

# KUI closing, what next

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# Studium

- B4B33RPZ - Rozpoznávání a strojové učení
  - více o statistickém rozpoznávání (poslední 2 přednášky)
  - více matematiky, Matlabu ...
- B3B33VIR - Vidění robotu
  - více k robotice
  - hluboké sítě, Python, TensorFlow, AI-Gym ...
- Magisterské studium, KyR, OI-Vision, OI-AI ...

# Projekty, bakalářská práce

- <https://cyber.felk.cvut.cz/study/student-projects/>
- <https://cyber.felk.cvut.cz/research/groups-teams/>
- <https://cyber.felk.cvut.cz/vras/>
- <http://mrs.felk.cvut.cz>



Katedra kybernetiky vás zve na



# CyberSpace

Neformální setkání nad kávou a občerstvením  
Bakalářské/diplomové práce a letní brigády

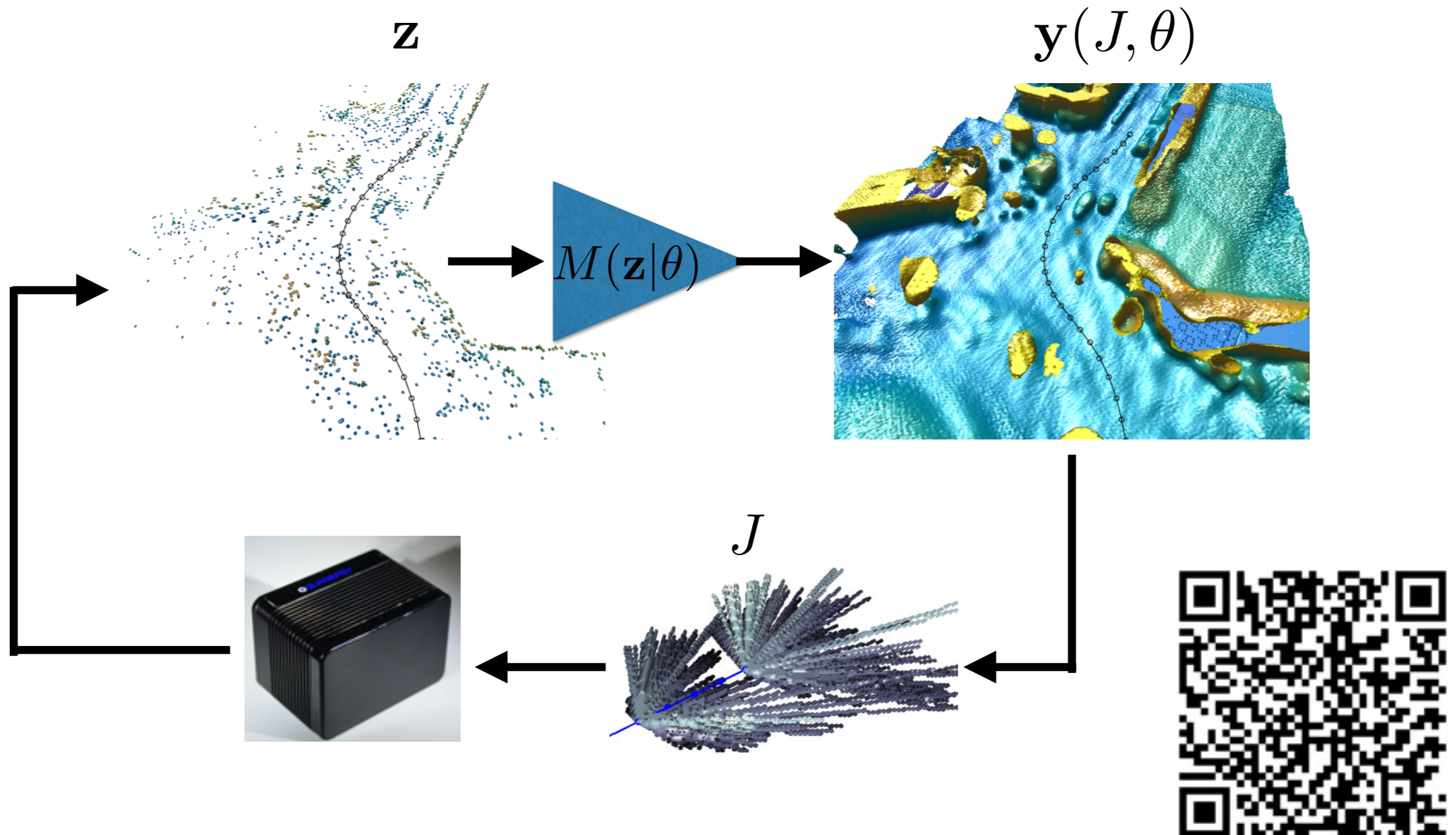
23.5.2018, 13:30 – 15:30

1.patro budovy E, FEL, ČVUT, Karlovo nám. 13



# Learning for active 3D mapping

- 3D mapping by deep convolution neural network....  $M(\mathbf{z}|\theta)$
- Control of depth-measuring rays in current map.....  $J$



# Dense 3D from very sparse measurements

RGB (only for visualization)



Sparse measurements

Reconstructed map



Occupancy is used to plan new measurements



Petricek, Zimmermann, Salansky, Svoboda. *Learning for Active 3D Mapping*. ICCV, 2017



