Edge AI
Smart Sensor Systems

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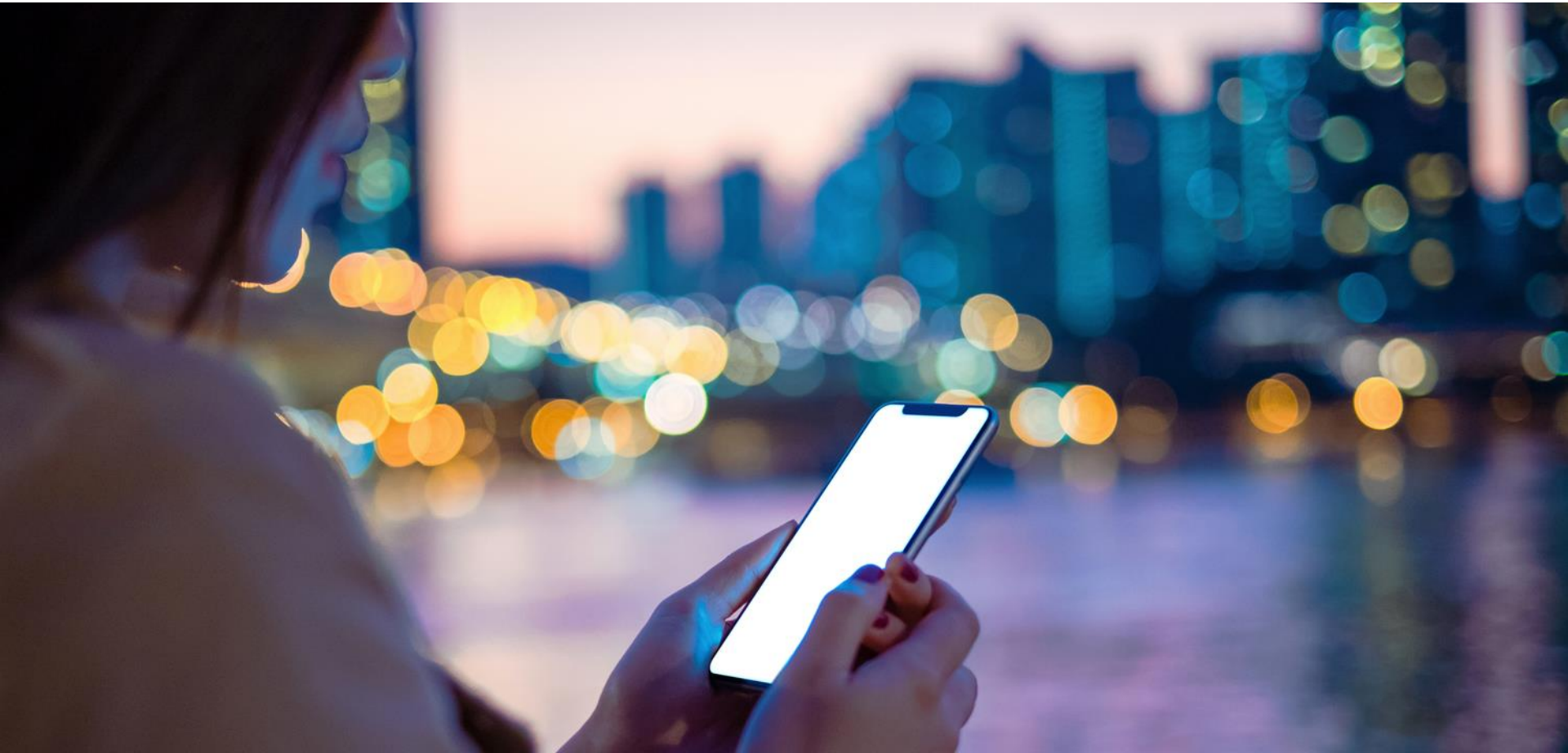
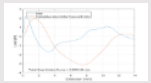
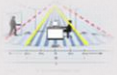
How do we want to interact with machines in future?



