

Edge AI Trends

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Motivation

- › Cloud computing is an central component of smart systems
- › Disadvantages of cloud lead to the movement of processing towards the edge
- › This leads to new challenges but also enables better and new applications
- › This impacts:
 - AI models
 - Sensor nodes
 - Microcontrollers
 - Distribution approaches
 - and many more aspects

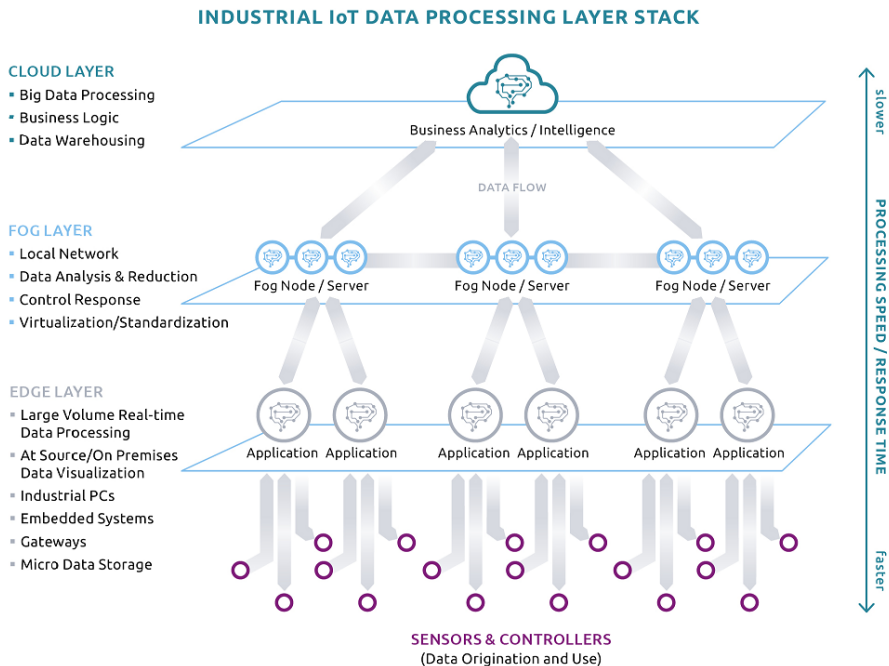


Image: EPoSS e. V.

Infineon is a globally leading semiconductor player



top 10
semiconductor company

~46,700
employees*

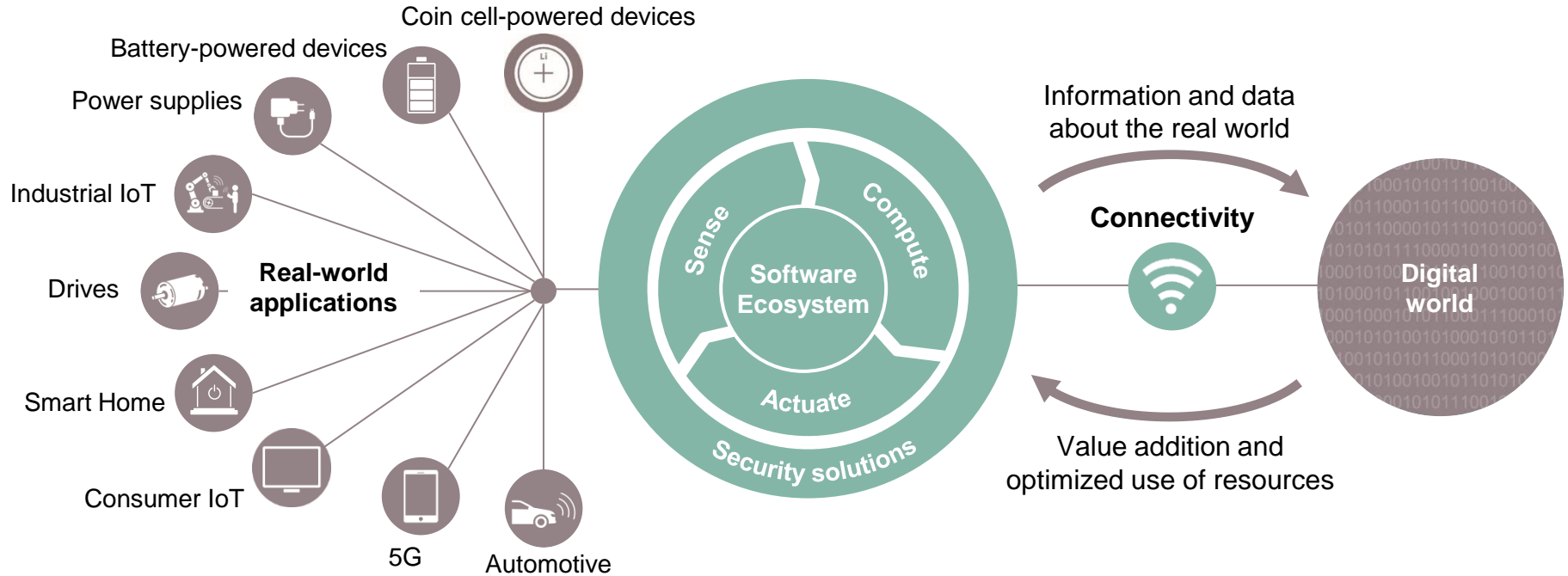
leading player
in automotive, systems for power management and drives, sensor systems, connected secure systems, wireless combos, differentiated memories

