

Robot Kinematics Component for robotics

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Project Details and Motivation

Canonical robots proposes a solution for addressing a crucial problem in robotics. The Robot Kinematics component (RoKi) that Canonical Robots is developing with help of the ZDMP team will offer Robot Kinematics resolution services to the ZDMP platform.

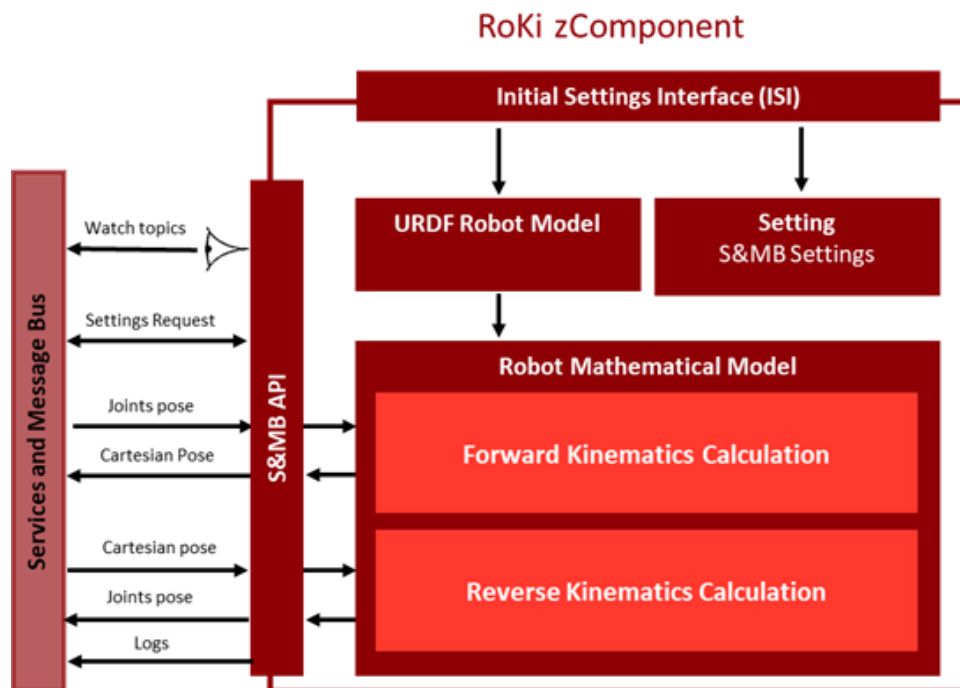
RoKi relies on mathematical Kinematics close solutions in opposition of numerical interactive methods. This allows RoKi to provide:

- Fast kinematics solutions
- All the possible inverse kinematic solutions in contrast with numerical methods that usually outputs just one solution that is based on the current robot configuration.
- Solutions provided are exact in contrast with numerical approximations.

Due to these characteristics, RoKi is suitable for high demanding robotic workloads like motion planners, robotic simulator, or real-time robot teleoperation.

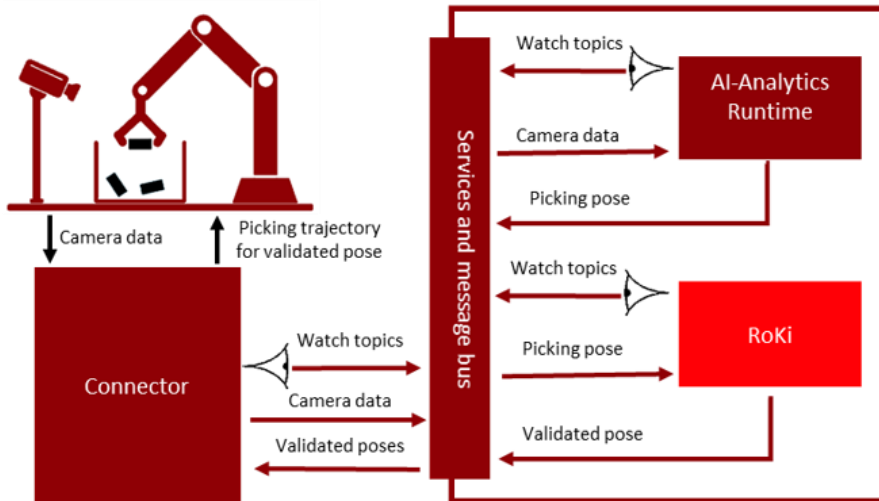
Results to Date

- Definition of the RoKi architecture.



