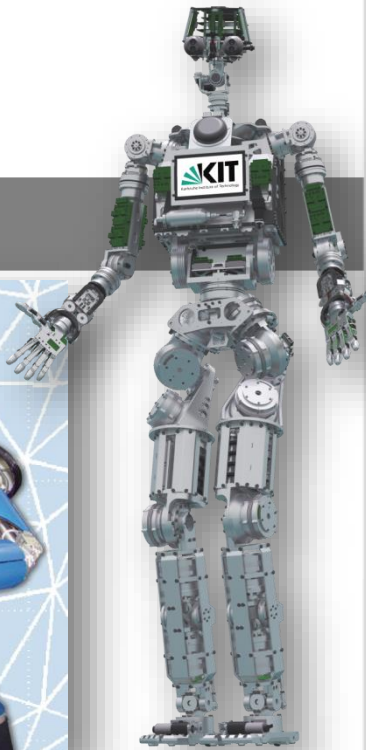
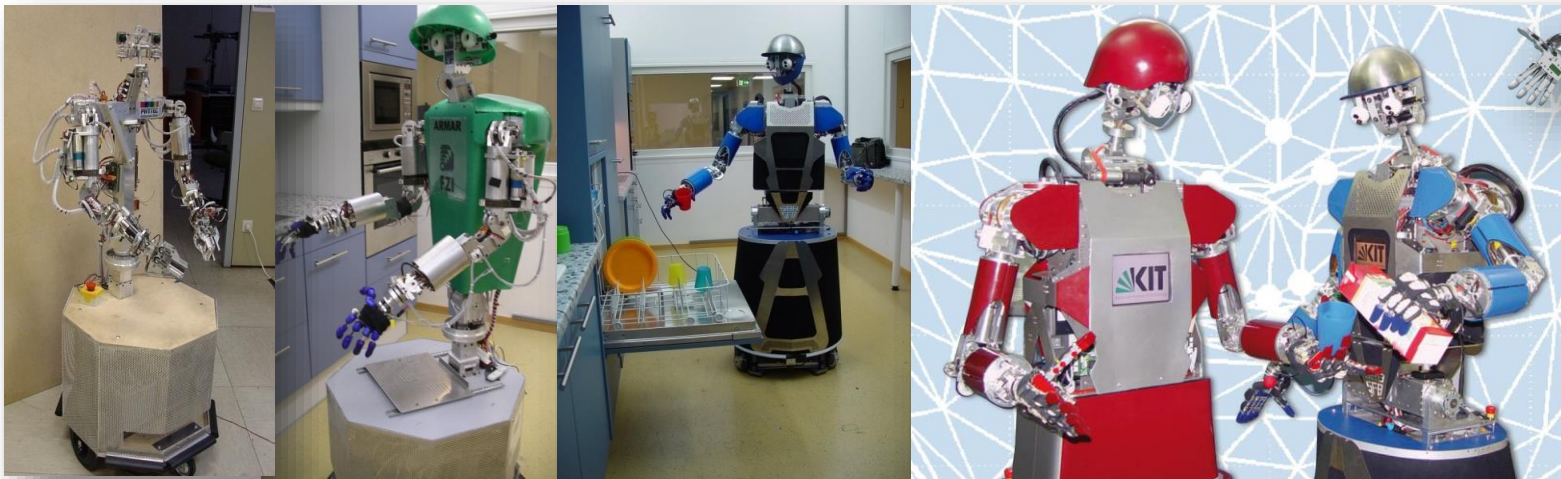


# Humanoid Robotics @ KIT

Tamim Asfour

Institute for Anthropomatics and Robotics (IAR), High Performance Humanoid Technologies (H<sup>2</sup>T)



