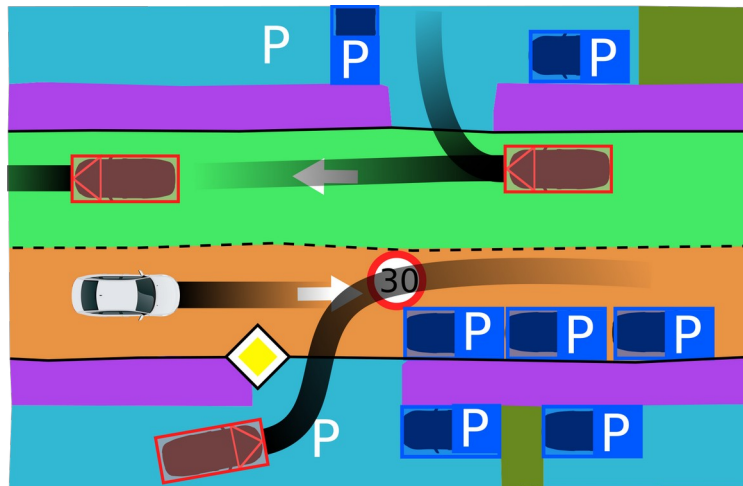


# Master's thesis: Deep Learning based Joint Object Prediction on Grid Maps

Self-driving cars do not only need to know the current locations of all surrounding road users, but also their possible future locations. Only then the car can plan a trajectory that is safe and avoids collisions with others.

The future locations of all detected objects therefore have to be predicted based on past information. This is often done individually for each detected object. But in dense traffic there are a lot of interactions between the individual road users which are ignored by such a simple approach.



The goal of this thesis is to implement a joint prediction of all road users which captures the interactions between them. You will be provided with a neural network that can detect and track objects in a birds-eye-view grid map. Your task is then to modify the network architecture and training pipeline to also output object predictions.

Your neural network will account for uncertainties in two different ways: One network head will predict an occupancy map. This allows the self-driving car to avoid grid cells that are likely occupied by other road users. Another network head will allow to sample future discrete states of the world from the underlying probability distribution. This allows the self-driving car to e. g. simulate cut-in scenarios.

The thesis will be supervised by the MRT (contact person Dr. Martin Lauer) and the KIT/FZI spinoff SafeAD (supervisor Dr. Niels Ole Salscheider).

If you are interested in this thesis proposal please apply with a recent transcript at [jobs@safead.de](mailto:jobs@safead.de).