# Learning to attack car data



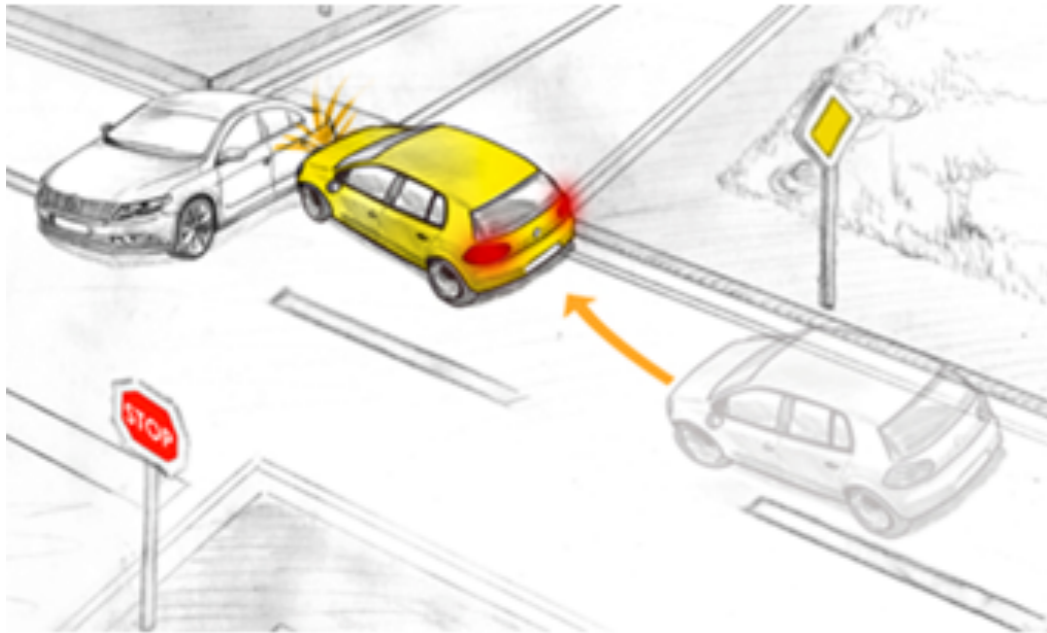
original

attacked



# Cross-Traffic Detection for Collision Mitigation

the use case



