Cahier des charges :

Machine Learning–Based Forecasting of Optimal Currency Exchange Timing

Lucas VULCANO

Rocío STUARDO

Vicente ABURTO

Yassine TSOULI HAZIME

S9 - DDEFI

Projet Data

Professor : Sitraka FORLER

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1. Project Identification

1.1 Team members

- Rocío STUARDO – GitHub: @rstuardoc
- Lucas VULCANO – GitHub: @LSVulcano
- Yassine TSOILI – GitHub: @hazime-y
- Vicente ABURTO – GitHub: @VichoAburto

1.2 Shared GitHub repository

https://github.com/VichoAburto/projet_data_DDEFI_2025-2026

2. Context

In a fully interconnected world, where people move easily around the globe, sending and receiving money. Before, it was obligatory to go to currency exchange offices and handle cash all the time. Now, with all the digitalization it's much easier and efficient. However, these days we try to optimize the change rate and don't waste money unnecessarily. Especially in the case of longer stays.

Just in Global FX there is an exchange of 9.6 trillion dollars per day up to April of 2025. Therefore, this market is extensive with great variability and necessary for all activities carried out by the population.

3. Problem Statement

A great amount of people trade currencies frequently due to the difference between their wage currency and spending currency. This occurs when travelling, when importing foreign goods and when studying abroad.

Many currencies are very volatile, and the difference in the exchange rate for a small time window (1 week, for example) can severely impact the money conversion. This means that, depending on the timing, an international student can get more or less Euros for the same amount of their home currency (for example), which gives unpredictability on budgets.

4. Proposed Solution

The proposed solution is based on the use of Machine Learning to analyze historical exchange rate data with some other indicators.

Solution approach:

- ❖ Collection of historical data:
  - ➢ EUR/USD exchange rate
  - ➢ Interest rates (European Union and United States)
  - ➢ Inflation rates

> ➢ Volatility Index
> ❖ Analysis of relationships between these variables
> ❖ Training of predictive models to:
>> ➢ Anticipate exchange-rate movements
>> ➢ Identify the most favorable day to convert money
> ❖ Present the prediction results in a website.

The implementation will be a program with a front-end, that will trigger the user to choose the currency they want to swap. The program will then say if the present day is good or not for exchanging currencies.

The answer will be based on machine learning that used parameters such as past exchange rates, interest rates and expected inflation - combined with the current version of this data - to say if the current exchange rate seems very favorable, favorable, indifferent, bad or very bad.

This will give users an idea if they should or should not immediately exchange their money, which helps them get a better value for their money.

5. Project Objectives

- Offer people a prediction of the best day on which they can exchange their currency for euros.

- Optimize currency exchange costs by seeking the lowest rate

- Create an API that automatically offers predictions based on the current market

6. Implementation Plan

1st — Selection and collection of the necessary data for 1 currency pair (ex.: USD/EUR)

2nd — Checking the data conformity, if it is complete and with no abnormalities

3rd — Data cleaning and standardization

4th — Preparation of the machine learning model, training

5th — Backtest to check results, restructure the model if needed

6th — Frontend development and connection with backend

7th — Checking in entire system works

8th —Start working on other currency pairs