

# Microscopic traffic simulation and analysis of the external effects generated from guided parking search traffic

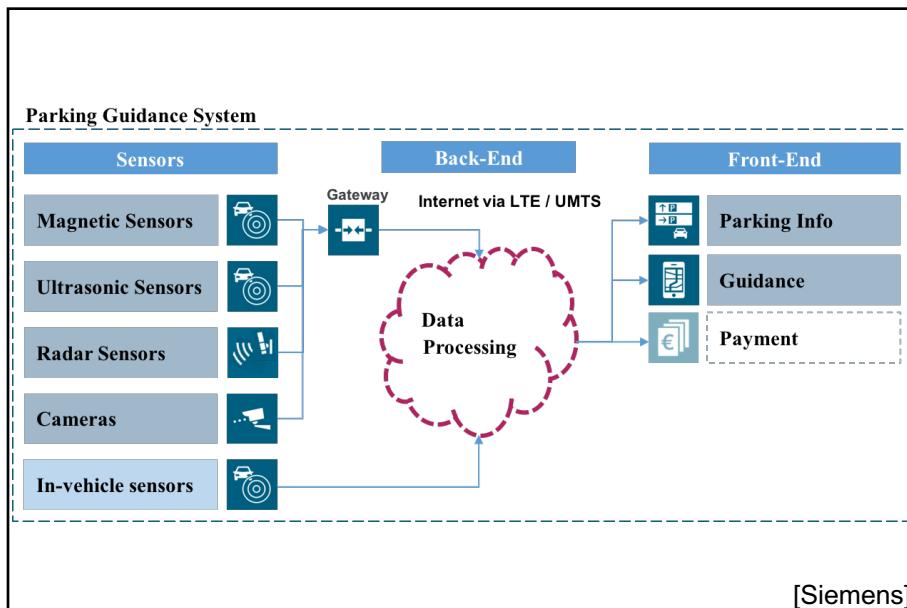
## Master's Thesis of Alexandra Ranz

### Mentoring:

Dr.-Ing. Silja Hoffmann  
Dipl.-Ing. Martin Margreiter

### External Mentoring:

M.Sc. Balazs Hajos (Siemens AG)



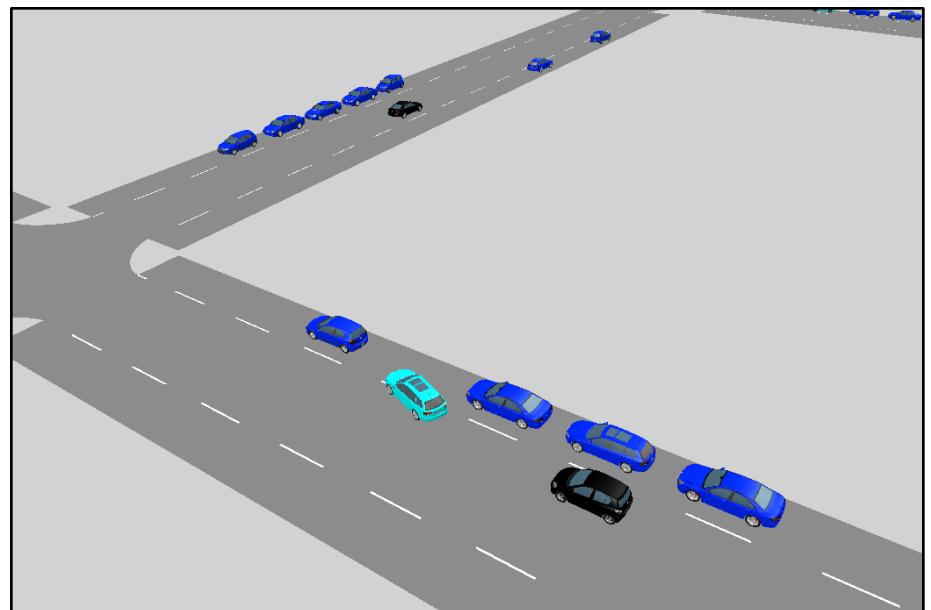
The present work presents an approach of using microscopic traffic simulation for an estimation of external effects of guided parking search traffic compared to random parking search without information on parking availability. The evaluation is based on different infrastructure penetration rates with detection sensors. The results show that the implementation of an intelligent parking guidance system will contribute to improvements in the overall traffic performance, including benefits for municipalities and individuals as well.

An improved information situation about the availability of free parking spaces can drastically reduce the time spent and kilometers traveled in cities for the search for car parking. With 100 % of infrastructure coverage with sensors, 23 % of total travel distance can be saved when all drivers use the system. With a reduction in total travel distance, benefits in terms of fuel consumption, vehicle emissions, safety, and noise occur as well.

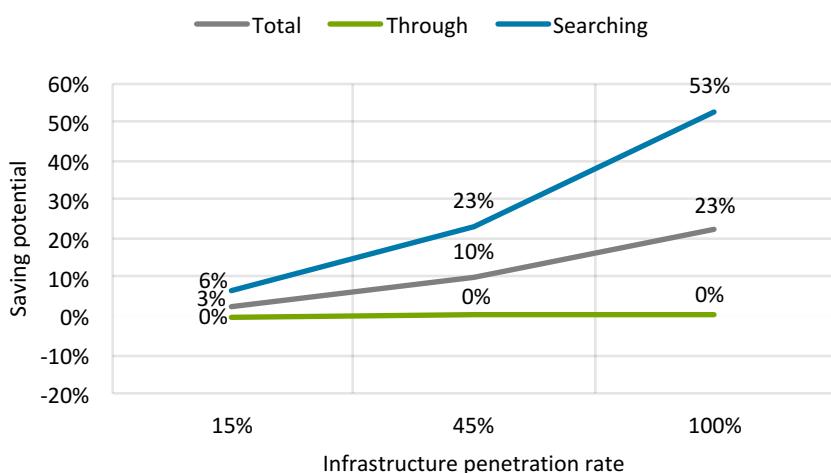
Growing urbanization leads to more traffic in urban centers, resulting in congestion and high levels of pollution. Since a high amount of traffic is parking search traffic the optimization of parking traffic is one major step in reducing traffic problems in cities. With the continuous development of certain technologies existing parking guidance systems can be improved and extended.

Especially the application of parking guidance systems for on-street parking spaces is getting greater relevance. Therefore, data about the availability of free parking spaces is gained through the implementation of reliable vehicle presence detection and forwarded to the drivers afterwards.

However, the implementation of a sensor based parking guidance system is characterized by high costs. Having a tool that provides better insight in the effects of intelligent parking guidance systems can help municipalities in the decision on whether to implement such a system.



### Saving potentials in travel distance



Although intelligent parking guidance systems have many benefits and almost no disadvantages, challenges exist in realizing such a system to gain such benefits. Today the guidance to only one specific parking space is not practicable since a reservation of parking spaces is not feasible in a reasonable effort.

To provide drivers with data about the availability of vacant spaces for a bigger area around their final destination and not only one single parking space would be much more efficient. The information could be forwarded using maps that indicate the occupancy rates of entire blocks. Looking towards future innovations, intelligent parking guidance systems recommending only one specific space will still play an important role. An ideal integrated intelligent parking guidance system for the future should include reservation, guidance, and payment, all within one application.