Analysis for Reuse and Maintenance: A Program for Experimentation

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Abstract

In the future, software development, like software maintenance, will be based upon reuse of existing products in a variety of forms. For example, what are the best techniques for abstracting a set of products in an application domain to generate an easy way to define new products in that domain. This requires better techniques for analyzing and abstracting knowledge from a variety of software documents. We need to gain some insight into the relationships between reading and writing, analysis and construction.

This talk discusses an experimental program for the development of families of software techniques that, based on empirical evaluation, are parametrized for use in different contexts and evaluated for those contexts. Specifically, the goal is to develop a set of analysis techniques that are:

- document and notation specific
- tailorable, based upon project and environment characteristics
- procedurally defined
- goal oriented
- aimed at a specific coverage of the document
- documented as to where it has been empirically shown to be effective

We will provide some examples of past, current, and planned studies, arguing for the need for experimentation. Past work includes the development and experimentation with reading techniques for the analysis of requirements documents with respect to quality control. Current work emphasizes the analysis of existing software documents for the purpose of constructing other documents, e.g. techniques for analyzing an object-oriented framework in order to use it to develop new systems derived from that framework. Experimentation with these techniques has begun. Future work under consideration for experimental study involve the analysis of a set of existing object models for a family of products in a particular application domain to build a set of generic use cases from which new product requirements can be generated.

Biography

Dr. Victor R. Basili is a Professor in the Institute for Advanced Computer Studies and the Computer Science Department at the University of Maryland, College Park, Maryland, where he served as chairman for six years. He holds a B.S. from Fordham College, an M.S. from Syracuse University, and a Ph.D. from the University of Texas at Austin. He was involved in the design and development of several software projects, including the SIMPL family of programming languages. He is currently measuring and evaluating software development in industrial and government settings and has consulted with many agencies and organizations, including AT&T, Boeing, CSC, IBM, GE, GTE, HP, MCC, Motorola, Xerox, NRL, NSWC, and NASA.
He works on the development of quantitative approaches for software management, engineering, and quality assurance, using models and metrics for improving the software development process and product. He is one of the founders and principals in the Software Engineering Laboratory, a joint venture between NASA Goddard Space Flight Center, the University of Maryland and Computer Sciences Corporation, established in 1976, recipient of the first Process Improvement Achievement Award by the IEEE and the SEI in 1994, and a NASA Group Achievement Award in 1996. Dr. Basili was one of the recipients of the NASA Group Achievement Award for the GRO Ada experiment in 1989 and the NASA/GSFC Productivity Improvement and Quality Enhancement Award, for the Cleanroom project in 1990. He received the 1997 Award for Outstanding Achievement in Mathematics and Computer Science by the Washington Academy of Sciences.

Dr. Basili has authored over 130 journal and refereed conference papers. In 1982, he received the Outstanding Paper Award from the IEEE Transactions on Software Engineering for his paper on the evaluation of methodologies.

He has served as Editor-in-Chief of the IEEE Transactions on Software Engineering, General Chair of the 15th International Conference on Software Engineering in 1993 in Baltimore, Maryland, Program Chair for the 6th International Conference on Software Engineering in 1982 in Japan and general or program chair for several other conferences. He is co-editor-and-chief of the International Journal of Empirical Software Engineering, published by Kluwer. He serves on the editorial board of the Journal of Systems and Software and is an IEEE and ACM Fellow.