Predicting TCP/IP network traffic using time series forecasting

Initial Presentation

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TCP/IP networks

- telecommunication networks (e.g. WANs)
- internet: collection of networks
- crucial part of today's infrastructure
- various applications depend on it (e.g. banking, ...)

→ important to understand and forecast behaviour

Internet Service Provider (ISP)

- optimize resources
- improve quality of service

Network Security

- detecting anomalies in network traffic
- examples: DDoS attacks, spam floods
- compare observed with expected traffic
- early detection

DATA SET

Part of the Time Series Data Library

- large collection of time series data sets
- by Rob Hyndman

Data from private European ISP

- traffic passing through transatlantic link

Key Characteristics

- three different resolutions (5 minutes, hourly, and daily)
- collected between June 7th and July 31st 2005

Time Plots

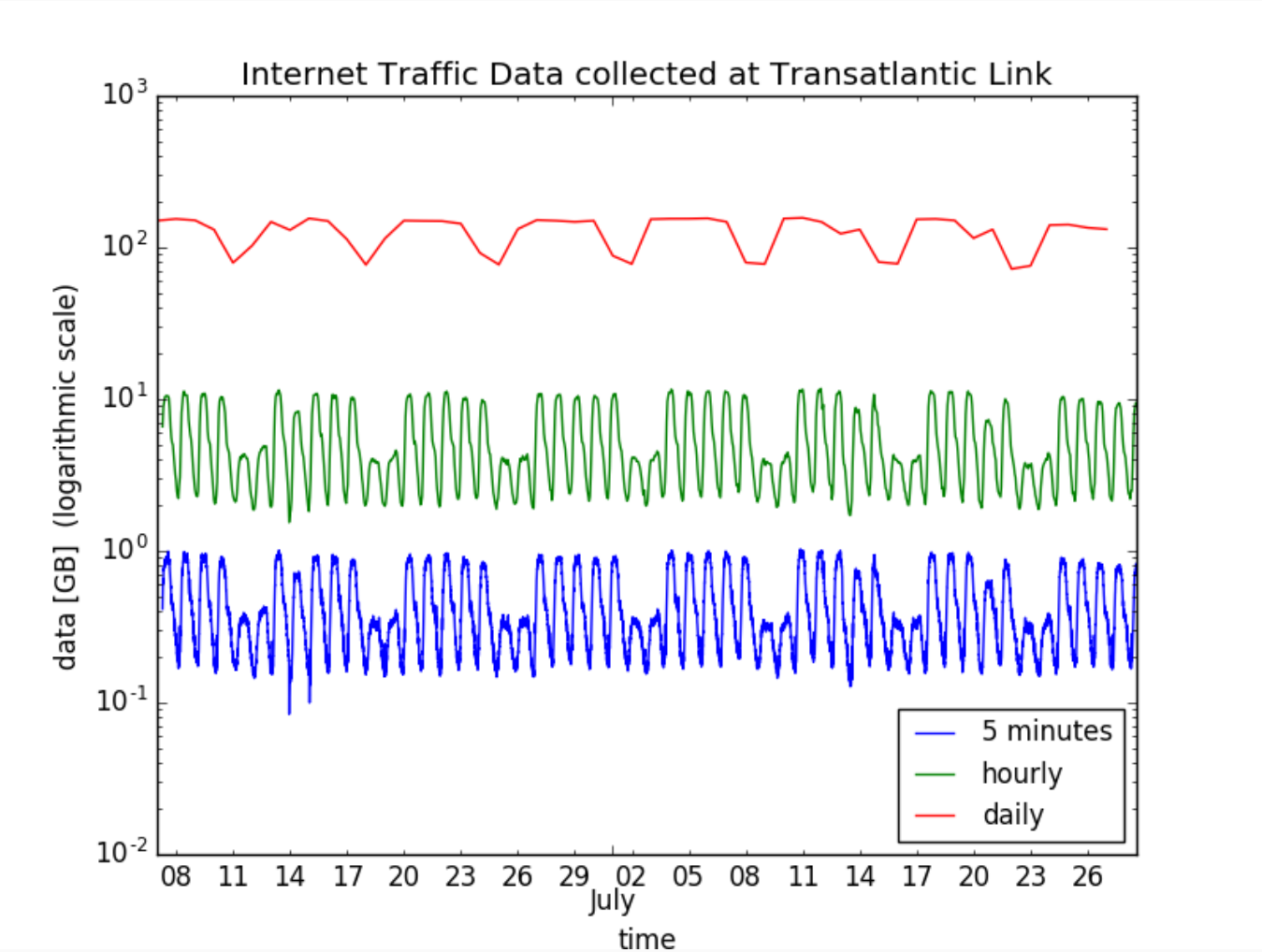

Figure 1: Time series plots of the data with different resolutions.

