Translational AI Center (TrAC) Seminar
Fall 2022

Tichakorn (Nok) Wongpiromsarn

October 7 at 12:00 noon (US Central Time)

Physical location: 2206 Student Innovation Center

Zoom: https://iastate.zoom.us/j/92178103551?pwd=dlNCa2l0ckVBTEVyR1JEN2Y3b21XQT09

Feedback Learning for Object Classification with System-Level Objectives

Abstract

The perception component of autonomous driving systems is often designed and tuned in isolation from the control component based on well-known performance measures such as accuracy, precision, and recall. Commonly used loss functions such as cross-entropy loss and negative log-likelihood only focus on minimizing the loss with respect to misclassification without considering the consequences that follow after the misclassifications. In other words, this approach fails to take into account the difference in the severity of system-level failures due to misclassification and other errors in perception components.

In this talk, I will describe a novel feedback learning training framework to build the perception component of an autonomous system that is aware of system-level safety objectives, which in turn, enhances the safety of the vehicle as a whole. The crux of the idea is to utilize the concept of a rulebook to provide feedback on system-level performance as safety scores and leverage them in designing and computing the loss functions for the models in the framework. Experiments based on an open-sourced dataset show that the resulting model improves the system-level safety performance over the baseline perception model.

Short Bio

Tichakorn (Nok) Wongpiromsarn received the B.S. degree in Mechanical Engineering from Cornell University in 2005 and the M.S. and Ph.D. degrees in Mechanical Engineering from California Institute of Technology in 2006 and 2010, respectively. She is currently an assistant professor in the Department of Computer Science at Iowa State University. Her research spans several areas of computer science, control, and optimization, including formal methods, motion planning, situational reasoning, hybrid systems, and distributed control systems. Most of her work draws inspiration from practical applications, especially in autonomy, robotics, and transportation. A significant portion of her career has been devoted to the development of autonomous vehicles, both in academia and industry settings. In particular, she was a principal research scientist and led the planning team at nuTonomy (now Motional), where her work focused on planning, decision making, control, behavior specification, and validation of autonomous vehicles.