

Computer Engineering

AI for Software and Software for AI

Lin Tan
Purdue University

Friday, January 31, 2020
10:00-11:30 am
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Abstract: This talk will present research focuses in two directions: (1) using software testing approaches to improve the dependability of machine learning systems, and (2) leveraging machine learning and natural language processing techniques to improve software dependability.

Machine learning software is widely used in domains including aircraft collision avoidance systems, Alzheimer's disease diagnosis, and autonomous driving cars. Despite the requirement for high reliability, machine learning software is difficult to test and debug. This talk will describe CRADLE, a new approach that (1) performs cross-implementation inconsistency checking to detect bugs in deep learning software, and (2) analyzes anomaly propagation to localize faulty functions in deep learning software.

On the other hand, machine learning and natural language processing techniques have unique advantages in completing and automating challenging software development tasks. This talk will present techniques that automatically analyze software text, such as code comments, API documentation, and processor specifications, to extract specifications, generate test cases, and detect software bugs. In addition, this talk will discuss how to build machine learning models to produce specifications and bug patterns automatically from existing bugs and their commit messages to find new bugs.



Bio: Lin Tan is an Associate Professor of Computer Science at Purdue University. She received her PhD from the University of Illinois, Urbana-Champaign. Her research interests include software dependability and software text analytics. Dr. Tan's co-authored papers have received ACM SIGSOFT Distinguished Paper Awards at MSR in 2018 and FSE in 2016; and IEEE Micro's Top Picks in 2006. Dr. Tan was a recipient of Canada Research Chair, an NSERC Discovery Accelerator Supplements Award, an Ontario Early Researcher Award, an Ontario Professional Engineers Award — Engineering Medal for Young Engineer, two Google Faculty Research Awards, a Facebook research award, and an IBM CAS Research Project of the Year Award.