NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

School of Computer Science and Engineering
College of Engineering

Machine Learning for Money Laundering Detection

Student: Huang Peng

Supervisor: A/P Ng Wee Keong

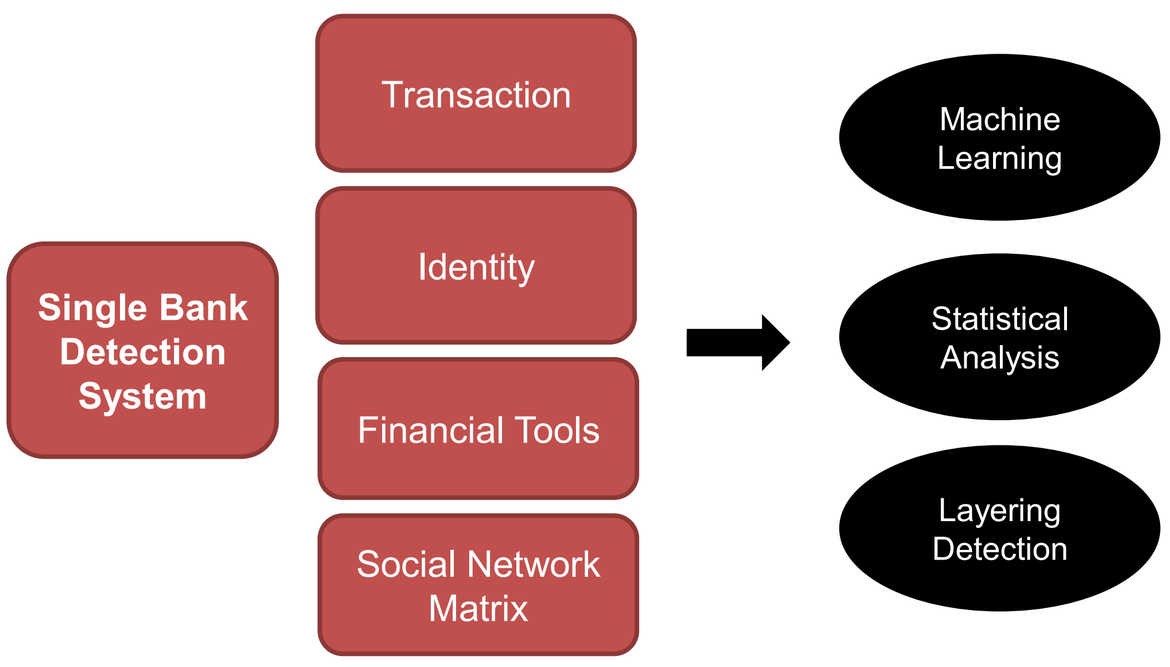
Abstract

Money laundering nowadays has gained attention from regulations globally. With the development of technology, machine learning and data mining techniques have been adopted in the anti-money laundering system. However, banks face difficulties when investigating cross-bank transactions due to restrictions in information sharing. This project studies the typologies of these activities and constructs indicators to quantify red flags for potential money laundering activities. We also propose a money laundering detection framework, comprising single-bank and multi-bank systems, using machine learning, homomorphic encryption, and secure multiparty computation techniques.

Indicators

Main Category	Subcategory
Customer Identity	Location
	Occupation
	Address
	Beneficiary
	Administration
Financial Behavior	Loan and Credit
	Financial Asset
	Rental Services
Transaction Behavior	Frequency
	Amount
	Behavior
	Counter Party
Social Network Matrix	In/Out/All Degree
	Deposit/Withdraw Degree
	PageRank

Protocol



Techniques

Machine Learning: Decision Tree, Frequent Pattern Algorithm, Support Vector Machine

Homomorphic Encryption (HE): A method of encryption allowing any data to remain encrypted while it is being processed and manipulated, thus preserving data privacy.

$$E(m_1) \blacksquare E(m_2) = E(m_1 \blacksquare m_2) \quad where \quad E: HE\ method, \blacksquare: mathematic\ operation\ (\pm,\times)$$

Multiparty Secure Computation (MSC): A method for parties to jointly compute a function over their inputs while keeping their inputs private.