

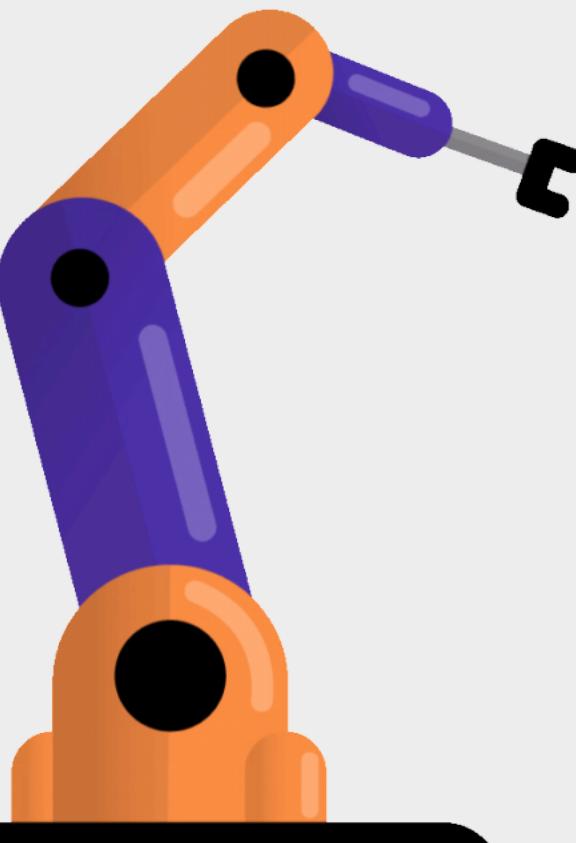
Visual servoing of a manipulator Robot

Date

June 1, 2023

Subject

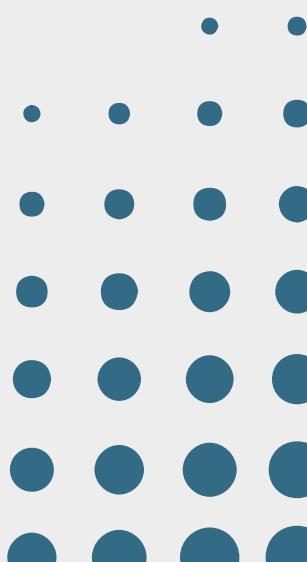
Personal and Professional Project



Examiner
supervisor

Mrs. Fatma zahra oueslati

Mrs. Amani AYEB



Our Team



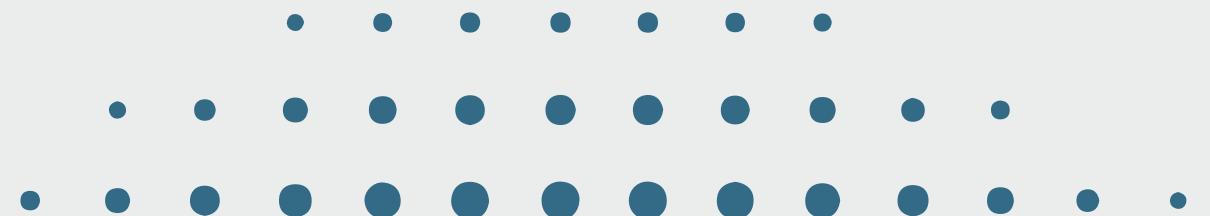
Amine Romdhane



Dorra Saadallah



Wissem Malleh



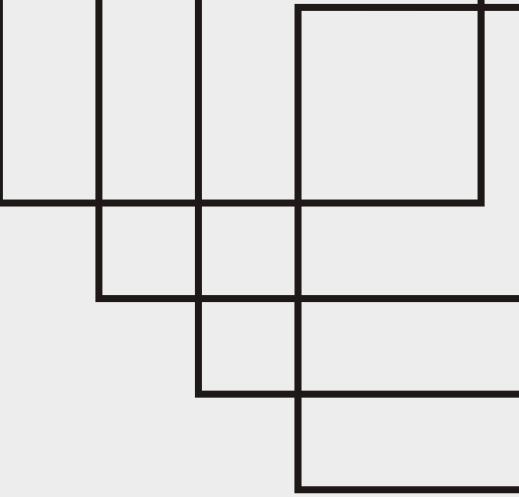


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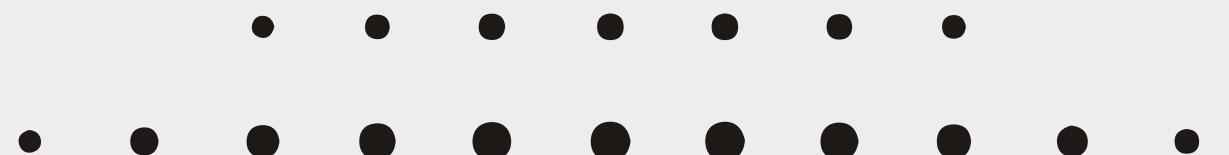


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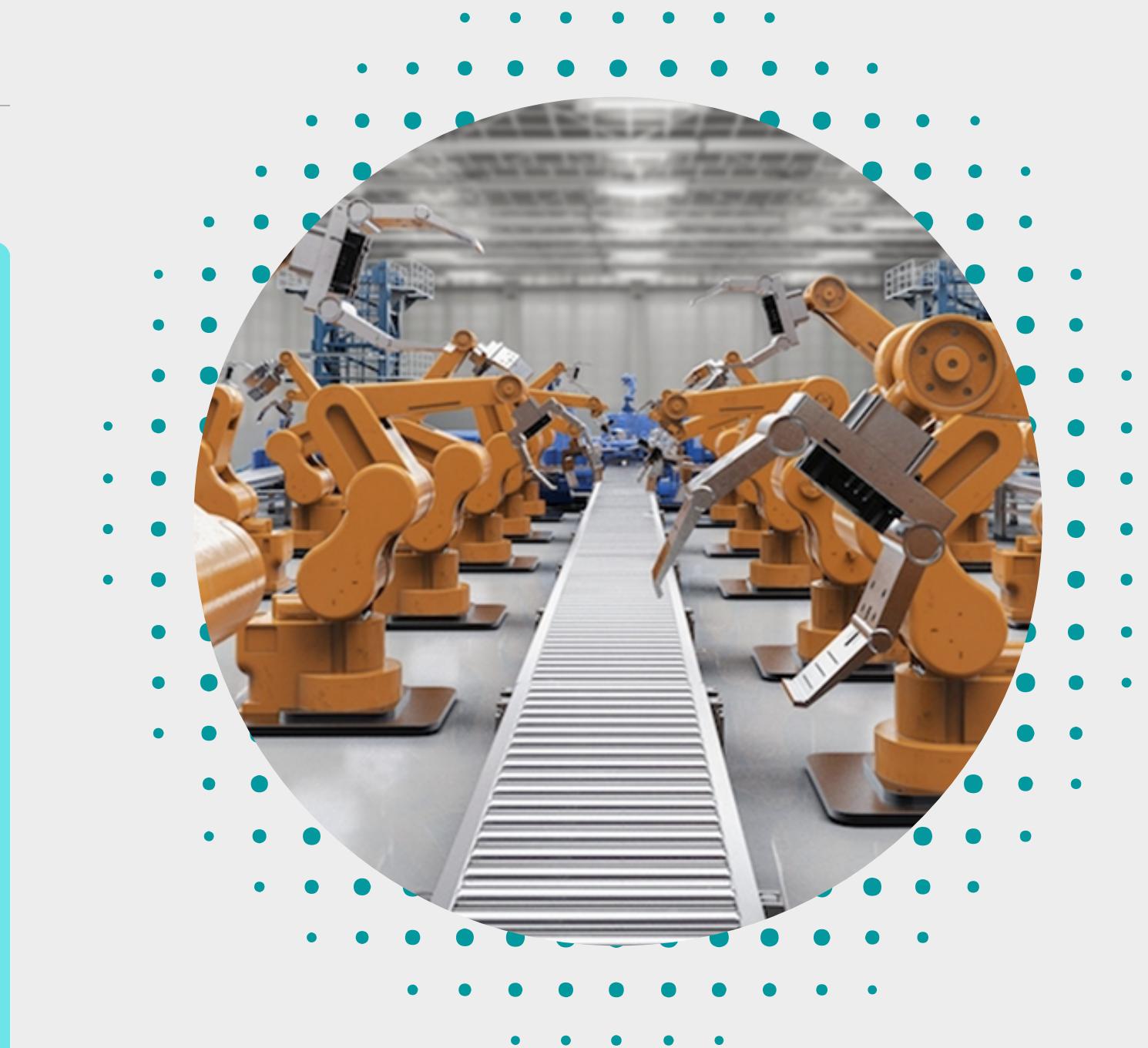
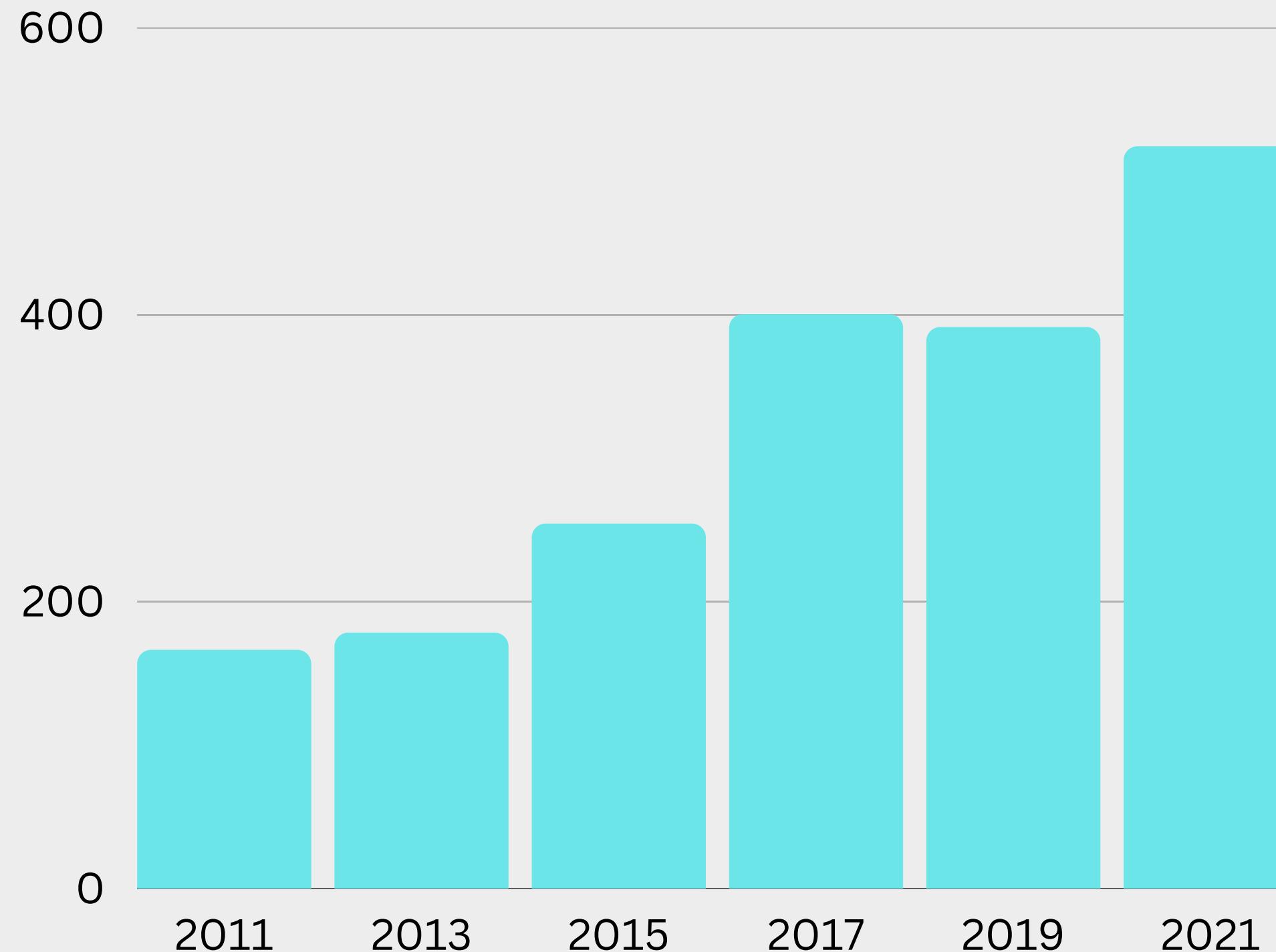
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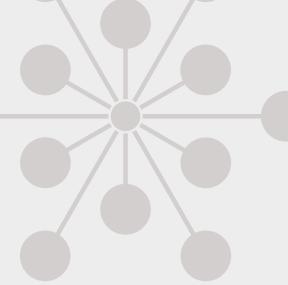


