Machine Learning Applications for Track Fitting on the STAR Forward Tracking System

Colby Smith, Abilene Christian University for the STAR Collaboration

The Forward Tracking System at the STAR detector is used to measure charged particles from polarized proton-proton collisions. This system consists of two separate detectors, the Forward Silicon Tracker (FST) and the Small-strip Thin Gap Chamber (sTGC). Charged particle trajectories are reconstructed from hits recorded in the different planes of each detector. One challenge is determining the correct combinations of hits. Previously, this was accomplished by reducing the possible pairs of hits by “cutting" the data according to certain criteria. However, an improved method is possible with machine learning techniques. This research aims to create a machine learning model to identify “real” pairs using only raw hit coordinates. Using a Multilayer Perceptron classifier, simulated pairs of hits are trained and tested to classify them as “real” or “fake” hit pairs. In this poster, we present a status report of the effectiveness of this method to distinguish “real” from “fake” pairs.