Automating the Tote Induction and Extraction Process

2015 - 2016

LOCUS

TEAM
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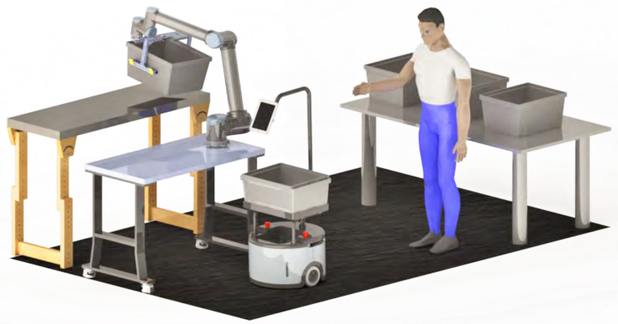
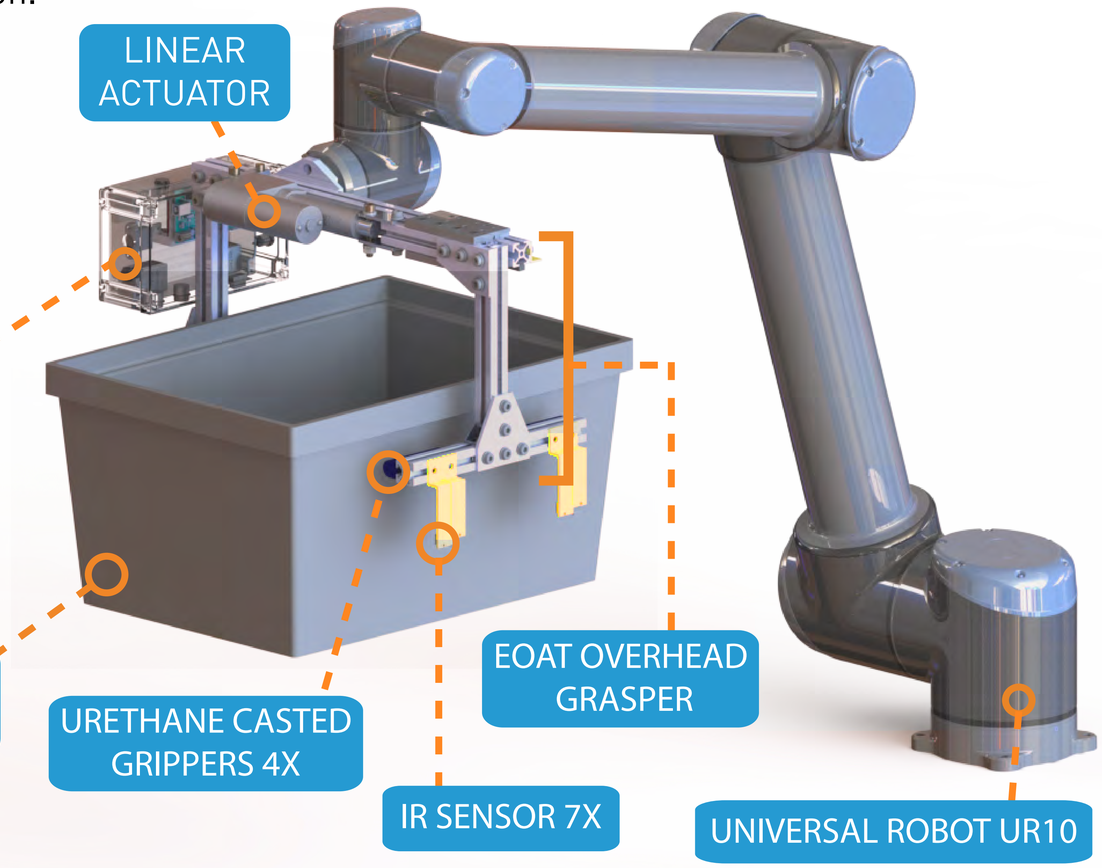
Project Description

The Locus Robotics SCOPE team developed a proof-of-concept prototype to automate the tote induction and extraction process for the Locus warehouse fulfillment system. Our system uses a robotic arm equipped with custom end-of-arm tooling, and uses a sensor suite to maximize utility and flexibility while ensuring coworker-safe operation.

Robot Interaction

1) Locus Robot drives up, in parallel, to the UR10 robot
2) The end of arm tooling (EOAT) on the UR10 senses the tote position and adjusts its position to securely grab the tote.
3) The UR10 robot transfers the tote from the Locus robot to the conveyor belts, or vice versa.



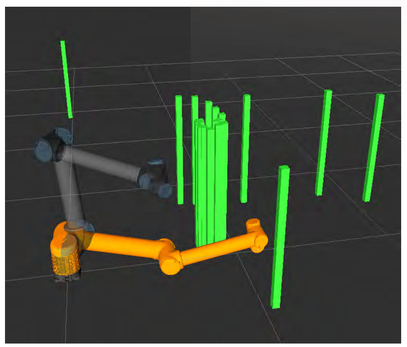


EOAT Overhead Grasper

- Linear actuator actuates tooling to hold and release the tote
- Four urethane casted grippers to prevent slippage when grasping the tote
- Three overhead IR sensors sense the contents within the tote
- Four side IRs sense and correct tooling position for any tote misalignment

Obstacle Avoidance

The team integrated the LIDAR data to allow for obstacle avoidance. The scan data from the LIDAR is used to generate these cuboid representations of obstacles in the MoveIt motion planning scene.



Motion Planning

The Universal Robots ROS MoveIt packages were used to interface with the UR10 controller to integrate sensor data and more complex decision making when performing path planning for the arm.