Abstract

Current enterprises spend much effort in obtaining precise models of *software and systems engineering processes* in order to *improve the process capability* of their organization. Nowadays, process engineers are designing such process models manually, which is complicated and time-consuming. In order to keep track of the involved documents and files, engineers use such *software repositories* as Software Configuration Management Systems, defect tracking systems, e-mail archives and others.

In the thesis, we *develop an approach* that uses the audit information from the *software repositories* for the *automatic derivation* of process models. We call our approach *incremental workflow mining*. Within our approach, we develop a *new process mining technique* - a transition system generation and Petri net synthesis technique. This technique allows for different modification strategies in order to produce models on different levels of abstraction.

Our approach is implemented in the form of plug-ins for the process mining framework *ProM*. We evaluate our approach on several *real software projects* from the area of open-source software and from the university practice. Moreover, in the thesis we show that the issues and solutions discussed in the context of software engineering processes are relevant for other research domains.