**MS in Applied Data Science - Portfolio**

**Name:** Sukhad Dnyanesh Joshi

* **Course:** **IST 691 – Deep Learning in Practice**

Portfolio Optimization using Bi-directional CNN-LSTM:-

**Project Overview:**

This project focuses on optimizing stock portfolio returns using a deep learning model that combines Convolutional Neural Networks (CNN) for feature extraction and Bi-directional Long Short-Term Memory (LSTM) for time-series forecasting. An Attention Mechanism is added to further enhance the model’s predictive capability by focusing on important data patterns. The model aims to outperform traditional forecasting methods like SARIMA, especially during periods of market volatility. This project demonstrates how deep learning can be adapted for financial forecasting and investment strategy design.

Files in This Folder:

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| **File** | **Description** |
| PortfolioOptimization\_CNN\_LSTM.ipynb | Main Jupyter Notebook for model development |
| Data | Data was imported from yfinance library. Data can be seen in the notebook. |
| Images (downloadable via the ipynb) | Visualizations such as candlestick charts and model output graphs |
| README.docx (IST 691\_Walkthrough) | Project documentation (this file) |

**GitHub Repository:**

<https://github.com/SukhadJoshi/MS-ADS-Portfolio_Sukhad-Dnyanesh-Joshi>

**Software Requirements:**

* Python 3.10 or later
* Jupyter Notebook
* Libraries: pandas, numpy, tensorflow, scikit-learn, matplotlib, yfinance

**How to Review:**

1. Open PortfolioOptimization\_CNN\_LSTM.ipynb using Jupyter Notebook and any other IDE such as Visual Studio code.
2. Ensure required libraries are installed.
3. Run all cells to reproduce stock trend predictions and visualizations.