The 8th Cluster Workshop on Intelligent Systems and Machine Learning

March 17 (Friday), 2023

4:00pm – 6:00pm (Alberta Time)

Organized by: AU FST ISML Research Cluster

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Keynote Presentation

Keynote Presenter	Prof. Liang Chen (University of Northern British Columbia, Canada)
Title	**From Computer's Point of View**
Abstract	What can Computing Machines do better than human beings? --- The jobs that require "massive" computing resources! But what are we going to "teach" a machine if we human beings do not know how to do a job? There is a gap between our expectation on computing performances and our knowledge on how to do a job. This talk argues that the objective of high accuracy in related research for such jobs lead to nowhere but a general ``trial and error'' process; therefore "stability" rather than "accuracy" should be applied as the evaluation standard in developing AI algorithms.

Presenter's short bio	Liang Chen earned a bachelor's degree in computer software at Huazhong University of Science and Technology in 1988 and a doctorate in computer science from the Software Institute at Chinese Academy of Sciences in 1994. Since then, he had worked at various universities and companies in China, Japan and France. He has been with the Department of Computer Science at the University of Northern British Columbia since 2001 where he is now a professor. His research interests include pattern recognition, image processing, computational geometry, intelligent language tutoring system, data mining, and bioinformatics.

Invited Presentation

Presenter	Md Rayhan Kabir
Title	Interpretable Ensemble Models For Associative Classification
Abstract	Associative classifiers have shown competitive performance with state-of-the-art classification methods for predicting class labels. In addition to their accuracy performance, associative classifiers produce human-readable rules for classification, providing an easier way to understand their decision-making process. However, the presence of high-dimensional feature vectors in the training data impacts these models' performances. In this research, we propose an ensemble model, Dynamic Ensemble Associative Learning (DEAL), where we use associative classifiers as base learners on feature sub-spaces. We also propose a dynamic feature sampling procedure that automatically defines the number of base learners and ensures diversity and completeness among the selected features. As each of the base learners of our ensemble model is interpretable, we can collect the rules from the base learners and examine them to understand the decision process. Although, understanding this decision process can be complicated if there is a large number of base learners. To that end, we introduce another ensemble model, Classification by Frequent Association Rules (CFAR), where we make the decision process of the model easier to understand. In CFAR, instead of using a voting method for the final decision of the ensemble, we rank the generated rules based on their prevalence and select a subset of the predominant rules for predicting class labels. We use ten datasets from the UCI repository to evaluate the performance of our proposed models. Both our ensemble approaches, DEAL and CFAR, eliminate the high memory and runtime requirements of recent associative classifiers, especially for training datasets with high-dimensional feature vectors, all without jeopardizing classification accuracy. CFAR enhances the model's interpretability by removing noisy rules while achieving increased classification accuracy in most cases in our experiments. While the decision process of DEAL is human interpretable, CFAR enhances this further by collecting and ranking the rules generated by its base learners to predict the final class label.
Presenter's short bio	Md Rayhan Kabir completed his master's from the Department of Computing Science, University of Alberta in 2022. His research interest is on ensemble

	models, Explainable AI and Reinforcement Learning. Currently he is working with Dr. Oscar Lin and Dr Ali Dewan.