A Practical Approach to Timeseries Forecasting using Python

- Overview of RNN Models
- Important Parameters in Forecasting
- Performance Analysis of LSTM
- Performance Analysis of Bidirectional LSTM
- Development of LSTM and Bi-LSTM Models for Time Series Forecasting

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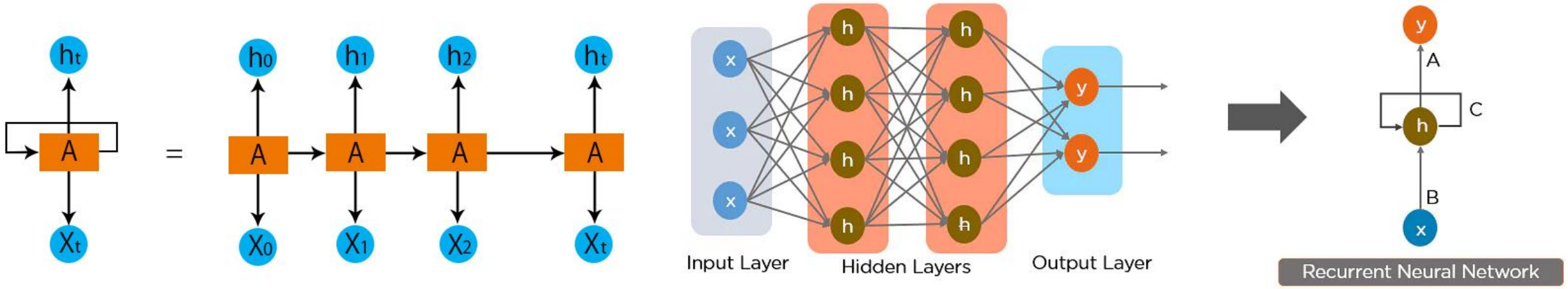
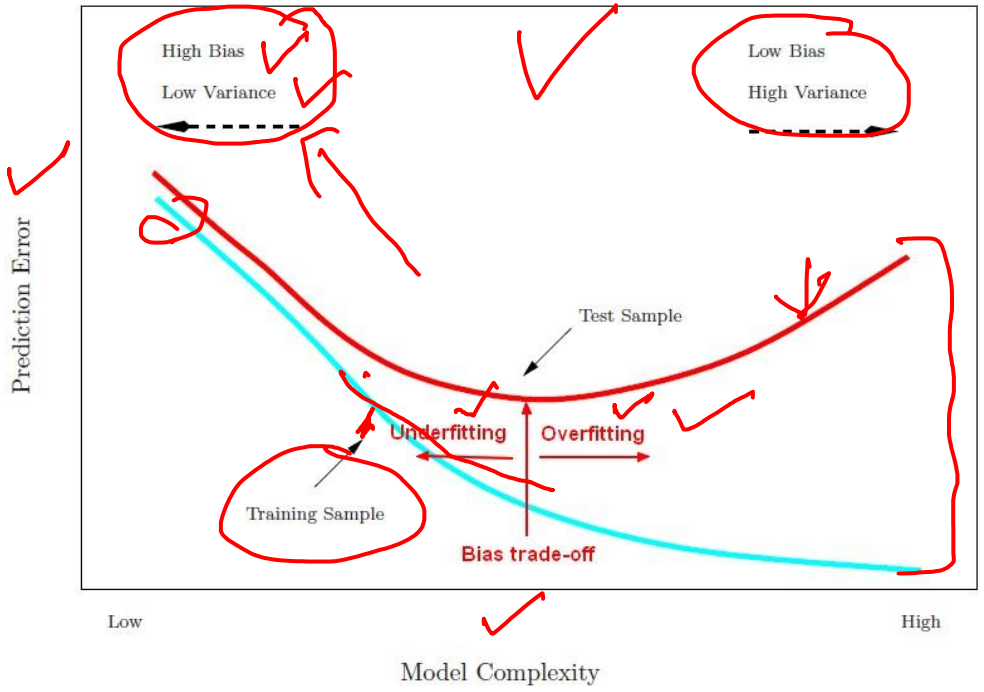
Overview of RNN Models

