Master Project UnrealRobots

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Overview

How can robots learn such tasks?

Imitation Learning:

- Immersive teleoperation scenarios
- Kinesthetic teaching
- Directly recording human motions

The project idea

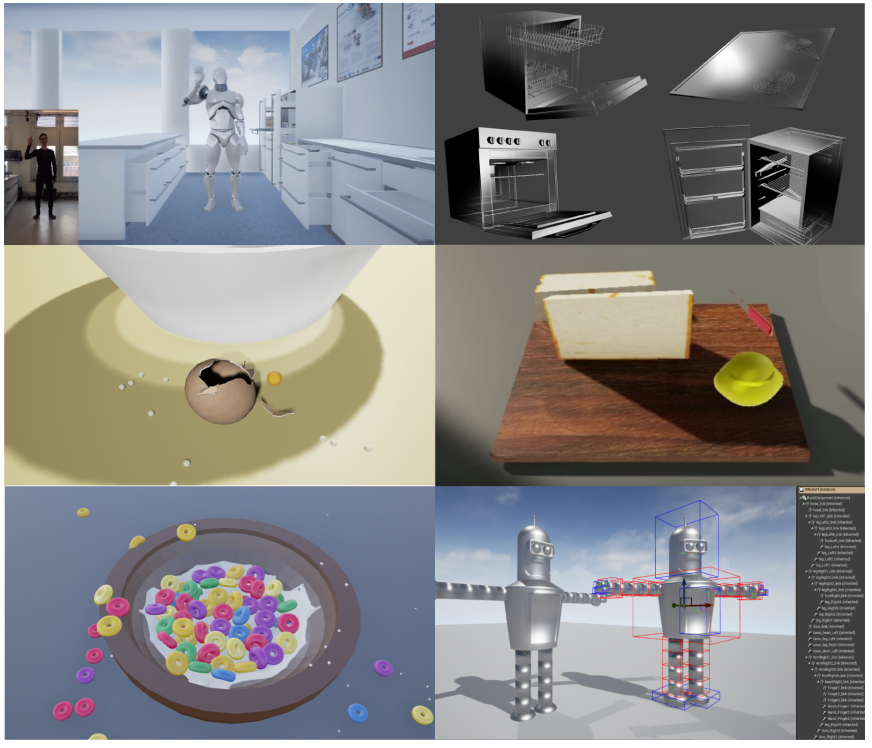
Execute tasks in a **virtual environment**:

- Ground truth data
- Human tracking
- Physics enabled scenarios
- Photorealism

Results of the first phase (Bachelor project)

Subgroups:

- Optitrack
- Realistic kitchen
- Hollow and destructible objects
- Dynamic mesh slicing
- Particle based simulation
- Physics based robot generation



Extension ideas...

- Continue on improving the current scenarios
  - Optitrack - human with object tracking
  - FleX - liquids, gas, soft / deformable / destructible objects
  - Complex robot simulation with joint controllers
  - Physics based VR interaction
  - Creating photorealistic models / lightning / materials
- Create new interesting scenarios
- Can be combined with learning, vision, knowledge representation etc.

What we offer...

- Possibility to work with a state of the art game engine and particle based simulation
- Possibility to experiment with various technologies:
  - **Machine Learning**
  - **Computer Vision**
  - **Knowledge Representation**
  - **Robotic Simulation**
  - ...
- **Opportunity** to stay for Master and PhD projects
- Collaboration with **international** partners

What we expect...

- Good programming skills (C++)
- **Interests and experience** in:
  - Game-, Rendering- and Physics Engines,
  - Artificial Intelligence, Robotics, Simulators
- The **ability and will** to:
  - implement the developed concepts
  - actively organize the project

Project organization

- Groups of 1-4 people for implementing the chosen topics
- Weekly plenums
- Project room and access to the lab

Recommended lectures:

- Artificial Intelligence
- Integrated Intelligent Systems
- Knowledge Acquisition and Knowledge Representation
- Robotics I + II

... and everything else on AI, Robotics, Computer Vision etc

Questions?

Thank you!

More Info:
http://ai.uni-bremen.de/teaching/unrealrobots