Video recording

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A video recording showing the navigation system in practice is available for download at the webserver of the TAMS research group (`http://tams-www.informatik.uni-hamburg.de/research/robotics/service_robot/videos/index.php`). It shows the robot navigating through the rooms of the TAMS laboratory. The system bases its planning on a static map of the rooms as well as on data from the laser range finders. The stereo cameras have not been utilized in this recording. Below a few comments to the scenes on the recording will be stated. They are tagged with the timestamps of the discussed scenes.

B.1. Scene 1 - The storage room

0:13 - 0:33 The graphical control interface of the navigation system is shown. It displays the current environment representation (shown as red lines), the position and the orientation of the robot (blue square), and the planned movement (purple line). Currently, the robot is ordered to move to the hallway. As the main doors of the room are blocked, the robot has to move through the cluttered storage room.

0:34 - 1:14 The robot is shown as it moves to the doorway leading to the storage room.

1:15 - 2:41 The robot moves through the doorway and crosses the storage room.

2:42 - 4:39 The robot exits the storage room and then moves down the hallway.

B.2. Scene 2 - Passing a small passage

4:51 - 5:26 The robot passes a narrow doorway with not much free space left to maneuver. The system is actually capable to move the robot through passages with even slightly less free space. However, the passage needs to be a few centimeters wider than the robot. Otherwise the planning software will try to find a way around the passage or will terming movement execution.

B.3. Scene 3 - Obstacle avoidance

5:36 - 6:24 This scene shows the robot moving towards its destination, when a person steps into its way. This forces the robot to terminate its movement and plan a different route.

B.4. Scene 4 - Dynamic pathplanning

6:36 - 6:45 The robot is instructed to move into the storage room, similarly like in scene 1. This time, however, the door to the storage room is closed. The robot cannot realize this from its initial position.

6:46 - 7:51 The robot approaches the closed door. When the data from the laser range finder (shown on the right hand screen) indicates that the door is closed, it turns around and tries to enter the storage room from the other doorway.

7:53 - 9:44 Here the robot is ordered to move back into the lab. Like before, the doorway will be blocked by a person, forcing the robot to take the other doorway.

B.5. Scene 4 - Dynamic obstacle avoidance in a cluttered environment

9:57 - 14:22 Many different obstacles are put into the robot's way. It navigates around them and adopts a new plan when the obstacles are moved. The swivel chair is of special interest: The laser range finders can sense only its central stand, thus its outline in the environment representation of planning software is much smaller than it should be. Therefore the robot comes very close to the chair and even touches it slightly (at 11:55 and 12:47). For this kind of situation the stereo camera approach was intended to detect the real size of the obstacle.