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Jürgen ‘Juxi’ Leitner

Team ACRV during the APC2016

Building On Repeatable Grasping Experiments

http://Juxi.net/projects/apc

J. Leitner, AW Tow, JE Dean, N. Suenderhauf, M. Cooper, M. Eich, C. Lehnert,
R. Mangels, C. McCool, P. Kujala, L. Nicholson, T. Pham, J. Sergeant, L. Wu,
F. Zhang, B. Upcroft, PI Corke

QUT

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Juxi
#ICRA2017

QUT

Robots for the real world

tinyurl.com/QUTRobotics

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QUT Queensland University of Technology · MONASH University · ANU THE AUSTRALIAN NATIONAL UNIVERSITY · THE UNIVERSITY of ADELAIDE

ETH zürich · Inria · MRG @ OXFORD DEPARTMENT OF ENGINEERING SCIENCE UNIVERSITY OF OXFORD · Imperial College London

roboticvision.org

http://Juxi.net/dataset/acrv-picking-benchmark/

amazon Picking Challenge

Robocup 2016, Leipzig, Germany

Dealing with the real world

or:
what is so hard about robotic vision

system approach

Robot Motion

End-Effector

(non-visual) Perception

Visual Perception

Flow/State Machine

Software Integration

lots of moving parts!

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one way

(small) parts definition

develop one solution

integrate

test

iterate

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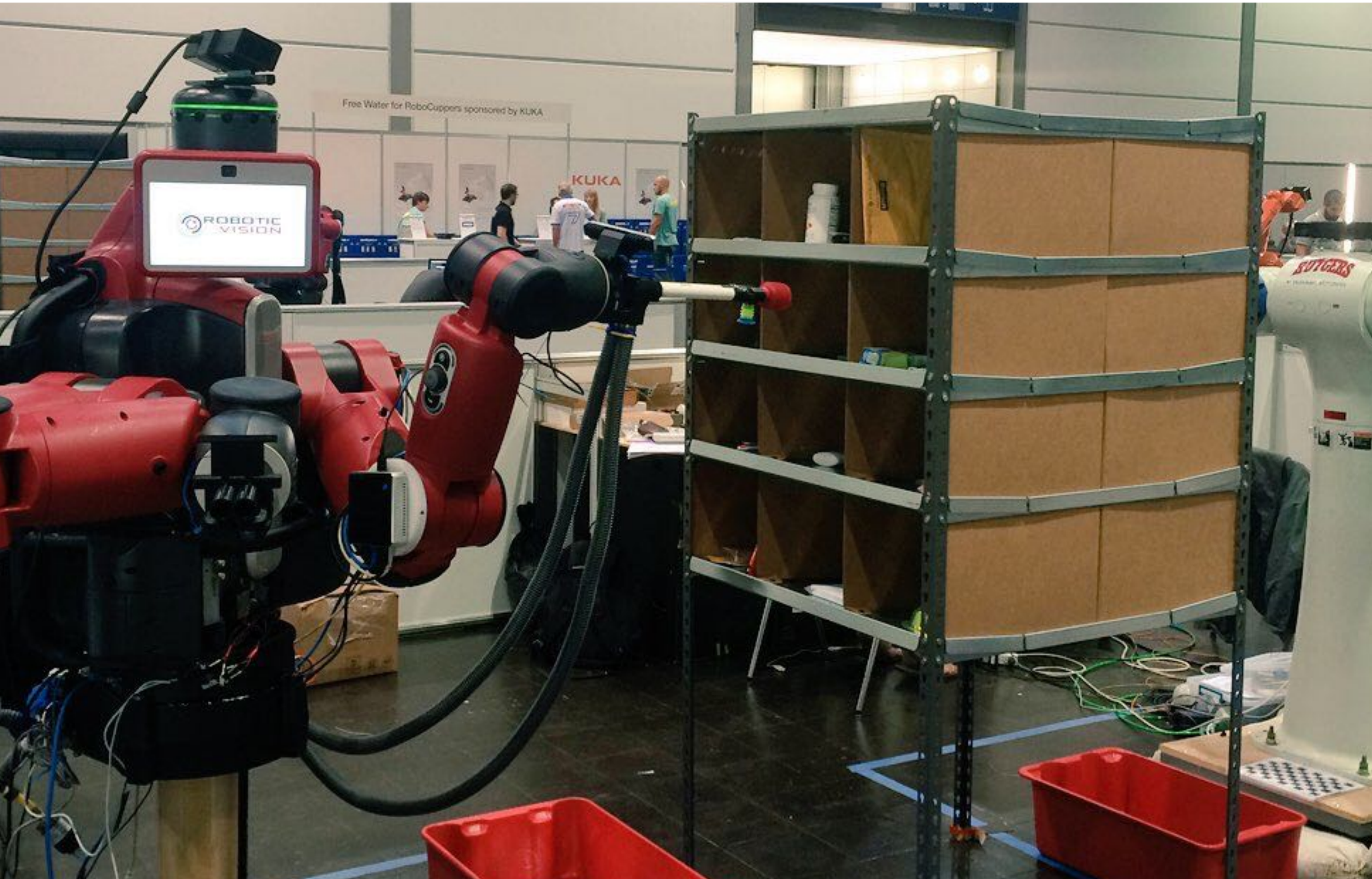
amazon Picking Challenge