Introduction

Annual installations of industrial robots
1000 units

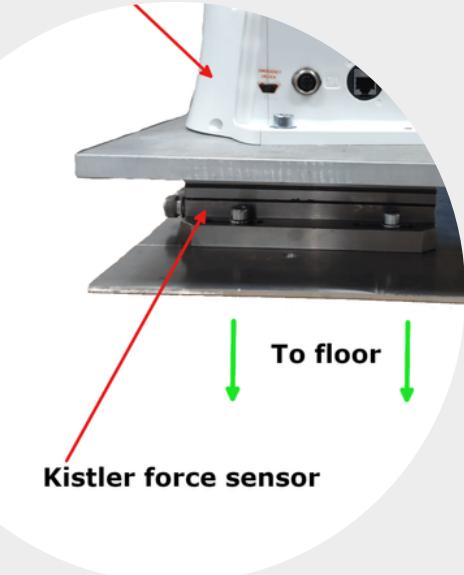


source: World Robotics 2022

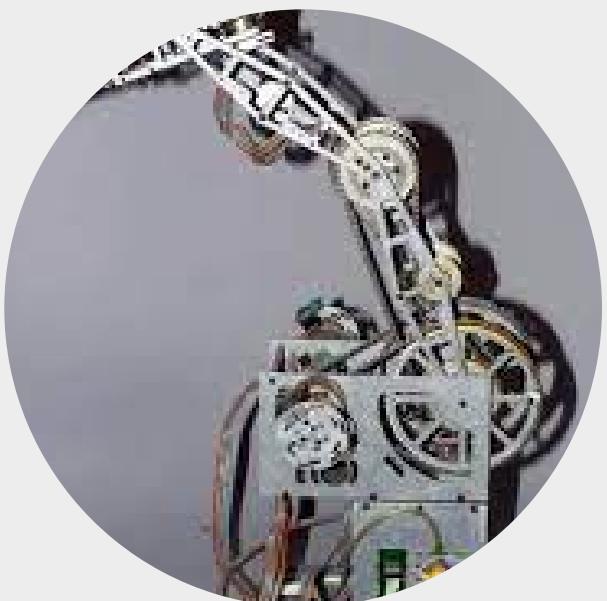


Exact Positioning Requirements

Problematic



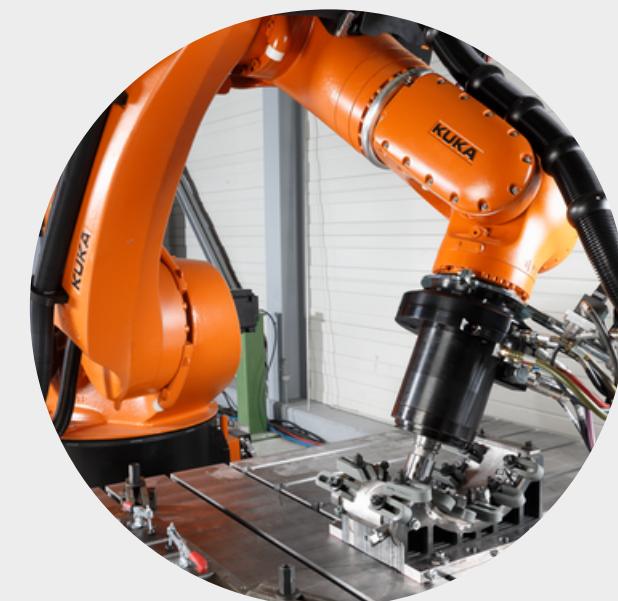
Dependency on Sensors



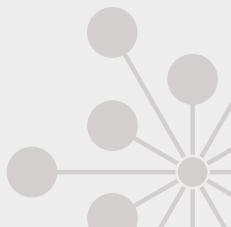
Lack of Adaptability



Limited Flexibility

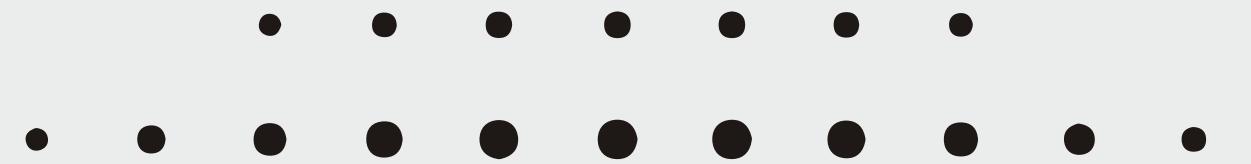
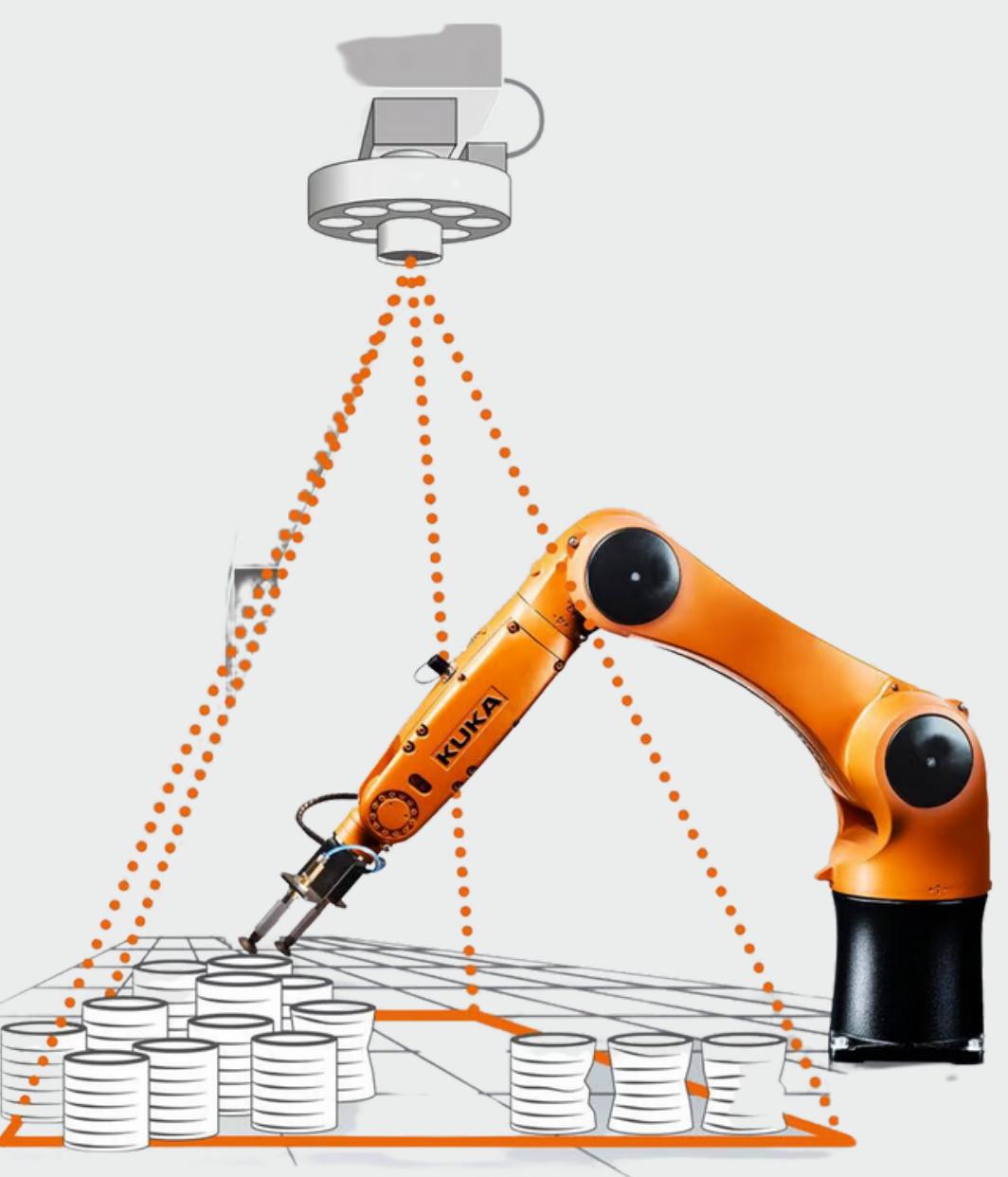


Fixed Positioning

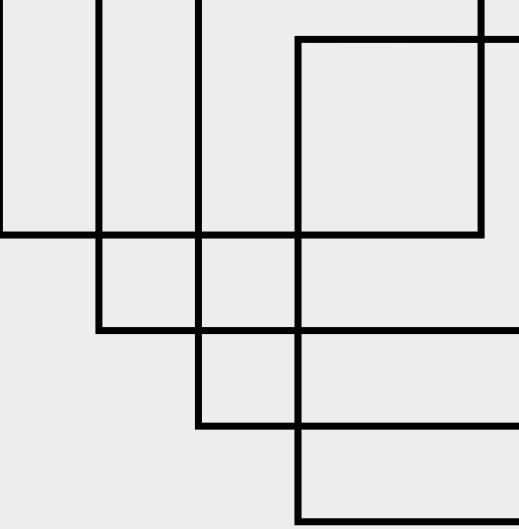
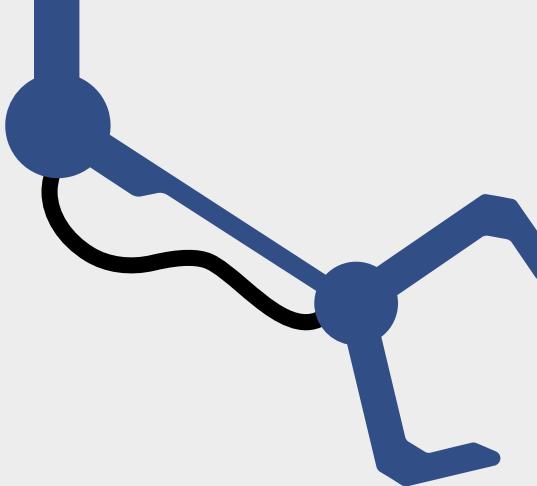




