TECHNISCHE UNIVERSITÄT MÜNCHEN
Human-centered Assistive Robotics
UNIV.-PROF. DR.-ING. DONGHEUI LEE

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F O R S C H U N G S P R A X I S
for
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User Interface for a Service Robot

Problem description:

In the near future, service robots will serve an increasingly important role in many sectors, such as healthcare and elderly care. The latter is due to the rapidly changing demographics and the corresponding lack in needed nursing staff. Not only should service robots be technologically capable, but also intuitively controllable by everybody. In this Forschungspraxis work, we aim to initiate the development of an interface for commanding ROS-based home service robots. Such an interface is envisioned to eventually combine user gestures, voice commands, visual feedback and 2D/3D graphical overlays into a novel multi-modal interaction system. Following human-centered design principles, the prototype should provide the means for easily communicating with and commanding a robot, throughout tasks that involve locomotion and object manipulation.
The aim of this project is to research and prototyping a user interface with several functionalities, without going too deep into each one.
In more details the interface should contain 3 main parts namely Navigation, Perception and Manipulation. The navigation part should enable the user to augment the SLAM-based map e.g. by labeling regions and setting pins/goals, which is a first step to semantic mapping. Moreover the perception part includes assistive perception functionalities, like object segmentation, labeling and selection. Finally, the manipulation part should empower the operator to grasp objects using gestures (e.g. open/close the gripper). As already stated, inputs to the interface can include gestures, which can be achieved by integrating a Leap Motion device.

Work schedule:

- Research related work and open source projects
- Choice of programming environment and tools
- GUI design
- Implementation of described functionalities
- Embedding Leap Motion for gesture control

Supervisor:	M. Sc. Matteo Saveriano
Start:	04.09.2017
Delivery:	05.11.2017

(D. Lee)
Univ.-Professor