Predicting TCP/IP network traffic using time series forecasting

Final Presentation

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RECAP

goal: forecast TCP/IP traffic

- real-time and short-time

data set

- network traffic of three months

approaches

- classical time series prediction methods
- artificial neural networks

NEURAL NETWORK APPROACH

data set preparation

- generate sequences using sliding window
- split into training, validation, and test set

neural network library

- keras
- theano

hyper parameter search

- sliding window, number of neurons, number of layers,...
- hyperopt library
- tree-structured parzen estimator

forecast error for different horizons

MLP

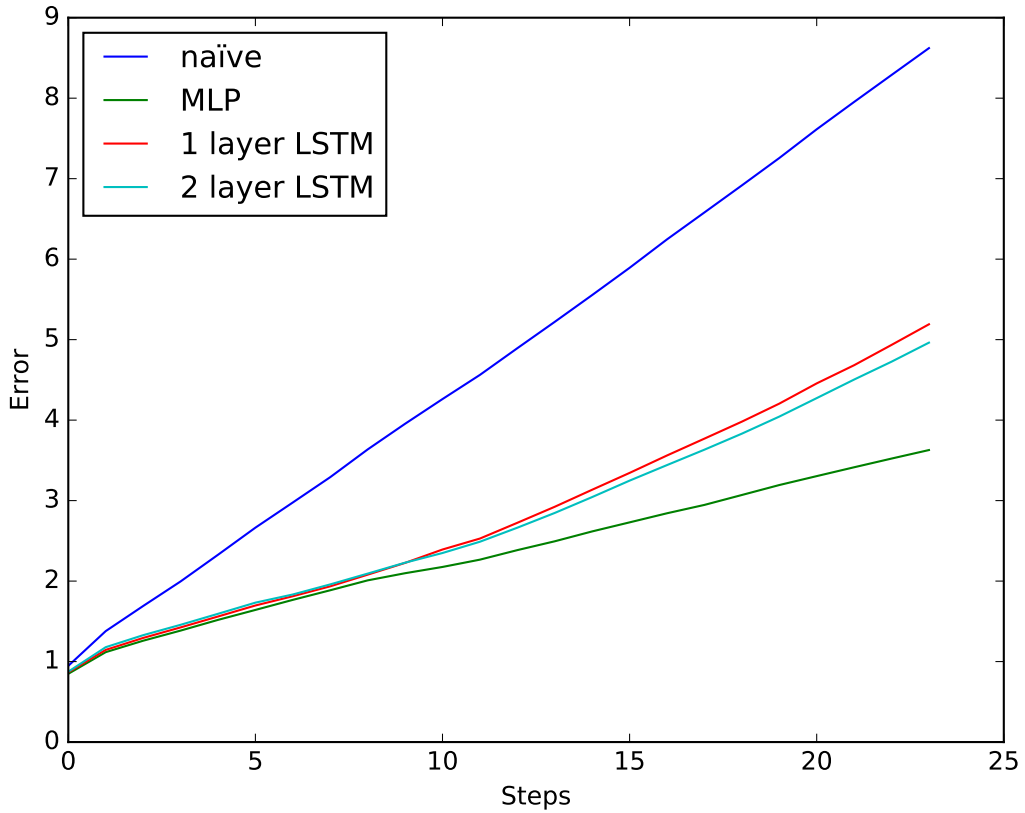
- $N = 25$
- $W = \{1, 2, 4, 8\} \cup \{287, 288, 289\}$