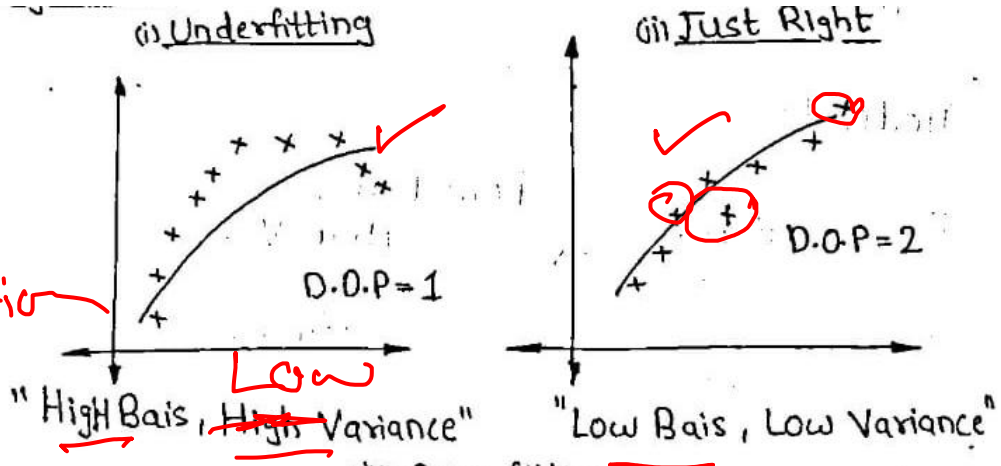
- It can handle sequence dependencies.
- RNN replaced Feed Forward Networks
- The Major Issues of RNN



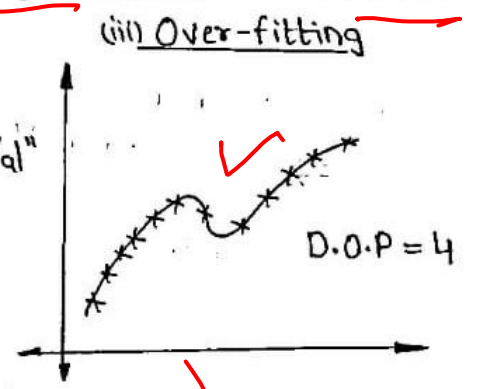
Important Parameters in Time Series Forecasting

- Bias
- Variance
- Underfitting
- Overfitting





Note:
D.O.P =
"Degree of polynomial"