field-testing in demonstrator vehicle

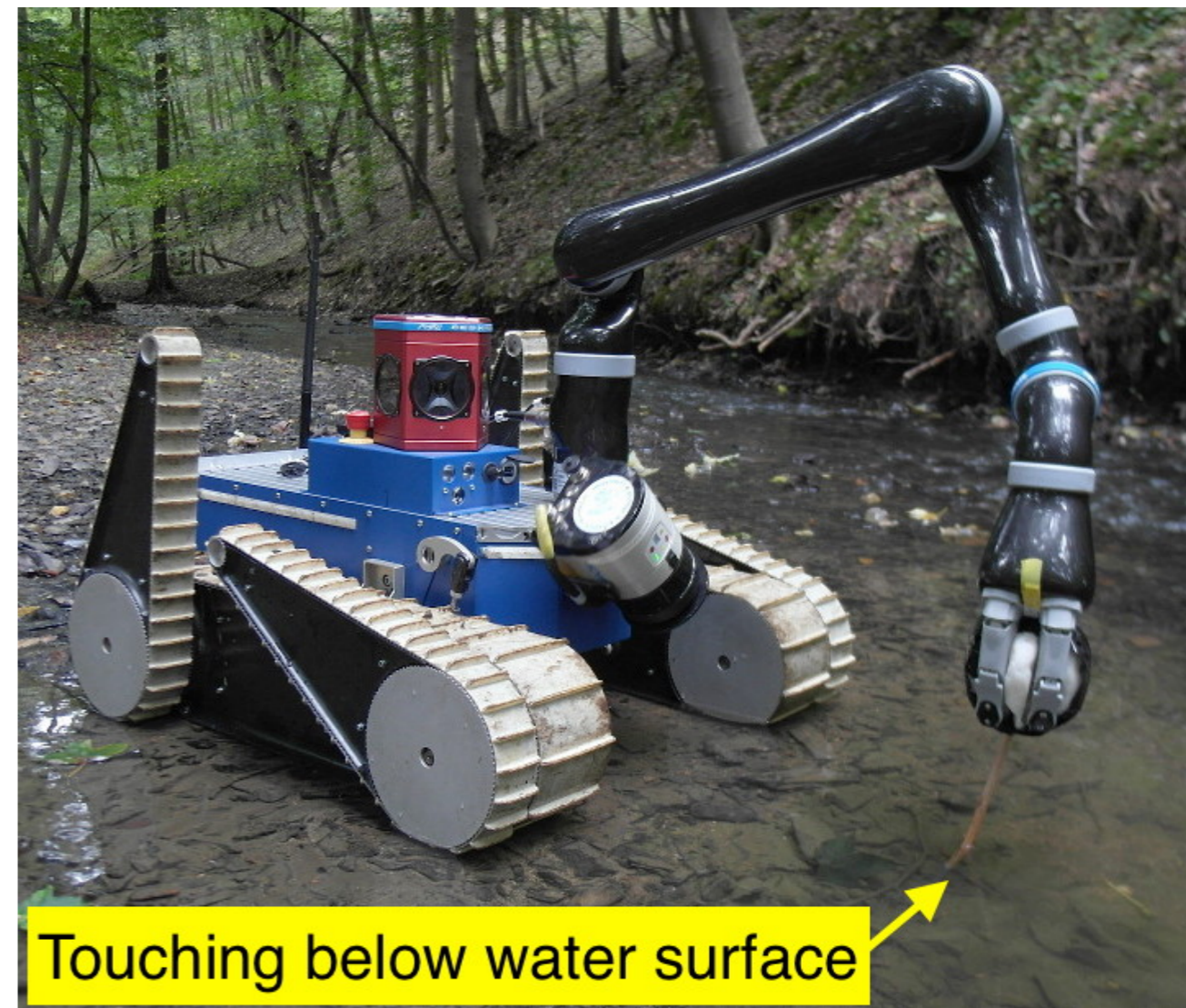
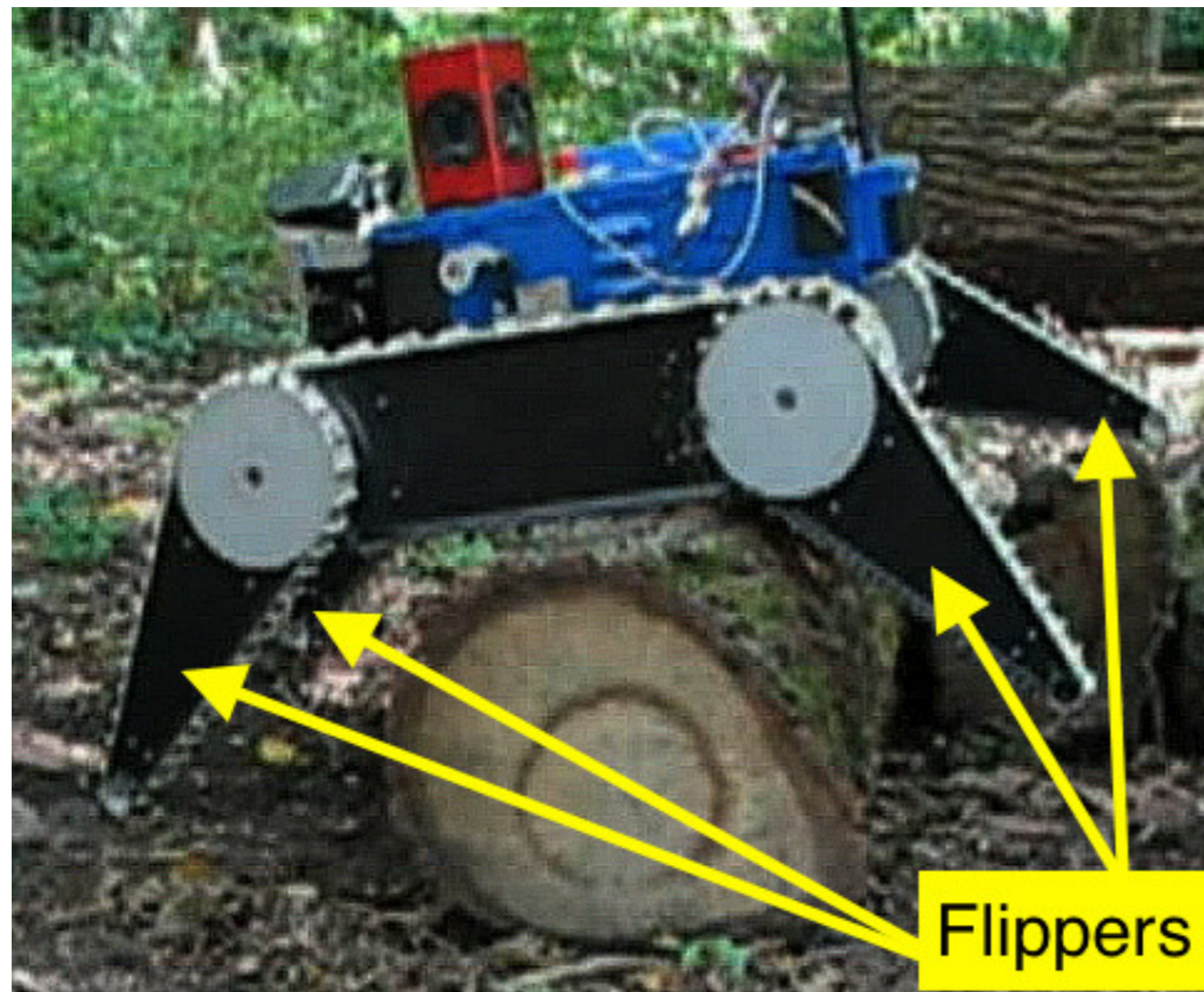


