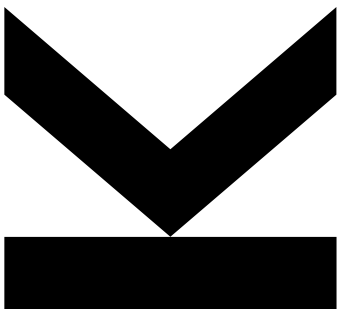**Univ.-Prof.ⁱⁿ Dr.ⁱⁿ**
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MASTER THESES

TEMPLATE FOR SCIENTIFIC WORKS

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I. Pedestrian Intention Prediction.

A. Research Idea

Perception systems are currently responsible for processing the data acquired by the vehicles' external sensors to make predictions of the dynamic states of the entities in the environment. Based on this, vehicles can take actions relying on the risk associated with the present situation.

In this context, pedestrians are of particular importance as they are the most vulnerable road users, especially when crossing the road. Anticipating the crossing intention of pedestrians allows systems to take actions to avoid possible accidents and to interrupt traffic.

Currently most approaches are based on trajectories where the future position of pedestrians is estimated. These approaches rely on motion patterns that are not always sufficient to determine the pedestrian's course of action. Thus, there are approaches that add more sources of contextual information to create models based on recurrent neuronal networks (RNN). Although these models have proven to be efficient, the use of recursion makes it impossible to parallelize the models, thus increasing the processing time. On the other hand, Transformers models have recently been designed which have an attention gate that establishes the relationship between features in a sequence of data.

Thus, the scope of this thesis is the study of Transformers to determine the pedestrian's intention to cross at different time intervals.

B. Research Questions.

- Which contextual features maximize the accuracy of the predictions?
- Which combination of contextual feature maximize the prediction?
- Which is the minimum and maximum time before crossing necessary to predict pedestrians crossing behaviour and which prediction time maximize the output?
- Which are the advantages and disadvantages between RNN and Transformer approaches?