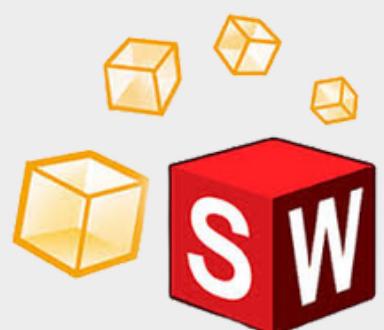
Solution Overview



Methodology



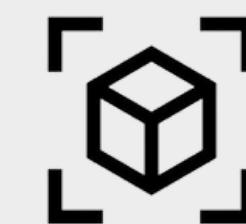
1 Research and
preliminary study



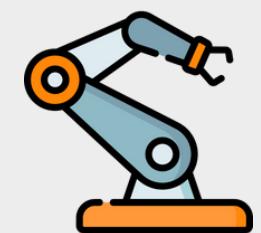
2 Design and modeling



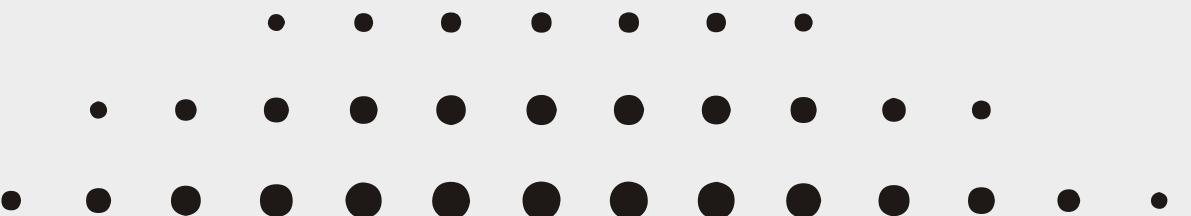
3 Implementation
with URDF and Gazebo

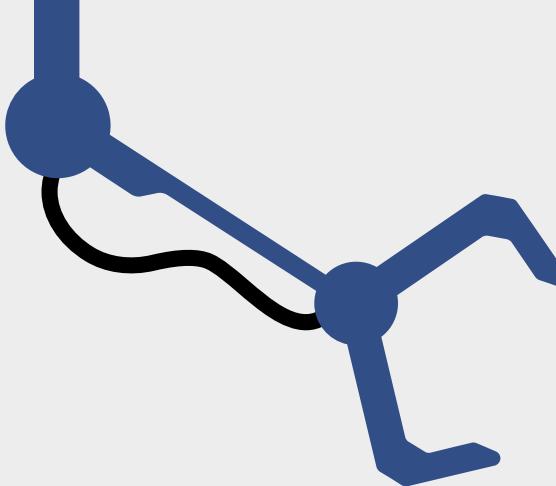


4 Development of
computer vision application

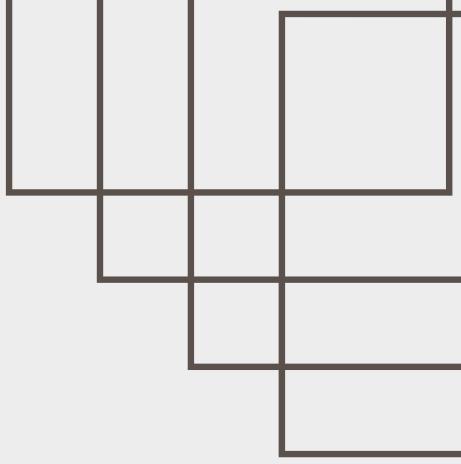


5 System
integration and testing

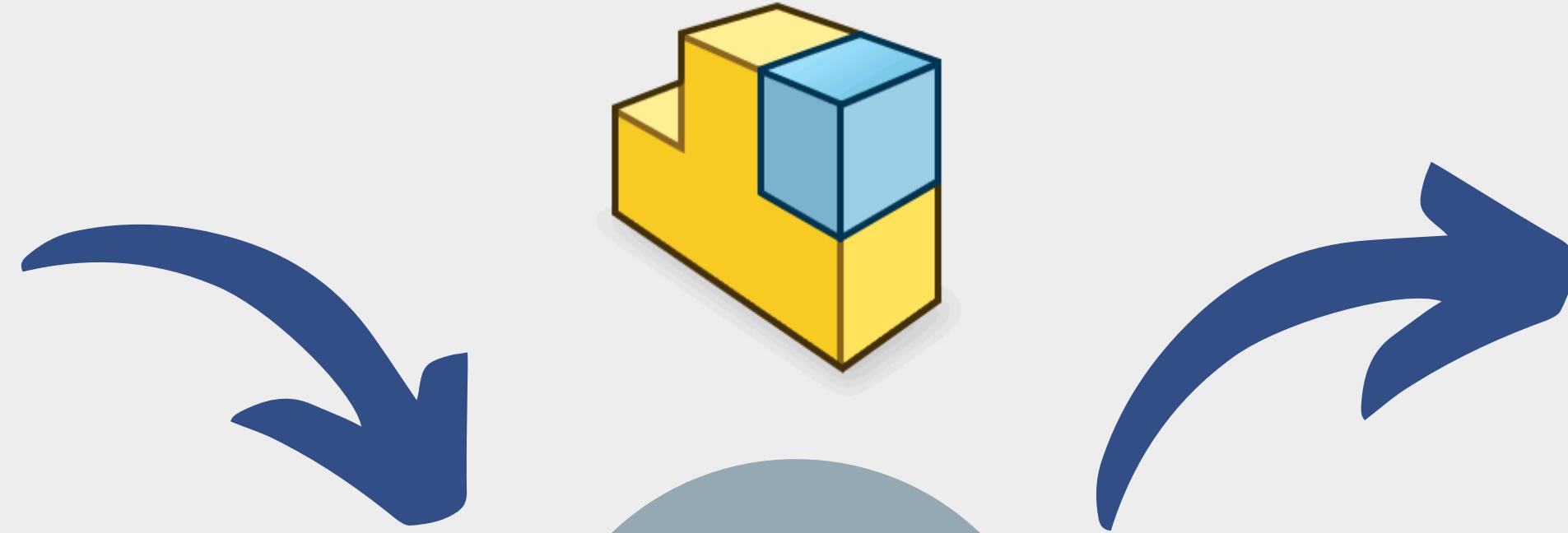
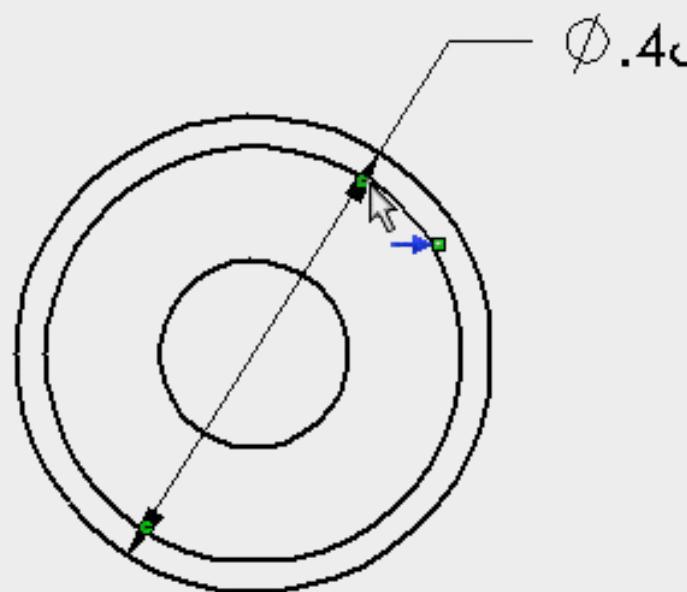




