Combination Analysis of Financial Fraud Detection in Operational Risk Management Using Machine Learning & Causal Inferences

The 2007-2009 financial crisis brought the significance of risk management out within the financial industry, among which particular attention has been given to how risks are being detected and managed (Leo, Sharma & Maddulety, 2019). The augmenting trend in financial frauds can be attributed partly to money laundering. Therefore, an efficient method that can detect the potential fraud and money laundering is crucial to risk management. Additionally, it is better to identify the deterministic variable that affect fraud mostly through causal inference analysis.

As technological innovations emerge, the newly breed of techniques like machine learning help managing risks at low costs. McKinsey & Co pointed out that by 2025, the risk functions in banks would be fundamentally different from what they are today. In financial sector, company like Deloitte released a report targeting the case for machine learning and artificial intelligence in combating money laundering and terrorist financing. Besides, the Federal Reserve of the U.S. reported the 5 largest banks (JPMorgan Chase, Wells Fargo, Bank of America, Citibank, & U.S. Bank) in the U.S. are investing heavily into imbuing their services with Artificial Intelligence and machine learning. In academic research, Le Khac and Kechadi (2010) introduced the application of data mining for anti-money laundering detection through a case study. Paula, Ladeira et al. (2016) used deep learning to detect anomaly as support fraud investigation in Brazilian exports and anti-money laundering.(More literature reviews in literature review section…

In my paper, I decided to make use of logistic regression, linear discriminate analysis, decision tree, and neural network. I proposed to compare the accuracy of those techniques and find the best model for predicting the financial frauds. Moreover, I would like to explore the causal inference and identify the covariant that has causal effect on fraud behavior.