

Time Series Final Project – Course Capstone

Project Overview:

For your final project, you will work on a real-world time series forecasting problem. Each of you will be assigned a unique department ID from a cleaned Walmart dataset (for those who choose the recommended dataset).

You will filter the data using your assigned department and focus on predicting Weekly Sales.

Use multi-step forecasting logic (e.g., recursive single step or/and multi step).

You are free to use your own time series dataset if you prefer, provided it has a clear timestamp and target variable — but make sure it is comparable in structure and forecasting nature.

Project Tasks:

Your project must include the following steps:

Time Series Analysis: Visualize the time series Identify and analyze trends, seasonality, and potential external regressors (e.g., temperature, holidays), Perform ACF/PACF

Exponential Smoothing Family: Try methods like Holt-Winters and Holt-Linear Trend

ARIMA Family Models: Apply and tune ARIMA, SARIMA, and SARIMAX models

Machine Learning Regressors: Train traditional regressors (e.g., Random Forest, XGBoost) with appropriate feature engineering for time series

Deep Learning Models: Apply ANN, CNN, RNN, LSTM (OR GRU)

Prophet: Use Facebook Prophet for forecasting and analyze its interpretability

Innovative Technique: Add something novel! Try a new library not covered in class (e.g., N-BEATS, Temporal Fusion Transformer) or implement an idea from a research paper. More innovation = more marks.

Evaluation & Comparison: Compare performance across all models using appropriate metrics (RMSE, MAE, MAPE, etc.) Reflect on why some models performed better than others

Deployment: Choose your best model and deploy it via one of the following: Flask API, FastAPI, Streamlit app or any other preferred method

Deliverables (Due 23 June 11:59PM):

Jupyter Notebook: Clean, well-commented, and structured. Must include all analysis, modeling, and evaluation steps

Presentation Slides: A 5–10 minute walkthrough of your modeling journey Summarize insights, challenges, and your final deployment Include visuals and performance comparisons

Good luck ya shabaab <3