Using Process Modeling and Analysis Techniques to Reduce Errors in Healthcare

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Friday, Nov 1, 11AM, Tech Center 111

Abstract:
As has been widely reported in the news lately, healthcare errors are a major cause of death and suffering. In the University of Massachusetts Medical Safety Project, we are exploring the use of process modeling and analysis technologies to help reduce medical errors and improve efficiency. Specifically, we are modeling healthcare processes using a process definition language and then analyzing these processes using model checking, fault-tree analysis, discrete event simulation, and other techniques. Working with the UMASS School of Nursing and the Baystate Medical Center, we have undertaken in-depth case studies of error-prone and life-critical healthcare processes and demonstrated a significant reduction in the number of errors reaching patients.

This talk describes the technologies we are using, discusses case studies, and presents our observations and findings to date. Although presented in terms of the healthcare domain, the described approach could be applied to human-intensive processes in other domains to provide a technology-driven approach to process improvement.

Bio:
Lori A. Clarke is chair the School of Computer Science at the University of Massachusetts, Amherst, and co-director of the Laboratory for Advanced Software Engineering Research (LASER). She is a Fellow of the ACM and IEEE, and a board member of the Computing Research Association's Committee on the Status of Women in Computing Research (CRA-W). She is a former vice chair of the Computing Research Association (CRA), co-chair of CRA-W, IEEE Publication Board member, associate editor of ACM TOPLAS and IEEE TSE, member of the CCR NSF advisory board, and ACM SIGSOFT chair. Awards include the 2012 SIGSOFT Outstanding Research Award, 2011 University of Massachusetts Outstanding Accomplishments in Research and Creative Activity Award, the 2009 College of Natural Sciences and Mathematics Outstanding Faculty Service Award, the 2004 University of Colorado, Boulder Distinguished Engineering Alumni Award, and the 2002 SIGSOFT Distinguished Service Award.

Dr. Clarke's research is in the area of software engineering. Recently she has been investigating applying software engineering technologies to detect errors and vulnerabilities in complex processes in domains such as healthcare, scientific workflow, and digital government. She is also involved in several efforts to increase participation of underrepresented groups in computing research.