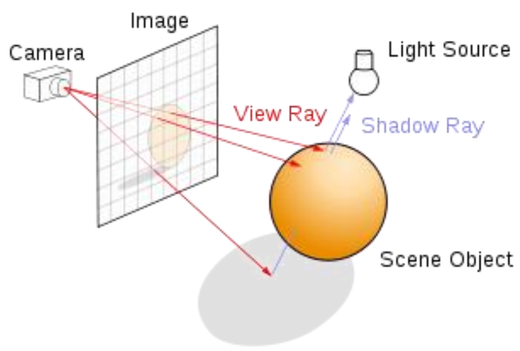
Tulipp: Towards Ubiquitous Low-power Image Processing Platforms

Horizon 2020

Motivation and Goals

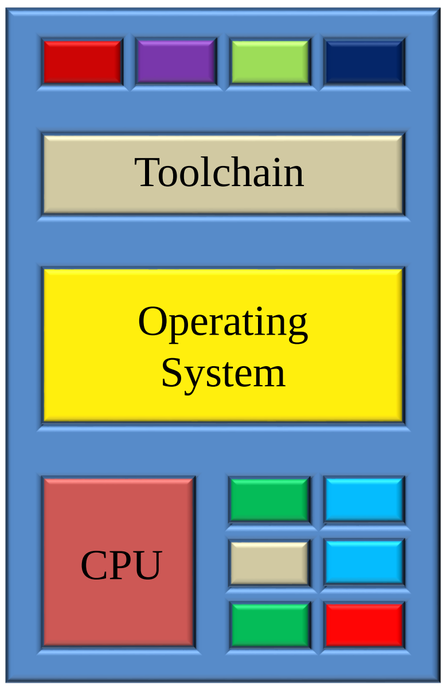


Intensive Image Processing — Embedded Constraints — Time-to-market / Cost-sensitive

Tulipp: Bringing energy efficiency from chip level to system level

Tulipp solution: Reference Platform Concept

Define implementation rules and interfaces between heterogeneous off-the-shelf HW, OS and Toolchain



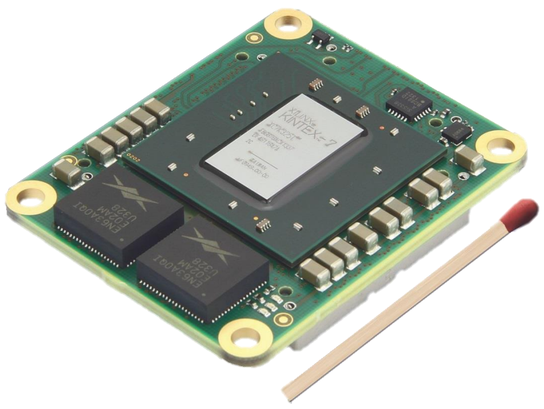
Component tools

Memory

IO

Processor

Reference Platform



All Programmable FPGA and SoC Modules

Same 5x4cm form factor

- Extended device life cycle
- Rugged for industrial applications
- Mechanically compatible
- Small and powerful
- Customizable

A Tulipp Hardware Instance

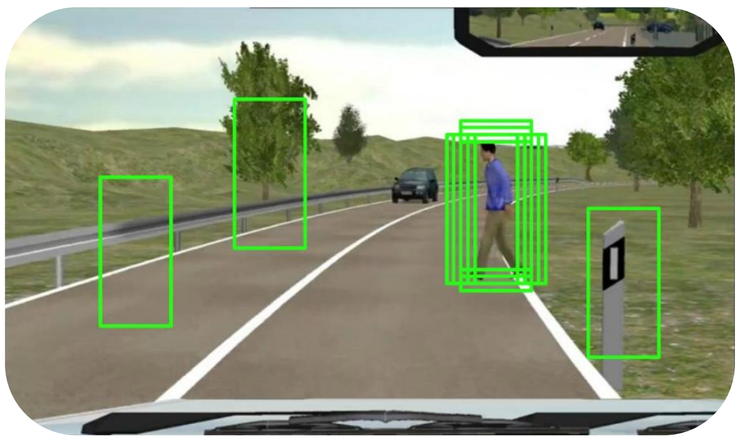
Improvements compared to 2013	End of Tulipp 2018	5 years later 2023
Peak perf. per watt	x 4	x 100
Average perf. per watt	x 10	x 200

Use cases

Medical X-Ray Imaging

Divide by 4 Radiation Dose

Advanced Driver Assistance



Safer driving experience

Surveillance and Rescue UAVs

Bring intelligence to drones

Partners

THALES

TECHNISCHE UNIVERSITÄT DRESDEN

NTNU

Fraunhofer IOSB

HIPPEROS Predictable Real-Time, Proven Performance

efficient innovation

Synective Labs

SUNDANCE

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