- Definition of the experimentation facilities demonstrator.

Zero-Defects Picking Validator

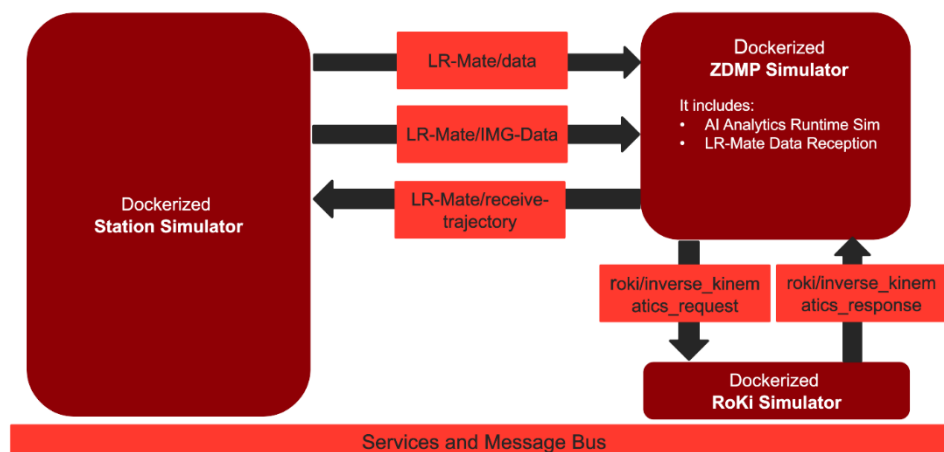


- Working demo showing the interaction between the RoKi component and the experimentation facilities demonstrator.
 - A validator is being developed in collaboration with the Experimentation Facilities.
 - It involves a picking application guided by a camera with position validation using RoKi capabilities.
 - Using the robot station with a FANUC LR-Mate 200iD.
 - Sony XC56 camera.
 - The cell controller is connected to the ZDMP Message Bus at 192.168.100.100:30204. Topics:
 - LR-Mate/data - For publishing cell data.
 - LR-Mate/IMG-Data – For publishing camera data.
 - LR-Mate/robot-trajectory – For receiving the validated picking pose from RoKi.



ZDMP Fit

The RoKi component plays nicely with other elements of the ZDMP ecosystem. For instance, in a Zero Defects Picking application in which a camera is used as sensory input to determine the picking robot configuration that is eventually sent to the robot. A possible ZDMP solution to this problem is shown in the image below:



Example of RoKi integration in the workflow of a ZDMP application

This application is controlled by a computer vision AI algorithm that runs in the AI-Analytics Runtime component of ZDMP. In this way the picking solution gets information from a camera, acquires, process the information, and finally the picking configuration of the robot can be sent as a motion command to the robot in order to perform the item picking.

Participant Details

- **Web:** www.canonicalrobots.com
- **Contact:** info@canonicalrobots.com
- **Profile:** Canonical Robots S.L. is a young robotics company than joins engineers with more than 20 years of experience in Robotics, Software and Artificial Intelligence who will work in this project. We have been developing industrial solutions and distributing cobots for four years and we are currently involved in other R&D projects from the Horizon 2020 Research and Innovation Programme as AMBSPSRR (RobMoSys), RONNIE(MANUNET), Mari4_Yard, ROS & FIONA and FED4FIRE+

Environment

The ZDMP – Zero Defects Manufacturing Platform – is a project funded by the H2020 Framework Programme of the European Commission under Grant Agreement 825631 and conducted from January 2019 until December 2022. It engages 31 partners (Users, Technology Providers, Consultants and Research Institutes) with a mission to “Provide the platform, components, services, and marketplace to achieve the right product, at the right time, with the right conditions using the right resources.”. Further information can be found at www.zdmp.eu. ZDMP channels 3.2M€ of SME orientated funding to subprojects, such as this one to both facilitate SMEs with their innovations and increase the value of the ZDMP ecosystem,

Links

• Sub project website	https://www.canonicalrobots.com/es/investigacion-desarrollo-innovacion/156-zdmp-es
• Canonical Robots website	https://www.canonicalrobots.com/
• Architecture Component(s)	https://www.zdmp.eu/documentation
• ZDMP Website	www.zdmp.eu