PROJECT-13

Stock Price Direction Prediction using Support Vector Machine (SVM)

Project Description: Stock Price Direction Prediction using Support Vector Machine (SVM). This project focuses on predicting the direction of stock price movement (up/down) using machine learning techniques. A Support Vector Machine (SVM) model was developed using historical stock market data and technical indicators to enhance predictive accuracy.

Tools/Technologies Used:

- Python: Programming language for data processing and model development.

- Pandas & NumPy: Data manipulation and numerical operations.

- Scikit-learn: Machine learning framework for model training and evaluation.

- Matplotlib & Seaborn: Data visualization and exploratory analysis.

Data Collection and Preprocessing:

- Collected and processed historical stock price data.

- Engineered features including technical indicators:

    o Simple Moving Average (SMA)

    o Relative Strength Index (RSI)

    o Moving Average Convergence Divergence (MACD)

- Conducted data preprocessing, normalization, and feature selection.

Model Development:

- Implemented a Support Vector Machine (SVM) classifier to predict stock price movement.

- Tuned hyperparameters using grid search and cross-validation for optimal model performance.

Model Evaluation and Performance Analysis:

- Assessed model accuracy using key evaluation metrics:

- o Precision

- o Recall

- o Confusion Matrix

- Compared different kernel functions in SVM to identify the best-performing model.

Insights and Impact:

- Developed an ML-based model for stock price direction prediction.

- Enhanced decision-making for traders by incorporating technical indicators.

- Provided a framework for further enhancements with sentiment analysis and additional market factors.

Conclusion: This project successfully demonstrates the use of machine learning for predicting stock price direction. By integrating technical indicators and hyperparameter tuning, the SVM model achieved improved accuracy. Future enhancements could include deep learning models and real-time financial data integration for more robust predictions.