WASP Summer School 2018
Johan Källström
Claudio Mandrioli

What Has Been Done

- Perception : colour tracker
- Perception: sensor fusion for distance from target
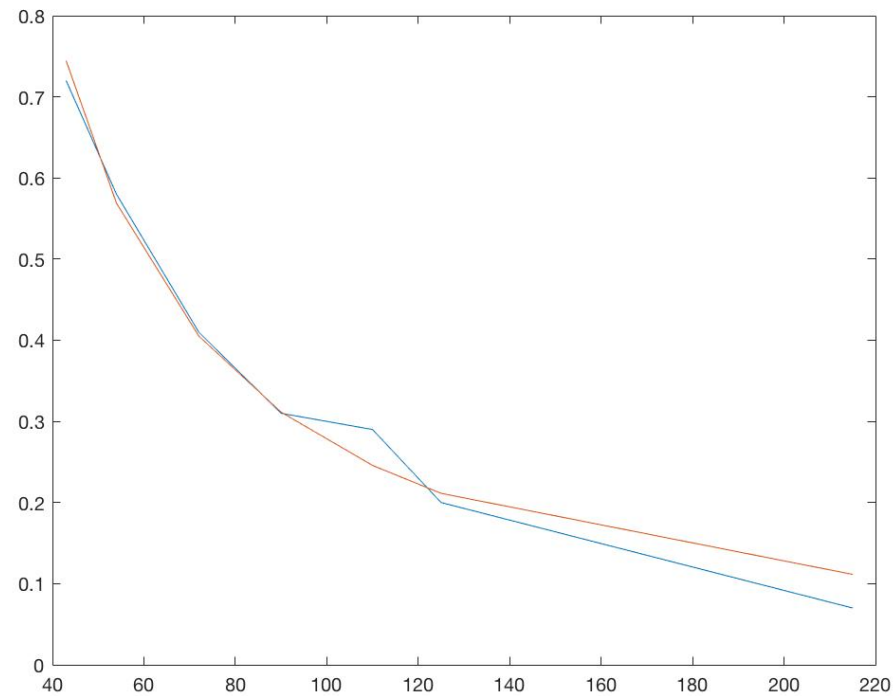- Control: thrust and steer controllers

The Tracker

- Colour tracker based on HSV images

- How it works:
  - Convert image
  - Contrast improvement
  - Erosion and dilation to remove noise
  - Find contrours
  - Draw bounding rectangle
  - Estimate distance from rectangle width (profiling from pixels to meters)

Useful info: rectangle coordinates

Camera for distance profiling

Meters

Pixels

The Controller

- Steering control
  - Try to get the target in the center
  - Load disturbance (would need a PI)
  - Implemented P
  - Invert when going backward

- Thrust control
  - Fuse info from US and camera (simple avg, under some conditions..)
  - PD controller
  - Increased control action for going backward
  - Control saturation when going forward
  - Hysteresis when target is lost

The Results

- Tracker seems to be working (according to the video evaluations)

- Steering strongly affected by load disturbance that causes to lose track

- Aggressive thrust control (we like it)

- Underperforming demo

Demo

Thank you

Thank you for the attention!!!