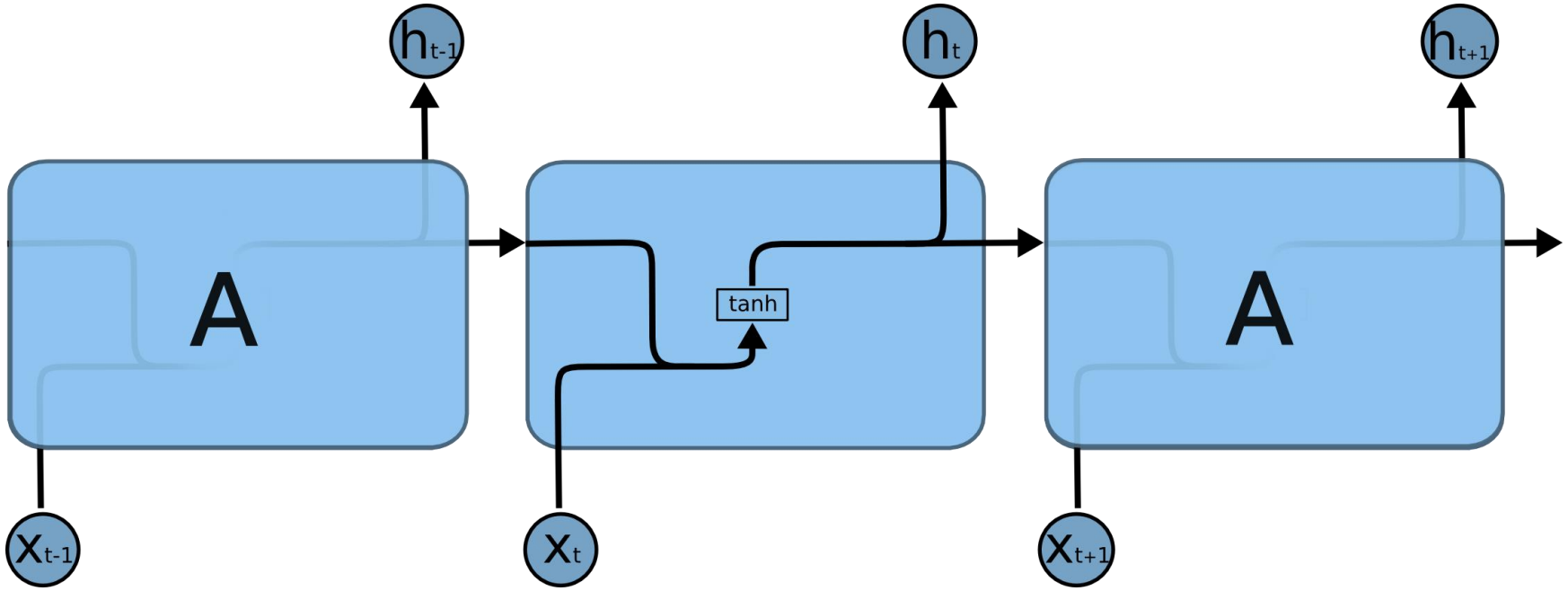


(i) Model 1 (Underfitting) : Train Accuracy ↓
Test Accuracy ↓

(ii) Model 3 (Overfitting) : Train Accuracy ↑
Test Accuracy ↓

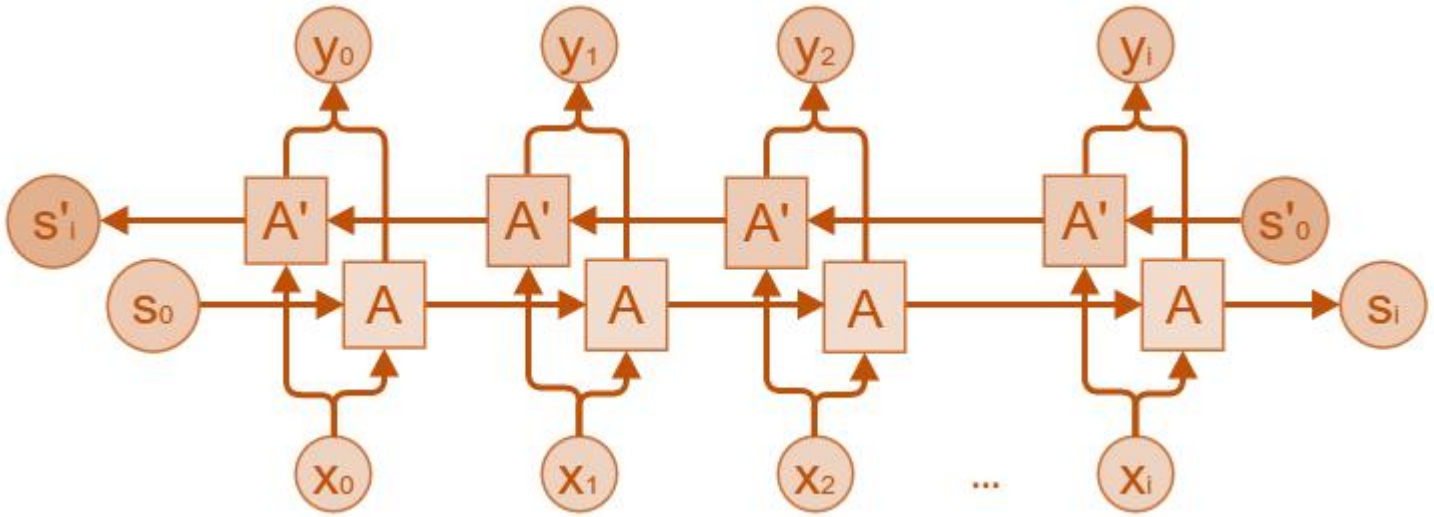
LSTM

- First, Introduced in 1997
- Designed to avoid the long-term dependency problem
- Ease of Use
- Ease of Customization



