

On The Design of Experiments in Robotics  
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In spite of the progresses and maturity of robotics research, it has often achieved limited success in terms of widespread penetration into industrial applications. One of the reasons might have been the difficulty in comparing the performance of the existing solutions and in assessing their suitability for the problem at hand.

Efforts have been spent in the recent years to develop "standards" to establish uniform criteria, to introduce "benchmarks" to assess the relative performance, and to organize "competitions" to compare different approaches in solving the same task in the same environment. Though, most of the published research results are still extremely difficult to compare and the community is often not able to answer the simple question about which is the better among two given algorithms that perform the same task. The main issue is the missing of focused, carefully planned, and expertly conducted programs of experimentation that hamper the opportunity of taking advantage of results that the research is offering.

In this talk, after a brief introduction of the Design of Experiments (DoE), we will suggest its application to robotics. DoE is a well-known structured, organized method that is used to determine the relationships between the different factors affecting a process and its output. We will try to capture the best practice in its use for other research fields and suggest how it could be applied in robotics to have results that are both scientifically grounded and operationally relevant.