Duckietown - Image Processing on FPGAs

At LIS we want to use the Duckietown hardware and software ecosystem for experimenting with our reinforcement learning based learning classifier tables (LCT) as part of the control system of the Duckiebots: https://www.ce.cit.tum.de/lis/forschung/aktuelle-projekte/duckietown-lab/

More information on Duckietown can be found on https://www.duckietown.org/.

In this student work, we want to enable the use of the FPGA in the Lane Detection. Previous work already experimented with the communication between NVIDIA Jetson and the FPGA via a DMA.

Goal of this work is to port the LSD to FPGA to benefit from offloading parts of the Lane Detection Algorithm from the CPU and execute them accelerated on the FPGA.

At the end, there should be a seamless integration in the Lane Following Pipeline.

Prerequisites

- Knowledge about Image Processing
- Lots of FPGA experience
- VHDL
- Python

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