Robocup 2016, Leipzig, Germany



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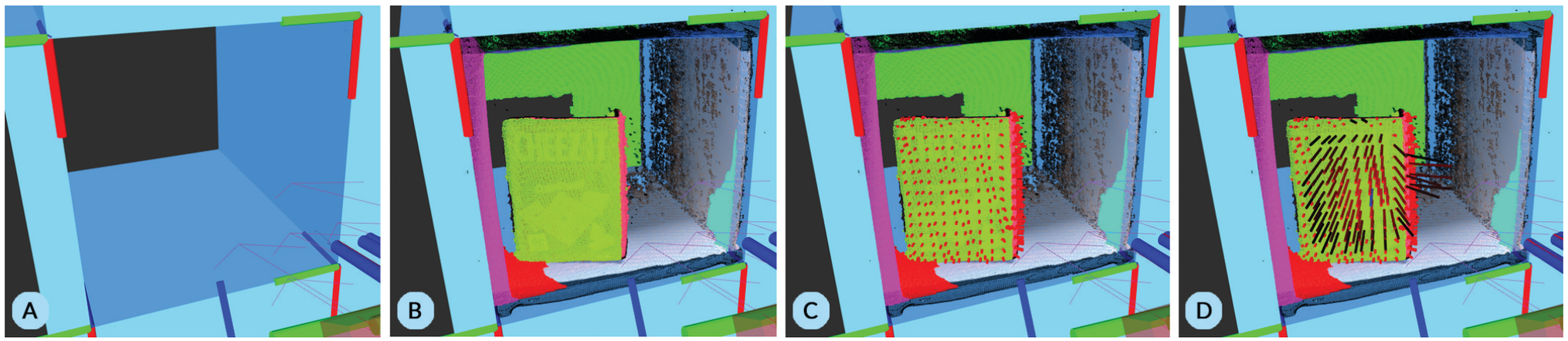
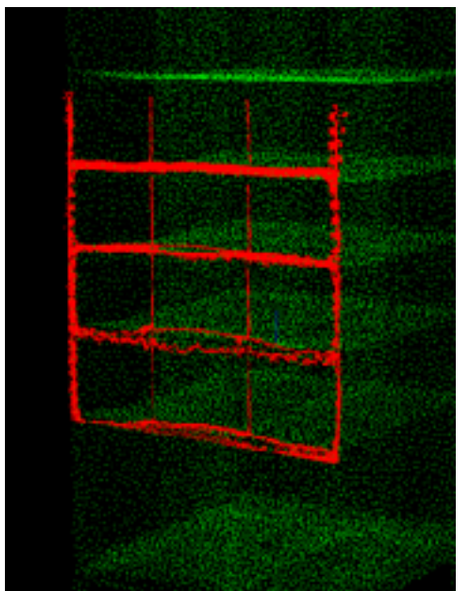
APC pipeline

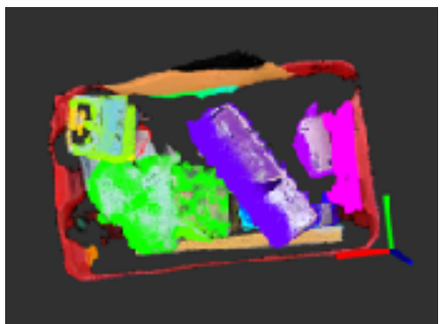
http://Juxi.net/acrv-picking-benchmark/

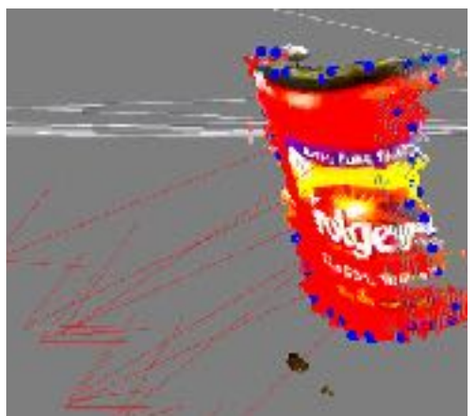
https://arxiv.org/abs/1609.05258



Shelf Localisation	Object Detection	Object Identification	Object Localisation
Kinect2 (once)	RealSense (every attempt)	2D regions (CNN)	point cloud
	KinectFusion		grasp point detection
	segmentation		







