

Building Formal Models for Software Requirements

Axel van Lamsweerde
Universite Catholique de Louvain

Requirements engineering (RE) is concerned with the elicitation of the goals to be achieved by the system envisioned, the operationalization of such goals into specifications of services and constraints, and the assignment of responsibilities for the resulting requirements to agents such as humans, devices, and software. Getting high-quality requirements is difficult and critical. Recent surveys have confirmed the growing recognition of RE as an area of primary concern in software engineering research and practice.

The talk will first briefly introduce RE by discussing its main motivations, objectives, activities, and challenges. The role of rich models as a common interface to all RE processes will be emphasized. We will then review various techniques available to date for system modeling, from semi-formal to formal, with the aim of showing their relative strengths and weaknesses when applied during the RE stage of the software lifecycle, notably, their limited scope, their lack of abstraction, their poor separation of concerns, and their lack of methodological guidance.

The talk will then discuss a number of recent efforts to overcome such problems through RE-specific techniques for goal-oriented elaboration of requirements, multiparadigm modeling and specification, the handling of non-functional requirements, the management of conflicting requirements, and the handling of abnormal agent behaviors.