Time Series Advanced Modeling

- Hunter

Quiz

- [x] What is LSTM
- [x] What is Prophet

Topics

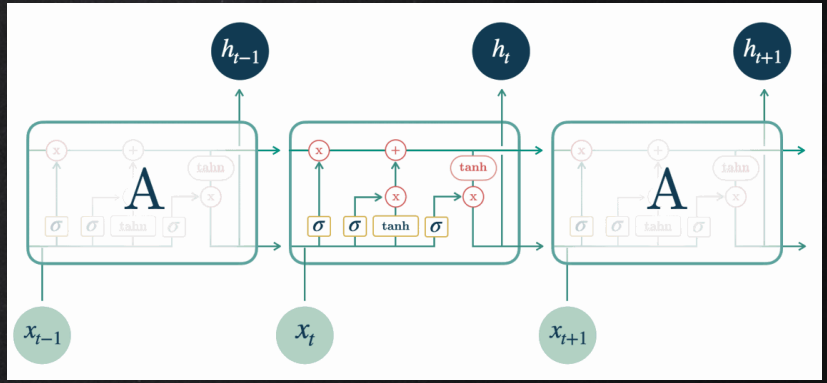
- ✗ LSTM
- ✗ Prophet

LSTM

What is LSTM

The LSTM (Long Short-Term Memory) network is a type of recurrent neural network used in deep learning

1. Use a "forget gate" to decide which information will be discarded from the current internal state. This gate is a multiplication of the input data with a matrix, transformed by a sigmoid function.
2. Use an "input gate" to define which information will be added to it. It to updates the internal state of the LSTM with new information.
3. Combine the information from the current internal state with the new information from the input series to create a new internal state.
4. Use an "output gate" to create the hidden representation to be passed to the next step based on the current internal state.
5. Then everything starts again using this hidden representation, the updated internal state and a new step of the time series.



What is LSTM

- ✗ LSTM with Window Method¶
- ✗ LSTM with Time Steps
- ✗ LSTM with Memory Between Batches
- ✗ Stacked LSTMs with Memory Between Batches

Prophet

What is Prophet

The Prophet library is an open-source library designed for making forecasts for univariate time series datasets. It is easy to use and designed to automatically find a good set of hyperparameters for the model in an effort to make skillful forecasts for data with trends and seasonal structure by default.

y(t) = g(t) + s(t) + h(t) + e(t)

here,

- ***g(t)*** *refers to trend (changes over a long period of time)*
- ***s(t)*** *refers to seasonality (periodic or short-term changes)*
- ***h(t)*** *refers to effects of holidays to the forecast*
- ***e(t)*** *refers to the unconditional changes that is specific to a business or a person or a circumstance. It is also called the error term.*
- ***y(t)*** *is the forecast.*

What is Prophet

- The Prophet() object takes arguments to configure the type of model you want, such as the type of growth, the type of seasonality, and more. By default, the model will work hard to figure out almost everything automatically.
- The fit() function takes a DataFrame of time series data. The DataFrame must have a specific format. The first column must have the name ‘ds‘ and contain the date-times. The second column must have the name ‘y‘ and contain the observations.

Recommended Readings

https://machinelearningmastery.com/how-to-develop-lstm-models-for-time-series-forecasting/

https://machinelearningmastery.com/time-series-prediction-lstm-recurrent-neural-networks-python-keras/

https://towardsdatascience.com/exploring-the-lstm-neural-network-model-for-time-series-8b7685aa8cf

https://forecastegy.com/posts/multiple-time-series-forecasting-with-lstm-in-python/

https://machinelearningmastery.com/time-series-forecasting-with-prophet-in-python/

https://facebook.github.io/prophet/

https://www.geeksforgeeks.org/time-series-analysis-using-facebook-prophet/

https://medium.com/illumination/understanding-fb-prophet-a-time-series-forecasting-algorithm-c998bc52ca10