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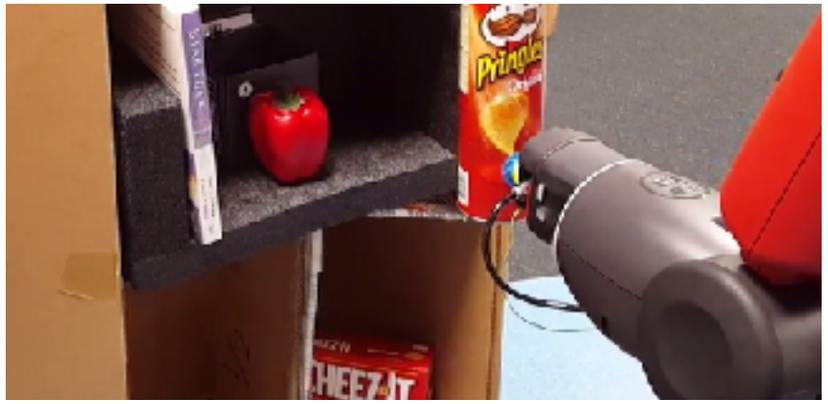
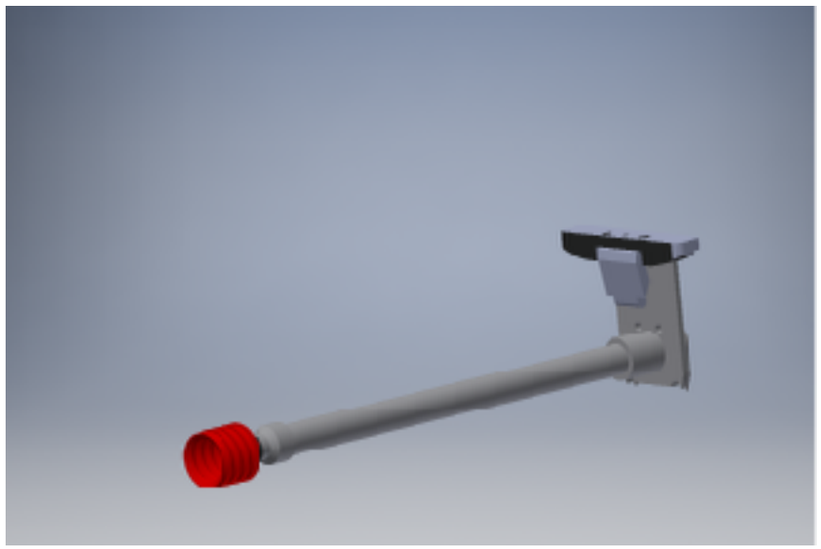
