Memo

By: Eric Janssen  
eric.janssen@prodrive-technologies.com

Subject: Graduation Assignment Next Generation Safety and Security

Date: 2015-04-14

Context

Prodrive-technologies is a developer and manufacturer of world-class electronics. It comprises over 750 employees and is one of the fastest growing companies in Europe.

Our organization is based on two groups: Development and Operations. The Development department is oriented at developing first-rate electronic, mechanic and software solutions. The operations department is responsible for production, assembly, testing and life-cycle-management of electronic products and systems in the range of 1 to more than a million pieces per year.

Currently, several cameras are designed and produced by Prodrive for a variety of customers. The customers range from traffic enforcement camera’s to intelligent lighting solutions. One of the camera’s is a high-end IP camera for the safety and security market featuring 20 Megapixel at 30 frames per second. Such designs challenge available technology to offer enough bandwidth and computing power while being constrained by form factor, thermal footprint and product costs.

The next generation camera’s will supersede the current generation in a number of ways which require investigation on both system level as well as understanding low-level details. A minimum subset of features is defined for example 4K and 30Hz imaging. Furthermore light sensitivity (image quality) is one of the key parameters for our camera’s.

Assignment

The student will investigate the literature and available camera designs for a new system architectural proposal including their advantages and disadvantages. The architecture requires requirement analysis (partly open for investigation) and results into an architecture for both hardware as well as software/firmware. For the system proposal it is required to investigate technology available at suppliers (e.g. sensors, FPGAs DSPs, SoCs). With the acquired knowledge, a suitable architecture (or options) is designed and analysed given the constraints of the customer requirements. The proposed architecture is evaluated for performance (e.g. frames per seconds, sensitivity, compression and image enhancement capabilities).

Deliverables

- Analysis of current camera design and customer requirements
- Exploration and hardware options for sensor, SoC/FPGA/CPU/DSPs
- Design for image processing pipeline and mapping to hardware
- Evaluation of next-generation camera proposal