Infineon's consumer sensors: We focus on MEMS sensors and target to become the leader in 3D sensing and radar

Microphone	Pressure	Environmental	3D radar	3D ToF
 no distortions	 best-in-class resolution	 6x6mm² world smallest form factor	 highest energy efficiency	 best-in-class resolution
 receive clear audio signals	 measure height	 measure CO_2	 biometrics	 3D mapping

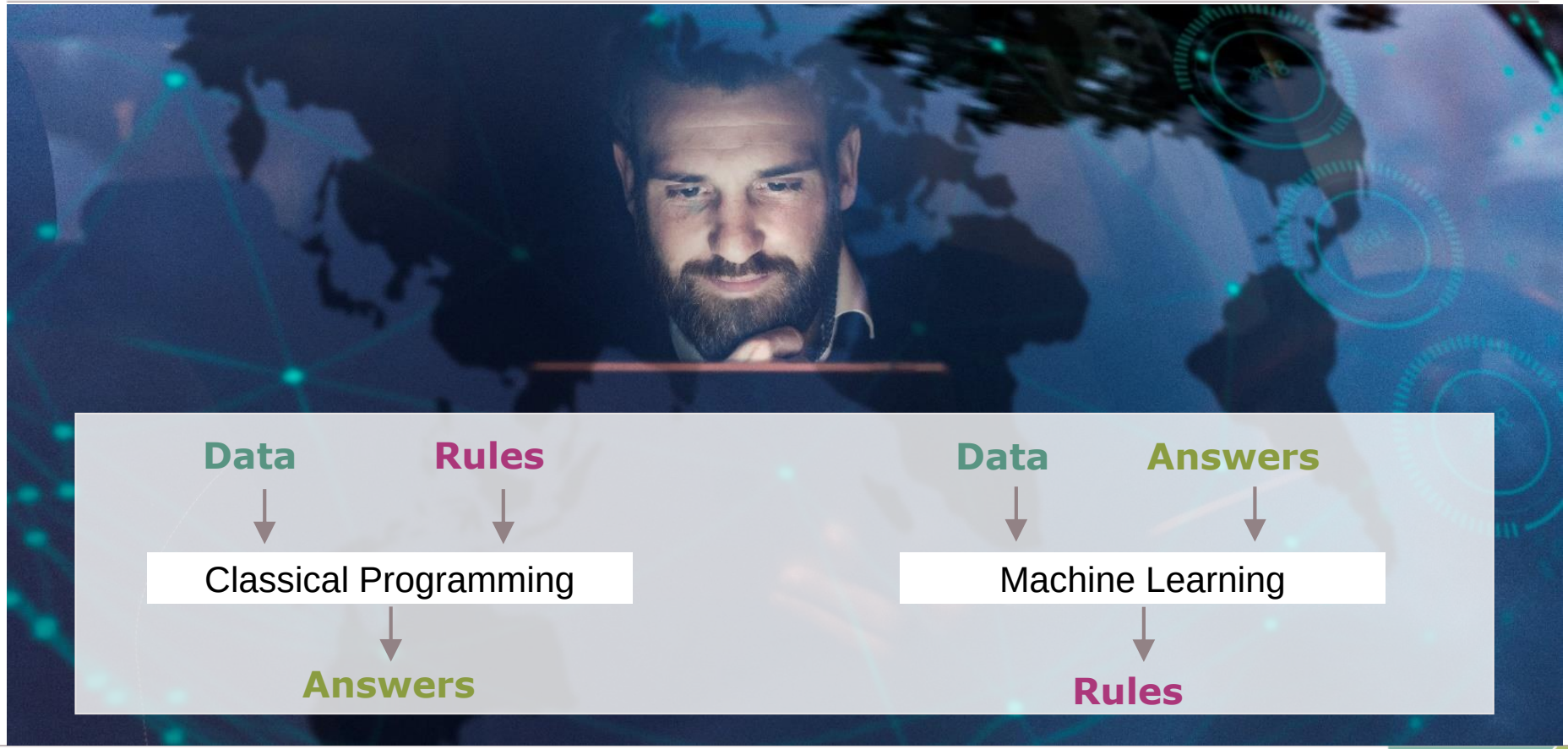
Smart Ears, Smart Feeling, Smart Nose

Smart Eyes & Sixth Sense

Use Cases Examples

Voice authentication	Advanced fitness tracking	Smog alarm	Gesture sensing	3D AR gaming
			Face recognition & biometric identification	
Human Machine Interface				

