

Software Engineering Seminar

April 13th 13:30-14:30- Online -

<https://us02web.zoom.us/j/82204090016>

Methodical Approach to Executable Integrative Modeling – MAXIM

Natali Levi

Abstract:

Lack of a modeling framework that integrates systems with software engineering is a major cause of product development problems. The current model-based systems engineering approach applies a variety of model kinds, each with its own fidelity level, with disparate or loosely integrated models. The gap between the system model and the software levels leads to a great fidelity gap, as the software is often not aligned with the model of the system it is supposed to control. My research overcome this system-software modeling gap by integrating computational, software-related, and model execution capabilities into Object Process Methodology – OPM ISO 19450-based conceptual modeling, resulting in a holistic unified executable qualitative-quantitative modeling framework. The gap is bridged by extending OPM with a Methodical Approach to Executable Integrative Modeling (MAXIM). During the research, I came across the model fidelity hierarchy. MAXIM enables continuous, seamless modeling approach with increasing accuracy. As errors are revealed during early system lifecycle stage, they are exponentially less costly to correct than those revealed downstream. Moreover, MAXIM provides a new methodology for developing diagnostic models. As a case in point, will be presented a model for assessing potential pediatric failure to thrive (FTT). FTTell—an executable model-based medical knowledge aggregation and diagnosis tool, in which the qualitative considerations and quantitative parameters of the problem are modeled using MAXIM. The efficacy of the tool is demonstrated on data collected from 100 children, providing 87% correct diagnosis. Pediatricians can use this model-based standardized approach to improve their FTT diagnosis for appropriate timely intervention.

Short bio:

Natali Levi Soskin is a PhD candidate supervised by Prof. Dov Dori. She received her MSc and BSc in Information System Engineering from the Technion in 2009 and 2007, respectively. Her MSc research was in the area of Information Retrieval. Her Ph.D. research concentrated in narrowing the gap between systems and software engineering. Natali published her work in iee system journal, Wrycza S., in conference Maślankowski J. (eds) Information Systems: Research, Development, Applications, Education and more. Natali has a decade of industrial experience as an information systems engineer in Intel and the Israeli Air Force.