Sequential Grasping in Clutter

The 12th Robotic Grasping and Manipulation Competition

IEEE/RAS International Conference on Robotics and Automation 2027

Seoul, South Korea | 24-27 May 2027

[TEAM NAME HERE]

Please choose a name that is short, distinctive, not offensive, and not misleading. We would recommend avoiding the lab name.

Instructions and guidelines for preparing the application

- No page limit, but we expect a maximum of 8 pages including tables, figures, and references
- Single column
- Font type and size: Times New Roman, 10pt
- Keep the template structure. You can remove guidelines in gray and the examples
- The document is not meant to be exhaustive at this stage. The document provides a first structure and content to update when preparing the report and Extended Abstract to submit at the various stages of the competition timeline and beyond. We encourage keeping track of ideas, innovations, practical choices, and results that can be used for other research outputs beyond the competition itself.

1. Team

A maximum of five members are allowed per team. Provide first name, last name, email, affiliation/organisation, country (optional but welcome: include pronouns and phonetic respelling or IPA transcription). For each member, provide a short paragraph with background and expertise, and role/contribution to the team for the competition. If you have no experience, please state it (this does not penalise the team, and anyone is welcome). Provide a short description of the overall complementarity and expertise of the team. Also provide any lab of belonging with the corresponding website.

Example:
Joe Doe (he/his, “joh”), joe.doe@domain.com, Joe University, USA. Joe is a PhD student working on grasping and manipulation and developed multiple systems for XXX. Publications [1, 4]
Role: For the team, Joe will design and develop a novel robotic control.

Anna Rossi (she/her, “AN-uh”), anna.rossi@domain2.com, Rossi University, Italy. Anna is an undergraduate student studying AI and robotics. She developed a perception model to recognise object pose for bin picking. For the team, Anna will fine-tune and optimise a vision-based model to deploy on the robot. Anna is supervised by Prof. X at the Robotics Lab: www.roboticslab.it

The team is complementary because XXX

Expertise and research areas of the labs involved in the team:

1.1 Video links

Please provide video links showcasing your expertise, background, or experience related to and relevant for the track. The video should also include at least one demonstration of grasping heterogeneous objects in cluttered environments.

2. Solution / Approach

Please provide a brief description of the idea/solution you would like to prepare for the competition. This should include existing methods, AI/ML/DL models, algorithms with references, and any potential innovation you are planning to provide.

2.1 Potential scientific and technical innovation

What would make your solution stand out for the competition beyond reusing past solutions or existing methods? What would make your solution worthy of submission of an Extended Abstract to a potential workshop we are planning in conjunction with the competition, and later to a RAS venue (e.g. IEEE Robotics and Automation Practice, IEEE Robotics and Automation Letter, ICRA 2028)?

2.2 Overview of the system

Please add a tentative and preliminary block diagram of your solution. Briefly describe perception, motion planning, grasping, control, and action components.

2.3 Existing methods, AI/ML models, algorithms

Please provide a list or table of methods, models, algorithms, and software stack you are planning to use. As RGMC and the track promote reproducibility and Open Science, please check the licensing of software and models to ensure you can reuse them for your purposes. The software stack can include ROS, ROS2, Gazebo, MuJoCo, PCL, OpenCV, PyTorch, MoveIt, etc.

3. Hardware

Please provide information on the hardware you are planning to use for your solution. If you are not able to bring any of the hardware to the competition site but robotic platforms might be available from sponsors, explain how you will be able to reproduce your setup at the competition area and make your solution work on a platform that might differ from the one you are developing your solution in the laboratory. Remember that the track focuses on a minimal and affordable setup.

3.1 Robot platform

Please provide brand and model of the robot(s) you are using in the lab (e.g. UR5-e, FR3, humanoid, etc.), and pictures

3.2 Hand or end-effector

Please provide the model names and any additional details (e.g., number of fingers, pictures). For example, Robotiq 2F-85

3.3 Sensing/perception system

Please provide any information about the perception system, including sensors and their configuration. This includes the number and model of the cameras, microphones, tactile sensors, or else. Example of setup and sensor configuration: 2x Intel RealSense D435i cameras, one mounted on a tripod at the side of the robotic arm and another mounted on the robotic arm, and a custom-designed tactile sensor mounted on the end-effector.

3.4 Workstation(s)

Please provide details of the workstation (it could also be a laptop) or multiple workstations that you will use for the solution and the competition. Please also include information on GPUs, such as type and number, that you may use for model training or inference/deployment. Estimates of GPU usage (time needed for executing the task) are also welcome and useful.

3.5 Any other requirements

Please provide any other information relevant for the competition, including power needed. If you plan to train AI/ML models, please specify the infrastructure you may use, including GPU type and number and their estimated usage.

4. Implementation

Please provide the current status of your solution, and a tentative short plan to ensure you can complete the solution and the execution of the protocol for the qualification phase (estimated towards the end of March).
Consider also the following aspects in your plan:

- **Demo video.** If not shared already with this application, an expected date of when you will be able to share a video link demonstrating a preliminary handover with your solution in progress.
- Preparation of an **Extended Abstract** to submit to the potential workshop connected to the competition,
- Preparation of a **video** describing your solution and providing demonstrations of the task for a broad audience to be uploaded on the RGMC YouTube Channel and posted on the website,
- Potential release of **data** and **software** with their respective licenses.

4.1 Status of the solution

4.2 Tentative plan

References

[1] Doe, J., “title here”, Venue, 2026, DOI link
[2] Rossi, A., “title here”, Venue, 2026, DOI link
[3] Doe, J., “title here”, Venue, 2025, DOI link
[4] Doe, J., “title here”, Venue, 2024, DOI link
[5] Doe, J., “title here”, Venue, 2020, DOI link