Weekly and Daily Patterns

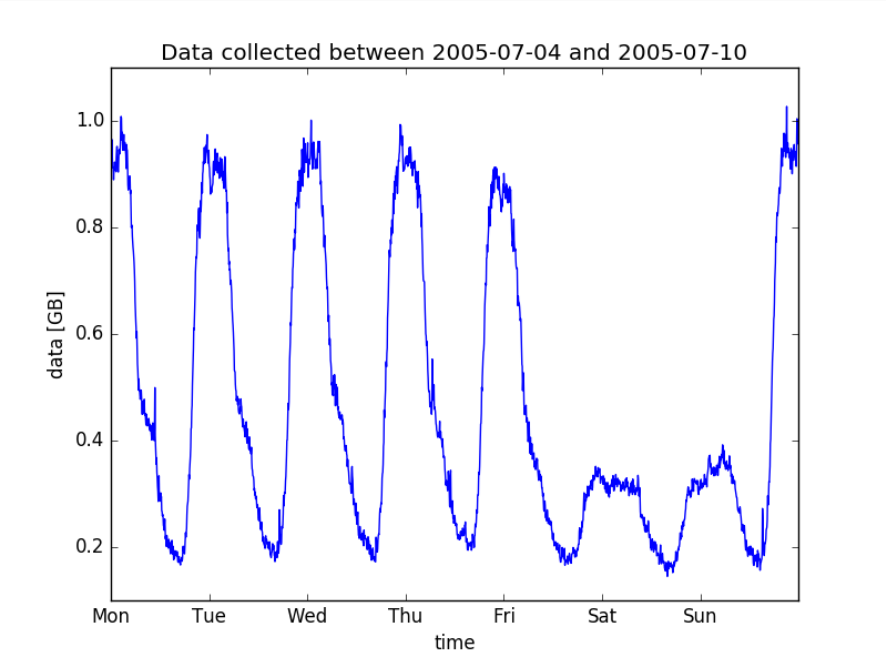

Figure 2: Exemplary pattern of a single week.

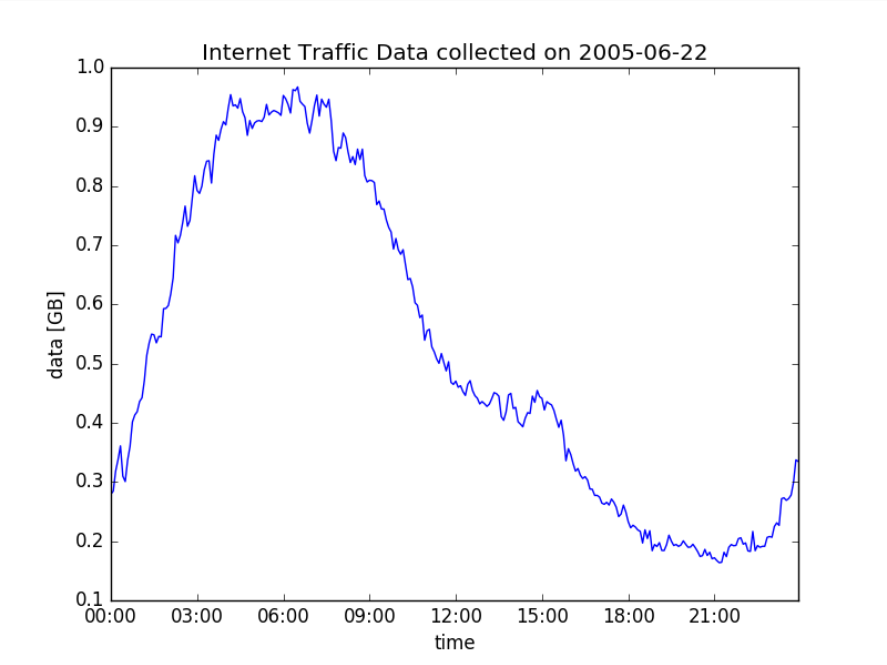

Figure 3: Exemplary pattern of a single workday.

