

DEPARTMENT OF COMPUTER SCIENCE

SEMINAR

2023 SERIES

XCurve: Machine Learning with Decision-Invariant Performance Curve Metrics

DATE & TIME

25 AUG 2023 (FRI) 10:30 – 11:30 AM

VENUE

WLB 208, The Wing Lung Bank Building for Business Studies,
Shaw Campus



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ABSTRACT

Recently, machine learning and deep learning technologies have been successfully employed in many complicated high-stake decision-making applications such as disease prediction, fraud detection, outlier detection, and criminal justice sentencing. All these applications share a common trait known as risk-aversion in economics and finance terminologies. In other words, the decision-makers tend to have an extremely low risk tolerance. Under this context, decision-making parameters (such as classification threshold in classification) will significantly affect the performance of models. In other machine learning applications such as recommendation and information retrieval, the decision parameters also play an important role since personalized decision requirements must be met. In these scenarios, the decision parameters change dynamically, leading to unavoidable biases if the training and test time decision parameters are inconsistent.

To mitigate such issues, we explore machine learning frameworks that could make the training process decision-agnostic. Inspired by the fundamental principle of the well-known AUROC optimization framework, we study the XCurve framework trying to optimize the Area Under X Curve (AUXC). The performance curve X is formed by a plot of two performance functions of the decision parameter. AUXC tends to be decision-invariant since the integral of the performance curve implicitly considers all possible choices of the decision parameters.

In this talk, I'll briefly introduce some of our recent works on learning with different AUXCs including AUROC (for long-tail classification), AUPRC (for retrieval), AUTKC (for classification with semantic ambiguity) and OpenAUC (for open-set recognition).



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