Invited Talk from ESEM 2009

Using Differences among Replications of Software Engineering Experiments to Gain Knowledge

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Abstract:
In no science or engineering discipline does it make sense to speak of isolated experiments. The results of a single experiment cannot be viewed as representative of the underlying reality. The concept of experiment is closely related to replication. Experiment replication is the repetition of an experiment to double-check its results. Multiple replications of an experiment increase the credibility of its results. Software engineering has tried its hand at the identical repetition of experiments in the way of the natural sciences (physics, chemistry, etc.). After numerous attempts over the years, excepting experiments repeated by the same researchers at the same site, no exact replications have yet been achieved. One key reason for this is the complexity of the software development setting. This complexity prevents the many experimental conditions from being reproduced identically. This paper reports research into whether non-exact replications can be of any use. We propose a process that allows researchers to generate new knowledge when running non-exact replications. To illustrate the advantages of the proposed process, two different replications of an experiment are shown.

Biographies:
Dr. Natalia Juristo is full professor of software engineering with the Computing School at the Technical University of Madrid (UPM) in Spain. Natalia has served in several Program Committees (ICSE, RE, REFSQ, ESEM, ISESE and others) and she has been Program Chair for ISESE04 and SEKE97 and General Chair for ESEM07, SNPD02 and SEKE01. She has been member of several Editorial Boards, including IEEE Software and the Journal of Empirial Software Engineering. Dr. Juristo has been Guest Editor of special issues in several journals, including IEEE Software, the Journal of Software and Systems, Data and Knowledge Engineering and the International Journal of Software Engineering and Knowledge Engineering. Natalia has a B.S. and a Ph.D. in Computing from UPM.

Dr. Sira Vegas is associate professor of Software Engineering with the Computing School at Madrid’s Technical University (UPM), Spain. She was a summer student at the European Centre for Nuclear Research (Geneva) in 1995. She was a regular visiting scholar of the Experimental Software Engineering Group at the University of Maryland from 1998 to 2000, and visiting scientist at the Fraunhofer Institute of Experimental Software Engineering in Germany in 2002. Dr. Vegas is the UPM’s second representative at the ISERN. She was program chair for the International Symposium on Empirical Software Engineering and Measurement (ESEM) in 2007.