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A Study of Dynamic Meta-Learning for Failure Prediction in Large-Scale Systems

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▼ Abstract

Despite years of study on failure prediction, it remains an open problem, especially in large-scale systems composed of vast amount of components. In this talk, I present a dynamic meta-learning framework called SysDP for failure prediction. It intends to not only provide reasonable prediction accuracy, but also be of practical use in realistic environments. Two key techniques are developed to address technical challenges of failure prediction. One is meta-learning to boost prediction accuracy by combining the benefits of multiple predictive techniques. The other is a dynamic approach to dynamically obtain failure patterns from a changing training set and to dynamically extract effective rules by actively monitoring prediction accuracy at runtime. I also present a case study of applying this framework to real system logs collected from the production Blue Gene/L systems at Argonne National Laboratory and San Diego Supercomputer Center. The study indicates that SysDP can provide reasonable prediction accuracy by forecasting up to 82% of the failures, with a runtime overhead less than 1.0 min. Furthermore, I discuss other related failure diagnosis and prognosis studies from my research group.

▼ Speaker's Biography

Dr. Lan is an associate professor in the Department of Computer Science at Illinois Institute of Technology, Chicago, Illinois. Her research interest includes fault tolerant computing, dynamic load balancing, performance analysis and optimization, and system support for parallel and distributed computing. She received her Ph.D. in 2002 from Department of Electrical and Computer Engineering at Northwestern University , where she worked with Professor Valerie Taylor in the Celero Research Laboratory. She is associated with the Scalable Computing Laboratory (SCS) .