

# Feynn Labs Internship

Project Report on

AI Product Service Prototype Development and  
Business/Financial Modelling

Submitted By,

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Topic:

Prediction of Credit Card Fraudulent Transactions

# Table of Contents

Background .....	3
Problem Statement .....	3
Product-Market Fit.....	3
Target Market Specification .....	4
Applicable Patents .....	4
Anti Money Laundering Regulators In India.....	5
Applicable Constraints .....	6
Opportunities for Business.....	6
Prototype Selection.....	7
Product Development .....	8
Business Modelling .....	9
SaaS Business Model.....	9
Financial Equation .....	10
Code & Documentation.....	11
Conclusion .....	11

## Background

Anti-money laundering software, often known as AML software, is a technology that enables banks and other financial institutions to monitor the behaviour of their customers for indicators of potentially illegal financial activity using automated procedures. The anti-money laundering software industry has taken into consideration a variety of AML solutions, including transaction monitoring, currency transaction reporting, client identification management, and compliance management. The implementation of anti-money laundering (AML) solutions in banks and other financial institutions has been spurred by an increase in the number of worldwide transactions. In 2017, the global market for anti-money laundering (AML) software was estimated to be worth \$879 million. This number is expected to increase to \$2,717.0 million by 2025, representing a compound annual growth rate (CAGR) of 15.2% from 2018 to 2025.

## Problem Statement

Find the best model that properly predicts and avoids suspicious financial transactions, then automate the existing AML software by incorporating machine learning and artificial intelligence algorithms.

## Product-Market Fit

The institutions currently use a strategy that places an emphasis on following the regulations. The rule-based method provides compliance officers with a set of rules or criteria that may be utilised in their investigation of potentially fraudulent activities. Every single financial institution keeps a record of everyone who has disobeyed their regulations or been involved in the laundering of illicit funds. This list is also referred to as a penalty list and a watch list at times. The

rule-based Anti-Money Laundering (AML) software will raise a red flag for the following transaction if it does not adhere to the applicable laws and guidelines. The compliance officer will then investigate the transactions that have been recognised as potentially problematic. This approach has the benefit of producing results that are straightforward and easy to understand. The rule-based method has a number of serious limitations, including the requirement to establish new regulations in order to accommodate shifting patterns of money laundering, which results in an inability to respond to emerging patterns. Another downside is that it requires a significant amount of time and makes poor use of the resources provided by the bank. Because the drawbacks are more numerous than the advantages, it is necessary to adjust this method in order to make it more effective. As a consequence of this, it is no longer debatable that the AML software has to be automated.

## Target Market Specification

AML is an acronym that refers for "anti-money laundering software." This type of programme enables financial institutions, such as banks and credit unions, to examine client data and identify activities that raise eyebrows. Monitoring of transactions, authentication of client identification, and administration of compliance requirements are all components of the process. By implementing systems that filter information and provide warnings in real time utilising AML software, organisations may increase both their level of operational security as well as their operational efficiency. Anti-money laundering software, sometimes known as AML software, is intended to assist businesses in satisfying the regulatory criteria necessary to combat financial crime. Key functions include the capability to report currency transactions (CTR), monitor transactions, identify customers, and handle compliance requirements. Other important aspects include client identification and monitoring. This solution was developed largely for the purpose of complying with AML requirements, which are applicable to all financial institutions.

## Applicable Patents

1. Mechanism to combat money laundering

Yuh-Shen Song, Catherine Lew, Alexander Song, and Victoria Song are the inventors.

Transactional monitoring is carried out by a computer system to identify various kinds of potential instances in order to stop financial crimes and help firms comply with various kinds of laws and regulations. Based on risk criteria, the computer system calculates a total risk score for each entity in a group. A risk score is given to each risk factor. When an entity's total risk score deviates by a certain amount from a reference calculated from the sum of the total risk scores of the group of entities, the computer system additionally identifies that entity. The computer system also aids a user in locating at least one transaction that changed the detected entity's total risk score from the reference calculated from the total risk scores of the group of entities.

## 2. Technique and method for assessing the danger of money laundering

Henry Grant Jr. and Tyler Reynolds are inventors.

