

## IVT - Assignments

---

<b>Head:</b>	Prof. Dr. K.W Axhausen
<b>Topic:</b>	<b>Using Recommendation System-based methodology to create the Choice Set composition</b>
<b>Assistant:</b>	B. Gramsch Calvo
<b>Registration:</b>	<a href="http://www.ivt.ethz.ch/en/studies/downloads/assignments.html#registration">www.ivt.ethz.ch/en/studies/downloads/assignments.html#registration</a>

---

Choice modeling is a popular technique to estimate the economic valuation of non-market goods, and it is widely used in transport planning and environmental economics for policy-making and resource allocation. These models explain how individuals make decisions when faced with a set of discrete alternatives by analyzing trade-offs between the characteristics of the choice set. Creating an appropriate choice set is straightforward for non-spatial decisions. However, when the number of alternatives is large and unknown by the modeler, the size and composition of the choice set are non-trivial, making it challenging to create a realistic choice set.

Sampling-based and heuristic-based techniques are the most prevalent to generate location choice sets. Sampling-based methods generate samples from universal sets of locations using random samples. Even though this method is consistent and efficient, it does not solve the problem of the choice set size. The heuristic-based model can be behaviorally more realistic but strongly dependent on the model's assumptions. The master thesis will propose a new heuristic methodology to create the choice set based on the streaming services' recommendation system that provides personalized suggestions to users using social network analysis. The original methodology is an AI algorithm trained to understand preferences using information on various criteria such as chosen alternatives, demographic information, and other factors to suggest or recommend additional products to consumers. This methodology will be adapted to the choice modeling context, using the information available to predict which alternatives belong to the choice set of an individual.

### Research objective:

- Investigate existing methods of recommendation used by streaming or other services to analyze which one is more suitable for the existing data.
- Develop a machine learning model that creates the choice set for the individuals in the database without assumptions on the choice set size.
- Analyze the methodology's performance when estimating an MNL model compared to random-sampling methods.
- Provide recommendations to implement this methodology to other modelers.

---

<b>Minimum credits:</b>	9-24 ECTS
<b>Recommended lectures:</b>	Survey Methods and Discrete Choice Analysis
<b>Additional remarks:</b>	Prior experience with the programming language R is necessary.

---