<http://www.humanoid.kit.edu>

<http://h2t.anthropomatik.kit.edu>

# H<sup>2</sup>T Research Topics

**Mechano-Informatics**

**Learning**  
from Observation and Experience

**Perception**  
Vision and Haptics

**Human Body**  
and Motion Analysis

**Humanoids@KIT**

**Grasping**  
and Manipulation

**Balancing**  
and Walking

**Mathematical Modelling**

**Robot Design**

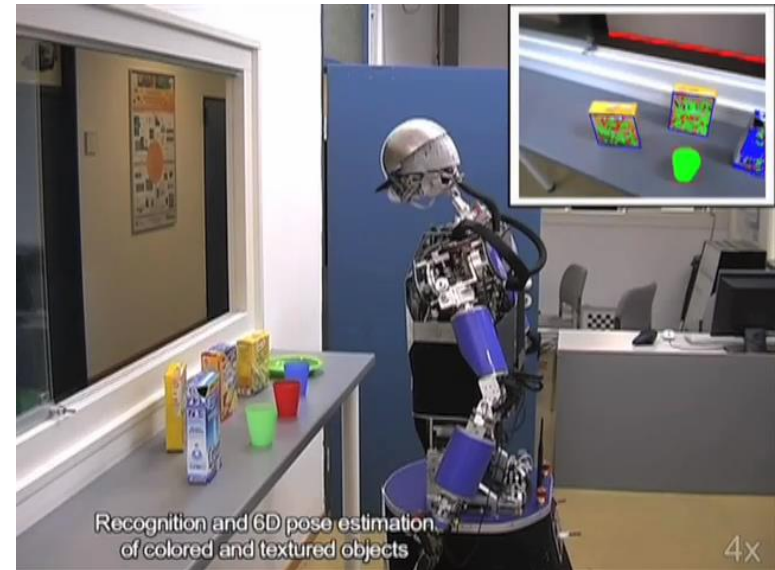
# Research Topics @ H<sup>2</sup>T

## ■ Grasping and manipulation

- Integration of vision and haptics to deal with unknown objects
- Active perception for object segmentation
- Vision-based localisation
- Mobile manipulation

## ■ Learning for human observation

- Marker-based (and markerless) observation of human actions
- Learning motion primitives from human demonstration
- Motion primitives for grasping, walking and whole-body locomotion and manipulation tasks