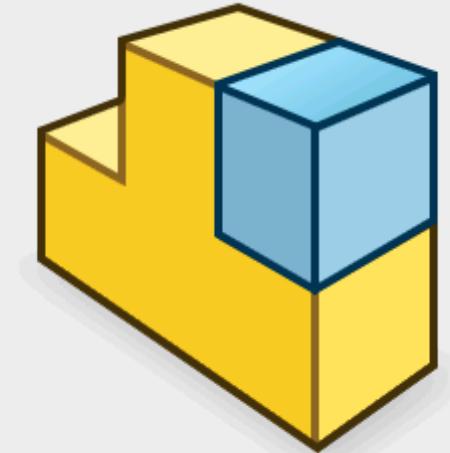
Design and modeling



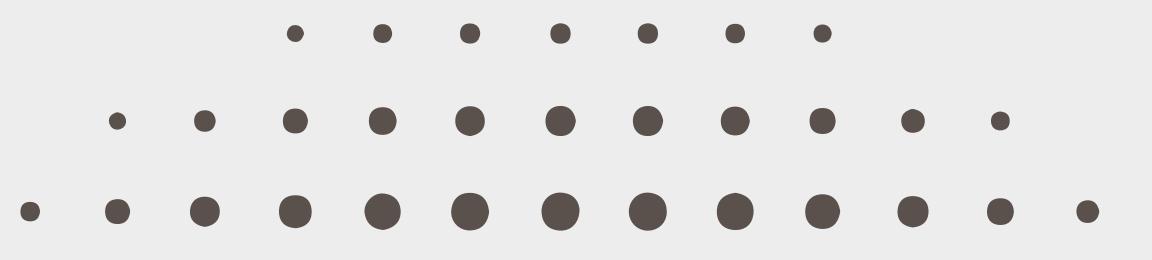
1
Dimensions

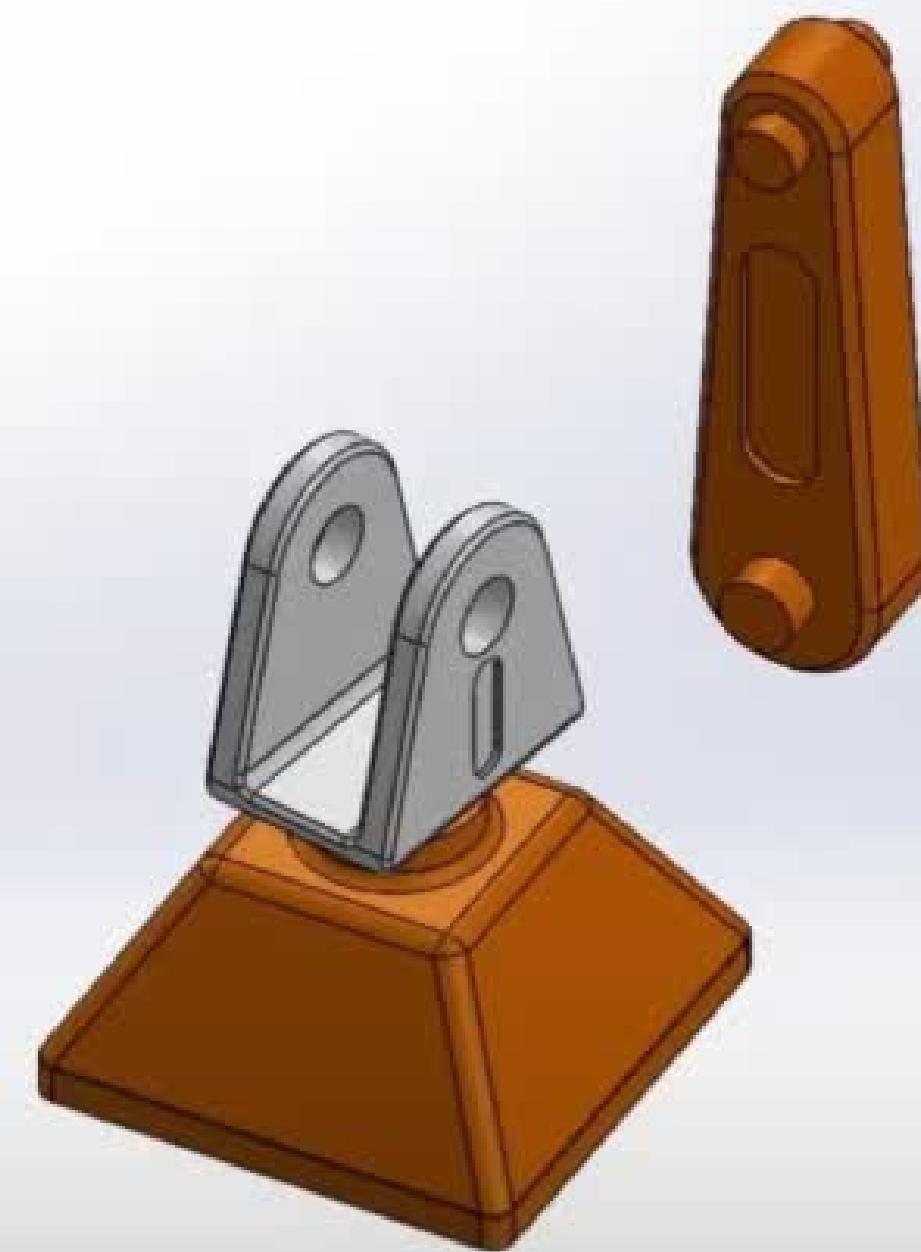


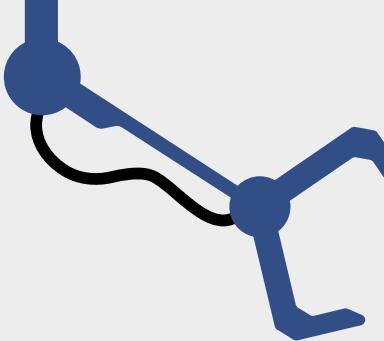
2
Assembly



3
Mechanical
constraints

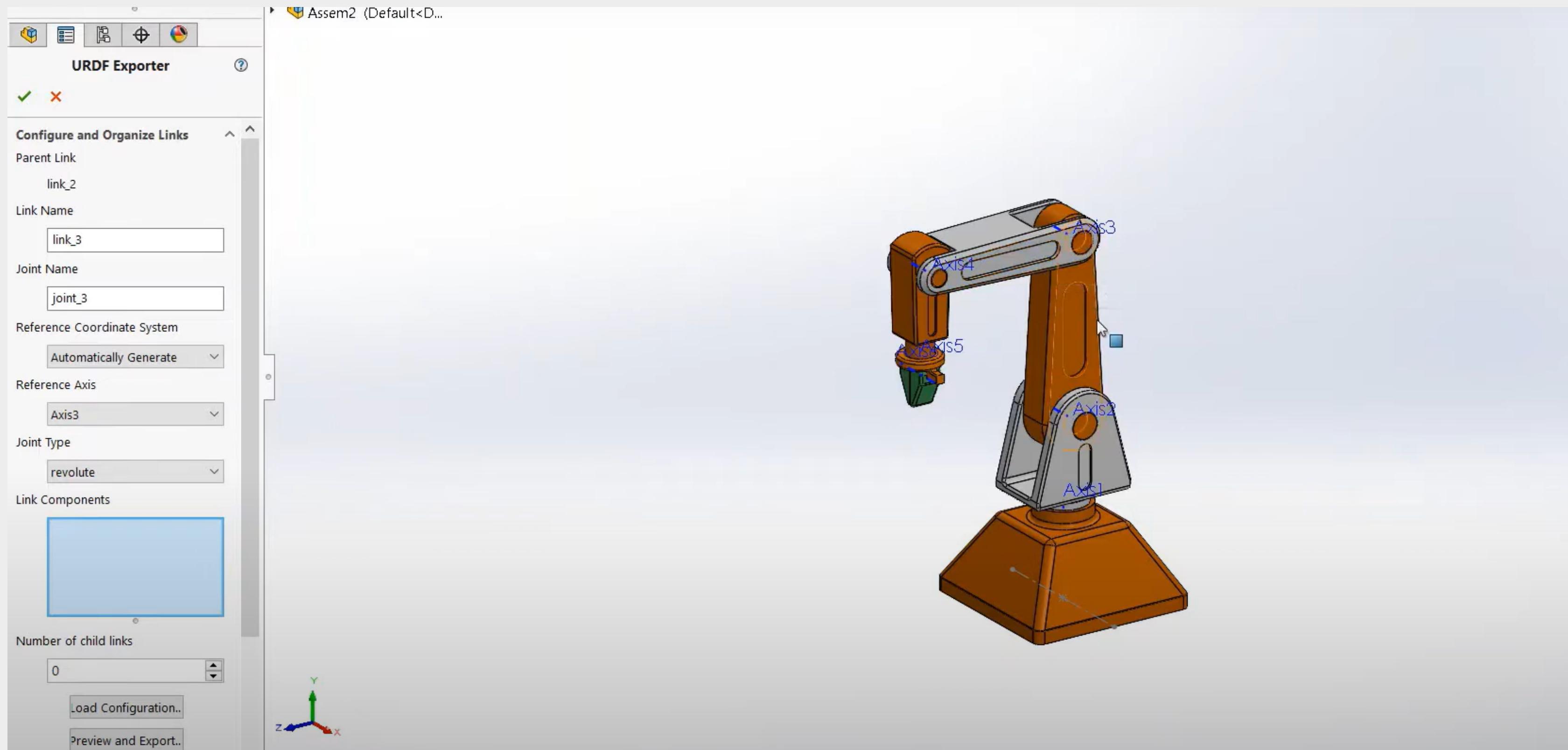


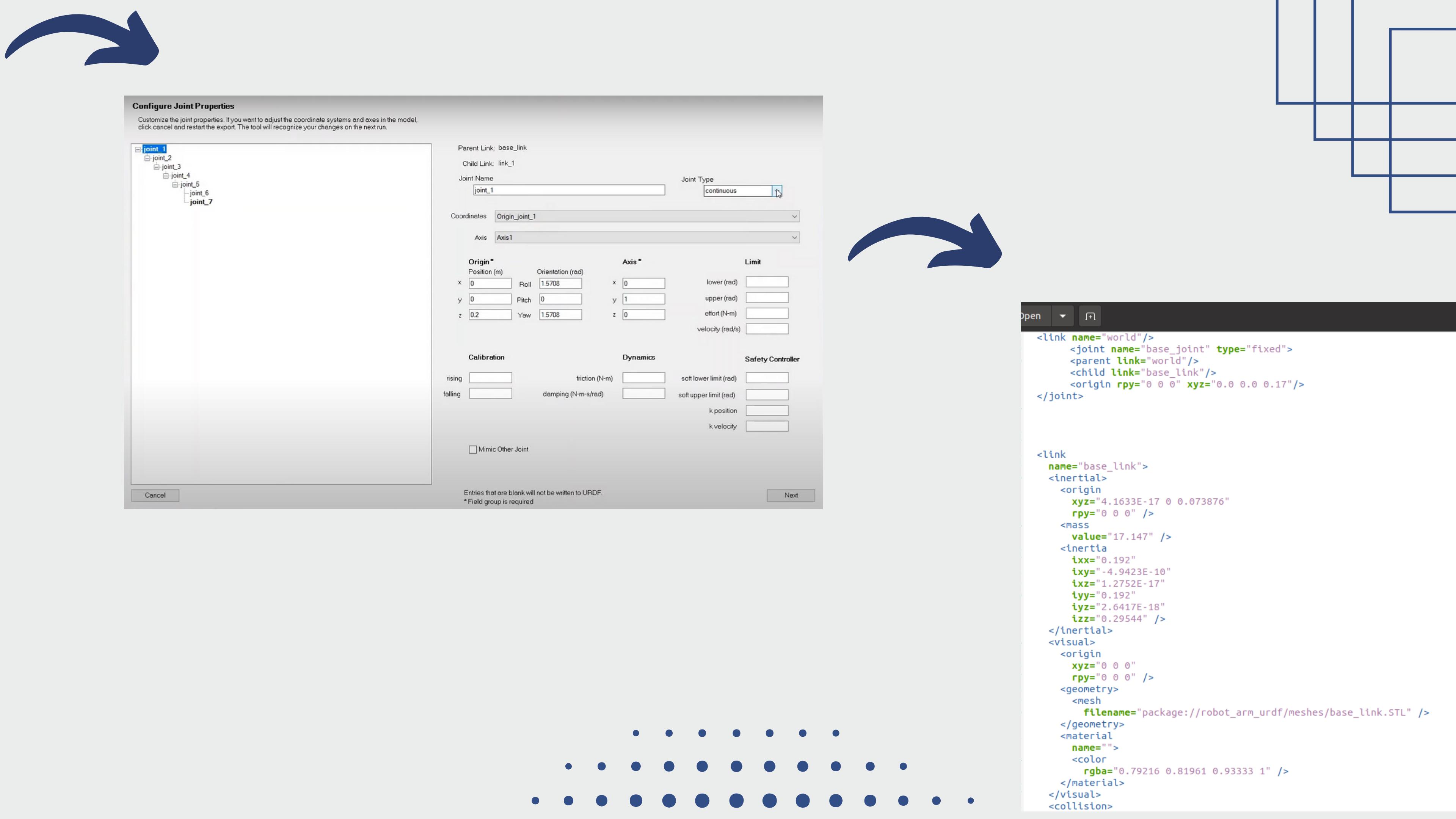




Implementation with URDF into Gazebo

(Unified Robotics Description Format)





