RoboMeasure Project: Robotic Gripper as a Sensor

We are pleased to announce an interesting and practical project opportunity for students of the University of Nova Gorica who would like to apply their knowledge in **robotics, programming, metrology, and automation** to a real-world engineering challenge.

Project Overview

Can a robotic gripper do more than just grasp objects? **Can it also act as a sensor?**

As part of the **RoboMeasure** project, students will explore how a robotic gripper can be used to **estimate the dimensions of sample objects** based on its opening, finger position, movement, and gripping force.

Traditionally, cameras, laser scanners, and other external sensors are used to detect and measure objects. In the RoboMeasure project, we will explore a different approach – the robot will obtain information about an object through **direct physical interaction**.

The project therefore provides a practical example of **active sensing** in modern robotics.

Project Objectives

The main objective of the project is to develop and test a method for estimating the dimensions of selected objects using a robotic gripper.

Students will:

- develop a program for the **Universal Robot UR3e** and **Robotiq 2F-85 gripper**,
- identify and acquire the data required for estimating object dimensions,
- use **Python and Jupyter Notebooks** for data processing and analysis,
- perform experimental measurements,
- compare the results with reference measurements obtained using a **vernier caliper**,
- determine measurement error and estimate **measurement uncertainty**

Student Task

Students will investigate how information about the position and movement of the gripper fingers can be used to determine the size of an object.

The following parameters will be considered in particular:

- gripper opening,
- finger position,

- position and orientation of the contact with the object,
- gripping force,
- gripper movement.

Based on the collected data, students will develop a procedure for estimating sample object dimensions according to the valid standards for measurement analysis.

Students will also prepare a representation of the measurement site (in the RoboDK, SolidWorks software package) and a diagram of the measurement principle, as well as a short technical report comprising the analysis and the outcomes.

Project Team

The project team will consist of **3–4 University of Nova Gorica students** with technical and/or project management backgrounds or interests.

The following knowledge and skills are desirable:

- basic knowledge of **3D modelling**,
- basic knowledge of **Python programming**,
- basic knowledge of **Jupyter Notebooks**,
- knowledge of or interest in **SolidWorks, RobotDK** and **Polyscope**,
- practical mechanical skills,
- an interest in robotics, automation, and metrology.

If more than one candidate applies, the selection will be made on the basis of their knowledge and competencies, particularly **Python, SolidWorks, and Polyscope**.

Once the project team has been formed, a **supervisor from the School of Engineering and Management** will be assigned to the project.

Project Timeline and Costs

Project start: December,1, 2026
Expected completion: before June, 1, 2027

All project costs will be covered by the University of Nova Gorica, including travel expenses and food allowances for students participating in the project.

What Will Students Gain?

Participation in the RoboMeasure project offers students an opportunity to gain hands-on experience with an industrial robot and robotic gripper while combining knowledge from **robotics, programming, metrology, and data analysis**.

The project results may provide the basis for a **conference paper and presentation at a conference in Slovenia, such as IEEE ERK, or within the ACROSS European University Alliance**.

All project team members will receive a **PTF certificate** upon successful completion of the project.

Application

Interested students are invited to submit **a short letter of motivation** outlining their competencies, knowledge, and areas of interest. Applicants are encouraged to form a group prior to submitting their application and to submit a joint application as a group.

Please send your application to:

info.ptf@ung.si

Please use the following subject line: **"RoboMeasure"**

Application deadline: November, 30, 2026

The RoboMeasure project offers an opportunity to apply your knowledge to a **real-world engineering challenge** and explore how a robotic gripper can become more than just a tool for grasping – **it can also become a sensor!**