UMONS

Sujets de Recherche disponibles à l'UMONS

Titre du sujet 1 : Prediction and recommendation models of software ecosystem health

Informations administratives

Personne proposant le sujet /email	Tom Mens tom.mens@umons.ac.be
Service	Génie Logiciel
Faculté	Sciences
Institut	COMPLEXYS et INFORTECH

Informations relatives au sujet proposé

Niveau de recherche	Doctorat ou PostDoc
5 mots-clés (français)	N/A
5 keywords (English)	software ecosystem heatlh, empirical software engineering, socio-technical network, collaborative software development, software repository mining
Bref descriptif (10-15 lignes) (français)	
N/A	
Summary (10-15 lines) (English)	
Highly collaborative software ecosystems are omnipresent. They include, for example, open source software repositories, software package distributions, software libraries, software product lines, social networks and collaborating software communities (e.g., StackExchange). The sustainability and survival of such collaborative software ecosystems can depend on a large number of factors that determine the ecosystem's *health*. Some examples are its *resilience*, i.e., the ability to withstand internal changes or external perturbations; its social, technical or organizational *diversity*; the presence of *security vulnerabilities* and *bugs*; the risk of key developers abandoning the ecosystem; the presence of *technical debt* and *community smells*, and many more. This research aims to take a macroscopic socio-technical view on the study of such health issues in large interdependent collections of software components maintained by interacting communities of contributors. The goal is to define a suite of metrics and corresponding prediction models of decreasing health, and propose automated recommendations of ways to improve the health. predict the quality and survival of projects or contributors in their ecosystems, to propose and support concrete guidelines and actions to improve this survival, and to validate these guidelines in practice. To do so, we will rely on techniques and ideas borrowed from the domains of software repository mining, empirical software engineering and data analytics, but also borrow ides from ecology, statistics and economical models.The proposed topic is related to the ongoing interdisciplinary and interuniversity research project SECOHealth www.secohealth.org	

Titre du sujet 2 : Advanced testing and evolution of executable behavioural software models

Informations administratives

Personne proposant le sujet /email	Tom Mens
	tom.mens@umons.ac.be
Service	Génie Logiciel
Faculté	Sciences
Institut	COMPLEXYS et INFORTECH

Informations relatives au sujet proposé

Niveau de recherche	Doctorat ou PostDoc
5 mots-clés (français)	N/A
5 keywords (English)	model-driven software engineering, statechart, executable modeling, software quality improvement, software testing
Bref descriptif (10-15 lignes) (français)	
N/A	
Summary (10-15 lines) (English)	

Model-driven software engineering (MDSE) relies on the systematic use of (often visual) software models as primary artefacts throughout the software development lifecycle. Modelling languages based on statecharts and Petri-net allow to model the executable behavior of a system. Ensuring and maintaining the quality and reliability of such behavioural models over time, finding scalable solutions to manage a multitude of interacting models, and coping with their (co-evolution) remains very challenging. The research aims to address these challenges by studying, combining and applying well-established software development techniques at the modeling level. The goal is to increase the state-of-the-art along the following directions:

• Advanced support for testing and lightweight formal verification of executable behavioural models, as well as for analysing and improving model quality.

• Scalable solutions for composing multiple interacting behavioural models, supporting model co-evolution, inconsistency management, design space exploration and variability analysis.