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A Data Science and Machine Learning Platform Supporting Large Particle Accelerator Control and Diagnostics Applications

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Osprey DCS is developing the Machine Learning Data Platform (MLDP) supporting machine learning and data science applications specific to large particle accelerator facilities and other large experimental physics facilities. It represents a "data-science ready"host platform providing integrated support for advanced data science applications used for diagnosis, modeling, control, and optimization of these facilities. There are 3 primary functions of the platform: 1) high-speed data acquisition, 2) archiving and management of time-correlated, heterogeneous data, and 3) comprehensive access and interaction with archived data. The objective is to provide full-stack support for machine learning and data science, from low-level hardware acquisition to broad data accessibility within a portable, standardized platform offering a data-centric interface for accelerator physicists and data scientists. We present an overview of the MLDP including use cases, architecture, implementation, and deployment, along with the current development status. The MLDP is deployable at any facility, however, the low-level acquisition component requires EPICS.

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