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Deep learning framework for fault detection in accelerators

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The main goal of NSRC SOLARIS is to provide the scientific community with high-quality synchrotron light. To achieve this, it is necessary to constantly monitor many subsystems responsible for beam stability and to analyze data about the beam itself from various diagnostic beamlines. This work presents an in-depth analysis of multi-modal, deep learning-based frameworks for fault detection within big research infrastructures, with a specific focus on accelerator facilities. The study explores diverse approaches and architectures for identifying anomalies indicating potential faults in operation. At the present stage, a binary classification is performed: stable beam operation or unstable beam operation / no beam with the accuracy of 90%. The models and the results obtained so far are discussed, along with plans for future development.

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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