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Machine learning for orbit steering in synchrotrons

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In the latest years Machine Learning (ML) has seen an unprecedented diffusion in the most different fields in simulations and real life as well. Probably two of the first and most used ML applications in accelerators are the optimization of the final performance of the machines, and the so called virtual diagnostics. In the latest years ML was successfully applied to improve the machine safety performing fault detection or to prevent interlocks. In this work we explored the possibility to use a ML approach to efficiently steer the beam in case the lattice contains high order magnets (sextupolar order and higher). We applied this scheme to SLS 2.0, the synchrotron upgrading at the Paul Scherrer Institut.

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