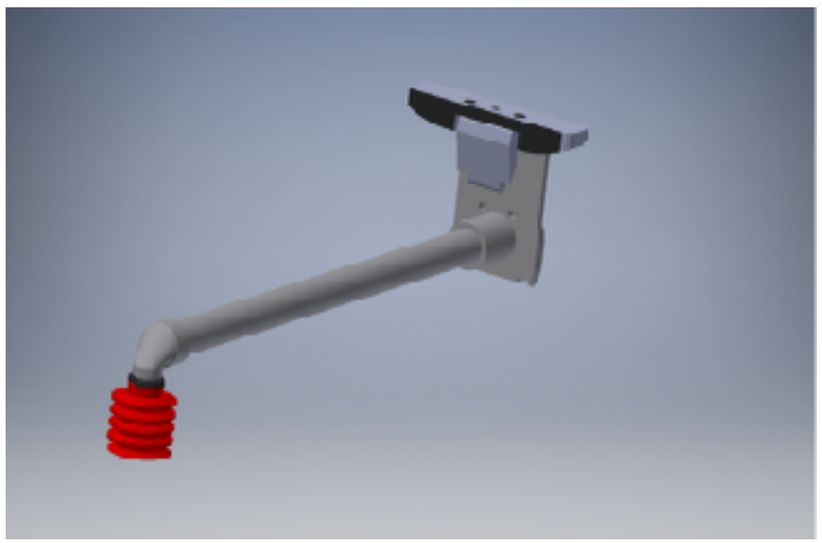
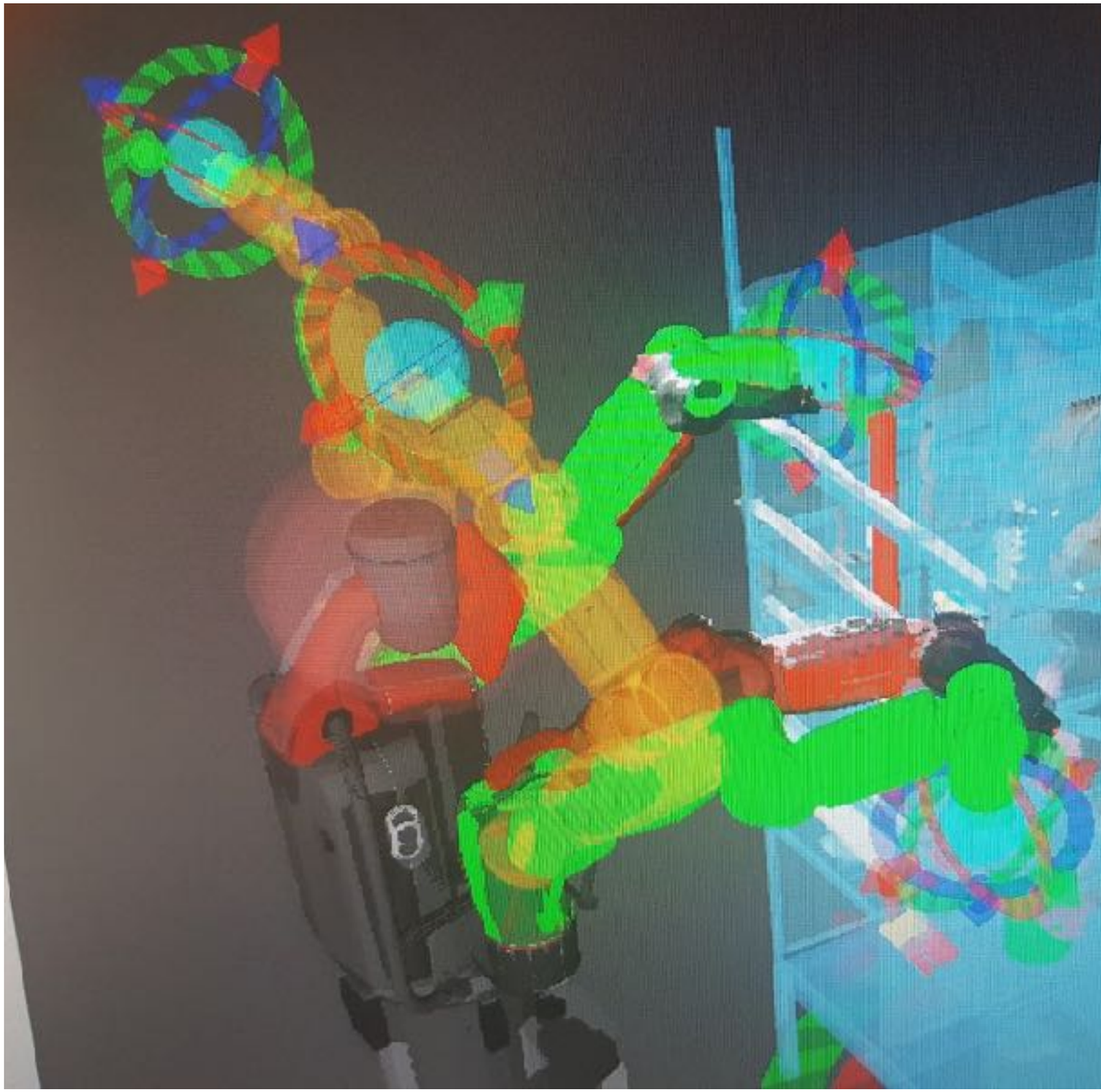
end-effector design









