M.Sc. Topic
Railway Revenue Management (RM) deals with the question of how to set the prices of offered train connections, with the goal to avoid overbooking and to maximize total revenue. In recent years, scientists and practitioners started to use discrete choice models (e.g. multinomial logit or nested logit) to represent customers’ demand. By integrating choice models in the RM optimization model, the switching behavior of customers between train connections triggered by differences in price is anticipated in the optimization. When applying choice-based RM models in practice, it is crucial to have sufficiently good forecasts of customer choice.

This master thesis deals with the challenge of deriving choice and demand parameters that reflect the choice of a train connection in the real world. The task is to estimate the parameters of such a choice model from historic booking data of DB Fernverkehr AG and to evaluate the quality of the resulting choice model. The outcome will be a set of parameter values that describe customers’ responses to the quality of a train connection (duration, number of transfers), to the price and the value of the no-purchase alternative, so that choice probabilities can be calculated. A simulation study will conclude this master thesis, computing the expected number of bookings for each offered train connection from the resulting choice model and comparing the result to a second real dataset to evaluate the forecasting error.

Prospective Tasks
- Derive choice data based on historic booking records of DB Fernverkehr.
- Develop an efficient estimation approach so that the forecasting process can be processed in reasonable time.
- Test the developed data against a (second) data set to evaluate the forecasting error.

General Information
- Supervisors: Dr. Ana González + Prof. Wolfgang Nowak
- Empirical study
- This topic is a joint project with DB Fernverkehr AG (Frankfurt). The student should be open to travel to Frankfurt for a few meetings. Expenses for train tickets will be paid by DB.

Desirable Skills
- Matlab, computer programming

Apply now!
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