Finding a person or other legal entity to be analysed is one way to assess anti-money laundering risk. You can choose a nation that is connected to the person or other legal entity. It is possible to choose at least one financial product or financial instrument related to the person or other legal entity. A client type linked with the person or other legal entity may also be chosen as part of the approach. Responses to specified criteria relating to the chosen nation, the chosen financial product, and the chosen client type may be used to produce a risk assessment.

## Anti Money Laundering Regulators In India

### 1. India's Financial Intelligence Unit (FIU-IND)

The Indian government formed the Financial Intelligence Unit of India (FIU-IND) in 2004 to examine and analyse shady financial activities. Under the Ministry of Finance, the Financial Intelligence Unit of India (FIUIND) is the entity in charge of combating financial crimes in India. The Financial Intelligence Unit receives reports from companies with AML responsibilities.

### 2. Reserve Bank of India (RBI)

The central bank of the Republic of India is the Reserve Bank of India (RBI). It oversees India's economic development and stability. To stop money laundering, it also has some regulatory authority.

## Applicable Constraints

1. Improved governance: For banks and financial institutions, managing cross-border and multi-jurisdictional AML-compliance requirements as well as ever-increasing client due diligence responsibilities may be challenging. Both determining beneficial ownership and putting corrective measures in place to address AML flaws found by regulatory inspections are challenging challenges.
2. Lack of competent staff: It might be challenging to find qualified individuals who have a thorough grasp of AML. Other difficulties include long onboarding times and expenditures, as well as employee churn. Also, organisations must spend a lot of time and energy educating staff on changing regulatory requirements.
3. Complex processes and technology: In order to comply with AML regulations, it is necessary to establish a variety of procedures and technical advancements that will combine KYC data and systems into a single repository. To undertake centralised fraud and financial crime analysis, they must also develop the infrastructure necessary for cross-channel detection of suspicious acts, improve data quality, and standardise data.
4. Depending on the customer's transactions, a different risk rating is assigned during onboarding. Banks must continuously examine each customer's risk and modify risk levels to prevent false positives. This necessitates constant transaction monitoring for each customer, a laborious task.

## Opportunities for Business

As a result of a rise in money laundering cases worldwide, the market for anti-money laundering (AML) software solutions is now expanding rapidly. Additionally, it is anticipated that a significant element driving the global anti-money laundering market will be the rising technical development, which includes the integration of IT technologies to improve an organization's operational efficiency. The market for anti-money laundering (AML) software solutions is anticipated to expand at a CAGR of 16.0% during the forecast period. It is anticipated to grow to a market of USD 3.5 billion by 2027. The market for anti-money laundering (AML) software solutions is anticipated to explode by the end of the projected period. Three categories—deployment, type, and industrial end-use—are used to categorise the market. Based on deployment, it is

separated into two categories: on-premise and cloud. On-premise is anticipated to be the biggest sub-segment within the forecast time frame. On the other hand, it is anticipated that throughout the forecasted period, the cloud-based sub-segment would increase at the highest rate. The sub-growth is anticipated to be significantly influenced by the rising use of cloud-based services by various enterprises. The many software categories include segment's Transaction Monitoring Systems, Currency Transaction Reporting Systems, Customer Identity Management Systems, and Compliance Management Software. Transaction monitoring solutions are anticipated to provide the highest revenue throughout the forecasted period.

The key driver of the sub-growth is anticipated to be the growing deployment of transaction monitoring systems by different financial institutions to reduce the risk of money laundering. The enduse industries include the IT and telecommunications segment, healthcare, the BFSI sector, transportation and logistics, manufacturing, the defence and government sector, retail, the energy and utilities sector, and others. The BFSI is anticipated to dominate the subsegment over the projection period. Money-related fraud should decline as anti-money laundering (AML) technology usage increases in the financial services sector.

## Prototype Selection

### 1. Feasibility

This project can be developed and deployed within a year as SaaS (Software as a Service) to use.

