



# International Stock Index Prediction Using Artificial Neural Network (ANN) And Python Programming

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**Abstract:** The stock market is one of the best channels for financial development that requires a high accuracy prediction of the trades. This subject needs some technical skills and experience to achieve the best result. This paper represents a tuned Python console program based on the Neural Network (NN), and the Artificial Intelligence (AI) to predict future price in a qualified and quantized way with high accuracy and close to real. New ideas implemented in this paper are combining AI and NN model in the Python console system with a security shell that works with voice and PIN to authenticate the user. It has Cross-Platform capability and supports cryptocurrencies price and their predictions. This program enables the user to have a duplication of the final data in his/her given email. The proposed approach presents the influence of AI and Machine learning in nearly future predictions. This system can be used in the all kinds of subjects that include past time databases.

**Index Terms – Neural Network, Cross-platform capability, Authenticate.**

## I. INTRODUCTION

The study centers on the development and deployment of a sophisticated Python console program tailored for stock market prediction, recognizing the pivotal role of accurate trade forecasts in fostering financial development. Emphasizing the need for technical proficiency and experience in navigating the complexities of stock market analysis, the study introduces an innovative approach integrating Neural Networks (NN) and Artificial Intelligence (AI) to enhance prediction accuracy. This tuned program aims to predict future stock prices with high precision and realism, leveraging AI and NN models within a secure environment facilitated by voice and PIN authentication. Notably, the program boasts cross-platform compatibility, supporting predictions for both traditional stocks and cryptocurrencies, while also enabling users to receive duplicate data via email for enhanced accessibility. By showcasing the potential impact of AI and machine learning on predictive modeling, the study underscores broader implications for future predictions across diverse domains, highlighting the transformative power of advanced technologies in financial forecasting.

## II. PROBLEM STATEMENT

In retail industry ensuring stock availability is crucial for customer satisfaction. This project introduces an innovative solution for automated on shelf stock monitoring by Graph Convolution Network (GCN) fundamental algorithm as framework. This particular system will combine computer vision techniques to capture real time shelf images and employees GCN to process the visual data efficiently. Through graph based representation of store shelves and products, the GCN algorithm will analyse the items and their availability status. This project includes in data collection, image preprocessing, object detection. The application of GCN is used to construct a dynamic graph that capture items. This algorithm's ability to model complex dependencies within the shelf inventory facilitates accurate stock availability. Alerts are generated when low stock or out of stock situations are detected. By this the corrective actions will be done such as restocking or reorganizing the shelves etc. A GCN is a type of neural network designed for processing and analyzing data represented as graphs. Graphs are mathematical structures that consist of nodes connected by edges. The Utilization of GCN algorithm for this purpose will demonstrate the potential of graph based deep learning technique in solving the real world challenges.

## III. OBJECTIVE

The project aims to develop a sophisticated prediction model leveraging Neural Network (NN) and Artificial Intelligence (AI) technologies to accurately forecast future stock prices. By addressing the complexities inherent in stock market dynamics, including rapid price fluctuations and the influence of cryptocurrencies, the objective is to provide traders with intelligent systems capable of analyzing vast datasets, recognizing patterns, and making informed predictions. Through the development of a dynamic Python console program, users will have access to real-time predictions, empowered to adjust parameters and make timely decisions. Security measures such as voice and PIN authentication will ensure data privacy, while cross-platform compatibility will enhance accessibility. The project also seeks to demonstrate the practical utility of AI and NN integration in financial forecasting, offering quantitative predictions that inspire confidence and inform trading strategies. Ultimately, the

project aims to showcase the effectiveness of advanced technologies in enhancing prediction accuracy and supporting informed decision-making in stock trading contexts, with a view towards ongoing refinement and improvement.

#### IV. SCOPE OF THE PROJECT

The scope of the project entails the development and implementation of a sophisticated prediction model for stock market analysis, leveraging Neural Network (NN) and Artificial Intelligence (AI) technologies. This involves designing and integrating advanced algorithms within a Python console program to analyze historical data, recognize patterns, and predict future stock prices accurately. Security features such as voice and PIN authentication will be implemented to safeguard user data, while ensuring cross-platform compatibility for accessibility across different operating systems.

