Tomasz Golan, "Machine Learning for MINERvA Physics Reconstruction"

Report of Contributions

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Machine Learning for MINERvA Physics Reconstruction

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There has been growing interest in machine learning methods in last years from both scientists and information technology companies. Mainly due to better access to big data and the development of parallel computations techniques using graphics processing units. The rapid development of algorithms, in particular those related to artificial neural networks, makes it possible to apply modern approach in data analysis. The methods becomes more and more popular in high energy physics. MINERvA is a neutrino experiment located at Fermilab. The unique design of the detector allows to measure cross sections on different nuclear targets. The crucial part of data analyses is the procedure of the events reconstruction. Recently, convolutional neural networks are used for the task. First results indicate the increase of an accuracy, comparing to standard reconstruction methods. During the seminar I will introduce briefly the MINERvA experiment and cover the basis of machine learning methods used for the vertex position reconstruction. It will be followed by preliminary results obtained for different nuclear targets.

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