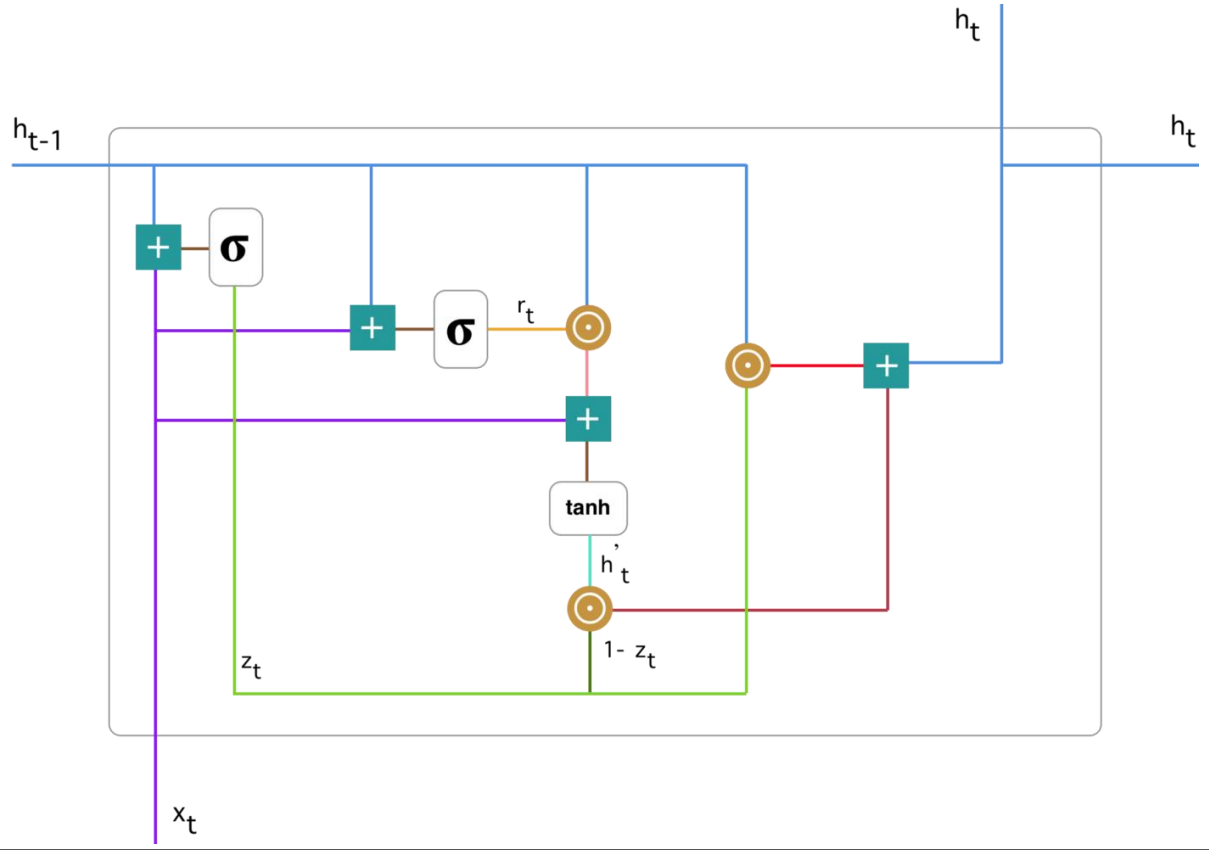
Bi-LSTM

- Two independent RNNs together
- Inputs run in two ways
- Computationally Expensive
- Not Suitable for Recognition systems