#### V. LITERATURE REVIEW

##### Prediction of Stock Price Based on LSTM Neural Network.

This study, based on the demand for stock price prediction and the practical problems it faces, compared and analyzed a variety of neural network prediction methods, and finally chose LSTM (Long Short-Term Memory, LSTM) neural network. Then, through in-depth study on how to predict the stock price by the LSTM neural network optimized by MBGD algorithm, the feasibility of the method and the applicability of the model are analyzed, and finally the conclusion is drawn. It is found that historical information is very important to investors as the basis of investment decisions. Past studies have used opening and closing prices as key new predictors of financial markets, but extreme maxima and minima may provide additional information about future price behavior. Therefore, the index of three representative stocks in China's stock market are selected as the research objects, and the key data collected from them include the opening price, closing price, lowest price, highest price, date and daily trading volume. The results show that although LSTM neural network model has some limitations, such as the time lag of prediction, but with attention layer, it can predict stock prices.

#### VI. MATERIALS REQUIRED

Table 1: Software Requirements

Operating System	Windows 7 or High
Data Bases	SQ Lite
Programing Language	HTML, CSS, Java Script, Python
Tools	Vscode, W3schools

Table 2: Hardware Requirements

Processor	Intel Core Or Ryzen
Speed	2.42 GHz
HDD	120 GB
RAM	4GB (Minimum)

#### VII. SYSTEM DESIGN

##### 7.1 SYSTEM ARCHITECTURE

- The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems.
- The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems.
- The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

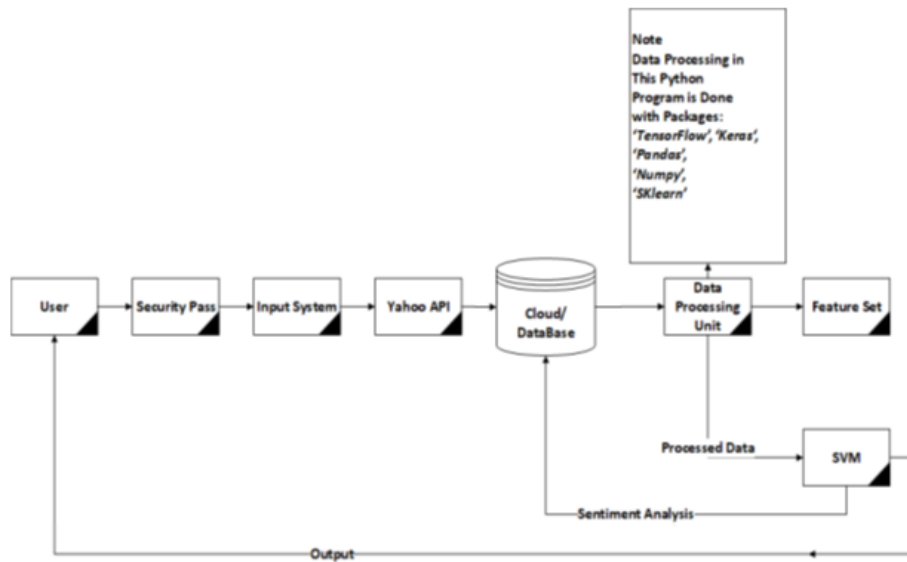


Fig – 1 System Architecture

7.1 DATA FLOW DIAGRAM

1. The DFD is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processing carried out on this data, and the output data is generated by this system.
2. The data flow diagram (DFD) is one of the most important modeling tools. It is used to model the system components. These components are the system process, the data used by the process, an external entity that interacts with the system and the information flows in the system.
3. DFD shows how the information moves through the system and how it is modified by a series of transformations. It is a graphical technique that depicts information flow and the transformations that are applied as data moves from input to output.
4. DFD is also known as bubble chart. A DFD may be used to represent a system at any level of abstraction. DFD may be partitioned into levels that represent increasing information flow and functional detail.

