Robotics and Automation Science

By Eugenio Guglielmelli

Those of you who were in Hong Kong last June at the record edition of our annual IEEE International Conference on Robotics and Automation had the opportunity to enjoy the plenary talk about robotics research in the Human Brain Project (www.humanbrainproject.org). This is a ten-year, €1 billion research initiative recently launched in Europe as part of the Future Emerging Technologies Flagship program promoted by the European Commission.

Robotics and automation (R&A) technology has been selected as one of the pillars for building up what is supposed to become the most advanced integrated technological platform for tackling fundamental open challenges in simulating and understanding how the human brain works. This choice can be considered as evidence that our R&A disciplines have reached a high level of scientific maturity. Not surprisingly, if you look at the about 100 papers related to R&A topics published over the last 15 years in *Science* and *Nature*, two journals with scopes that span all of the modern scientific disciplines, you will find that nearly half of them address the use of robots as neuroscientific tools.

Other specific topics include design methods for R&A systems, applications of robots in remote and hazardous environments, R&A-based solutions for the severely disabled, and basic enabling technologies for R&A systems.

The IEEE Robotics and Automation Magazine Editorial Board fully supported the proposal for launching a special issue on replicable and measurable robotics research (see the "Call for Papers" on page 154 of this issue, also available on the magazine's Web site).

The underlying assumption behind the selection of this topic is that a significant portion of R&A research is still missing systematic application of the scientific method. We need careful experimental design, transparency, and many independent researchers worldwide double-checking interactively how the research was performed by other groups and following up by performing similar experiments to determine how dependable the research results are against the initial hypotheses.

The time has come for the R&A community to no longer rely only on the interpretation of the scientific method that has been consolidated over years in other fields such as neuroscience. We are ready to develop our own approaches by systematizing best practices and investing in the significant additional effort needed to develop new methods and tools. We need to spread such basic knowledge among the whole community while it is rapidly enlarging. This is why the IEEE Robotics and Automation Magazine Editorial Board believes that this new special issue fits well with the mission and within the scope of our magazine.

I would love to receive more regular articles focusing on enhancing experimental reproducibility, challenging the falsification of research outcomes generated by other labs, and sharing benchmarks, data sets, and even remote access to local research platforms with other groups for running independent experiments.

When reading these lines, many of you will probably be on the way back from the 2014 IEEE/Robotics Society of Japan International Conference on Intelligent Robots and Systems in Chicago, which will be the first of our large conferences featuring only so-called interactive sessions. I believe that this format has a huge potential to become a powerful tool for fostering independent, interactive evaluation of experimental results, just like some centuries ago, when systematic application of the scientific method began with public demonstrations of major scientific experiments and related achievements.

After reading this column and maybe having attended many interactive sessions in Chicago, I am sure that some of you will derive from the many different features of this rich *IEEE Robotics and Automation Magazine* issue good hints for your next article on the reproduction of some of the experiments presented here. And do not miss the very interesting "Turning Point" column, which features an interview with Frank Park, the editor-in-chief (EiC) of *IEEE Transactions on Robotics* (*T-RO*). Park outlines how to best address the submission of your research results to *T-RO*, like Ken Goldberg, EiC of *IEEE Transactions on Automation Science and Engineering*, did in the same column in March. Enjoy the issue!

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