediction

- **Efficient learning**
  - Robust learning through minimal data, unsupervised learning, on-device learning

- **Personalization**
  - Continuous learning, contextual, always-on, privacy-preserved, distributed learning

- **Power efficiency**
  - Model design, compression, quantization, algorithms, efficient hardware, software tool

- **Action**
  - Reinforcement learning for decision making

IoT/IoT
Edge cloud
Cloud
Mobile
Automotive
Neural Decision Processors
- At-Memory Compute
- Sustained High MAC Utilization
- Native Neural Network Processing

ML Training Pipeline
- Enables Production Quality Deep Learning Deployments

Data Platform
- Reduces Data Collection Time and Cost
- Increases Model Performance

End-to-End Deep Learning Solutions for TinyML & Edge AI

partners@syntiant.com
www.syntiant.com
Platinum Strategic Partners
WE USE AI TO MAKE OTHER AI FASTER, SMALLER AND MORE POWER EFFICIENT

Automatically **compress** SOTA models like MobileNet to <200KB with little to no drop in accuracy for inference on resource-limited MCUs

**Reduce** model optimization trial & error from weeks to days using Deeplite’s **design space exploration**

**Deploy more** models to your device without sacrificing performance or battery life with our **easy-to-use software**

Add Advanced Sensing to your Product with Edge AI / TinyML

Reality AI

Pre-built Edge AI sensing modules, plus tools to build your own

Reality AI solutions
- Prebuilt sound recognition models for indoor and outdoor use cases
- Solution for industrial anomaly detection
- Pre-built automotive solution that lets cars "see with sound"

Reality AI Tools® software
- Build prototypes, then turn them into real products
- Explain ML models and relate to the function to the physics
- Optimize the hardware, including sensor selection and placement

https://reality.ai  info@reality.ai  @SensorAI  Reality AI
BROAD AND SCALABLE EDGE COMPUTING PORTFOLIO

Microcontrollers & Microprocessors

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<td>Arm® Cortex®-M 32-bit MCUs</td>
<td>Ultra-low Energy 8 &amp; 16-bit MCUs</td>
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<td>Arm® ecosystem, Advanced security, Intelligent IoT</td>
<td>Bluetooth® Low Energy, SubGHz, LoRa®-based Solutions</td>
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<td>Arm®-based High-end 32 &amp; 64-bit MPUs</td>
<td>High Power Efficiently 32-bit MCUs</td>
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<td>High-resolution HMI, Industrial network &amp; real-time control</td>
<td>Motor control, Capacitive touch, Functional safety, GUI</td>
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<td>Arm® Cortex®-M0+ Ultra-low Power 32-bit MCUs</td>
<td>40nm/28nm process Automotive 32-bit MCUs</td>
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<td>Innovative process tech (SOTB), Energy harvesting</td>
<td>Rich functional safety and embedded security features</td>
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Renesas Synergy™ Arm®-based 32-bit MCUs for Qualified Platform
Qualified software and tools

Core technologies

AI
A broad set of high-power and energy-efficient embedded processors

Security & Safety
Comprehensive technology and support that meet the industry’s stringent standards

Digital & Analog & Power Solution
Winning Combinations that combine our complementary product portfolios

Cloud Native
Cross-platforms working with partners in different verticals and organizations

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Gold Strategic Partners
Maxim Integrated: Enabling Edge Intelligence

Advanced AI Acceleration IC

The new MAX78000 implements AI inferences at low energy levels, enabling complex audio and video inferencing to run on small batteries. Now the edge can see and hear like never before.

www.maximintegrated.com/MAX78000

Low Power Cortex M4 Micros

Large (3MB flash + 1MB SRAM) and small (256KB flash + 96KB SRAM, 1.6mm x 1.6mm) Cortex M4 microcontrollers enable algorithms and neural networks to run at wearable power levels.

www.maximintegrated.com/microcontrollers

Sensors and Signal Conditioning

Health sensors measure PPG and ECG signals critical to understanding vital signs. Signal chain products enable measuring even the most sensitive signals.

