Industrial Robotics Script:

Hi, welcome to our Dual Robot Bottle Sorter

To improve efficiency when cleaning an environment, we have programmed two cobots to collaboratively dispose and sort cups and cans within a known environment. Our system utilises the Widow X250, a 6DOF robot that has seen extensive uses in the home, office, and industrial environment. Along with this, we also have the highly maneuverable UR3e with 6 DOF and adaptable end effector, with this version comes added safety features over its standard UR3 counterpart. Our robots can be used in any indoor environment with the capacity to maintain safety features and can also be manipulated in various configurations. For the Widow X250, two sliding finger Grippers are used, with the UR3e utilising the Robotiq two-finger gripper.

When designing our environment, we …

Robot motions are precisely managed through Resolved Motion Rate Control, utilizing cartesian trajectory to generate linear trajectories. This method enables accurate regulation of both the robot's velocity and the end effector's orientation during transitions between target transforms, ensuring spill-free handling of any remaining liquid in cups and cans.

Here in our system, we utilise a variety of safety features ranging from a standing fire extinguisher for any fires that could occur from electronics and a warning sign to keep users or operators visually aware of the robots in action.

Light curtains are used to monitor movement that enters the area and most importantly, an E-stop is implemented onto the table outside the working are to disable the two robot’s mid operation.

Here we can show the collision detection in action with the movement of the Widow X250. This aims to avoid the table leg by finding the most efficient trajectory.

Here we demonstrate the light curtain in action with a cup simulated being thrown into the working environment of the robot. Once the cup enters the vicinity of the placed curtains, a visual barrier appears to indicate this and will stop the operation of the robots.

Along with our system, we utilize an interactive and simple Graphical User Interface (GUI) to manipulate the individual joints of each robot. Here we start with the Widow X250 joint and then also with the UR3e. In addition, XYZ cartesian movement can also be applied as seen.

We also simulated a physical estop using an Arduino, push button and LED light, where when the push button is pressed the light will remain static until it is pushed again to resume operation.

Here we also have the real UR3 robot demonstrating the same movement for the pick and place of the cup.

Thanks for watching and please support our Dual Robot bottle sorter.