Machine Learning:
Systems learn from data and recognize patterns



AI chips make it possible to develop edge-AI applications

General Purpose Processor

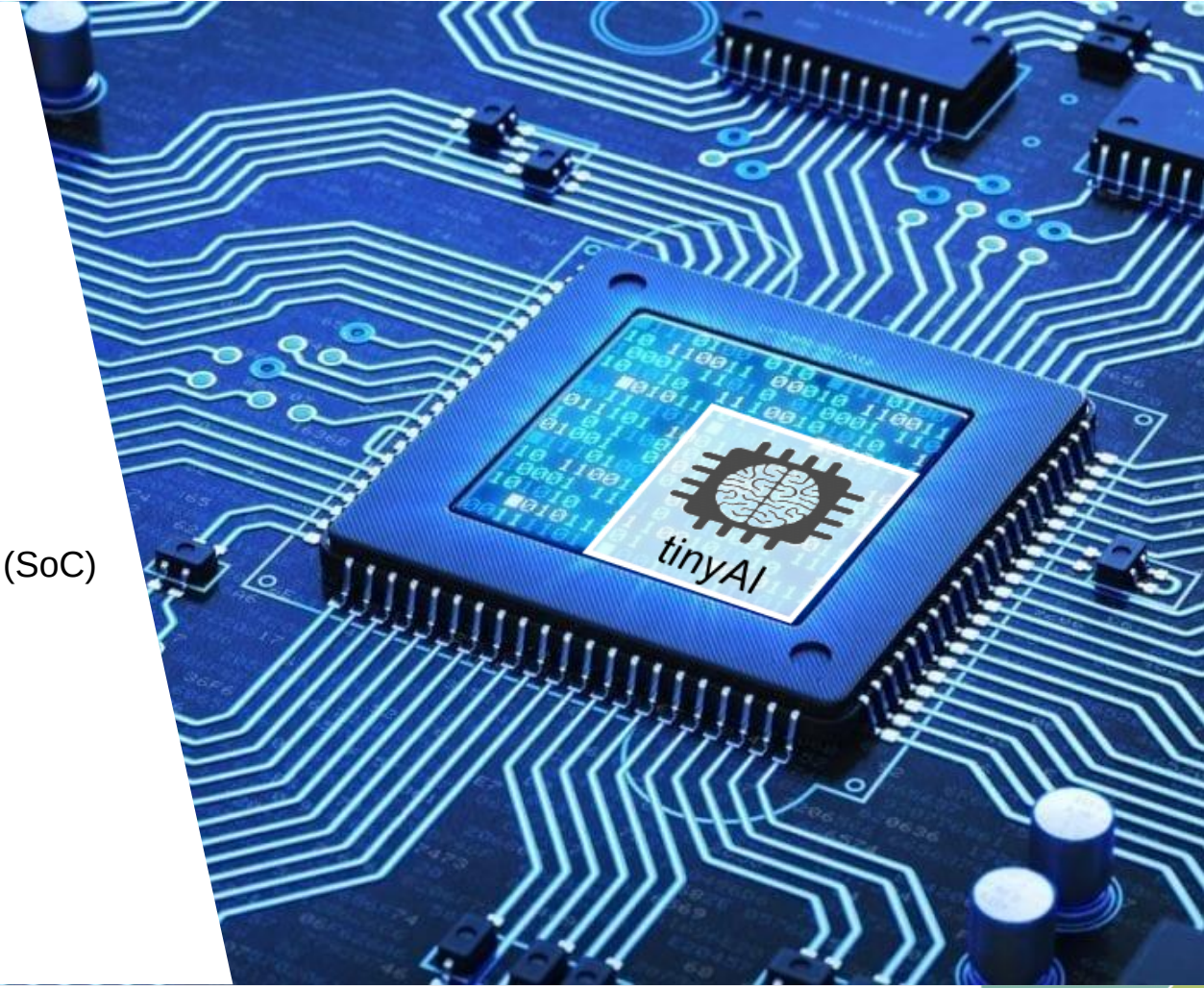
- Application-specific functionality via software
- One fits it all
- Disadvantage: for nothing optimal

