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Predicting Calibrations using AI for the Central Drift Chamber in GlueX at Jefferson Lab

Thursday, 2 December 2021 11:20 (20 minutes)

The AI for Experimental Controls project at Jefferson Lab is developing an AI system to control and calibrate a large drift chamber system in near-real time. The AI system will monitor environmental variables and beam conditions to recommend new high voltage settings that maintain consistent dE/dx gain and optimal resolution throughout the experiment. At present, calibrations are performed after data has been taken and require a considerable amount of time and attention from experts. The calibrations require multiple iterations and depend on accurate tracking information. This work would reduce the amount of time and or data that needs to be calibrated in an offline setting. Our approach uses environmental data, such as atmospheric pressure and gas temperature, and beam conditions, such as the flux of incident particles as inputs to a Sequential Neural Network. For the data taken during the latest run period, the SNN is successfully able to predict the existing gain correction factors to within 4%. This talk will briefly describe the development, testing, and future plans for this system at Jefferson Lab.

Significance

This represents one of the first approaches to use environmental only experiment information to perform near real time calibrations.

References

Speaker time zone

Compatible with America

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Session Classification: Track 2: Data Analysis - Algorithms and Tools

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