1 layer LSTM

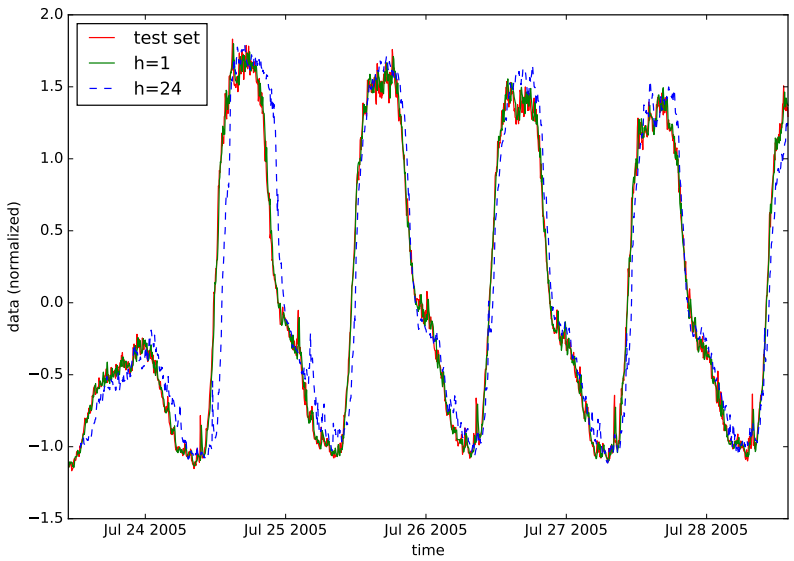
- $N = 19$
- $W = \{1, 2, \ldots, 19\}$

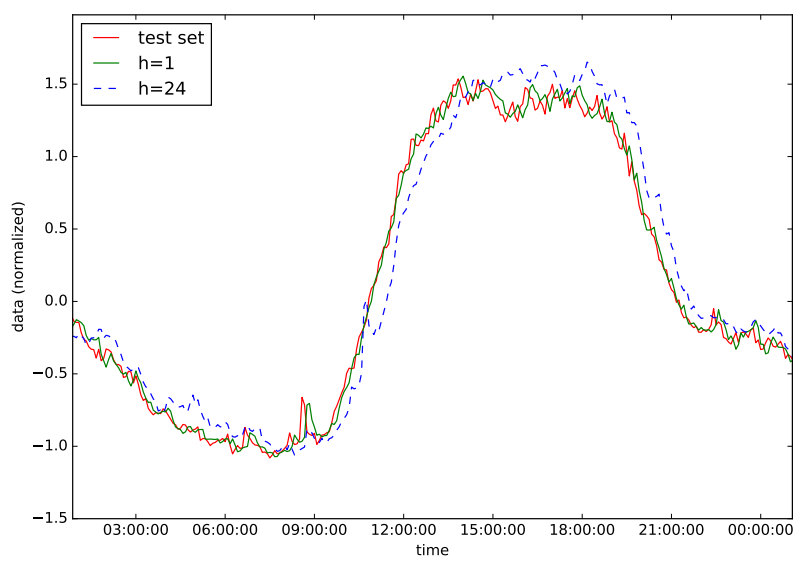
2 layer LSTM

- $N_1 = 13$
- $N_2 = 5$
- $W = \{1, 2, \ldots, 14\}$



forecasting examples with $h = 1$ and $h = 24$ using MLP





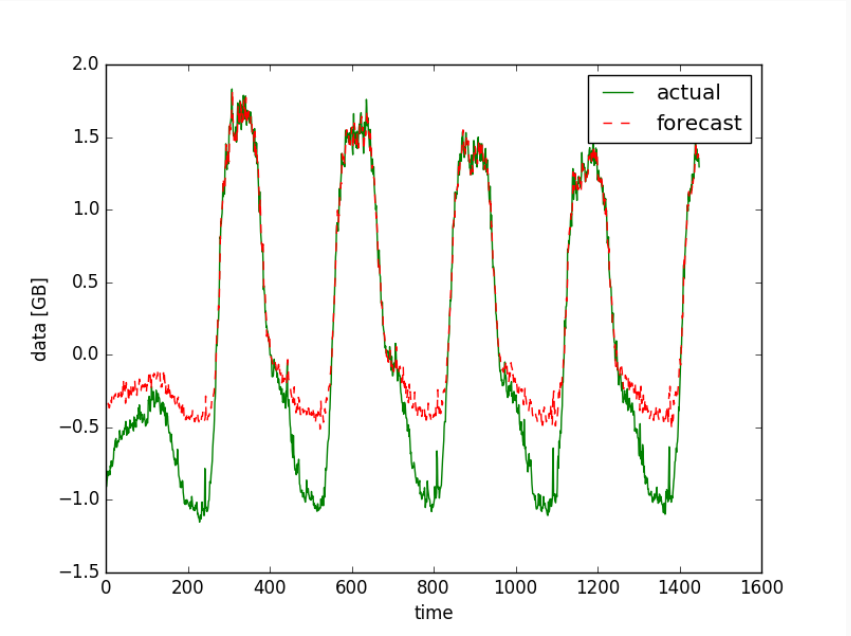
CONCLUSION

forecast horizon

- one step ahead forecasting
- direct vs. iterative forecasting

training loss function

- MSLE
- penalizes underestimates
- numerical issues



LSTM issues

- high expectations
- too few training samples
- slow

neural networks and time series

- used often for forecasting
- numerous different approaches
- problem solved?

Questions?