

Application of machine learning techniques at BESIII experiment

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The BESIII detector is a general purpose spectrometer located at BEPCII. BEPCII is a double ring e+e- collider running at center of mass energies between 2.0 and 4.6 GeV and has reached a peak luminosity of $1 \times 10^{33} \text{cm}^{-2} \text{s}^{-1}$ at $\sqrt{s} = 3770$ MeV. As an experiment in the high precision frontier of hadron physics, since 2009, BESIII has collected the world's largest data samples of J/ψ , $\psi(3686)$, $\psi(3770)$, $\psi(4040)$ and $\psi(4260)$ decays. These data are being used to make a variety of interesting and unique studies of light hadron spectroscopy, charmonium spectroscopy and high-precision measurements of charmed hadron decays.

Machine learning techniques have been employed to improve the performance of BESIII software. Novel approaches for "particle identification of lepton" and "track segment building for the CGEM (Cylindrical Gas Electron Multiplier Inner Tracker)" will be discussed. The comparison of performances with traditional approaches will be given.

Primary author: LIU, Beijiang

Presenter: LIU, Beijiang

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