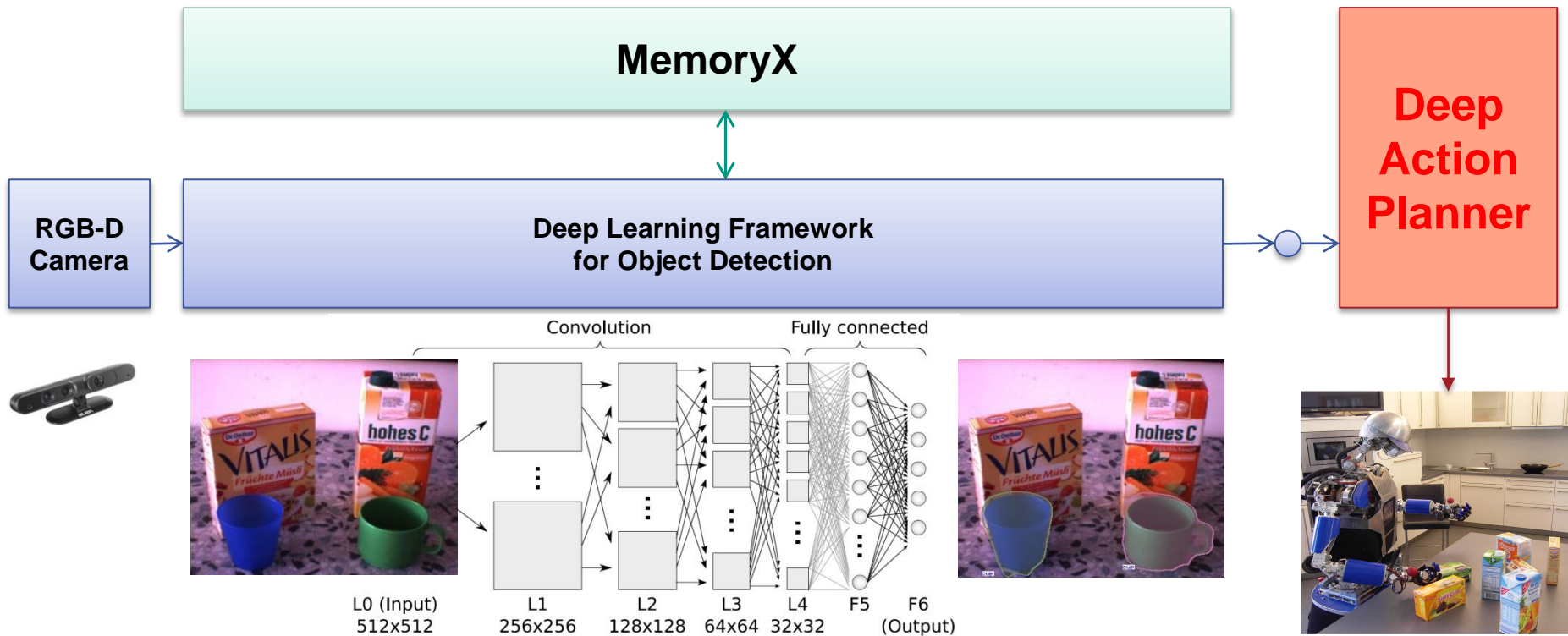


# Praxis der Forschung in WS 16/17 am H<sup>2</sup>T

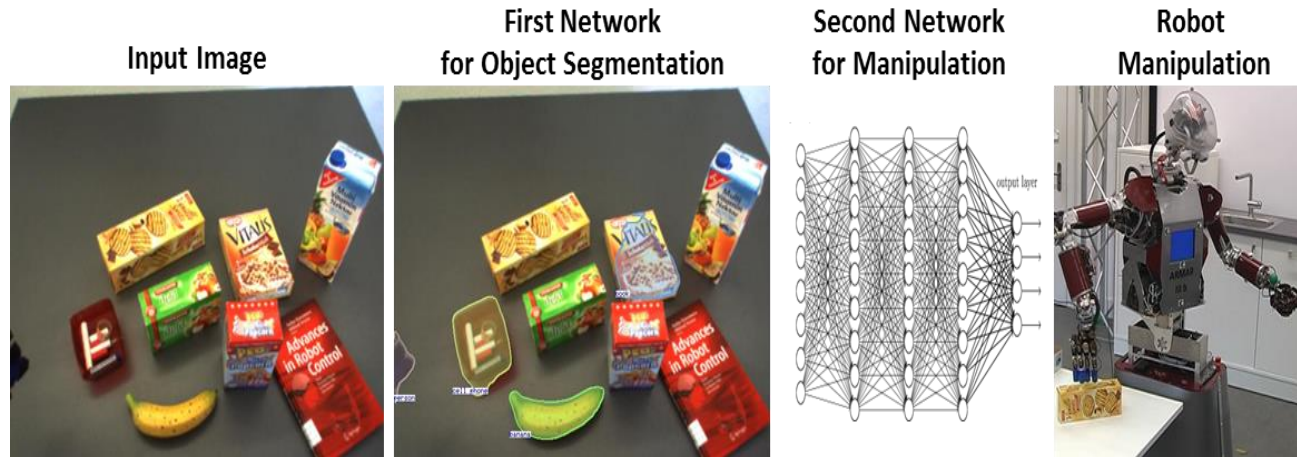
# Two Topics

1. Deep Learning for Object Manipulation
2. Reactive Grasping of Unknown Objects

# 1. Deep Learning for Object Manipulation



# 1. Deep Learning for Object Manipulation



## ■ Goal

- Applying RNN-based deep learning techniques to allow ARMAR to explore the possible actions that objects suggest
- Collecting and annotating data for training the proposed deep architecture

## ■ Requirements

- Knowledge in computer Vision, robotics, and machine learning
- Solid programming skills in C/C++ (or Python)

## 2. Reactive Grasping of Unknown Objects

### ■ Task

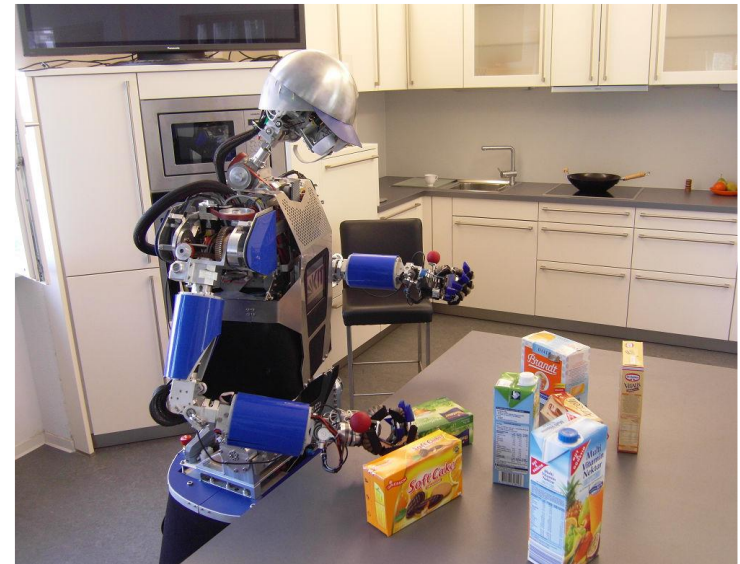
- Design a closed-loop reactive grasping controller
- Data fusion of vision and haptics
- Online grasp execution

### ■ Methods

- Comparison of different data-driven methods (SVM, Gaussian Processes, ...)
- Data collection with ARMAR-III

### ■ Requirements

- Solid programming skills in C++
- Solid background in math





## H<sup>2</sup>T „special“ requirements for PdF

- Candidates **must** spend **at least one day per week** in the H<sup>2</sup>T labs

# Contact

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