Recent advances in technology have increased the need for using simulation models to analyze tasks and obtain human performance data. A variety of task analysis approaches and tools have been proposed and developed over the years. Over 100 task analysis methods have been reported in the literature. However, most of the developed methods and tools allow for representation of the static aspects of the tasks performed by expert systemâ€“driven human operators, neglecting aspects of the work environment, i.e. physical layout, and dynamic aspects of the task. The use of simulation can help face the new challenges in the field of task analysis as it allows for simulation of the dynamic aspects of the tasks, the humans performing them and their locations in the environment.

Modeling and/or simulation task analysis tools and techniques have been proven to be effective in task analysis, workload and human reliability assessment. However, most of the existing task analysis simulation models and tools lack of features that allow for consideration of errors, workload, level of operatorâ€™s expertise and skills, among others. In addition, the current task analysis simulation tools require basic training on the tool to allow for modeling the flow of task analysis process and/or error and workload assessment. The modeling process is usually achieved using drag and drop functionality and, in some cases, programming skills.

This research focuses on automating the modeling process and simulating individuals (or groups of individuals) performing tasks in a dynamic work environment in any domain. The main objective of this research is to develop a universal tool that allows for modeling and simulation of task analysis models in a short amount of time with limited need for training or knowledge of modeling and simulation theory. A Universal Task Analysis Simulation Modeling (UTASiMo) tool can be used for automatically generating simulation models that analyze the tasks performed by human operators.

UTASiMo is a multiâ€“method modeling and simulation tool developed as a combination of agent based, discrete event and system dynamics simulation models. A generic multiâ€“method modeling and simulation framework, named 3M&S Framework, as well as the Unified Modeling Language have been used for the design of the conceptual model and the implementation of the simulation tool. UTASiMo generated models are dynamically created during runâ€“time based on user inputs. The simulation results include estimations of operator workload, task completion time and probability of human errors based on human operator variability and task structure.

Major: Modeling and Simulation

Educational Career:
Bachelor's of Electronic and Computer Engineering, BS, 2010, Technical University of Crete
Master's of Modeling and Simulation, MS, 2012, University of Central Florida

Committee in Charge:
Waldemar Karwowski, Chair, Department of Industrial Engineering and Management Systems
Peter J. Kincaid, Institute for Simulation and Training, University of Central Florida
Petros Xanthopoulos, Department of Industrial Engineering and Management Systems, University of Central Florida
Peter A. Hancock, Department of Psychology, University of Central Florida

Approved for distribution by Waldemar Karwowski, Committee Chair, on October 8, 2015.
The public is welcome to attend.