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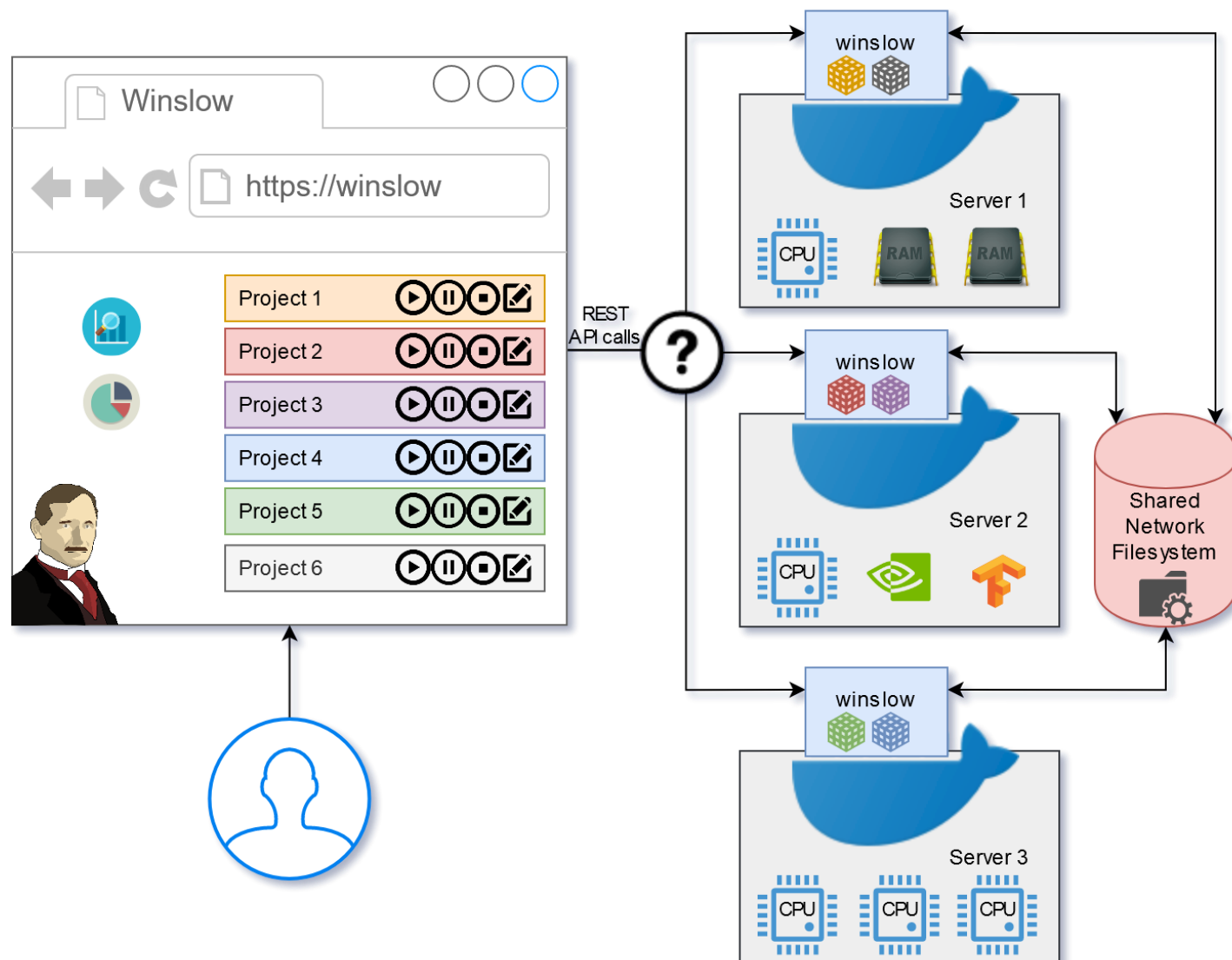
IT DESIGNERS GRUPPE

