CHAI Seminar Series
Refreshments will be served.

DATE: Monday, February 27, 2023

SPEAKER: **Hitesh Sapkota**
Ph.D. Student, RIT Computing and Information Sciences

TITLE: Adaptive Robust Evidential Optimization for Open Set Detection from Imbalanced Data

IN PERSON: Golisano Hall, Room 2400

ABSTRACT: Open set detection (OSD) aims at identifying data samples of an unknown class (i.e., open set) from those of known classes (i.e., closed set) based on a model trained from closed set samples. However, a closed set may involve a highly imbalanced class distribution. Accurately differentiating open set samples and those from a minority class in the closed set poses a fundamental challenge as the model may be equally uncertain when recognizing samples from the minority class. We propose Adaptive Robust Evidential Optimization (AREO) that offers a principled way to quantify sample uncertainty through evidential learning while optimally balancing the model training over all classes in the closed set through adaptive distributively robust optimization (DRO). To avoid the model to primarily focus on the most difficult samples by following the standard DRO, adaptive DRO training is performed, which is governed by a novel multi-scheduler learning mechanism to ensure an optimal model training behavior that gives sufficient attention to the difficult samples and the minority class while capable of learning common patterns from the majority classes. Our experimental results on multiple real-world datasets demonstrate that the proposed model outputs uncertainty scores that can clearly separate samples from close and open sets, respectively, and the detection results outperform the competitive baselines.

BIO: **Hitesh Sapkota** is a sixth-year PhD candidate in Computing and Information Sciences at RIT and a member of the Machine Learning and Data Intensive Computing research lab led by his advisor Dr. Qi Yu. His research focuses on building novel machine learning models that can effectively learn from weakly supervised learning signals by leveraging key learning paradigms, including multiple instance learning, active learning, and distributionally robust optimization. He has published papers in top-machine learning conferences including AISTATS, CVPR, KDD, ICLR, and ICDM. During his PhD study, he completed multiple internships at Amazon as an Applied Scientist. You can read more about his work at his website: *https://hiteshsapkota.github.io*

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