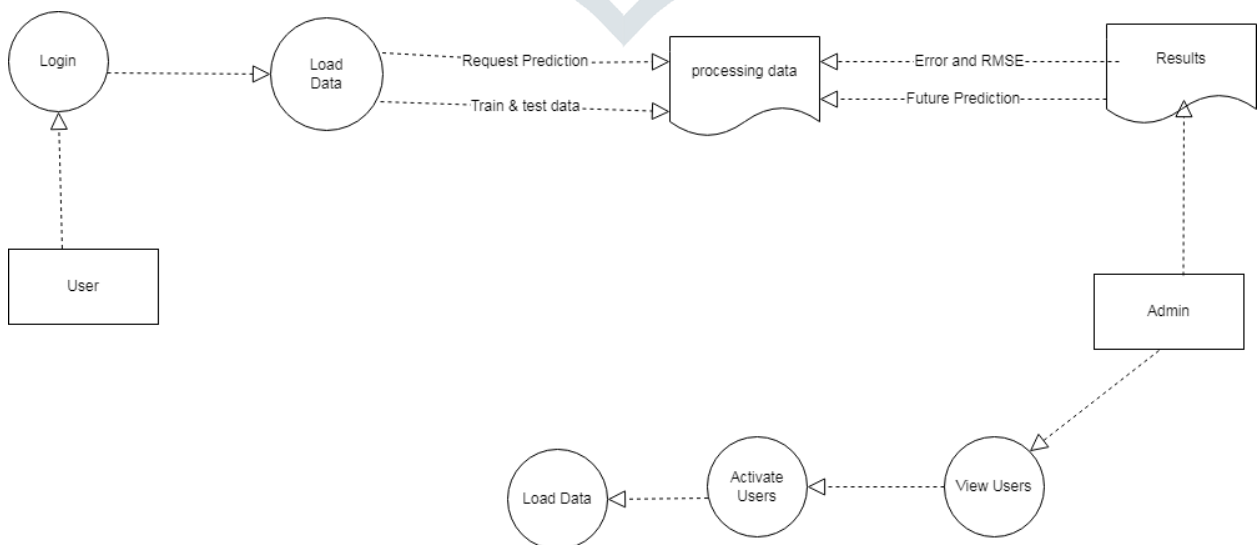


Fig – 2 Level of Flow Diagram

## VIII. UML

The Primary goals in the design of the UML are as follows:

- Provide users a ready-to-use, expressive visual modeling Language so that they can develop and exchange meaningful models
- Provide extendibility and specialization mechanisms to extend the core concepts.
- Be independent of particular programming languages and development process.
- Provide a formal basis for understanding the modeling language.
- Encourage the growth of OO tools market.
- Support higher level development concepts such as collaborations, frameworks, patterns and components.
- Integrate best practices.

## IX. PROGRAMMING CODES

The below hyperlink contains the Interactive Mode Programming code. Kindly go through.

[Interactive Mode Programming](#)

The below hyperlink contains the Project Creation Code. Kindly go through.

[Project creation Code](#)

The below hyperlink contains the Program Implementation Code. Kindly go through.

[Program Implementation Code](#)

## X. RESULTS

A dataset can be viewed as a collection of data objects, which are often also called as a records, points, vectors, patterns, events, cases, samples, observations, or entities. Data objects are described by a number of features that capture the basic characteristics of an object, such as the mass of a physical object or the time at which an event occurred, etc. Features are often called as variables, characteristics, fields, attributes, or dimensions. The data preprocessing in this forecast uses techniques like removal of noise in the data, the expulsion of missing information, modifying default values if relevant and grouping of attributes for prediction at various levels.

Based on the split criterion, the cleansed data is split into 60% training and 40% test, then the dataset is subjected to four machine learning classifiers such as ANN (Artificial Neural Network), LSTM (Long Short-Term Memory). The Stock Price Predict of the classifiers was calculated and displayed in my results. The classifier which bags up the highest accuracy could be determined as the best classifier.

