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ML study program for particle accelerators at IJCLAB

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Our goal is investigation and demonstration of applicability and efficient use of Machine Learning (ML) techniques for advanced control and optimization of particle accelerators. With main effort concentrated on the application of novel algorithms to projects we already working on, we will qualify ML concepts for possible generalization and application for particle accelerators. Recently, ML has been successfully applied to a variety of real-world tasks for the scientific/engineering problems, which gives the justified indications of the success of the ML-based approaches for particle accelerators.

The advanced control and optimization techniques will be used to improve accelerators by solving following tasks: machine tuning and beam dynamics (ThomX), beam parameters extraction, dealing with noisy data; complex diagnostics and control of high intensity laser (LaserX, industries), which is crucial for the optimization operation of laser-plasma based accelerators; construction and training of virtual detectors for machine monitoring purposes.

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Classification de thématique: ML for particle accelerators