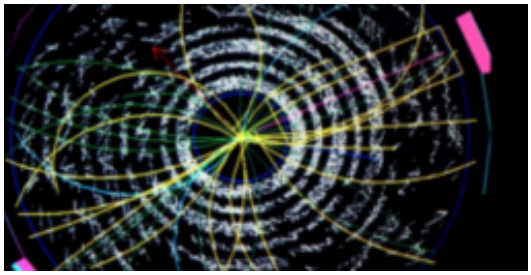

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Electron Neutrino Reconstruction in MicroBooNE Using Deep Learning Technique

Monday, 5 June 2017 10:00 (15 minutes)

MicroBooNE employs the first large scale (> 100 ton) Liquid Argon Time Projection Chamber (LArTPC) in the U.S. to detect electron and muon neutrinos produced from the Fermilab Booster Neutrino Beamline (BNB). The primary goal of the experiment is to perform a definitive study of the observed electron neutrino event excess at low energy by the MiniBooNE experiment, which could indicate the presence of sterile neutrinos. The current challenge of the experiment is efficient and effective event reconstruction to identify any possible event excess above background. In this talk, I describe the use of the machine learning technique called Deep Learning to these problems in MicroBooNE, in particular for electron neutrino event reconstruction and analysis. Deep Learning is making revolutionary advancements in the field of artificial intelligence and computer vision and is also making an impact on neutrino experiments such as NOvA. We demonstrate that Convolutional Neural Networks (CNNs), a type of Deep Learning algorithm, can also be used for event reconstruction using LArTPC data. I will discuss the current status of the application of this technique for electron neutrino event reconstruction in MicroBooNE.

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