AI Accelerator
(Application Specific Instruction Processor)

- Optimized for one application: ML
- New Hardware Architectures
- Advantage: optimal performance, high energy efficiency

tinyAI is the Infineon Intellectual Property (IP) project for AI acceleration at the edge

- AI algorithms are accelerated in tinyAI IP block on System on Chip (SoC)
- tinyAI is an Application Specific Instruction Processor (ASIP)
- tinyAI enables ultra-low power AI acceleration for always-on applications e.g. keyword spotting



Intuitive sensing for natural interactions with the digital world

Voice-controlled devices

Gesture control

New Sensors

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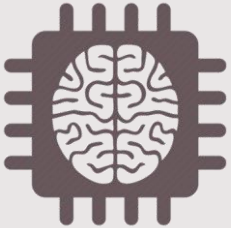
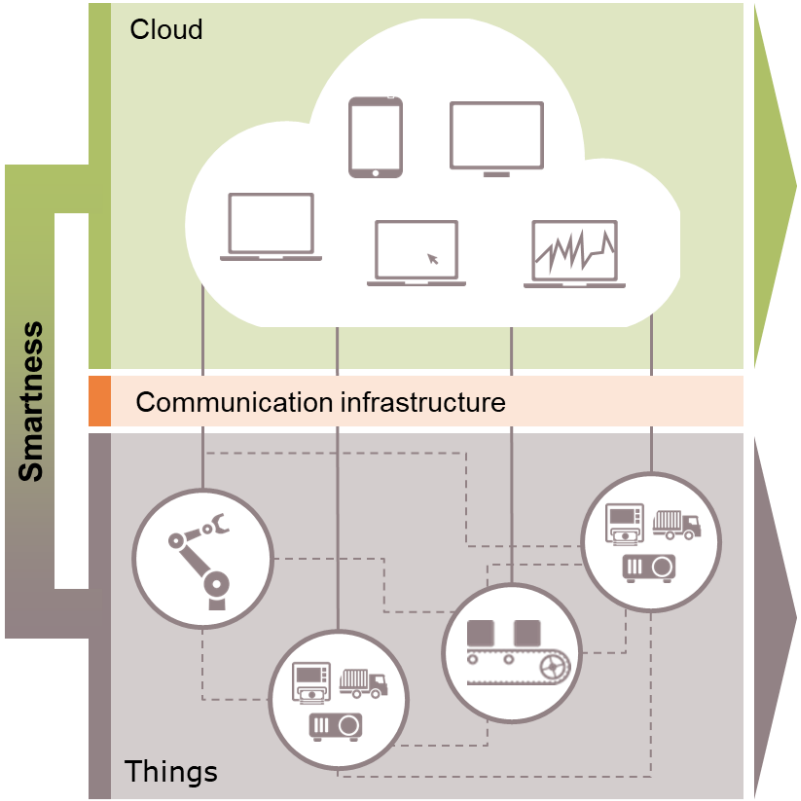


Edge AI

= **Smart Sensors**

It's the intelligent devices that make the IoT "smart"



Top layer of "IoT smartness"

- At cloud level, the information of individual intelligent devices is aggregated
- A range of applications process the available information according to defined use cases

Basic layer of "IoT smartness"

- Intelligent devices are equipped with sensors, processors, security and actuators
- Thus, they can collect data, coordinate and analyze it, secure it, and initiate actions

Machine Learning

Training

of ML models
on big data

Edge AI

Inference

real time
low power

Edge-AI chips for smart sensor systems

AI chips are necessary to enable edge-AI applications.

Advantages of Edge AI:

- Low latency
- Energy efficiency
- Data security

Infineon‘s first Edge AI chip is developed in Dresden.

DC Dresden: ready for edge-AI success stories

- Almost 50 employees
  - Automotive electronics for embedded power and e-mobility applications
  - Chip design and functional verification
  - Smart chips with embedded AI
- Long-term vision: 250 people
- State-of-the-art labs

Strong ecosystem for AI hardware made in Germany

Part of your life. Part of tomorrow.