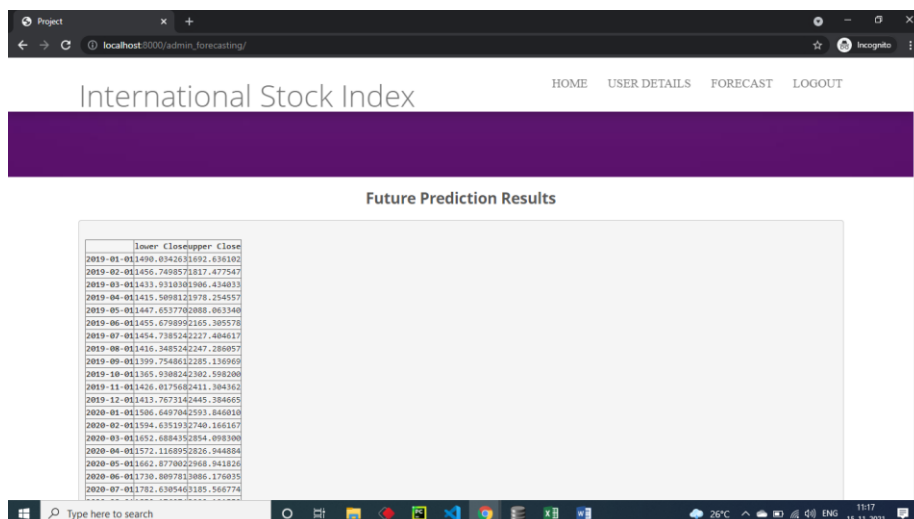


Fig – 3 Admin view of Forecast Values

## **XI. SYSTEM TESTING**

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

### **TYPES OF TESTS**

#### **Unit testing**

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

#### **Integration testing**

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

#### **System Test**

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration-oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

#### **White Box Testing**

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is used to test areas that cannot be reached from a black box level.

#### **Black Box Testing**

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box you cannot “see” into it. The test provides inputs and responds to outputs without considering how the software works.

#### **Unit Testing**

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

## **XII. CONCLUSIONS**

In this paper, for Stock Prediction based on the LSTM machine learning, the AI, Python Programming, and International Stock Market was carried out on analysis with the deep learning and AI frameworks in the Python operating system. As an experiment, the program used to predict the future price and the graph of the prediction plots in three different times for stock AMZN. In this order, the results validate the possibility and correctness of the program and the prediction. The experiment compared with the prediction that indicated with classic ways, validates the correctness of the proposed Python program. Therefore, this method can be extended to different applications such as financial applications and educational applications.

The innovation of this paper can be summarized in 7 aspects:

- (1) The proposed program can predict the price of cryptocurrencies such as Bitcoin (BTC) and Ethereum (ETH).

- (2) The model presented in this paper is tuned with a flexible method that its accuracy increases when the user enters a wide range of data.
- (3) In this paper, the model is approved with a secure layer that called Shell Layer, thus the user should be authenticated with voice or PIN.
- (4) The proposed program has the ability to plot the candlestick graphs for the given data.
- (5) When the data is converted to information with processing, and analyzing, an Excel file with 'xlsx' format is sent to the email that the user has entered.
- (6) The Python program that is made with the paper method can be used by all kinds of users, for instance, a stock expert, or a scientific one.
- (7) The proposed program can predict all kinds of subjects that include previous numeric data such as a house, or car pricing.

#### REFERENCES

- [1] D. Wei, "Prediction of Stock Price Based on LSTM Neural Network," in 2019 International Conference on Artificial Intelligence and Advanced Manufacturing (AIAM), 2019, pp. 544-547.
- [2] M. Abdechiri, K. Faez, and H. Bahrami, "Neural network learning based on chaotic imperialist competitive algorithm," in 2010 2nd International Workshop on Intelligent Systems and Applications, 2010, pp. 1-5.
- [3] T. Mankar, T. Hotchandani, M. Madhwani, A. Chidrawar, and C. Lifna, "Stock market prediction based on social sentiments using machine learning," in 2018 International Conference on Smart City and Emerging Technology (ICSCET), 2018, pp. 1-3.
- [4] L. Sayavong, Z. Wu, and S. Chalita, "Research on Stock Price Prediction Method Based on Convolutional Neural Network," in 2019 International Conference on Virtual Reality and Intelligent Systems (ICVRIS), 2019, pp. 173-176.
- [5] M. Billah, S. Waheed, and A. Hanifa, "Stock market prediction using an improved training algorithm of neural network," in 2016 2nd International Conference on Electrical, Computer & Telecommunication Engineering (ICECTE), 2016, pp. 1-4.