Autocorrelation Plots

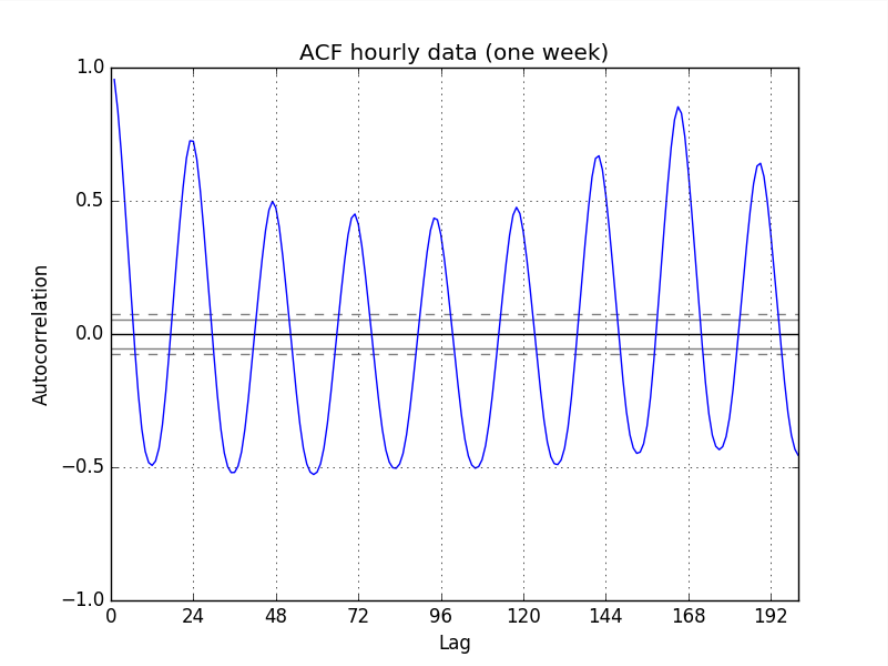

Figure 4: ACF which shows daily and weekly patterns based on the hourly data.

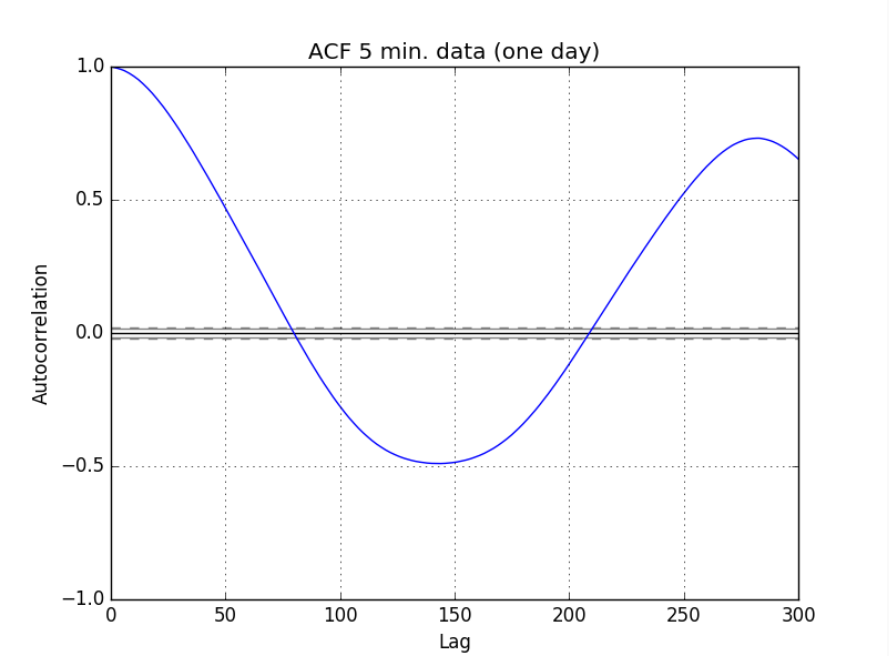

Figure 5: ACF which shows a daily pattern based on the 5 minute data.

Questions?