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## Uncertainty estimation and RL applications at JLab

*Wednesday, 29 November 2023 11:55 (20 minutes)*

Standard deep learning models for classification and regression applications are ideal for capturing complex system dynamics.

Unfortunately, their predictions can be arbitrarily inaccurate when the input samples are not similar to the training data. Implementation of distance aware uncertainty estimation can be used to detect these scenarios and provide a level of confidence associated with their predictions.

We present results using UQ for ML methods for 1) anomaly detection at Spallation Neutron Source (SNS) accelerator and 2) the Fermi National Accelerator Lab (FNAL) Booster Accelerator Complex.

We also present an application of reinforcement learning to improve accelerator controls.

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**Session Classification:** AI/ML for Accelerators