

Title

Less is More: Including Network Features for Insurance Fraud Detection - A Case Study for a Belgian Insurance Company

Speaker/Company

Bruno Deprez / KU Leuven & UAntwerp

Abstract

Research on fraud detection has seen an increase in interest over the past years across different applications, including credit card and other payment frauds, Anti-Money Laundering (AML) and insurance fraud. This increase is both driven by new regulations and the large financial losses linked to fraudulent activities. Additionally, advanced, data-driven methods are finding their way to insurance applications, where social network analysis (SNA) is the current state-of-the-art. Via SNA, we want to leverage the additional information that is present when considering social interactions between individuals. These can give us critical information when looking for patterns in behaviour of fraudsters. This presentation focuses on different aspects of network analysis. We apply a selection of SNA methods to a data set covering motor insurance claims coming from a large Belgian insurance company. More specifically, we discuss and apply three different techniques in order to extract meaningful information from the network structure, each with a different basis. These techniques are BiRank (classified under guilt-by-association), Metapath2Vec (classified under shallow embeddings via truncated random walks) and GraphSAGE (classified under Graph Neural Networks). We take a critical look at the added value coming from the latent representations that are obtained from these three methods. In particular, the increase in fraud detection power is compared to the power of more traditional network features, such as the degree or betweenness centrality of the nodes. This paper shows that the advanced SNA methods do not give better results on the data set at hand. In addition, the traditional and simpler features facilitate interpretation by a human investigator. Hence, we conclude that the traditional feature engineering approach is competitive with advanced state-of-the-art SNA methods.

Biography

Bruno has a master's degree in Mathematics and in Actuarial and Financial Engineering, both at KU Leuven. During his studies, he worked as an actuarial consultant at KPMG Belgium for 2.5 years, serving larger and smaller insurance companies on the Belgian market.

He is currently pursuing a joint PhD in fraud detection at the Research Centre for Information Systems Engineering (LIRIS) at KU Leuven and at the Department of Mathematics at the University of Antwerp in Belgium.
