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Data Quality, ATS & Fraud DetectionWe will present recent advancements in our work on Data Quality, ATS, and Fraud Detection, developed in collaboration with Banca Intesa Sanpaolo. Specifically, we describe two complementary approaches. The first builds on our previous work combining Feature Engineering, Self-Organizing Maps (SOM), and Isolation Forest (IF). In this case, we focus on analyzing the behavior of specific instances across different time windows. The second approach investigates the use of autoencoders to identify potential outliers. We will also briefly illustrate how the same methodology (Feature Engineering, SOM, and IF) can be applied to the Astrophysics domain, where it enables the identification of a relatively pure sample of Active Galactic Nuclei (AGN) among galaxies and stars. Moreover, we introduce our fraud detection strategy, which uses Random Forest to identify potentially fraudulent events, and applies the K-Nearest Neighbors (KNN) algorithm at a user-level to identify anomalous operations by comparing each transaction to the user's typical behavior. Finally, given the good results obtain in the high energy astrophysics, it is also presented briefly FoCUS, an evolution of cusum, and a possible application on the Banking data.

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