www.maximintegrated.com/sensors
LatentAI

Adaptive AI for the Intelligent Edge

Latentai.com
Deploy TinyML into the Real World - Plug and Play ML

**Sensors:**
- modulated and ready-to-use sensors to simplify the setup process
- support 500+ grove modules

**Wio Terminal:**
- complete AI platform integrated with a 2.4" LCD Screen, onboard IMU (LIS3DHTR), microphone, buzzer, microSD card slot, light sensor, infrared emitter (IR 940nm)

**Codecraft:**
- no code programming platform to Get Started With TinyML
- supports Arduino, Python, C or JavaScript etc.

**Edge Impulse:**
- to optimize data utilization and enable deploy a machine learning model faster than ever

**TensorFlow Lite:**
- to easily train low memory usage machine learning models

**Applications:**
- Artificial Nose
- AI Thermal Camera for Safe Camping
- Azure IoT Squirrel Feeder

**Inference:**
- Motion / Gesture / Speech / Smell / Sports
- Barcode / Face / Image
Build Smart IoT Sensor Devices From Data

SensiML pioneered TinyML software tools that auto generate AI code for the intelligent edge.

- End-to-end AI workflow
- Multi-user auto-labeling of time-series data
- Code transparency and customization at each step in the pipeline

We enable the creation of production-grade smart sensor devices.

sensiml.com
SynSense builds sensing and inference hardware for ultra-low-power (sub-mW) embedded, mobile and edge devices. We design systems for real-time always-on smart sensing, for audio, vision, IMUs, bio-signals and more.

https://SynSense.ai
Silver Strategic Partners
tinyML Summit 2022
Miniature dreams can come true…
March 28-30, 2022
Hyatt Regency San Francisco Airport
https://www.tinyml.org/event/summit-2022/

Presentations are available on www.tinyML.org and that videos will be available on www.youtube.com/tinyML

tinyML Research Symposium 2022
March 28, 2022
https://www.tinyml.org/event/research-symposium-2022

More sponsorships are available: sponsorships@tinyML.org
Our next tinyML Trailblazers Series
Success Stories with Mouna Elkhatib
(CEO, CTO, and Co-Founder, AONDevices Inc.)

LIVE ONLINE June 7th, 2022 at 8 am PDT

Register now!
Join Growing tinyML Communities:

tinyML - Enabling ultra-low Power ML at the Edge


The tinyML Community

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www.youtube.com/tinyML
Reminders

Slides & Videos will be posted tomorrow

tinyml.org/forums  youtube.com/tinyml

Please use the Q&A window for your questions
Host of the Trailblazers Series

Chris Rowen

Chris is a Silicon Valley entrepreneur and technologist, now VP of AI Engineering and Product for Webex Collaboration in Cisco. Most recently he was co-founder and CEO of BabbleLabs, a speech ML company, acquired by Cisco in 2020. Prior to BabbleLabs, Chris served as CTO for Cadence’s IP Group, which he joined after Cadence’s acquisition of Tensilica, the company he founded in 1997 to develop extensible processors. He led Tensilica as CEO and later, CTO, to develop one of the most prolific embedded processor architectures, especially for compute-intensive embedded processing. Chris was a pioneer in developing RISC architecture and helped found MIPS Computer Systems in 1984. He has an MS and PhD in EE from Stanford and a BA in physics from Harvard. He was named an IEEE Fellow in 2015 for his work in development of microprocessor technology.
Thierry Moreau

Thierry is a co-founder of Seattle-based startup OctoML, where he spends his time building a platform to automate the deployment of machine learning models to a multitude of cloud, edge and IoT systems. Thierry got his Ph.D. from University of Washington where he spent his time building up Apache TVM, a now widely-used open source deep learning compiler. His research aimed to facilitate hardware-software co-design by introducing a complete open source deep learning stack (TVM+VTA) comprising a deep learning compiler and a modular hardware accelerator design. Today he focuses on extending the TVM framework to better support NPU type co-processors on edge systems, including microcontrollers.
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