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University of Stuttgart
Institute of Flight Mechanics and Controls

Exploiting (supervised) learning-based detectors for on-board, real time localization and target tracking

Deep Field Workshop

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FRPG Flight Robotics and Perception Group

iFR

Agenda

1) Who am I
2) Deep Learning based detectors
3) Bayesian tracking with DNN detectors

Presenter

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  - Post Doc Researcher, IFR FRPG Uni Stuttgart
  - Up to now, PhD student, Max Planck Institute for Intelligent Systems
  - Project AIRCAP (Aerial Outdoor Motion Capture)
    https://ps.is.tuebingen.mpg.de/research_projects/aircap

Deep Learning in Robotics

- The beginning:
  - 2012 AlexNet owns the ImageNet classification challenge (ILSVRC)

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  - 2016 SSD Multibox speeds visual detection up for robotic applications

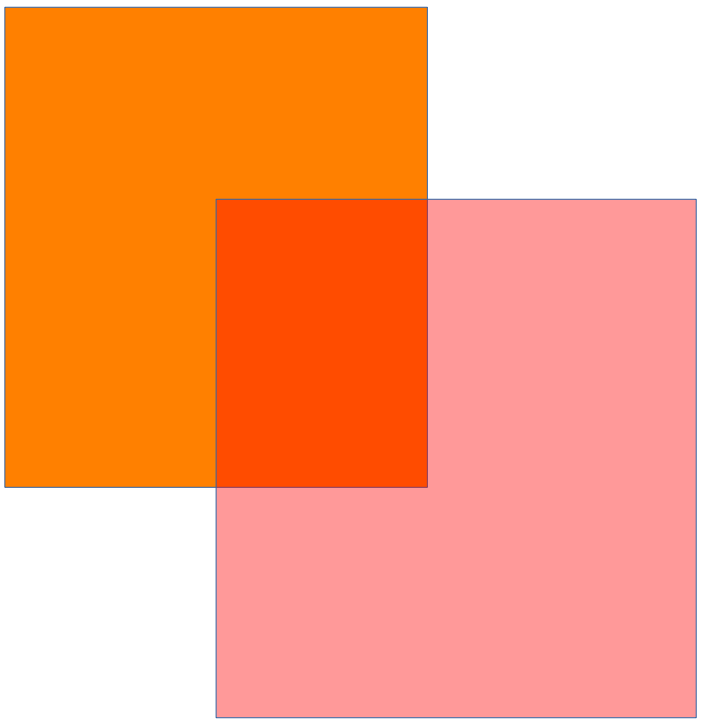
2018

- We exploit SSD in a Multi Vehicle Collaborative Detection and Tracking Framework

Performance Metric in Computer Vision

- Detectors are compared based on Mean average precision.
- Using “Jaccard Overlap”
  - Aka Intersection over Union

as the main metric.



Performance Metric in Robotics

- For Bayesian Inference we like to have
  - Mean Deviation (localization)
  - (Co-)Variance