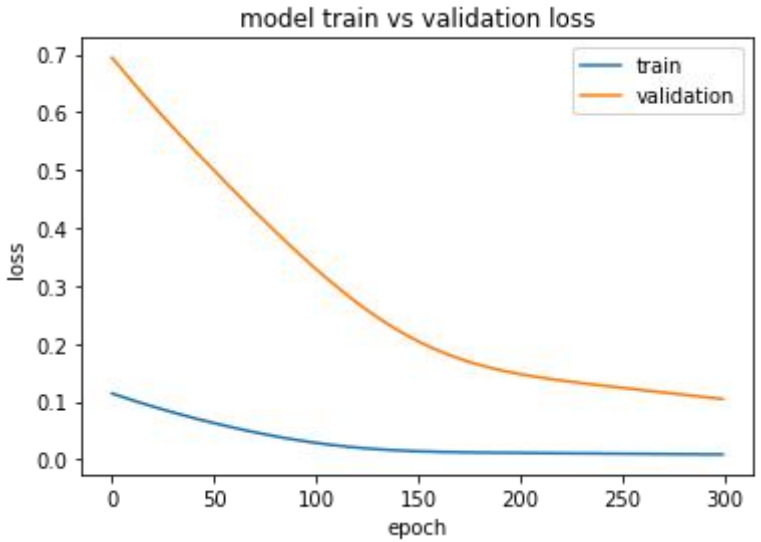
Gated Recurrent Unit (GRU)

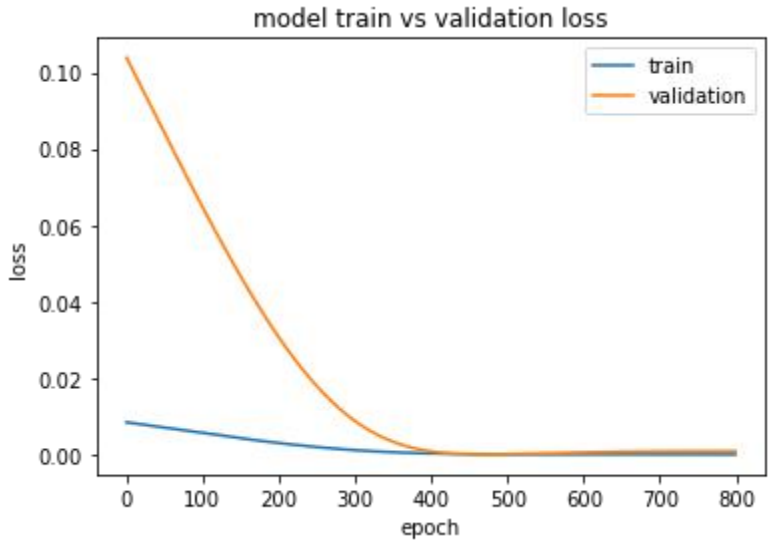
- In some cases: Better than LSTM
- Computationally Cheaper and Fast
- Has three main attributes, Update gate, Reset Gate, and current memory gate

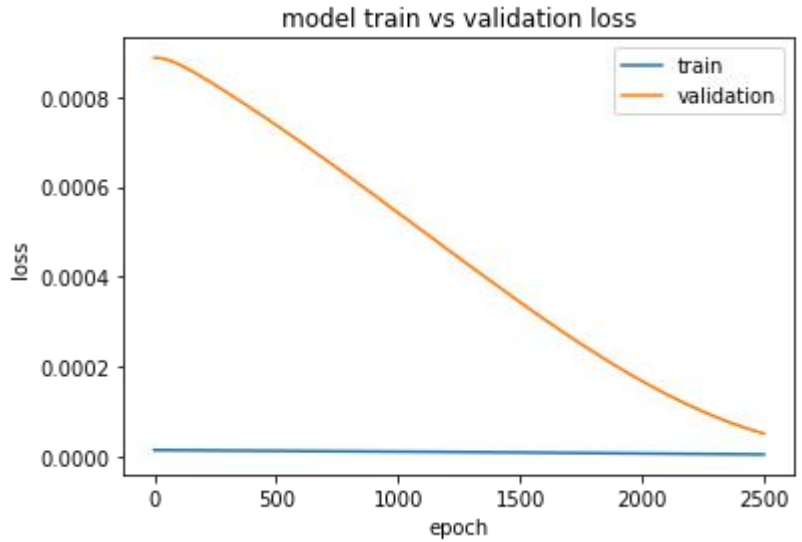


Underfitting and Overfitting

- A model may be underfit if performance on the training set is better than the validation set
- In Some cases, performance may be improved by increasing the capacity of the model







Development of LSTM and Bi-LSTM