

# Conditions for Replicable Experiments and Performance Comparison in Robotics Research

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## Abstract

In all field of science experiments play an important role, in order to confirm/refute a theory and to discover new theories. It is a widespread opinion that experimental methodologies in robotics have not yet achieved a level of maturity comparable with that in traditional science. On the other hand being able of objectively measure and comparing performances is a critical aspect of modern engineering. In this workshop, we will discuss fundamental issues about the role of experiments in robotics, such as how can results be replicable and refutable on the one hand, and quantitatively comparable according to community-endorsed metrics to enable a faster cumulative progress, or even appreciate disruptive changes, on the other end. We will particularly focus on how might be possible, by providing the proper kind and amount of data to enable the replication of experiments as a prerequisite to quantitative comparison of capabilities. A key point to allow replication and comparison of results is having adequate data support: all the data necessary to repeat a given experiment, how to achieve it with today's digital media will be addressed. We will concentrate on three main subfields: visual servoing and grasping, slam and navigation. In these fields it is already possible to outline several compelling criteria. These issues, when viewed in the context of some general principles about experiments in science and engineering, will allow us to do some insightful considerations on the role of experiments in robotics and its scientific and epistemological foundations. This workshop is a joint initiative of the IEEE Technical Committee on Performance Evaluation and Benchmarking of Robotic and Automation Systems (PEBRAS) and the EURON Special Interest Group on Good Experimental Methodology for Robotics (SIG GEM).