

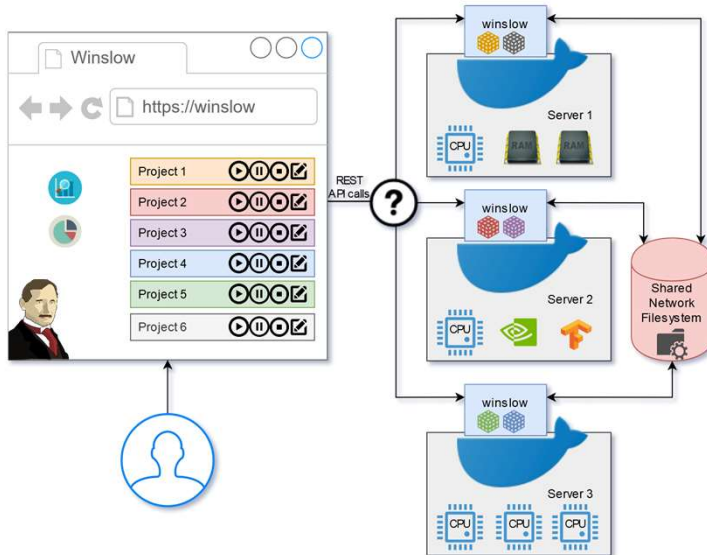
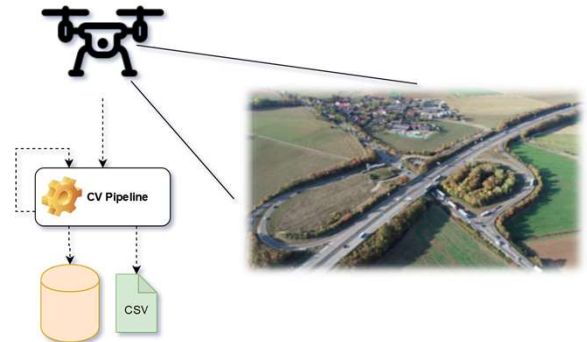
Conception and realization of a distributed and automated computer vision pipeline

Project context

- Detecting vehicles in video footage using Computer Vision and Artificial Intelligence
- Tracking vehicles throughout the video to determine speed, size, acceleration, class, position and lane changes
- Export data for further traffic flow analysis (in other projects or for the customer)

Main Goal

- Automate manual workflow that distributes the workload onto servers and collects the data



Further Requirements and Objectives

- Automatically distribute jobs onto computing nodes
- Handle large files (4k video footage) and multiple projects
- Representation as multi-stage pipeline that can be paused at any stage and investigated, to re-do stages with optimized parameters
- Consider specific hardware requirements for CV and AI

Architecture, Design and Technologies

- Decentralized decision making
- Resilient against node failures
- Shared network filesystem for data, configuration and coordination
- Docker for easy installation of additional compute nodes

Challenges and Experimental Work

- Finding a fitting network filesystem
- Solely depend on a shared filesystem for communication and coordination to strip down external (system) dependencies

Results

- Synchronous EventSystem with Broadcast functionality based on files on a shared filesystem
- Implementations of a timeout Mutex on-top of the EventSystem to lock projects throughout the whole system

Project Progress

