Anexo I. Registro del Título del Trabajo Fin de Grado (TFG-BA)

NOMBRE DEL ALUMNO: Elena Conderana Medem

PROGRAMA: Business Analytics GRUPO:GITT+BA FECHA: 22/10/2024

Director Asignado: Coronado Vaca, María
Apellidos Nombre

Título provisional del TFG-BA:

ANALYSING THE IMPACT OF APPLYING LARGE LANGUAGE MODELS IN STOCK PRICE PREDICTION.

ADJUNTAR PROPUESTA (máximo 2 páginas: objetivo, bibliografía, metodología e índice preliminares)

Firma del estudiante: ECM

Fecha: 22/10/2024

I. Objectives

Predicting stock prices is no easy task due to their volatile nature and the variety of factors impacting their price. The most widely used method to predict stock price movements is technical analysis, which makes future predictions based on historical market data. Since the results of technical analysis are usually lacking, this bachelor thesis aims to improve said results through the inclusion of an additional factor, sentiment analysis of news headlines. The following objectives are necessary to accomplish the final goal of the thesis.

- Extract emotional tone, positive, negative or neutral from news headlines through Large Language Model (LLM) development
- Develop stock price prediction model based on historical data for IBEX35.
- Use sentiment analysis model alongside historical data to make predictions about stock price movements in the future
- Analyse the impact of including sentiment analysis in stock price prediction.

Every stock exchange possesses its particular features in terms of the companies it englobes, the amount of them and their locations among others. For that matter, the thesis will study the impact of sentiment analysis of news headlines on the IBEX35 stocks' price prediction. The reason being that different studies show that models that perform well on certain markets, do not adjust well to others (KR23).

II. Methodology

The whole project is structured in four main steps. The first one consists of familiarizing myself with the theme, researching and getting a clear picture of what tools and data sources I will be using.

The second and third step can be parallelized. The former consists of developing a LLM to perform sentiment analysis of news headlines, while the third step comprehends the development of a model that manages to predict future stock price movements based on historical data. Both steps need to go through a testing phase before moving forward.

The last step is to include the sentiment analysis in the stock price prediction model and analyse whether there is a significant impact on the predictive capacity of the model compared to the model solely based on historical data.

III. Proposed Index:

1. Introduction
2. Background
    - Current research
    - Motivation
    - Project objectives
3. Dataset aggregation
    - Stock prices
    - News headlines
4. Software Implementations
    - LLM Sentiment Analysis
    - Stock Price Prediction
    - Stock Price Prediction based on Sentiment Analysis
5. Results
6. Conclusions and Outlook
7. Bibliography

IV. Bibliography:

The main bibliography to familiarize myself with the theme of the thesis are the research papers provided by my supervisor. These mainly focus on different NLP and machine learning models used to measure the impact of applying sentiment analysis to stock price prediction.

- [KR23] Laura Karimova and Sabina Rakhmetulayeva. Application of the algorithm for analyzing stock prices based on sentiment analysis. 2023 IEEE International Conference on Smart Information Systems and Technologies (SIST), pages 214–220, 2023.
- [PB23] Karlo Puh and Marina Bagi´c Babac. Predicting stock market using natural language processing. American Journal of Business, 38:41–61, 2023
- [FZ24] Kui Fu and Yanbin Zhang. Incorporating multi-source market sentiment and price data for stock price prediction. Mathematics, 12(10):1572, 2024
- [AR23] Matin N. Ashtiani and Bijan Raahemi. News-based intelligent prediction of financial markets using text mining and machine learning: A systematic literature review. Expert Systems with Applications, 217:119509, 2023.
- [DYWFM23] Siska Putri Denanti, Irni Yunita, Tri Widarmanti, and José Manuel Ferreira Machado. The correlation of headline news sentiment and stock return during dividend period. IEEE, pages 1–6, 2023