SIMULATION



Define Robot
Poses

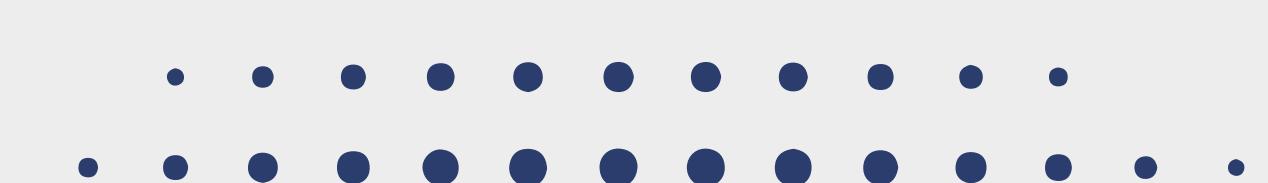


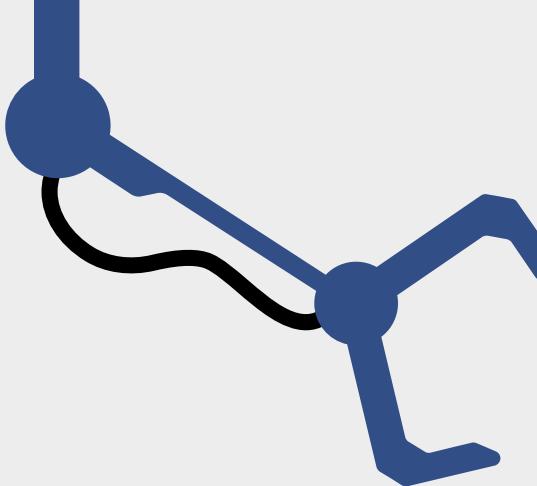
 **MoveIt**

Planning the
path

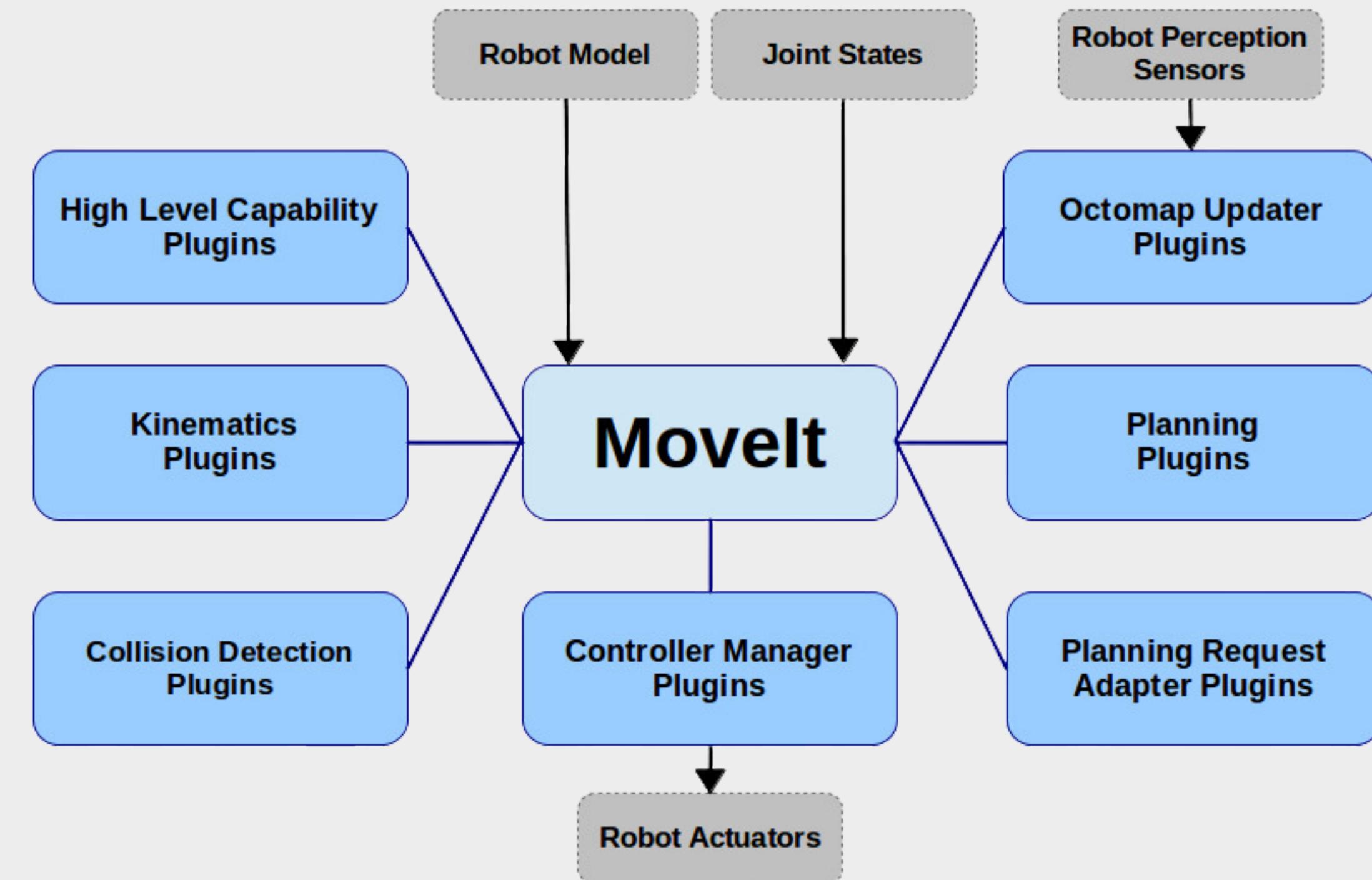


Realistic
environment





MoveIt



Define Robot Poses

Create poses for the robot. Poses are defined as sets of joint values for particular planning groups. This is useful for things like *home position*. The first pose for each robot will be its initial pose in simulation.

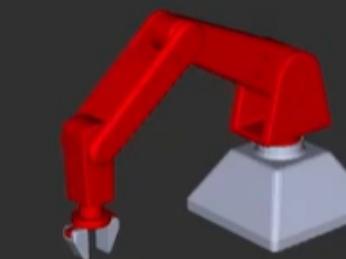
Pose Name:

pick_object_pose

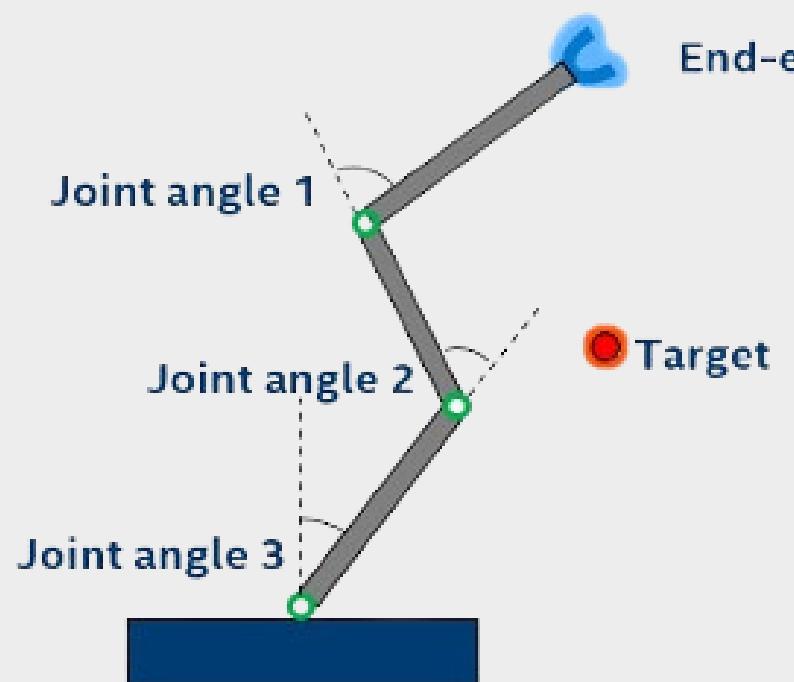
Planning Group:

arm_group

joint_1	0.0000
joint_2	1.0843
joint_3	-0.4166
joint_4	-0.6770
joint_5	1.5720



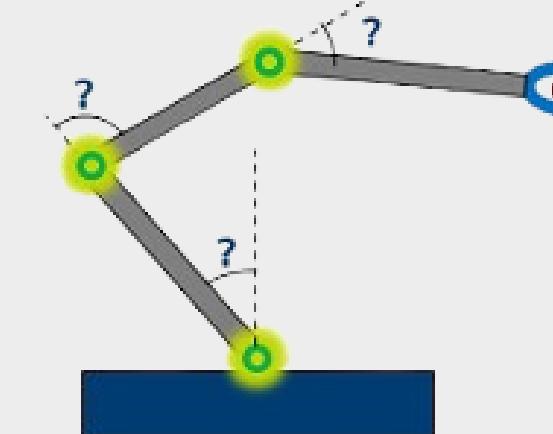
Joint Angle



Direct Kinematics

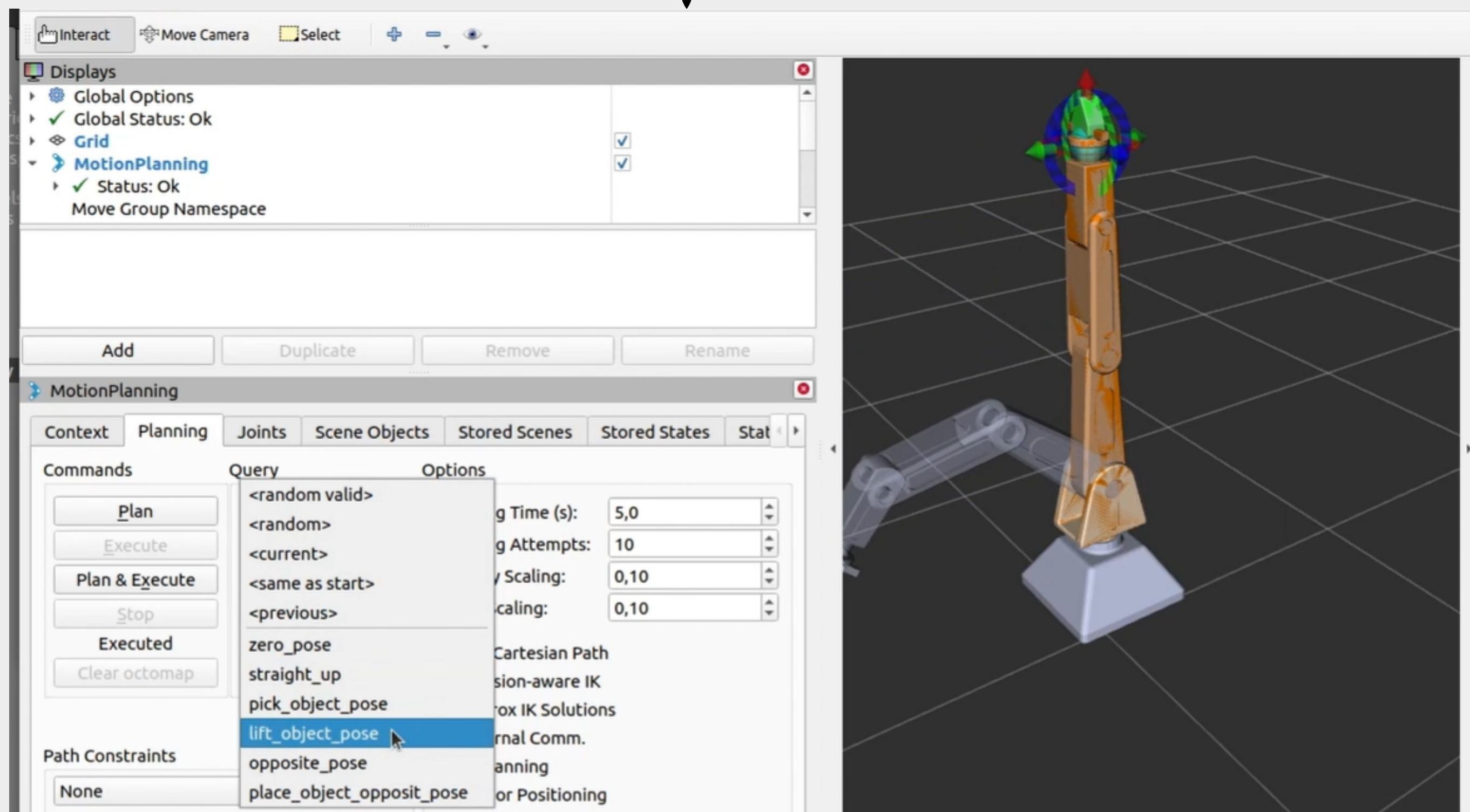
Catch the target

Inverse Kinematics

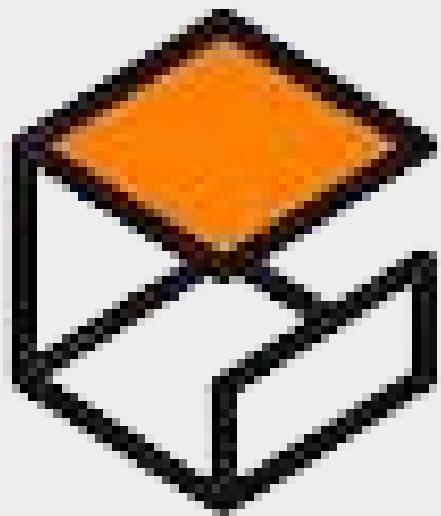
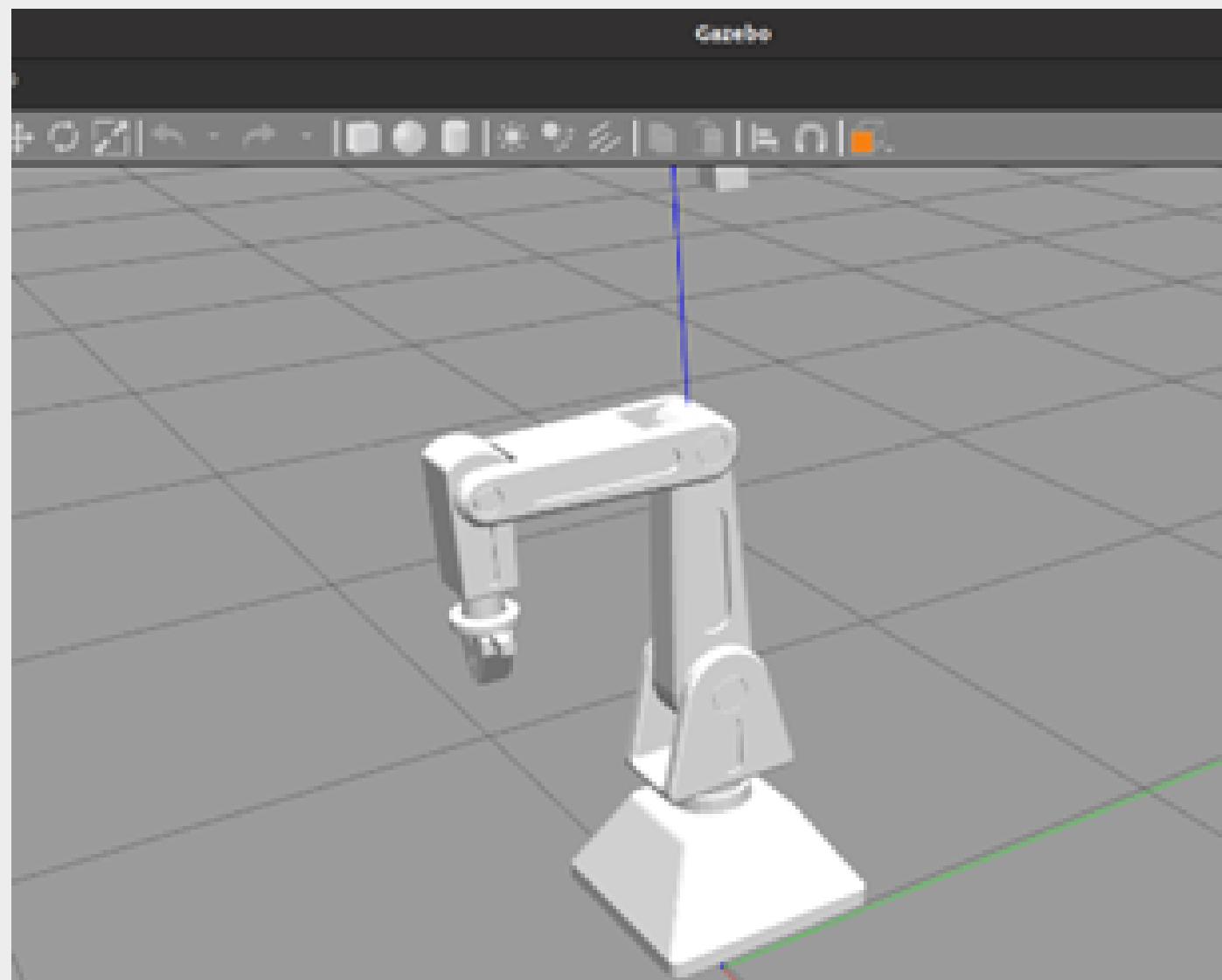


