Topics in Advanced Modeling Techniques

Assignment: Hidden Markov Models

Assignment date: December 12, 2024

Due date: January 10, 2025

1 Introduction to the power-consumption dataset

The dataset contains 1,416 hourly means of power consumption of a city in the period of 01/01/2017 to 28/02/2017.

2 Data file

- Comma-separated file z1_hr_mean.csv

- Variables:

  1. day_in_year: day (format: DD/MM/YYYY)
  2. hr: hour of the day
  3. mean_power: mean power consumption (in KWh)
  4. sqe: sequence number

3 Assignment

- The response of interest is the mean power consumption.

- Fit HMMs with different numbers of states to the data. Interpret the models. Check their fit.

- Which model would you select/recommend? Why?

- In your report, provide the information (printouts, figures, etc.) supporting your decisions and conclusions. Include (in an appendix of max. 1 page) the main parts of the syntax underlying your results. Limit your report to 8 pages, including the title page and the appendix. Submit your report on BlackBoard by the indicated deadline.

4 Software hints

- You can use any software of your choice, but you have got to know and understand the methods that are implemented in the software. A possible tool is the *HiddenMarkov* R-package. An HMM is defined by using function dthmm. The model can be fitted by using the BaumWelch or neglogLik functions. Global decoding can be performed by using function Viterbi. The help of the latter function shows how to perform local decoding.