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Fault Detection using Pulse Reconstruction with CVAE in the KOMAC High-power Systems

Thursday, November 14, 2024 1:00 PM (1h 30m)

Conditional Variational Auto-Encoder (CVAE) model is applied to detect faults in the pulse waveform signals from the KOMAC High Voltage Converter Modulator (HVCM) and Klystron. Based on the CVAE model previously studied for anomaly detection of HVCM in SNS accelerator, we tuned the model and hyperparameters by considering features of the KOMAC data. Experimental results confirmed that the distribution of normal signals was effectively learned, as demonstrated through visualizations using t-SNE, boxplots, and KDE plots. In terms of the distribution function of the deep learning model, faults were detected through the difference in reconstruction error between normal and abnormal signals. These results can be used to develop an anomaly detection system to increase operation rate of the KOMAC accelerator.

Contribution track

ICABU WG1. Accelerator Systems

Paper submission Plan

Yes

Best Presentation

Yes

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