



Evaluation of a smartphone processor for the real-time implementation of the SURF feature detector

In this project, the SURF algorithm is analysed and improved to make it run in optimal conditions in a Gumstix Overo embedded hardware platform.

SURF (standing for *Speeded Up Robust Features*) is a robust image detector and descriptor. The image interest points (recognisable features) are detected at different scales and then described using the surrounding region. An intermediate representation (*integral image*) is used to accelerate the process.

The hardware platform includes a ARM Cortex A8 based processor (mounted in many smartphones and embedded systems), with multimedia oriented extensions, along with other specific hardware.

A literature research has been performed as first step. The test environment is also documented. The algorithm is explained and illustrated with diagrams. Additionally, the elements and terminology (e.g. box filtering, keypoint) are described.

The possibilities available for the optimization are then studied, particularly the NEON technology. Different approaches and techniques are applied and the results analysed and measured.

Finally, conclusions and suggestions for future works are stated.

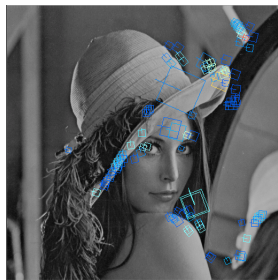
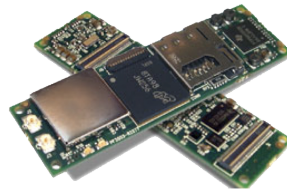


Image showing keypoints



Hardware used

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DIPLOMA THESIS

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