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

- 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

- <u>Decentralized</u> decision making
- <u>Resilient</u> against node failures
- Shared network filesystem
- Docker
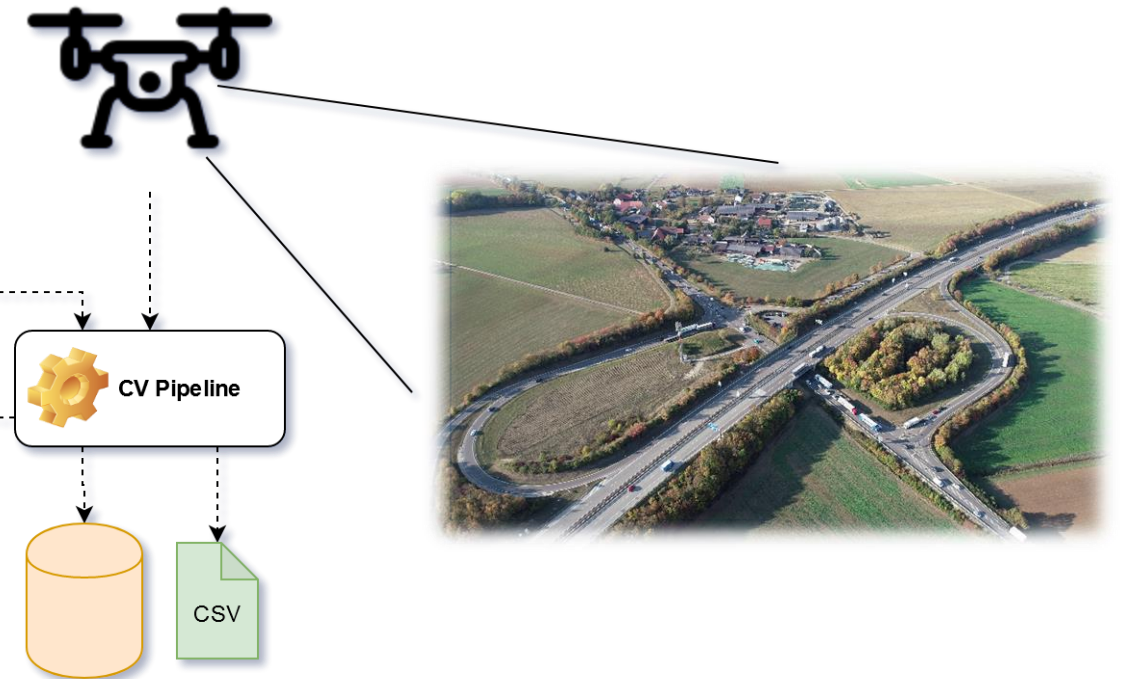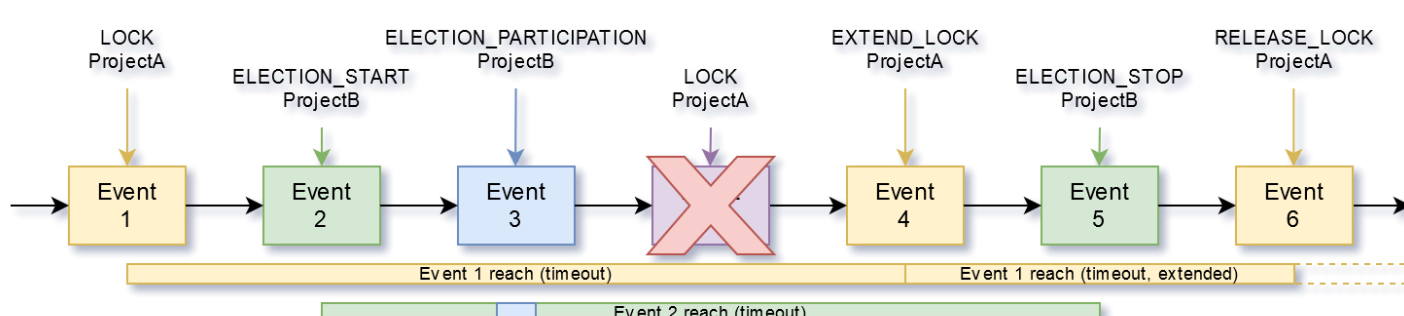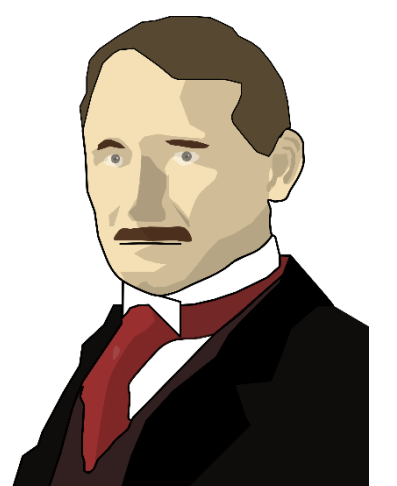

Frederick Winslow Taylor
1856 - 1915

Challenges and Experimental Work

- Finding a fitting network filesystem
- Communication and coordination
- Finding the most fitting execution node for a job

Results

- Time savings because of higher hardware utilization due to automatic stage execution
- Creation of a distributed and synchronous EventSystem with timeout based mutex ontop

Project Progress

Task	Progress	2019				2020		
		Sept	Oct	Nov	Dec	Jan	Feb	Mar
Research	DONE							
Experimental work	DONE							
synchronization, coordination and communication								
managing docker container								
Implementation	FINALIZING (99%)							
Job distribution (algorithm)								
Error resilience on job failures, node failures and timeouts								
reacting to User-Feedback								
Metrics, Analysis and Evaluation	60%							
finding valuable metrics								
collect and analyse								
Thesis	70%							
writing everything down								