9%+ | 19% | 13%
target operating model**

* as of 30 September 2020

** over the cycle 9%+ revenue growth; 19% Segment Result margin; investment-to-sales ratio of 13%; targets to be approached as integration progresses

Infinion offers a unique portfolio that links the real and the digital world



Sense: sensors Compute: microcontrollers, memories Actuate: power semiconductors Connectivity: Wi-Fi, Bluetooth, USB

Edge AI State-of-the-Art

- › Hardware for edge AI (e.g. Jestson Nano, Coral TPU)
- › Machine learning models for AI (e.g. ProtoNN, Bonsai)
- › Distributed learning at the edge (e.g. Federated Learning)

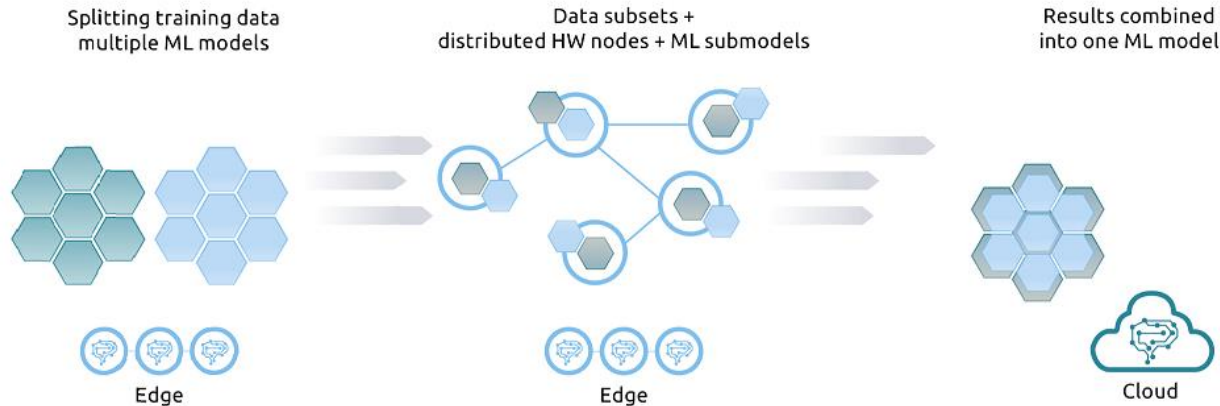


Image: EPoSS e. V.

Edge AI State-of-the-Art

- › Frameworks and platforms (e.g. Tensorflow Lite)
- › Hardware-software co-design
- › Distributed AI over cloud and edge

