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SOLARIS synchrotron. Status and planned developments.

Monday, 20 February 2023 12:30 (1 hour)

The National Center for Synchrotron Radiation SOLARIS in Cracow is the only operator of a synchrotron radiation source in Poland and a premier center in the world. It provides beam time both for scientific and commercial users, in a broad range of topics from material sciences to biological and pharmaceutical applications. Currently we operate six experimental beam lines and three are under construction. All are available for different users from Poland and abroad. Therefore, it is crucial to supply the best possible quality and stability of light for the yearly running schedule. This requires a stable and continuous electron beam within the storage ring. The utilization of ML algorithms based on modern open-source libraries will enable us to perform on-line corrections of the beam profile enhancing its lifetime and the quality and stability of the light delivered by the SOLARIS ring. The suggested Bayesian algorithms such as Bayesian Neural networks or BSTS are finding the application in both science and industry such as forecasting seasonal events in time series (econometry), classifying convoluted overlapping sets of data and performing accurate predictions. For simpler and less complex problems we plan to use small and commonly used algorithms based on Boosted Decision Trees (XGBoost) to classify small subsets of data. We plan to study in detail the proposed method, to understand its effect on the correction. In the scope of this seminar the general setup of the SOLARIS accelerator complex, diagnostic tools and plans for the future will be discussed.

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