Chapter 12
Enhancing Money Laundering Detection Through Machine Learning:
A Comparative Study of Algorithms and Feature Selection Techniques

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ABSTRACT

Money laundering is a worldwide issue that jeopardizes the stability and integrity of financial institutions. Many countries have implemented anti-money laundering laws and regulations to combat this. The basics of money laundering and its influence on the financial system, as well as existing strategies for detecting and combating it, are covered in this chapter. K- nearest neighbors, random forest, naive bayes, deep neural networks, and evolution metrics are examples of machine learning techniques and algorithms used to identify suspicious transactions. Financial institutions and regulatory bodies can strengthen their ability to detect and prevent money laundering activities and help to protect the integrity of the financial system by utilizing a variety of measures. In this work, the authors have presented a deep comparative analysis among various machine learning algorithms that are used in money laundering detection.

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1. INTRODUCTION

Money laundering is a criminal activity that involves the concealment of illegally obtained funds. It is a process by which criminals attempt to make their ill-gotten gains appear legitimate. Banks have a legal and ethical obligation to ensure that their operations are conducted in a safe and sound manner, and that they do not facilitate illegal activities. Accepting ill-gotten money can expose banks to reputation risks, financial losses, and legal liabilities, as well as harm the integrity of the financial system as a whole. The term "money laundering" originated from the practice of washing dirty money through legitimate businesses to make it appear clean. The process of money laundering typically involves three stages: placement, layering, and integration (Jullum, Løland, Huseby, Ånonsen, & Lorentzen, 2020).

During the placement stage, the launderer introduces illegal funds into the financial system. In the layering stage, they move these funds through various accounts and transactions to make it difficult to trace their origin. Finally, in the integration stage, they reintroduce these funds into society as legitimate income. Money laundering poses a significant threat to global financial systems and economies. It enables criminals to profit from illegal activities such as drug trafficking, terrorism financing, and corruption while avoiding detection by law enforcement agencies (Raiter, 2021). To combat money laundering, governments around the world have implemented strict regulations and laws that require financial institutions to report suspicious activities and transactions. These measures aim to prevent criminals from using banks and other financial institutions for their illicit activities. The size of the global money laundering problem is difficult to estimate with certainty because the vast majority of illicit financial flows are not detected or reported. However, various reports and studies have provided estimates of the scale of money laundering in today's world (Yang & Wu, 2020).

According to the United Nations Office on Drugs and Crime (UNODC), it is estimated that the amount of money laundered globally in one year is between 2% to 5% of global GDP, which equates to

Figure 1. Typical money laundering scenario

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