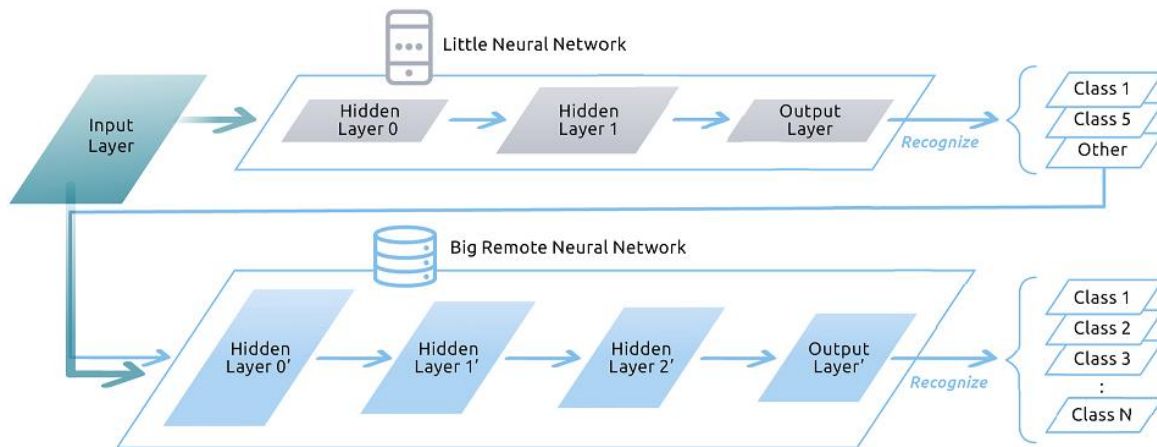


Image: <https://core.ac.uk/download/pdf/55872843.pdf>

Edge AI Trends & Challenges

- › Trust and explainability
- › Learning and Re-learning at the Edge
- › Functional safety, Security and Adversarial Attacks

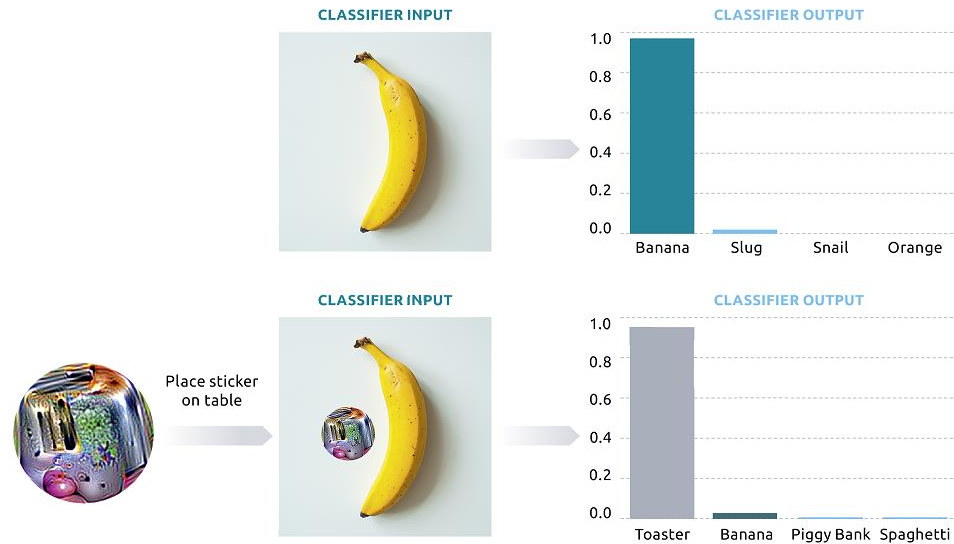


Image: <https://arxiv.org/pdf/1712.09665.pdf>

Edge AI Trends & Challenges

- › Accelerated fusion of embedded software and hardware
 - e.g. digital twins, analog AI
- › New AI processing elements and specific memory technologies for
 - Deploying neuromorphic technologies for improved energy efficiency and latency
 - Realizing new products for hazardous environment
 - Integrating AI into the smallest devices to e.g. enable intelligent sensors
- › Meta-learning and hybrid modelling
- › Deployment of new AI techniques (e.g. efficient transfer learning, data augmentation, automatic design exploration)
- › Blockchain and AI

Non-technical Trends

- › Improved public-private cooperation for
 - Generation and curation of high-quality data
 - Knowledge transfer
 - Open source tool and library development
- › Required skill set of engineers are changing
 - E.g. only hardware or software knowledge is not enough
- › Provide safety and trust through regulation and certification
- › Development of standards
- › Dealing with the fast pace of technical innovation

EPoSS AI at the Edge White Paper

EPoSS AI at the Edge White Paper is now available under the link:

www.smart-systems-integration.org/publication/eposs-ai-white-paper





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