

Faculty of Information Technology

***Computer Science Department***

***Artificial Intellignce***

**Stock Price Prediction: Addressing the Challenge of Market Dynamics**

Graduation Project (1/2) Report

Prepared by:

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Supervisor’s Name

**To obtain**

**BSc in Computer Science/Artificial Intelligence**

Semester / Academic Year

Group No.: AI-23-1-1-**serial** (replace **serial** by group serial number)

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Middle East University

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| Declaration **إقرار الملكية** |
| Declaration  We hereby acknowledge that the work presented in this document report and the ideas based upon are the group members own unless stated otherwise and properly cited in text and referenced at the end of the document.   |  |  |  |  | | --- | --- | --- | --- | | Date | Signature | Students Name | Student ID | |  |  | Hashem Al-Ayasrah | 202010678 | |  |  | Qais Qawasmi | 201920084 | |  |  |  |  | |  |  |  |  | |
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| Supervisor Approval **موافقة المشرف** |
| **APPROVAL FOR SUBMISSION**  I certify that this project report entitled “**TITLE TO BE THE SAME AS THE FRONT COVER, CAPITAL LETTERS, BOLD**” was prepared by **STUDENT’S NAME** has met the required standard for submission in partial fulfillment of the requirements for the degree of Bachelor of Science in …………………………………. at MEU.  Approved by  Signature: ……...……..………………………..................  Supervisor: Dr…..…….…………………………………  Date: ……………..……………………………………… |
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| Abstract (English) **المستخلص (إنجليزي)** |
| **Title**  contains short, descriptive title of the proposed thesis project (should be fairly self-explanatory)  and author, institution, department, research mentor, mentor's institution, and date of delivery  **ABSTRACT**  the abstract is a brief summary of your thesis proposal  its length should not exceed ~250 words  present a brief introduction to the issue  make the key statement of your thesis  give a summary of how you want to address the issue  include a possible implication of your work, if successfully completed |
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| Abstract (Arabic) **المستخلص (عربى)** |
| **عنوان المشروع**  **المستخلص** |
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| List of Abbreviations **قائمة الاختصارات** |
| **LIST OF SYMBOLS/ABBREVIATIONS**  NLP Natural Language Processing  SA Sentiment Analysis  CNN Convolutional Neural Networks |
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| List of Abbreviations **قائمة الاختصارات** |
| **LIST OF KEYWORDS** |
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# **Chapter 1: Introduction**

* 1. Problem Statement and Purpose

Predicting stock prices is a crucial yet difficult task in the business and finance domains. Making accurate predictions can be very profitable, but it can be difficult due to the stock market's intrinsic volatility, which is affected by a variety of factors such as economic data, market mood, geopolitical events, and unanticipated outside occurrences.  
  
Due to simplistic assumptions and linear correlations, traditional forecasting approaches, which rely on quantitative models and historical data, can provide inconsistent findings. This emphasizes the requirement for more advanced, flexible prediction techniques.  
  
Artificial intelligence (AI), machine learning (ML), and big data analytics are examples of advanced technologies that present fresh chances to raise forecast accuracy. These techniques have the ability to incorporate a wider range of influencing factors, reveal subtle correlations, and find hidden patterns.

The creation of more trustworthy prediction models will have a significant impact on investors, financial institutions, and the overall economy. Precise projections of stock prices have the potential to improve investment choices, minimize hazards, and maximize resource distribution. Additionally, more accurate prediction techniques support the efficiency and stability of the financial system.  
The goal of this project is to use state-of-the-art machine learning and data analytics approaches to create a complete and successful predictive model. Our goal is to deliver actionable insights to investors and analysts by going above and beyond standard approaches. We want to advance the field of stock price prediction and provide stakeholders with the tools they need to manage the complicated financial environment of today through rigorous experimentation, validation, and analysis.

* 1. Project and Design Objectives

The main goal of this project is to use artificial neural networks to increase the accuracy of daily stock price predictions. Among the specific goals are:  
  
Creating a Predictive Model: Using a three-layer multilayer perceptron that was trained using the backpropagation algorithm, create a robust model.  
  
Including Crucial Variables: To capture a range of influences on stock price movements, identify and incorporate crucial input variables, such as technical and fundamental analytical features.  
Optimizing Model Architecture: To improve forecast accuracy and optimize the model's architecture, try out different configurations.  
Analyzing a Hybrid Approach: Determine how well a hybridized prediction approach combines technical and fundamental analytical variables.  
  
Testing and Validation: Make use of performance metrics and properly chosen datasets to carry out comprehensive testing and validation.

1.3 Intended Outcomes and Deliverables

At the conclusion of this project, the following outcomes are expected:

A complete process framework ...

Following the project's completion, the following results are anticipated:  
Finding the Most Effective Predictive Models By means of methodical testing and analysis, ascertain which models are the most reliable in predicting daily stock prices.  
  
Comparison of Model Performance: To evaluate prediction accuracy across various techniques and tactics, present test results with data that is not included in the sample.  
  
Correlation Analysis: To help with comprehension of model performance, provide visual representations showing the correlation between real and predicted stock values.  
Verification of Method: Conduct thorough testing to assess the prediction strategy's robustness and dependability.  
  
