



Development of a software for a fast parallel calculation of the Optical Flow with Intel processors

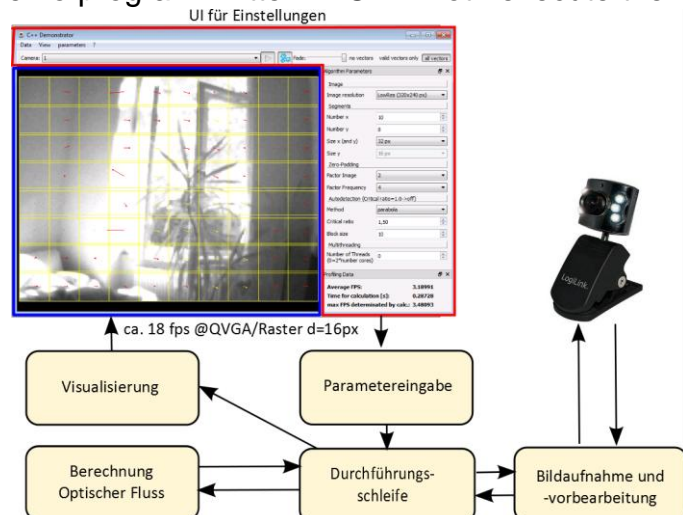
Abstract

In recent years, the performance of CPUs increased clearly by using architectural features for parallelization: for example multi-core support and SIMD (Single Instruction Multiple Data) instruction sets like SSE. With the help of compiler add-ons and software libraries it is possible to accelerate computationally intensive programs easily.

In this work a correlation based algorithm for the calculation of the Optical Flow was used. Such an algorithm can be used e. g. for methods of visual navigation on mobile robotic platforms. In the context of previous works implementations on different hardware platforms were already developed. Till now the only real-time capable implementation needs the involvement of a GPU.

The developed implementation of this work uses a CPU exclusively. The MATLAB[®] reference implementation was used as starting point and for the validation. Finally the implementation was integrated in a demonstrator based on MATLAB[®] plus a self-contained demo program written in C++. Both execute the full sequence of processing including image acquisition using a webcam, the calculation and the visualization of the vector field of the Optical Flow.

By the use of the architectural features for parallelization an implementation was created with a comparable level of performance to the implementation on the GPU but with a significant reduction of power consumption.



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