amazon Picking Challenge

Robocup 2016, Leipzig, Germany

Lessons learned

(Robust) Grasping is a big challenge

(Deep) Learning helps

Planning?! really?!

undergrad team can deliver

Progress is facilitate by a (hard) deadline

Out-of-the-lab experience is valuable

Make-it-happen person required

Systems are ~~a pain~~ hard

Possible pay-off

trade-off between specialised solutions and generality

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what is next

manipulation, or: why is grasping so hard?

efficient learning, or: how should I move to learn?

transferring skills, or: how do I teach a robot from vision?

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picking benchmark

http://Juxi.net/acrv-picking-benchmark/

https://arxiv.org/abs/1609.05258

limitations of current robotic systems
reproducible research on TASKS not datasets

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picking benchmark

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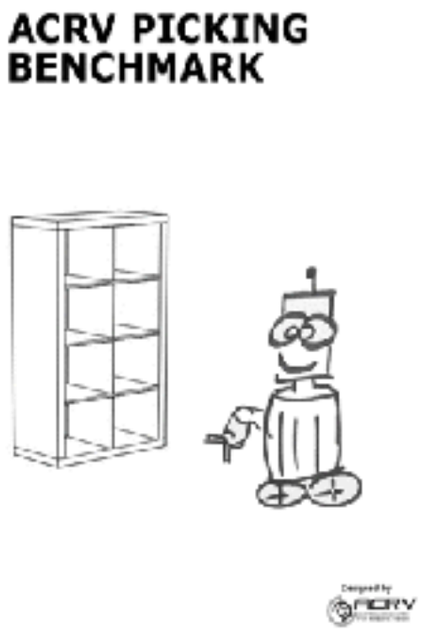
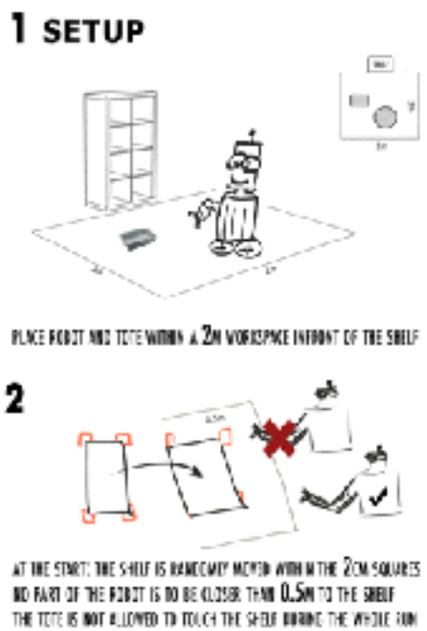
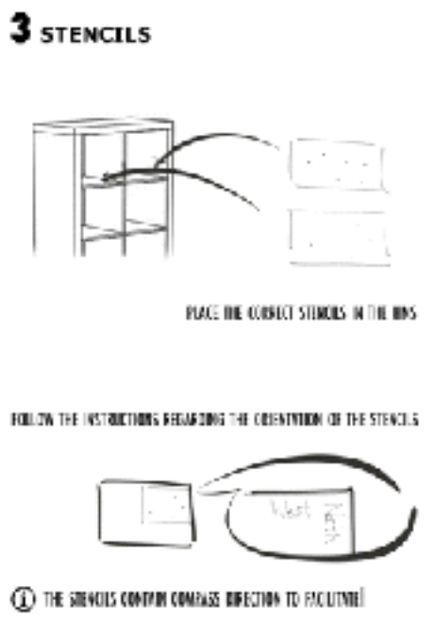
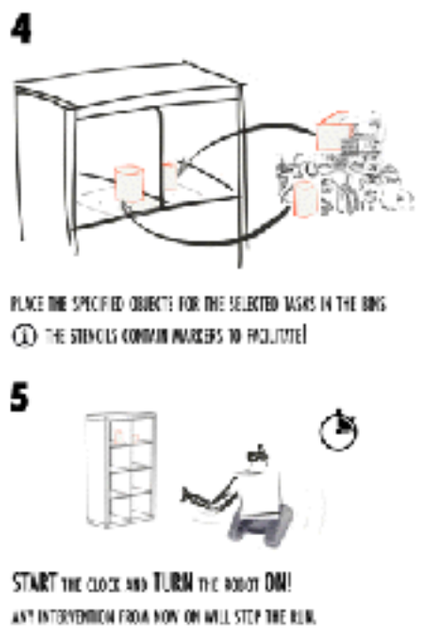
evaluation









more!

May 31, 2017
Session
Paper

Manipulation Planning 2 – WeD7

The ACRV Picking Benchmark

A Robotic Shelf Picking Benchmark to Foster Reproducible Research

http://Juxi.net/acrv-picking-benchmark/

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Thank You

http://Juxi.net/projects/AmazonPickingChallenge/

https://arxiv.org/abs/1609.05258