Cartesian Coordinates

RViz

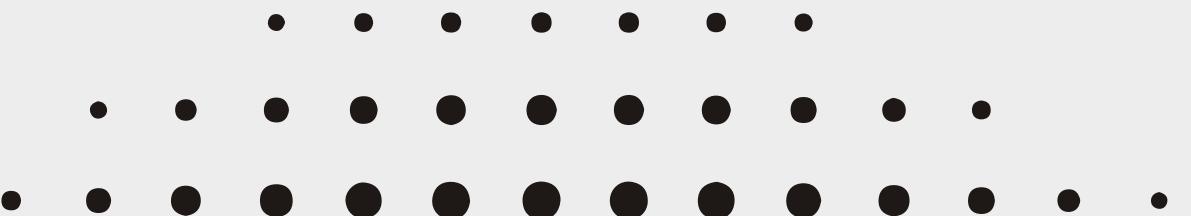


Gazebo

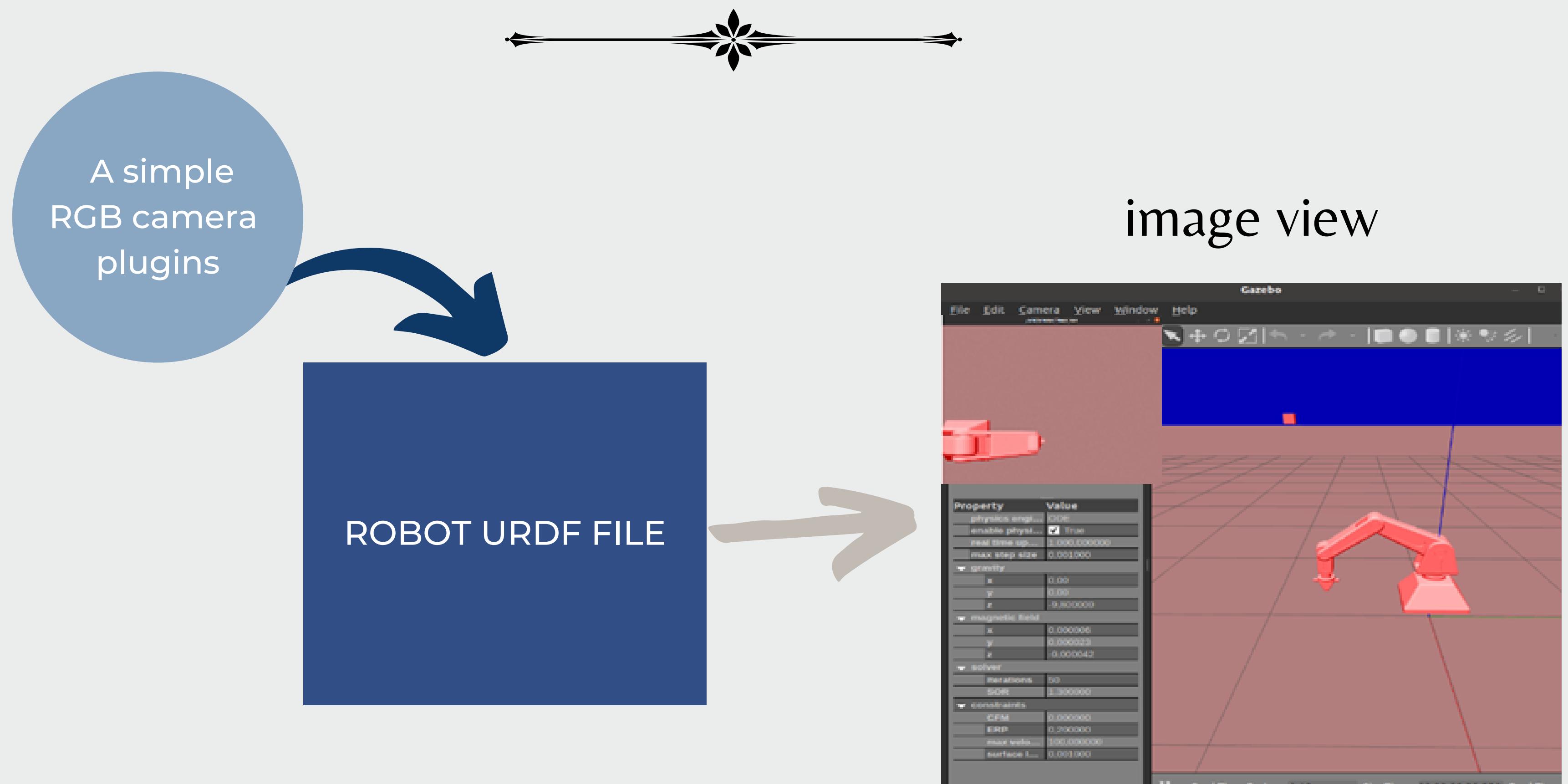


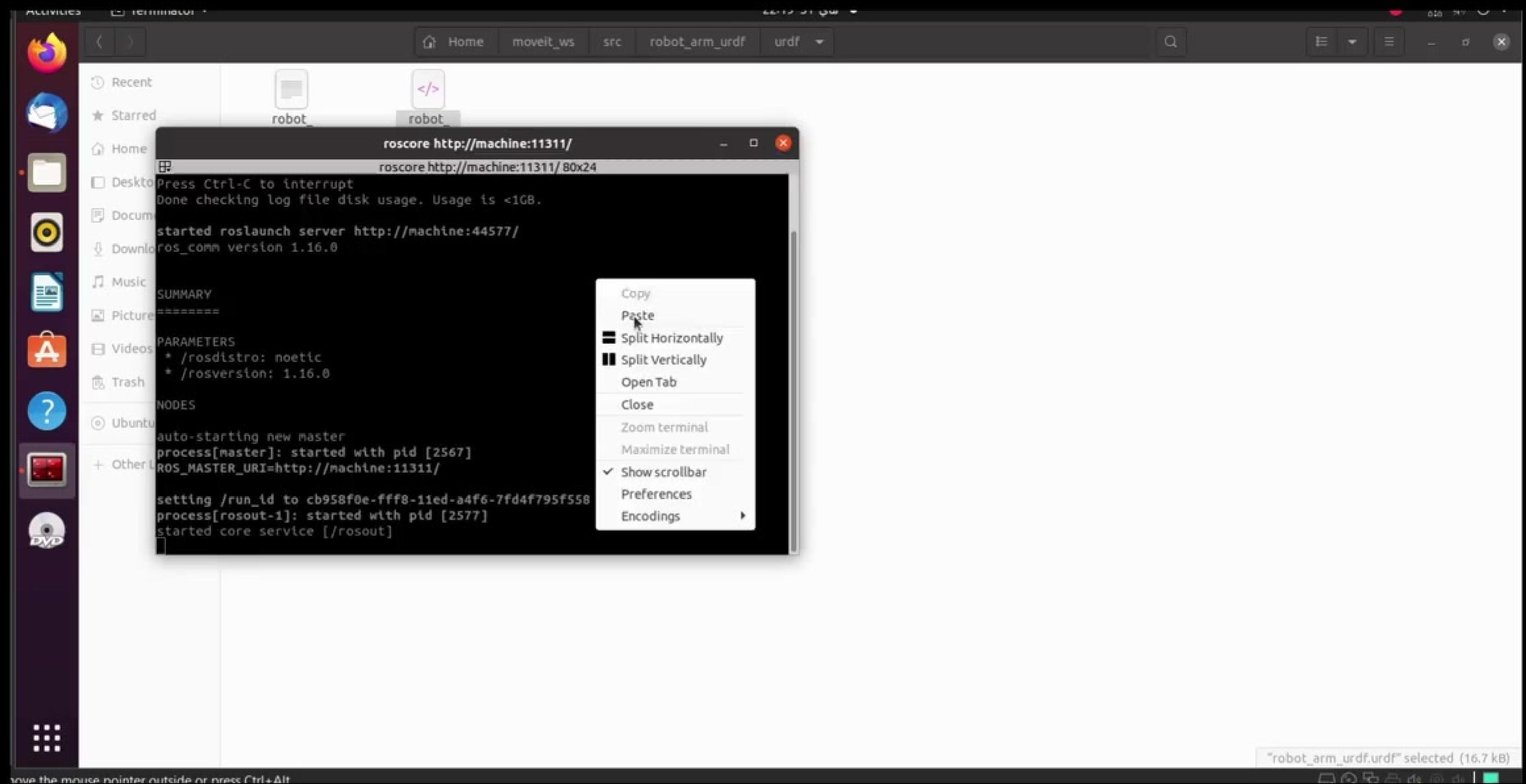
GAZEBO

3D robotics simulator

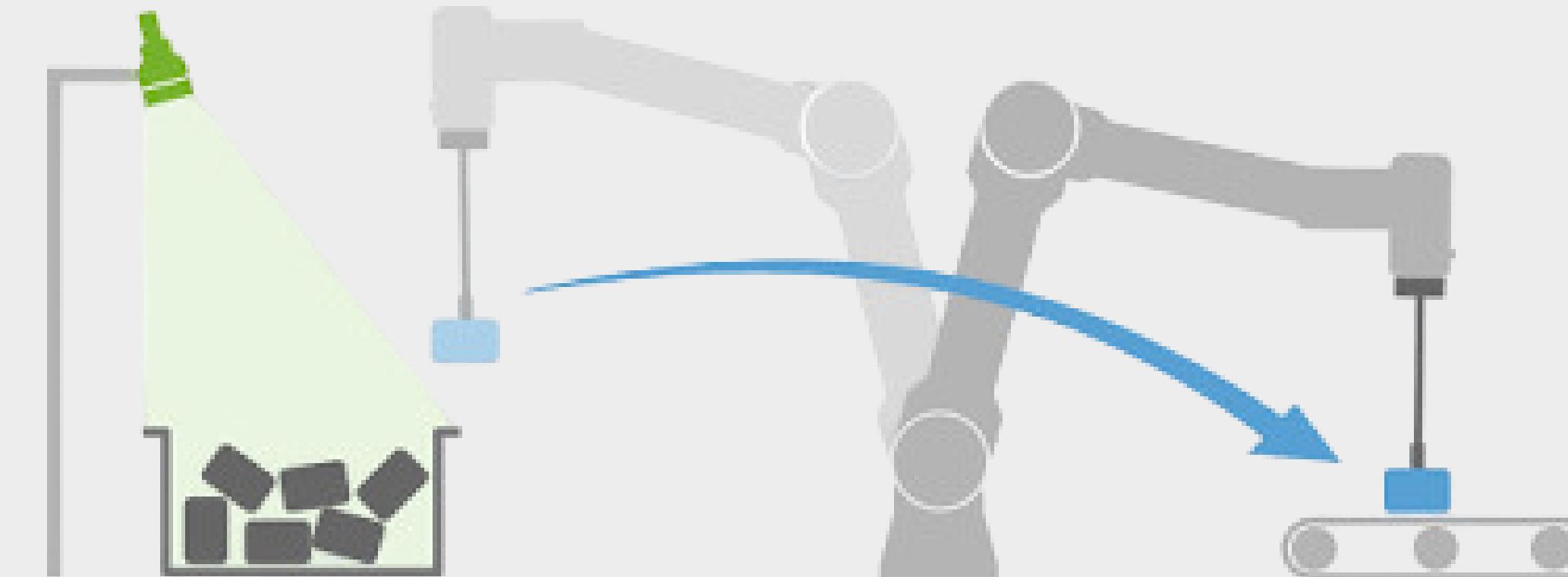
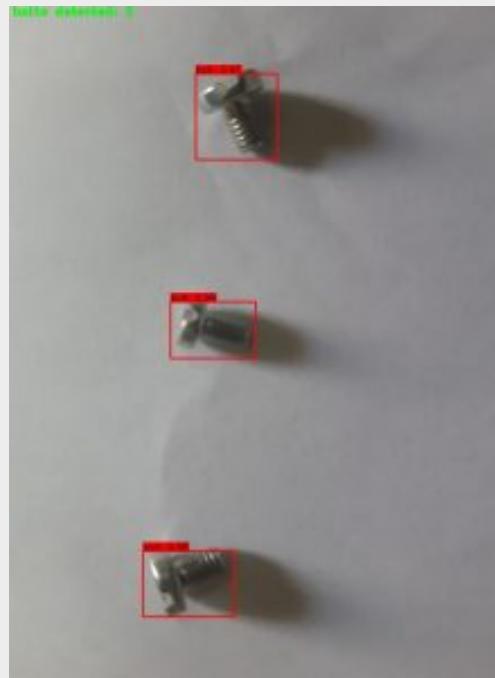
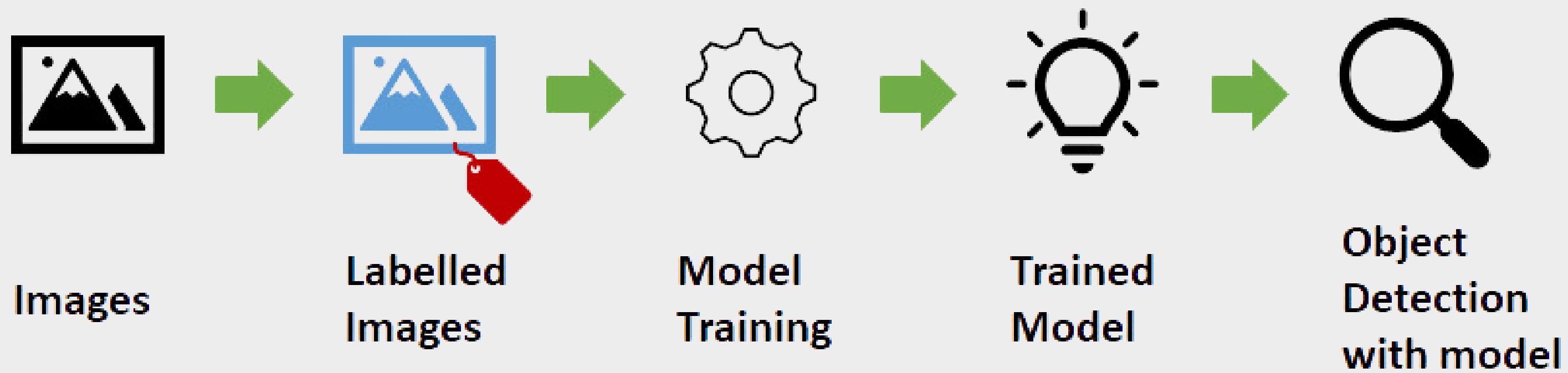


