



FEASIBILITY OF COMPUTER VISION IN JULIA

Context

The Mathware department has a strong computer vision competence group that solves challenging customer problem related to processing image data. Typical problems involve fault detection, non-invasive measurement and object tracking; usually under strict constraints on time and on computing resources.

We want to investigate if the Julia language, which is gaining traction in other numerical computing projects, is a useful tool for image analysis too. A strong motivation is that our existing tool stack relies on a two-language approach, where top-level Python code is used to call lower-level C functionality.

Sioux Technologies is already a strong partner to industry partners adopting Julia. Sioux has recently organized a "Hot-or-Not" event on Julia, attracting roughly 200 industry professionals from the area. Sioux is also involved in organizing the local Julia MeetUps.

Internship overview

- Bachelor / Master
- Internship
- Mathware
- Location: Eindhoven

Technologies

- Julia
- Computer vision
- Tracking algorithm development



Assignment

The student will investigate what tools exist in the Julia language for performing typical Computer Vision tasks. The tools should be compared to well-known alternatives such as OpenCV. The comparison should focus primarily on coverage of different use cases. This will require the student to find or construct a suitable benchmark of tasks. Performance of the tools is a secondary matter.

After identifying gaps in the functionality of the Julia tooling, we will plan how to address these shortcomings by contributing to open-source packages. This shall be done with a test-driven approach.

In particular, the student can focus on a challenging topic of eye tracking. Building on top of the existing knowledge of feature detection and optical flow using OpenCV library, the student will develop a fast and accurate eye-tracker within Julia environment. The validation as well as comparison of the proposed approach will be done on video footage, acquired at different time and length scales. If time permits, the student can analyse the characteristics of eye movement and map the temporal cues to human/brain activity.

Activities

- Exploring available tooling
- Studying literature on benchmarks
- Writing test cases
- Delevering results to open-source community
- Implementing functionality

Why choose Sioux?

- Working on innovative technology
- Challenging, dynamic and varied work
- A comfortable and personal work environment
- Plenty of opportunities for personal development
- Great career opportunities
- Contributing to a safe, healthy and sustainable society

Get in touch!

Would you like to know more about this student assignment?

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