Applying Machine Learning for Watch-list Filtering in Anti-money Laundering

By:
Mohannad Akram Ibrahim Alkhalili

Supervisor:
Dr. Mahmoud H. Qutqut

Co-Supervisor:
Dr. Fadi Al-Masalha

This master thesis was submitted in Partial Fulfillment of the Requirements for the Master's Degree In Computer Science

Applied Science Private University

Deanship of Scientific Research and Graduate Studies

Abstract

Financial institutions must meet international regulations to ensure not to provide financial services to criminals and terrorists. They also need to endlessly monitor all financial transactions to detect suspicious activities in order to stop it. Regulated businesses have many operations that monitor and validate their customer's information against sources that either confirm their identities or disprove it using international or private blacklists. Failing to detect unclean transaction(s) will result in harmful consequences on the financial institution responsible for that such as warnings or fines depending on the transaction severity level. SWIFT messages are widely used to transfer money around the world, and considered as the backbone of global financial communication. The financial institutions are using Anti-money laundering (AML) software sanctions screening and watch-list filtering to screen every single transaction within the financial network to verify that none of the transactions can be used to do business with a forbidden people.

Lately, the financial industry and academic researchers have agreed that machine learning (ML) may have a significant impact on monitoring money transactions which will lead to more useful tools to fight money laundering and terrorist financing. Several research work and implementations have been done on Know Your Customer (KYC) systems. But there is no such work on the watch-list filtering systems due to the compliance risk behind it. Thus, we propose an innovative model to automate the process of examination blocked transactions in the watch-list filtering systems. To the best of our knowledge, this thesis is the first research work on automating the watch-list filtering systems.

We evaluated the accuracy of applying ML to detect the transaction decision. Three algorithms studied in this thesis, namely support vector machine (SVM), decision tree (DT) and naïve Bayes (NB). We achieved %84 accuracy using SVM after adding additional features from swift messages and KYC application. Also, we provide the best way to develop a Machine Learning - Component (ML-Component) that will be integrated with the current watch-list filtering systems. Our proposed ML-Component consists of three phases; named as monitoring, advising, and take action. Our model will handle a known critical issue, which is the false-positives (i.e., some transactions that are blocked by a false alarm). Also, it will minimize the compliance officers' effort, and provide faster processing time of money transactions.