Node Camera integration





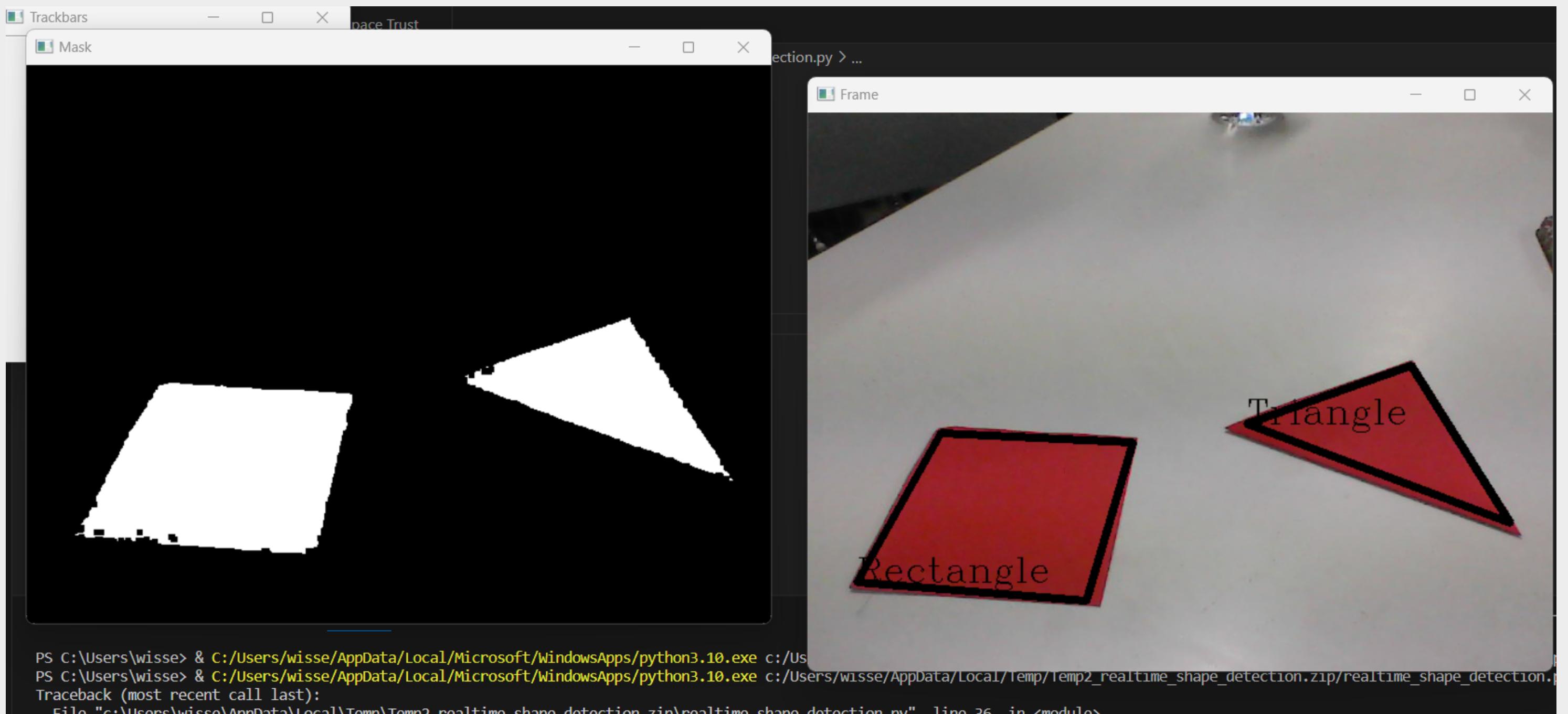
computer vision application

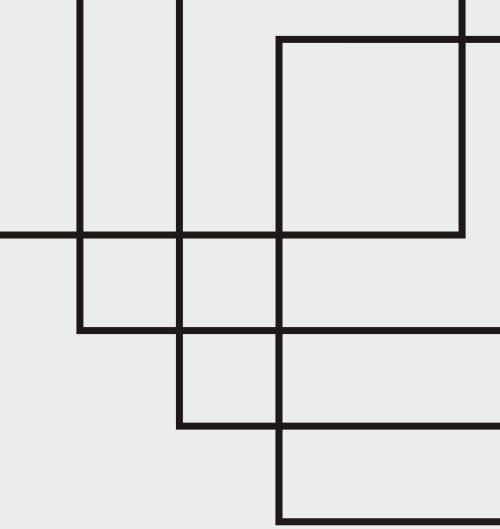


OpenCV

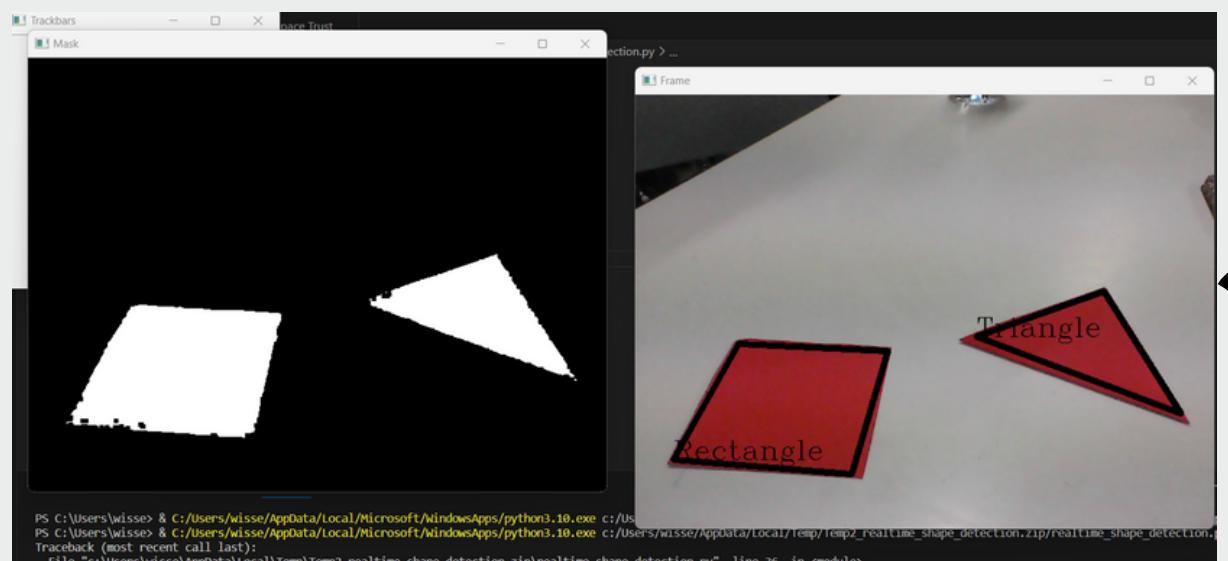


shape detection





ROS publisher node



OpenCV

CV-bridge

ROS

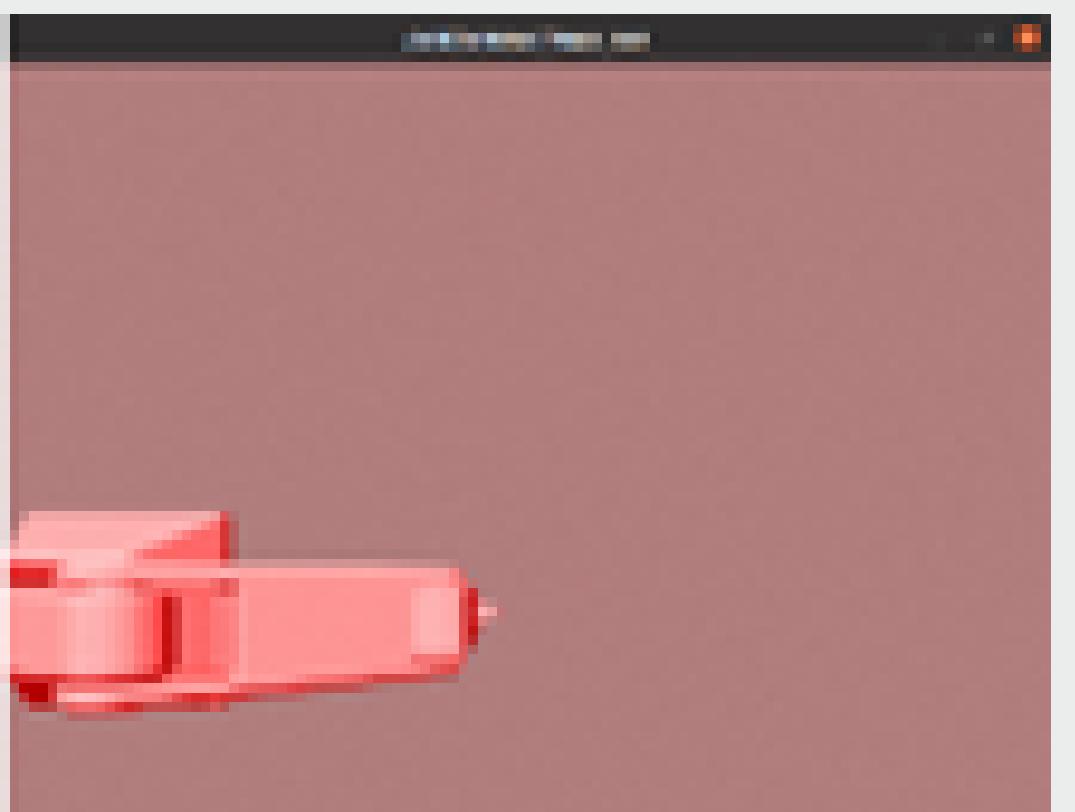
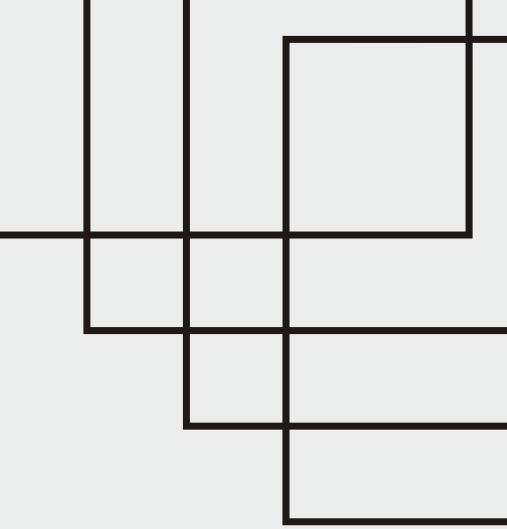
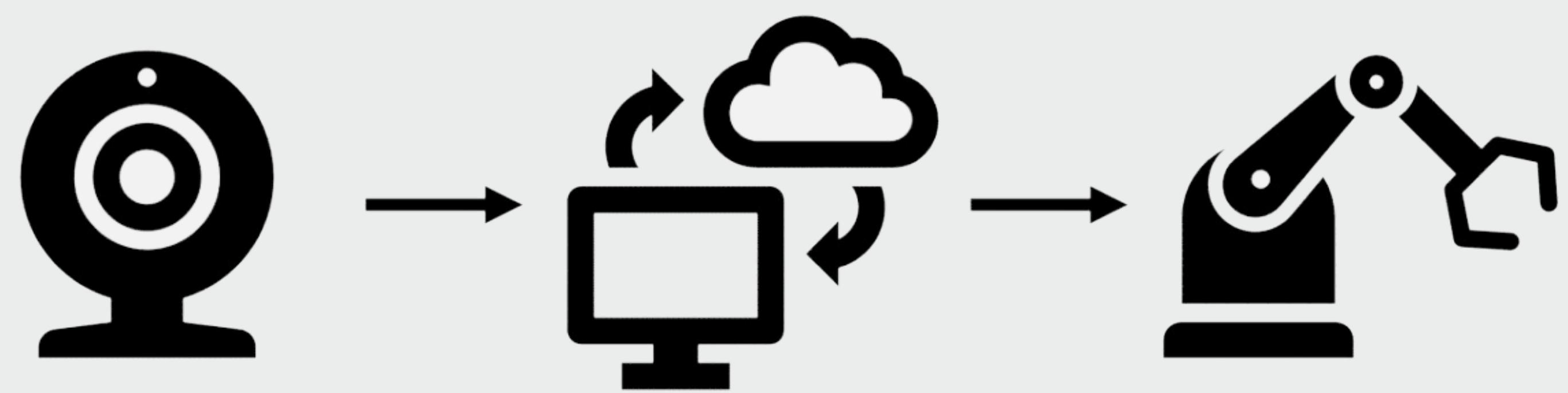


Image view in Realistic
world(Gazebo)





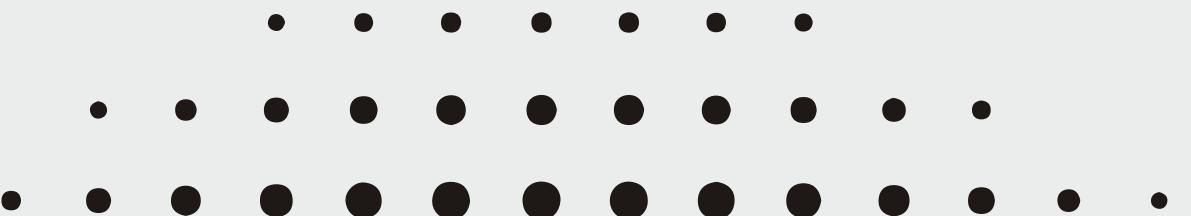
Conclusion



Input
(Camera)

Processor
(Computer and program)

Output
(Robot)





Thank you!

