

# Chapter 1

# AI-Driven Intelligent Solutions:

## Leveraging Machine Learning to Combat Financial Crimes

**Saurabh Chandra**

 <https://orcid.org/0000-0003-4172-9968>

*Bennett University, India*

### **ABSTRACT**

*This chapter discusses how machine learning (ML) is transforming the face of anticorruption or anti-fraud landscape in financial institutions. Given that most financial crimes have become much more complex than ever before, traditional methodologies have fallen behind in terms of the detection of these crimes and this has led to a significant spike in false positives and operational inefficiency. Even with its promise, issues like data quality, algorithmic bias, and regulatory compliance continue to be major challenges. Adopting such smart solutions can help organizations bolster their defences against financial crimes while also enhancing broader operational efficiency.*

### **1. INTRODUCTION**

A Global Risk that Poses Serious Threats to Economic Growth and Individual Lives Financial crimes are a systemic risk to the world economy and society, as they simply slash the foundation of financial development and inflict enormous damage on public lives. Such crimes include those such as fraud, money laundering, human trafficking and terrorist financing. The scale of financial crime is truly staggering in 2023 alone, it is estimated over \$3.1 trillion in illicit funds circulated

DOI: 10.4018/979-8-3693-9405-2.ch001

through the global financial system, and fraud losses totalled around \$485.6 billion worldwide<sup>13</sup> (Abrahamsson & Skog, 2024). The potential of ML are underscored in this study as it can process large volumes of dataset in real-time, detect complex patterns through data that signifies fraudulent activities and build relevant patterns as per the changing criminal strategies. None of the above are exhaustive but highlight some key areas such as transaction monitoring, the customer risk assessment and the use cases of ML integrated with upcoming technologies such as block-chain. This disturbing development emphasizes the desperate need for fresh ideas to identify and stop them in their tracks.

## **1.1 Background of Financial Crimes**

Driven by technology and the globalization of markets, financial crimes have become far more complicated and sophisticated in recent years. Financial crime is often described as a non-violent crime conducted for financial gain that is perpetrated by deception. These range from types of fraud including credit card fraud, identity theft, and investment scams—to organized crime, including money laundering and human trafficking. It is estimated by United Nations Office on Drugs and Crime (UNODC), that there is between \$800 billion and \$2 trillion laundered globally every year, which is about 2 to 5% of the gross domestic product (GDP) of the whole world (Alzahrani & Alzahrani, 2024). These crimes do not just cause financial losses, they also cause corruption, undermine public confidence in financial services, and add to social problems like poverty and inequality. Human trafficking, for example, makes an estimated \$346.7 billion each year, and takes advantage of those in vulnerable situations, all in the name of benefitting criminal enterprises. This “precedent” has been escalated by the COVID-19 pandemic, which has seen criminals quick to exploit new vulnerabilities resulting from economic uncertainty, and increased online activity. 51% of organizations experienced fraud in the past two years marking the highest level recorded in more than two decades. This increase in financial crime highlights the need for organizations to strengthen their defences against changing threats (Gupta & Mehta, 2021).

## **1.2 Importance of Machine Learning in Fraud Detection**

As financial crime increases and grows more complex, traditional detection is no longer fit for purpose. Systems based on rules tend to create countless false positives, burdening compliance teams with time-consuming processes and negating the impact of anti-fraud processes. One such technological solution is machine learning (ML), which could improve analytical processes for fraud detection. By leveraging machine learning algorithms, organizations can quickly sift through massive amounts

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