



Graduate School of Information Science, University of Hyogo
2nd International Research Seminar

**UNCERTAINTY-AWARE ACTIVE LEARNING:
PREDICTIVE VS. GEOMETRIC UNCERTAINTY
METHODS**

Thu. 4 July 2024 (13:00 ~ 14:00) JST

IN-PERSON/ONLINE SEMINAR

Active learning is a machine learning paradigm in which the algorithm adaptively selects the most informative and representative data points to label, with the goal of achieving high performance with fewer labeled examples compared to standard supervised learning. A key challenge in active learning is determining which unlabeled data points are the most informative or uncertain, as querying these points can lead to the greatest reduction in model uncertainty. To address this challenge, researchers have explored the use of uncertainty quantification methods to guide the active learning process. Predictive uncertainty methods, which rely on the model's own estimates of the confidence in its predictions, have shown promise in active learning. However, these methods have several limitations: (i) they require a sufficient amount of initial training data, (ii) the machine learning models often have parameters that need to be tuned, (iii) they may struggle with extrapolation when training data is scarce, and (iv) their effectiveness may depend on the specific type of learning model employed. Given these limitations of uncertainty prediction methods, there is a need to explore alternative approaches. One promising alternative is the use of geometric uncertainty quantification methods that can capture the uncertainty inherent in the underlying data distribution, rather than relying solely on the model's own predictive confidence. By using both predictive and geometric uncertainty information, active learning strategies can potentially be further improved, leading to more robust and efficient learning from fewer labeled examples.

Register here (free)

<https://shorturl.at/qkBtV>

Contact: rashed@gsis.u-hyogo.ac.jp



Guest Speaker



Alaa Othman

Postdoctoral Researcher
Bielefeld University of Applied
Sciences and Arts,
Germany

HS'BI

Hochschule
Bielefeld
University of
Applied Sciences
and Arts

Dr. Alaa Tharwat is a postdoctoral researcher and research group leader in engineering informatics at Bielefeld University of Applied Sciences since 2019. He received his Ph.D. in the field of optimization and machine learning from Suez Canal University, Egypt (2017). His main research area is machine learning with a focus on active learning, optimization, uncertainty, and learning on data streams. He has made several contributions in the area of active learning and published his results in high-impact peer-reviewed journals such as IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Knowledge and Data Engineering, and Knowledge-Based Systems.

For more details:

<https://shorturl.at/fOC9M>

Kobe Campus for Information Science,
Computational Science Center Building,
Large Hall (720), 7th Floor
<https://www.u-hyogo.ac.jp/about/access/>