integrated implementation





# Machine learning for robot motion control

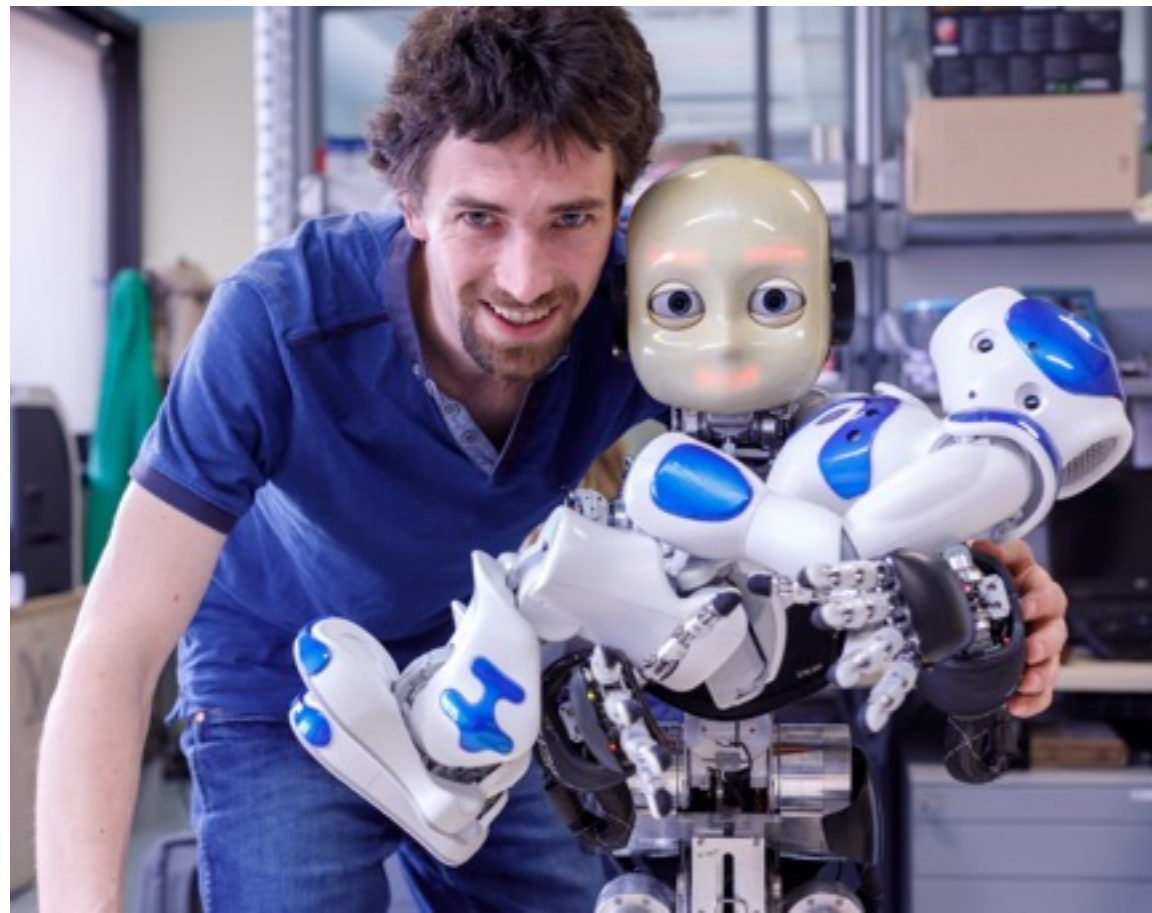


**M. Pecka, K. Zimmermann, M. Reinstein, and T. Svoboda. Controlling Robot Morphology from Incomplete Measurements. In *IEEE Transactions on Industrial Electronics*, Feb 2017, Vol 64, Issue: 2, pp. 1773-1782**

**V. Kubelka, L. Oswald, F. Pomerleau, F. Colas, T. Svoboda, and M. Reinstein. Robust data fusion of multi-modal sensory information for mobile robots. In *Journal of Field Robotics*, June 2015, Vol 32, Issue: 4**



