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**WiDS ‘22 - ‘23 Final Documentation**

**<****28 - Stock Market Prediction using Time Series Forecasting>**

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**Introduction to Problem Statement**

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| Starting with the theoretical foundations of Python and machine learning, our trip into the stock market analysis will end with the practical application of the information to provide effective price forecasts. Stock price data is time-stamped and susceptible to stationarity, seasonality, and autocorrelation. Techniques like moving average, exponential smoothing, ARIMA, etc. may be used to model time series data. Throughout the assignment, we will work to better grasp the terminology used above before putting the ARIMA model to use to forecast and test our model. |

**Existing Resources**

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| https://github.com/shiveshcodes/Time-Series-Forecasting-Resources |

**Proposed Solution**

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| Learn the fundamentals of machine learning and Python: Learning the fundamentals of machine learning and the Python programming language is the first step.  Start by evaluating the data from the stock market to identify patterns, seasonality, and autocorrelation. |

**Methodology & Progress (Mention the work done week-wise)**

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| *Setup of Jupyter Notebook and introduction to Python essentials in Week 1.*  *Week 2: Understanding the theoretical underpinnings of Time Series Data and Machine Learning in general.*  *Week 3: Starting to develop models and become familiar with common AI/ML libraries.*  *Week 4: Finish implementing the model and become familiar with acceptable coding procedures.*  *Week 5: Project debugging and completion, as well as discussions on further learnings.* |

**Results**

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| https://github.com/Samar9664/wids-time-series.git |

**Learning Value**

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| **Learning Python programming and machine learning concepts: Develop a solid knowledge of the Python programming language and the principles of machine learning.**  **Learning to study market data will help you recognize seasonality and autocorrelation.**  **Learn about the many time series modeling strategies, including moving average, exponential smoothing, and ARIMA.**  **Gain practical experience with the ARIMA model for time series data analysis.**  **Model evaluation: The accuracy of the model may be assessed using a variety of criteria.**  **Real-world applications: Use the project's information to create stock market forecasts in practical settings.**  **Problem-solving abilities: By using several approaches to solve a real-world problem, you may hone your critical thinking and problem-solving abilities.** |

**Tech-stack Used**

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| Python  Jupyter Notebook  Anaconda  Numpy  Pandas  Matplotlib  Sckitlearn  statsmodel.api |

**Suggestions for others**

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| begin with the fundamentals: Before beginning the project, have a solid understanding of the Python programming language and machine learning principles.  Collect information: Compile a sizable stock market data set for use. The information should be time-stamped and well-organized.  Select the appropriate method: Depending on the parameters of the stock market data, choose the suitable time series modeling approach.  Try out several methods and settings to determine which model performs the best.  Analyze the model: Determine the model's correctness using a variety of metrics and make the required corrections to enhance it.  Utilize data visualization tools to visualize the project's findings and conclusions.  Consider cooperating with others to obtain fresh viewpoints and ideas to enhance the project.  Continue learning: Keep abreast with industry advancements and continue picking up new tricks and strategies. |

**Contribution by each Team Member**

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| It was an individual project and the implementation of the ARIMA model by each candidate can be found in the excel below.  https://docs.google.com/spreadsheets/d/1jtrquiuvpFIchgc6fiTetB1z2CwwHIgNHxo7xNCx6QU/edit#gid=0 |

**References and Citations**

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| *https://youtube.com/playlist?list=PLqYFiz7NM\_SMC4ZgXplbreXlRY4Jf4zBP*  *https://youtu.be/Y2khrpVo6qI*  *https://www.influxdata.com/time-series-forecasting-methods/*  *https://www.analyticsvidhya.com/blog/2020/11/stock-market-price-trend-prediction-using-time-series-forecasting/*  *https://towardsdatascience.com/time-series-forecasting-predicting-stock-prices-using-an-arima-model-2e3b3080bd70* |