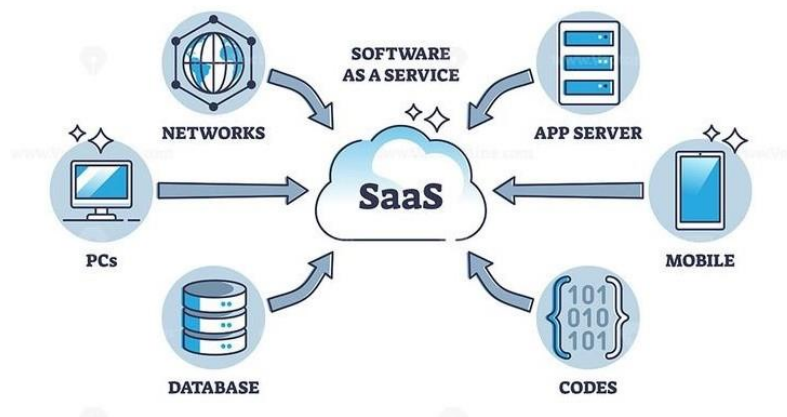
### 2. Viability

Anti-money laundering (AML) software refers to a solution, which enables banks and other financial institutions to monitor customer behaviour for suspected criminal financial activities through automated processes. Increase in the volume of global transactions has increased the deployment of AML solutions in banks and other financial institutions.

So, it is going to survive in long term future and important factor to keep in mind that the most successful business models are dynamic and repeatedly evolving.

### 3. Monetization

This service is directly monetizable as it can be directly released as a service on completion which can be used by Banking and other Financial Institutes



## Product Development

### 1. Input Behavioural and Profile Data

The first step of AML screening is to collect and organize the customer/transaction data. The transaction details, KYC, or other customer activities are collected. This process is usually fulfilled by the financial institutions. The data is then fed to AML software.

### 2. Analyse Transactions

In this Phase we analyse the transactions on the given data and try to identify if a transaction possesses some risk. The model makes a decision based on the above conditions which include Money Laundering risk, Fraud Risk, Financial Crime Risk and Known Offender Risk. So, to sum up this phase, the software does the following functions: AML monitoring and Screening, Fraud Monitoring and Backlist Screening

### 3. Manage Customer Risk

From the above phase, we get a clear understanding if the transaction possesses a risk or not. If the transaction is valid, then the software allows to transaction to proceed. If the transaction is flagged as fraud, then the transaction is blocked and given to a compliance officer for further screening. The model then can learn from the previous decisions to improve the accuracy of the model.



# Business Modelling

## SaaS Business Model

Software as a Service, or SaaS, is a business model where software is centrally hosted and housed on a cloud infrastructure. The use of the programme requires a membership charge from the user. Software as a Service Model will be utilised for business modelling because the project will be implemented on cloud infrastructure. Instead of paying a one-time charge, the SaaS business model enables subscribers and other clients to utilise the product with an annual or monthly subscription. This kind of pricing structure enables startups and other SaaS companies to produce monthly recurring revenue while concentrating on new features, new products, improved service, and other advantages that provide lifetime value to both new and existing consumers. There are certainly other inventive approaches to the SaaS pricing strategy as well as unique methods to expand the client base and improve cash flow, but subscription-based income undoubtedly still forms the basis of most SaaS business models. To raise money, SaaS firms may also charge more for continuing support or premium onboarding and offer services.

The worldwide anti-money laundering software market was valued at \$868.0 million in 2017 and is anticipated to reach \$1.77 billion by 2023, according to a recent market intelligence research by BIS Research titled "Global Anti-Money Laundering (AML) Software Market - Analysis and Forecast, 2018-2023". The AML software market in India, which made up around 4.09% of the worldwide market in 2017, is anticipated to increase at a CAGR of 15.71% over the projected period to reach \$86.7 million by 2023. (2018-2023).

In India, 9,600,000 reports of cash transactions were recorded between 2013 and 2014.

"The application of analytics and machine learning in AML is driving the acceptance of anti-money laundering software in the crypto currency sector and emerging economies," claims Yash Agrawal, Analyst at BIS Research. For financial institutions, anti-money laundering (AML) software as a service (SaaS) solutions are progressing. Data recently collated on more than 3,000 AML transaction monitoring systems in use in the U.S. revealed that more than half are implemented off-premise, according to research company Celent's study from 2019. The cloud hosts around two thirds of the off-premise systems. As a result, SaaS accounted for 34% of all AML transaction monitoring systems in use

in 2019. Gartner forecasts that global end-user expenditure on SaaS will reach \$117.7 billion in 2021, up 16% from 2020, thus we anticipate that this amount will rise.

