2025

4Geeks Academy: data science cohort 12

DAY 26: TIME SERIES

TODO

TIME SERIES DATA

Times in Python and Pandas, forecasting

TIME SERIES PROJECT

Work on Alternative time series project (Time series module), plan to finish over the weekend

CLUSTERING PROJECT

Submit K-means Project Tutorial (Unsupervised Learning Module), if you haven't already

TOPICS

O1 TIME DATA: PYTHON & PANDAS

O2 FORECASTING

TIME DATA: PYTHON & PANDAS

WHAT

- Unix timestamp: number of second since epoch (Jan 1st, 1970 midnight UTC)
- Python time module: functions for working with time and system clock
- Python datetime() class: stores & manipulates date and time information
- Pandas Timestamp() class: optimized replacement for datetime (compatible)

- Simplifies year, month, day, etc. -> stored as attributes
 - Packages time data with common time methods (Object-Oriented Programming)
 - Handling strings vs numbers Aug. 22 is a Friday this year, but not next year
 - Other weird time-specific stuff: time zones, AM/PM vs 24 hour clock, etc.

HOW Converting strings to times (data ingest)

- Python strptime(): datetime method -> converts string to datetime object
- Pandas pd. to_datetime(): function to convert DataFrames/Series to timestamp

Both take an input format specifier - EX: 2025-08-22 is %Y-\mathbb{w}-\mathbb{d} formatted

FORECASTING

WHAT Predicting future observation(s) based on past observation(s)

Model order: input time points (6)

Forecast horizon: predicted time points (1)

Forecast origin: last input time point

HOW

Using 'standard' ML models

- 'Features': model order
- 'Label': forecast horizon

Using sequence specific models

- ARIMA: autoregressive integrated moving average great for univariate time series (future stock price based on past)
- Neural networks: RNN, LSTM, GRU (weather forecast)