Title: Achieving software Technology Excellence in High-Technology Companies: The DESARC method

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Abstract:

Achieving excellence in software development techniques is an important issue for the organizations that develop advanced software-intensive products. Within this context, software excellence is defined as the adoption of advanced software techniques and methods to cope with the complexity and the needs of modern software systems. However, this is not trivial due to the rapidly changing software technology, continuously increasing existence of large and complex software systems and difficulty in following the developments of the state-of-the-art in computer science.

The existing university-industry cooperation methods are usually triggered after writing grant proposals to financing organizations and passing through strict selection processes. This is, in general, a very inefficient and tedious process to undertake. Many good ideas may not go through simply because they do not fulfill the necessary procedural requirements. Moreover, industrial people may not be familiar with the methods and jargon used in the selection processes. Even if a project is approved, many times it does not result in a technology transfer to industry since accomplishing academic results is the main objective of such projects.

This talk presents an overview of a pilot implementation of our approach termed as "Describe, Search and Acquire the Required Capability" (DESARC). This method includes the identification of the research problems, the description of research projects, and the selection of research groups who are experts in the selected domains of the research projects.
We have applied the approach to two large software IT companies for a period of 11 months. Based on the analysis of the existing product development projects and a series of workshop meetings, we were able to identify 80 important key research projects that will be used in further PhD studies. To this aim, we are setting up an European research consortium consisting of 14 Universities around Europe. Each research project has been described in detail together with the IT company and addresses topics that are both business critical for the company, and tackle novel, hard problems in the state-of-the-art. The identification of the research projects has provided a novel vision for the company and there is a confidence that these projects will support achieving excellence in the important domains.

Biodata:

Mehmet Aksit holds an M.Sc. degree from the Eindhoven University of Technology and a Ph.D. degree from the University of Twente. Currently, he is working as a full professor at the Department of Computer Science, University of Twente. He and the members of the Software Engineering Chair were among the pioneers of the following techniques: (a) Since 1988, the group has developed, probably the first aspect-oriented language called Sina, which has later evolved into Composition Filters. It has some unique features such as language independence, "interface-programming", domain specific aspects and a large set of verification tools. The group has organized the first Aspect-Oriented Software Development conference (AOSD2002) and Aksit has been the co-editor of the first aspect-oriented journal. Currently, Aksit is working on event-based languages to model and implement emergent behavior in large systems. (b) Since begin 90's, the group has developed synthesis based architecture/software design, which adopts controlled problem solving techniques in designing software architectures. Currently, Aksit is working on software synthesis and composition techniques in certain safety-critical application domains. (c) Since 1994, the group has applied, probably for the first time, fuzzy-logic based techniques to modeling software design heuristics and processes. Recently, these techniques have been extended by fuzzy-probabilistic methods and applied to software process and product optimization problems. (d) Since 1997, the group has been developing new design formalisms to evaluate various software metrics. For this purpose around 2000 the concept of Design Algebra was introduced. Later, the group has worked on new software metrics such as adaptability, evolvability, documentability, fault-tolerance, integrate-ability (dealing with semantic interference), traceability, relevance. Currently, Aksit is supervising a large industry research project that combines multiple verification techniques together, such as model-checking, fault-tolerance and run-time verification, without creating unnecessary overhead. Aksit is working in the identification of research needs of some large high-technology companies and setting up a university research consortium in Europe among 21 researchers.