FINANCIAL ANALYSIS AND RISK MITIGATION USING DECISION TREE MODELS

AN

MSc. DATA SCIENCE RESEARCH PROPOSAL

BY

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Introduction

1.1 Context of the Study

Analyzing financial market data is a major aspect in identifying operational and systematic risk that gives a better understanding of managing and mitigating uncertainty in investments. The advent of Artificial Intelligence (AI) and Machine Learning (ML) have made the automation of complex data and narrow difficult tasks much easier. A study by (Financial Stability Board, 2017) states that Computational systems using Machine Learning and Artificial intelligence (AI) are being used in several financial markets and industries. Therefore, it is very vital to adopt the use of such applications in managing the stability and monitoring the financial implication of the services rendered in financial industries. The analysis and development would imperative and thoroughly monitored because of the rapid evolvement of the technology used and the nature of the data. With the classification of data in an attempt to evaluate and forecast the financial market has significantly impacted and added value to society and allowed individuals to venture into a lucrative business with little calculated risks. After carefully studying the data mining algorithm techniques Cart Algorithm will be adopted which is a supervised algorithm technique that uses information gain to segment data during decision tree generation. As stated by (Rutkowski, Jaworski, Pietruczuk, & Duda, 2014) Cart algorithm is the most popular algorithm in terms of data mining and decision trees. It plays an important role in the classification of data with high accuracy in a timely processing period and determines the best attribute.

1.2 Statement of the Problem

It has been a major challenge in the absence of computational methods for investors to determine the market rate and return on investment while measuring the risk involved in decision making. This has contributed a lot to depreciation in the financial markets and running businesses at loss. There have been increasing number of investments during Corona Virus Outbreak in Nigeria facing high financial risk due to reduction in productivity and slowing down global market trading. This resulted in the closure of many business enterprises as a result of insufficient funds and creativity to reshape their scope thereby diversifying into a modern financial investment that connects buyers and sellers in an Online Platform for a seamless transaction. As stated by (Cavalcante,

Brasileiro, Souza, Nobrega, & Oliveira, 2016) states that modernizing financial markets will add to economic and business enterprises as it plays a crucial part in global trading. However, the lack of adequate risk analysis of the Nigerian Financial Market remains a major discrepancy that leads to poor business analysis and loss of profits. In this kind of modern organization with available information, traders will have the chance to make an effective financial analysis that will yield valuable assets. Furthermore, this will ease the use of computational systems and create a seamless financial transaction.

1.3 Aim and Objectives

The main objective of this research is to analyze the financial market and building a model to measure risk and forecast the future. Data Mining algorithm and sensitivity analysis will be used as a modeling and framework that includes cart algorithm and create a quantitative model. The utilization of data mining algorithms will contribute to the increment of market value and generate more income. Moreover, the with help of cart algorithm techniques and scenario and sensitivity analysis Individuals and organizations can foresee financial threats and opportunities, thereby come up with a unique and distinctive idea that will enable them to prepare budgets and forecasts. In addition, it enables companies and individuals to diversify into new investments and generate more profit with minimal risk. According to (Zhang & Zhou, 2004) states that with the modernization of global trading and rapid advancement of computational systems, there is a need in revamping the large usage of financial data that is being generated in business sectors and financial enterprises for decision making and strategic planning.

1.4 Scope of the Study

The proposed system will adopt scenario and sensitivity analysis in measuring risk and evaluation of the Nigerian financial market in an attempt to predict the future. This helps in determining the worst-case or best-case in financial market industries. Cart algorithm will be used as a data mining technique in classifying and predicting the class of data. With the role of data mining algorithm and sensitivity analysis relative information will be fetched online and generate global stock market data. Thereby building a model to identify the core problems of the current market state while segmenting it into clusters and comparing the results for budgeting and forecasting the

financial markets. This will create a solution to test the inefficiency of the markets and the risk involved. Hence providing efficient and effective solutions to it. According to (Borgonovo & Plischke, 2016) Scenario and Sensitivity analysis play a vital role in quantitative modeling and building structure in planning and forecasting the financial markets. This is could be achieved using goal seek and data table. Several business problems require modeling input to value the financial market so as to evaluate and forecast the future.

1.5 Significance of the Study

A series of experiments such as cart algorithm as part data mining technique and scenario and sensitivity analysis will be used to document the market hypothesis in planning and managing risk related to financial markets with a positive return on investment. The concept of cart algorithm and sensitivity analysis will be validated in classifying a large group of a dataset into clusters and performing scenario by creating a model that will transform them into useful information and patterns. A study by (Ogiela & Ogiela, 2015) stated that the execution of financial data will add to the effectiveness of the result and generate an efficient solution. There will be an increment of the utilization of data analysis which will add valuable insight in managing the processes of data in ventures or financial enterprises. The data management system will be used and executed based on the evaluation of economic conditions accessible to them.

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