Machine Learning Applications in Accelerator Science

DANIEL RATNER, SLAC

In the last decade, machine learning (ML) techniques have surged in popularity across all areas of science, and accelerators are no exception. With a wealth of data, extensive automation, and daunting operational requirements, particle accelerators are ideal targets for machine learning. While ML may be best known for applications in data analysis, there are additional opportunities across autonomous control, surrogate modeling, and fault detection/recovery. In this talk I will give examples of ML applications at SLACs accelerator facilities in each of these areas, as well as a vision for the role of ML in the design and operation of future accelerators.