Implementation of attitudes and well-being in MATSim

ABSTRACT – MATSim User Meeting 2022

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Every traffic model tries to mimic reality by using input data that focuses on network characteristics and information about people's daily lives. Since researchers try to simulate travel behavior, several assumptions are made. These assumptions range from taking a sample of the actual population of the study area to focusing on only one traffic mode (e.g. cars). Another element that is often assumed, is the behavior of dwellers as homo economicus. This concept sees humans as a species who wants to maximize his personal utility, while being fully rational and having full knowledge of all possibilities. The criticism of this concept is well known. Homo economicus is an antisocial species, full knowledge is impossible, it leads to a deterministic view of humanity, etc.

Applying these remarks to MATSim, we see that this multi agent-based traffic model also uses the concept of homo economicus. This assumption makes the model robust and allows the co-evolutionary algorithm to give us insight into the effects of changes that may occur in different scenarios. Classic examples of this are the way people react to the introduction of, e.g. road pricing or the introduction of a new transport mode, such as shared cars or shared bikes.

The disadvantage of this is that personal attitudes and real life travel behavior can be overlooked in MATSim. The MATSim model allows users to add some additional individual characteristics to an agent, such as vehicle ownership and other personal preferences, such as gender or age. These can be used to enrich the simulations.

In the MATSim model for Ghent (Belgium) that is currently under development, we try to implement personal attitudes and emotions of agents in the MATSim traffic simulations. With data on the travel attitudes/personal emotions of a sample of the population of Ghent, we hope to apply this information for each agent and have an effect in the scoring function currently used in MATSim. The goal is to adapt the scoring algorithm with characteristics of an agent related to its attitude and well-being.

Location

Ghent is a city located in the northern part of Belgium with approximately 265,000 inhabitants. The city is mobility-wise known for its recently (2017) introduced traffic circulation plan, its relatively large car sharing network and its focus on sustainable urban freight deliveries. The current mobility split in the city is as follows, car are the dominant transport mode (38.6%), the bike comes at the second place (32.7%), on foot has a share of 12.9%. Multiple public transport modes are available in Ghent, tram and bus have a combined modal share of 9.9%; train has a share of 4.9%. Motors have the smallest modal share with 1.0% of all trips made.

Population generation

To generate a representative population for the city of Ghent (Belgium), we were able to use data from the triennial survey conducted by the city of Ghent. This survey mainly focuses on respondents' travel diaries, but also includes data on various personal characteristics (e.g. age, gender, household information), mobility-related characteristics (e.g. car and bike ownership and public transport subscription) and even some questions on how they perceive

recent changes in the mobility landscape of the city of Ghent (e.g. a few questions are about the circulation plan introduced in 2017).