## Financial Equation

### Cost Estimation:

#### 1. Employees salary

AML KYC Analyst salary in India ranges between ₹ 2.5 Lakhs to ₹ 6.5 Lakhs with an average annual salary of ₹ 3.9 Lakhs. AML KYC Analyst salary in India with less than 1 year of experience to 6 years ranges from ₹ 2.5 Lakhs to ₹ 6.5 Lakhs with an average annual salary of ₹ 3.9 Lakhs based on 263 salaries.

Estimated Take Home Salary ₹ 28,513 - ₹ 29,875/month

### Team Hiring Cost:

#### 1. Software developer

Software Developer salary in India ranges between ₹ 2.2 Lakhs to ₹ 13.4 Lakhs with an average annual salary of ₹ 5.1 Lakhs. Salary estimates are based on 120.4k salaries received from Software Developers.

Estimated Take Home Salary ₹ 38,150 - ₹ 39,343/month

#### 2. ML Engineer

Machine Learning Engineer salary in India ranges between ₹ 3.5 Lakhs to ₹ 21.8 Lakhs with an average annual salary of ₹ 7.5 Lakhs. Salary estimates are based on 1.4k salaries received from Machine Learning Engineers.

Estimated Take Home Salary ₹ 55,703 - ₹ 57,098/month

#### 3. Compliance officer

Compliance Officer salary in India ranges between ₹ 2.3 Lakhs to ₹ 16.0 Lakhs with an average annual salary of ₹ 5.0 Lakhs. Salary estimates are based on 799 salaries received from Compliance Officers.

Estimated Take Home Salary ₹ 37,564 - ₹ 38,765/month

#### 4. Financial Institutional Officers

Estimated Take Home Salary ₹ 13,644 - ₹ 15,094/month

Total cost for team hiring = 20.1 lakhs

An ML project roughly cost: \$8,750 to \$26,250

**Equation:**

$$y = m x(t) + c$$

**y = Total Profit**

**m = Price of Product (RS 5000)**

**x(t) = total sale as a function of time (Calculated by Forecasting the Market with respect to time)**

**c = Production cost (includes Team Hiring ,server ,software and office cost)**

## Code & Documentation

The complete code along with the dataset is available at the following GitHub Links:

Main Link:

[https://github.com/LikhithV02/Feynn\\_labs\\_internship/tree/main/AI%20Product%20Service%20Prototype%20Development%20and%20BusinessFinancial%20Modelling](https://github.com/LikhithV02/Feynn_labs_internship/tree/main/AI%20Product%20Service%20Prototype%20Development%20and%20BusinessFinancial%20Modelling)

Assignment Specific Link:

Name	Link
Dataset	<a href="https://www.kaggle.com/datasets/mlg-ulb/creditcardfraud">https://www.kaggle.com/datasets/mlg-ulb/creditcardfraud</a>
Notebook	<a href="https://github.com/LikhithV02/Feynn_labs_internship/blob/main/AI%20Product%20Service%20Prototype%20Development%20and%20BusinessFinancial%20Modelling/AI%20Product%20Service%20Prototype%20Development%20and%20BusinessFinancial%20Modelling.ipynb">https://github.com/LikhithV02/Feynn_labs_internship/blob/main/AI%20Product%20Service%20Prototype%20Development%20and%20BusinessFinancial%20Modelling/AI%20Product%20Service%20Prototype%20Development%20and%20BusinessFinancial%20Modelling.ipynb</a>

## Conclusion

On the front lines of the battle against money laundering and terrorism funding are financial institutions. To shorten the "time to value," or the time needed to complete the transaction life cycle, financial institutions must also expedite the investigation process. As a result, if financial crime is to be combated more successfully and quickly, machine learning must be included to watch-list filtering systems that track financial transactions. Machine learning algorithms have been the subject of several research and investigations, however the industry is wary about automating regulatory compliance areas due to the severe fines that might be levied if a failure happens.