# Humanoid/collaborative robotics



**B**

WP1 Models of body representations



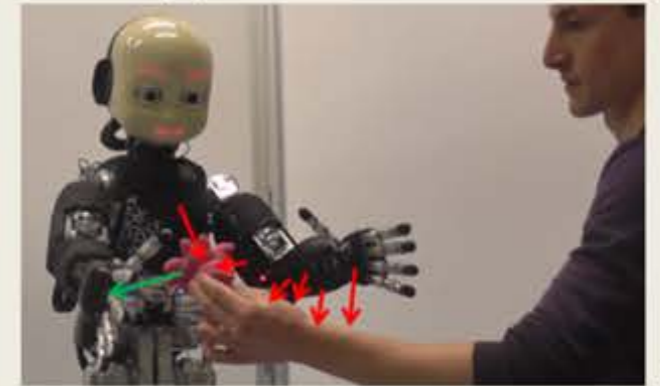
*modeling*



WP2 Automatic robot self-calibration



WP3 Safe physical human-robot interaction



Prof. Lockman, Dr. O'Regan,  
Dr. Heed, Prof. Blanke, Dr. Serino

Collaborators  
Dr. Li, Dr. Pajdla

Prof. Metta, Dr. Roncone,  
Dr. Zimmermann

collaborative manipulation





# UAV - Landing on a moving target

Contact: Martin Saska

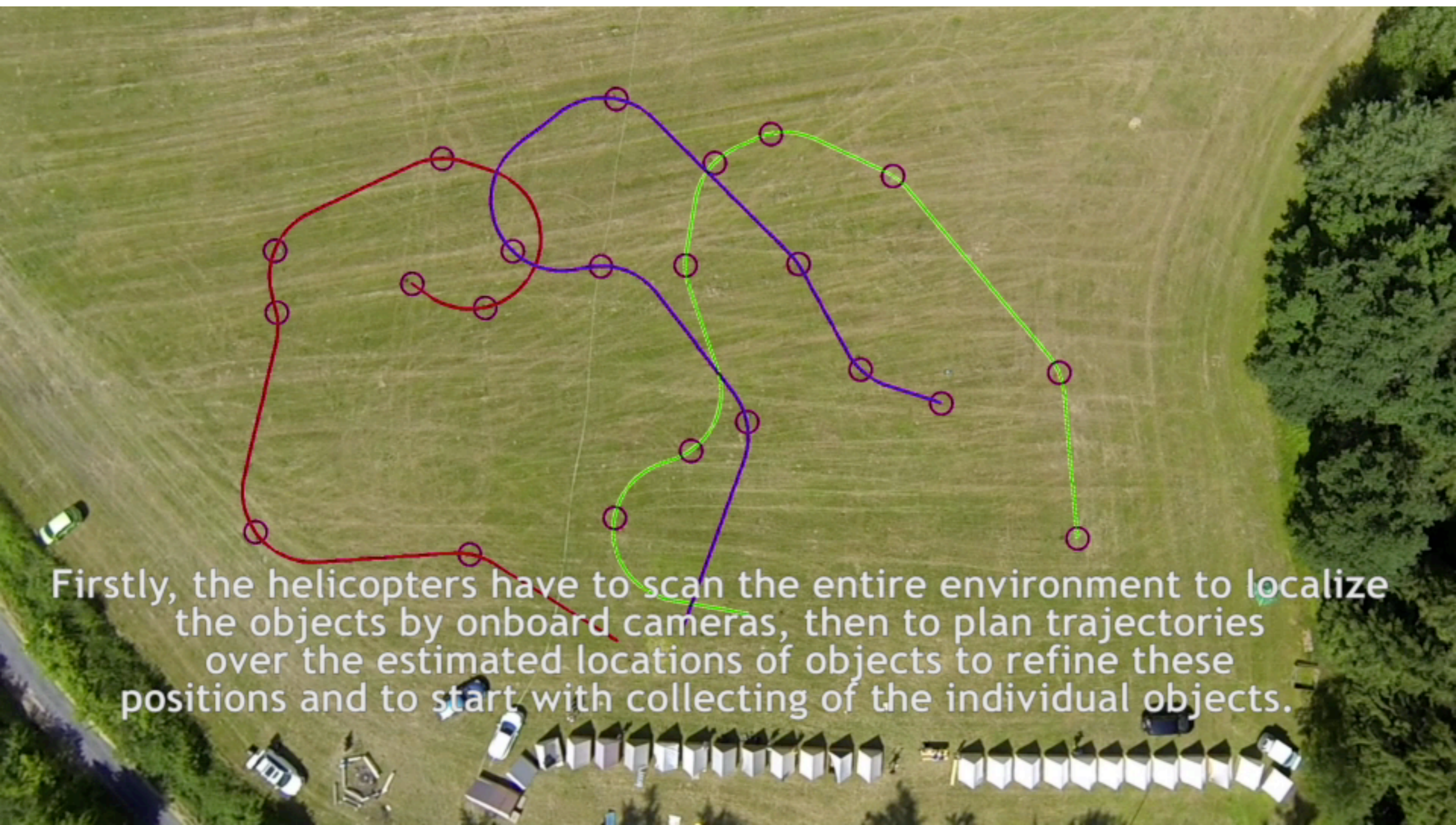


The helicopter has to fly up autonomously above the field, where the car is expected to move, and to localize the car using the landing pattern carried on its roof.



# coordinate UAVs – Treasure hunt

Contact: Martin Saska



Firstly, the helicopters have to scan the entire environment to localize the objects by onboard cameras, then to plan trajectories over the estimated locations of objects to refine these positions and to start with collecting of the individual objects.



# MBZIRC – Victory





# Large scale image retrieval



Contact: Ondřej Chum, <http://cmp.felk.cvut.cz/~chum/>

CMP:G2  
image search



Edit GT



hide positives



hide negatives

heap\_scoring  qe  incremental\_verification  spatial\_verification

nn



535dc375e7422d3058fa62cc3c74a177





# Reading text in the wild



Contact: Jiří Matas, <http://cmp.felk.cvut.cz/~matas/>



1 ROAD ENDS  
2 IN WATER  
3 300 FEET

ROAD ENDS  
IN WATER  
300 FEET

ROAD ENDS  
ROAD ENDS  
IN WATER  
IN WATER  
300 FEET  
300 FEET





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