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(Abstract of Dr. Philippe)

### **“Reverse modeling Java code to UML models using dynamic analysis”**

It is commonly admitted that maintenance is the most expensive part in the life cycle of a software system development. This represents between 60% and 90% of the total cost of a program over its life cycle. It is less commonly known that almost two thirds of the maintenance cost are devoted to software comprehension or understanding. In fact, before being able to maintain a legacy program it is necessary to understand its working and its functional architecture. But software writing is fundamentally a human task. Therefore, the maintenance engineer must understand the way the developer built the software before being able to maintain it. But, to make things worse, many generations of maintenance engineers may have modified the program since its inception. Therefore there is a high probability for the software not to comply with its original architecture, if there was any. For the very same reason, the documentation the original developer may have written is likely to be misleading after several years of modifications. Therefore, the only reliable sources of information that usually remain are the source code and the knowledge the users have about the use of the system.

In this talk, I will present an project we developed to help with legacy information system understanding based on the UML analysis model. First I explain the context of program understanding and a limited “theory” of software understanding. Next I present the domain knowledge to source code matching problem and the way we approached it. Then I present the tool we developed and specifically the inference engine to infer the relationships between the source code and the UML model’s elements. The main issues in dynamic system analysis are covered last, with a few comments on source code instrumentation. I conclude the talk with the results of this project and the perspectives for the future.

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