Implications for Real-World Trading: To improve traders' and investors' ability to make decisions, apply study findings to real-world trading scenarios.

1.4 Motivations

In this section, state the reasons and motivation of choosing the project, problems it is trying to solve, and the impact of your solution to society, human kind, etc.

Handling Market Uncertainty: To enhance investing methods, reduce the natural volatility and unpredictable nature of financial markets.  
  
Improving Decision-Making: Give investors insightful information to help them avoid making poor investing judgments and make more educated decisions.  
  
Enhancing Market Efficiency: Accurate stock price forecasts will help the economy as a whole as well as individual investors by encouraging economic growth and the best possible capital allocation.  
  
Encouraging Financial Access: By granting dependable access to financial data and investment prospects, you may empower people and communities.  
  
Enhancing Financial Technology: Promote knowledge and innovation while pushing the boundaries of predictive modeling in stock price prediction to further the field of financial technology (FinTech).

1.5 Report outline…

The structure of this report is organized as follows:

**Chapter 1: Introduction**: This chapter provides an overview of the problem statement, project and design objectives, intended outcomes and deliverables, motivations for the research, and the report outline.

**Chapter 2: Background**: This chapter reviews the relevant literature, discusses the complexities of stock price prediction, and introduces the proposed approach using Recurrent Neural Networks (RNNs).

**Chapter 3: Literature Review**: This chapter analyzes existing research and theories related to stock price prediction and machine learning techniques.

**Chapter 4: Dataset**: This chapter details the data sources, data collection methods, and preprocessing steps used in the study.

**Chapter 5: Methodology**: This chapter explains the research design, model development process, and the algorithms used for stock price prediction.

**Chapter 6: Results**: This chapter presents the findings from the predictive models and evaluates their performance.

**Chapter 7: Discussion**: This chapter discusses the implications of the results, the strengths and limitations of the study, and potential improvements.

**Chapter 8: Conclusion**: This chapter summarizes the research outcomes, highlights the contributions of the study, and suggests directions for future research.

# **Chapter 2: Background**

Any background and related information help reader understand the document.

Traditionally, stock prediction was difficult due to limited data analysis methods.

Machine learning offers some prediction ability, but deep learning has become increasingly popular.

This paper focuses on CNNs, a type of deep learning

While Recurrent Neural Networks (RNNs) might seem more fitting for time series data like stock prices, they can suffer from vanishing gradients.

The purpose of this paper is to use recurrent neural networks (RNNs) to predict stock prices.

Companies and investors can do business on the stock market. Because stock prices fluctuate frequently, it is difficult to predict them.

While human approaches were used in the past for prediction, this study suggests an automated solution based on RNNs.

RNNs are used because they work well for time series analysis and can accurately depict intricate aspects. The study will go over relevant research, the suggested approach, findings, and potential next steps.

# **Chapter 3 – Literature Review**

A good related work section should include works ...

‣ If they address the central problem

‣ If they address a related problem

‣ If they identified the problem

‣ If they use the same methodology for a similar problem

‣ If your work was inspired by them

Ideally, ends with the conclusion that the present work is needed.

# **Chapter 4 – Dataset**

Data selection, description, collection, pre-processing and usage.

# **Chapter 5 – Methodology**

This section contains an overall description of your approach, materials, and procedures

What methods will be used?

How data is collected and analyzed?

What materials will be used?

Include calculations, technique, procedure, equipment, and calibration graphs

Detail limitations, assumptions, and range of validity

Citations should be limited to data sources and more complete descriptions of procedures

Do not include results and discussion of results here

# **Chapter 6 – Results (if any)**

Provide the results objectively without interpretation

# **Chapter 7 – Discussion (if results provided)**

Interpret the results and their impact

Implications of Research

Link the results with the related studies listed in Chapter Three (Literature Review)

What new knowledge will the proposed project produce that we do not already know?

Why is it worth knowing, what are the major implications?

# **Chapter 8 – Conclusion**

8.1 Summary: summary of the work done including results, contributions, and major findings.

8.2 Limitations: What are limitations and obstacles faced during the project.

8.3 Future work: Suggest either what is the plan for project 2, or how other students can carry on based on your work.

# **REFERENCES**

Cite all ideas, concepts, text, data that are not your own **in the document**

If you make a statement, back it up with your own data or a reference

All references cited in the text must be listed **here**

Do not use footnotes

Citation format: Harvard [Numbers]

References:

[1] Ajibade, O. J., & Atayero, A. A. (2021). Stock Price Prediction using Neural Network with Hybridized Approach.

[2] Alhaji, S. A., & Tahir, I. M. (2018). Predicting Stock Market Price using Artificial Neural Network: An Empirical Study of Nigerian Stock Exchange Market.

[3] Khandagale, R. B., & Shelke, R. R. (2016). Stock Market Prediction Using Artificial Neural Network.

[4] Wang, S., Wan, Y., & Su, J. (2022). Deep Learning-based Stock Price Prediction Model Using Sentiment Analysis.

# **APPENDICES**