FINAL15 – MOVING OBSTACLES (MO)05

National Institute of Standards and Technology

ARIAC NIST
Agile Robotics for Industrial Automation Competition

Trial Description

- **Task**: Build **2** shipments from 2 orders, on opposite AGVs. The initial order will be interrupted by a second order around 20 sim seconds. In this scenario there are two persons moving in aisles #3 and #4. These persons are obstructing the path of the robot from accessing products that are required in both orders. The robot has to plan a path to access aisles #3 and #4 without colliding with the moving persons. Colliding with any of the moving persons will set the score to 0 for this trial.
  - The conveyor belt is used.
  - There are faulty products in the environment.
  - Grippers are faulty and will drop products over both AGVs.
  - Sensors will stop working temporarily but the robot should keep working during the blackout.
  - 2 moving obstacles which obstruct the path of the robot from accessing products on shelves.

- **Orders**: 2 orders with 1 shipment each: order_0::shipment_0 and order_1::shipment_0.
  - order_0::shipment_0 consists of 3 products in total:

Fig. 1: Products used in shipments for order_0.

  - order_1::shipment_0 consists of 3 products in total:

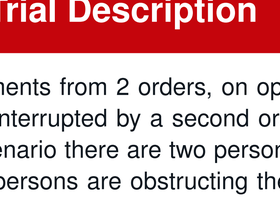
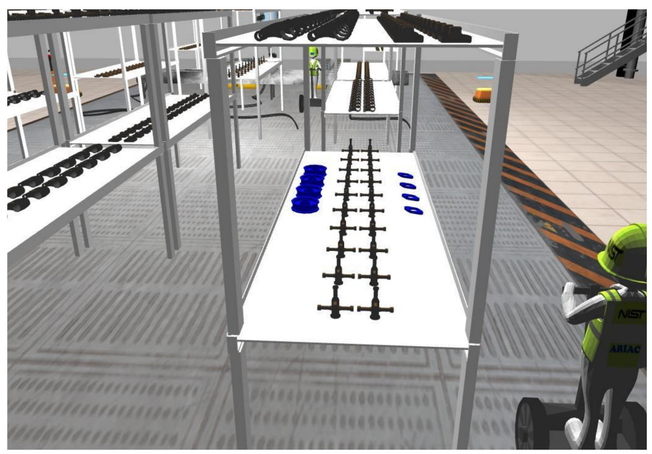


Fig. 2: Products used in shipments for order_1.

- **Maximum completion score**: 24 pts.
- **Agility challenges**:
  - Faulty products.
  - Faulty grippers.
  - Sensor blackout.
  - Flipped products.
- **Product vessels**: bin × 0, shelf × 2, conveyor belt is used.
  - **Shipment deliveries**:
    - order_0::shipment_0: AGV1.
    - order_1::shipment_0: AGV2.
- **Time limit**: 500 sim seconds.

Initial Product Placement



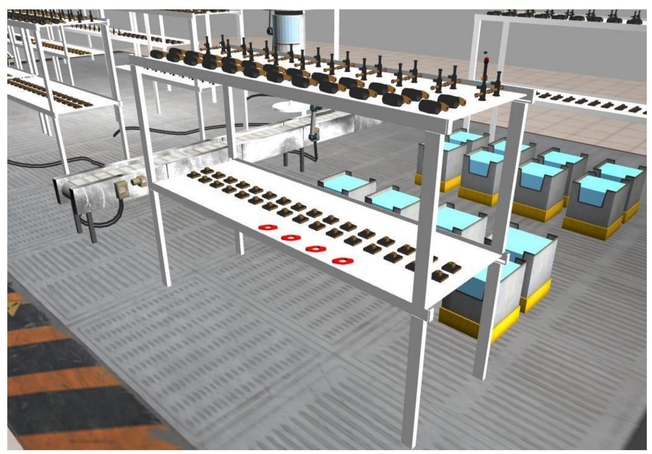


Fig. 3: Initial product placements.

- The conveyor belt will spawn a total of 10 red pulleys.

Agility Challenges

- Faulty products: There are 3 faulty products in the environment. 2 are on the shelf and 1 is on the conveyor belt.

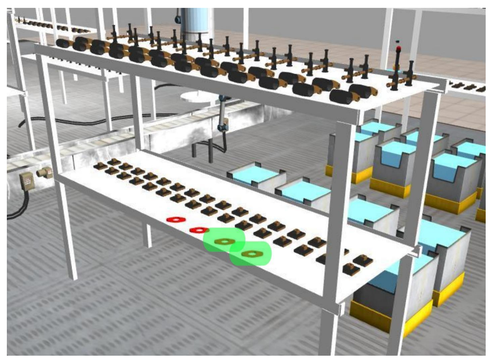


Fig. 4: Faulty products in the environment.

- Faulty gripper: 1 red gasket is expected to be dropped over AGV1. 1 blue gasket is expected to be dropped over AGV2.
- Sensor blackout: All sensors will stop working for 50 sim seconds after a second product is placed on any AGV.
- Flipped products: Each shipment requires a flipped pulley (see Figures 5 and 6).

Orders

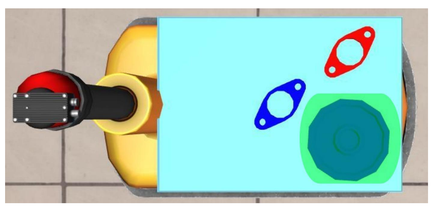


Fig. 5: order_0 shipment configuration on AGV1.

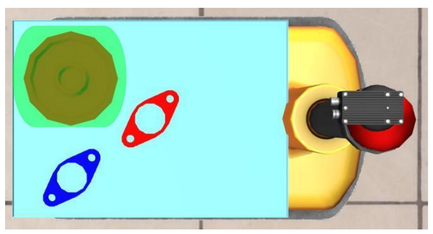


Fig. 6: order_1 shipment configuration on AGV2.