BUILDING TEMPORAL SCENE GRAPHS FOR AUTONOMOUS DRIVING

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1. Introduction

To enable intelligent automated driving systems, a promising strategy is to understand how human drives and interacts with road users in complicated driving situations [3]. Int this project, we propose a novel algorithm that builds on top of other notable efforts in the same field and aims to improves on temporal attention and symbolic memory mapping in graph convolutional networks. We will be using the Egocentric Graph convolution networks (GCN) from [1] as building block. We plan to introduce a soft attention Recurrent neural network (RNN) which improves the modelling of temporal features in a stream of inputs which is ideal for driving. We plan to validate the proposed framework on tactical driver behavior recognition.

2. Related Works

Although substantial work has been done in the field of autonomous driving, there is still room for improvement. Most of the approaches published so far either completely ignores the temporal aspect of how humans drive or fail to provide a dynamic feedback to the framework. Driving a vehicle is a continuous process where the input is a stream of data points inter-related across time [1].

However, the current approaches treat each input data point independently or cluster them together to form batches. This results in loss of crucial information that could enable us to predict necessary actions much earlier [2] [3].

3. Proposed Approach

We plan to introduce a soft attention Recurrent Neural Network (RNN) which creates a closed feedback loop and provides temporal bridging between different inputs.
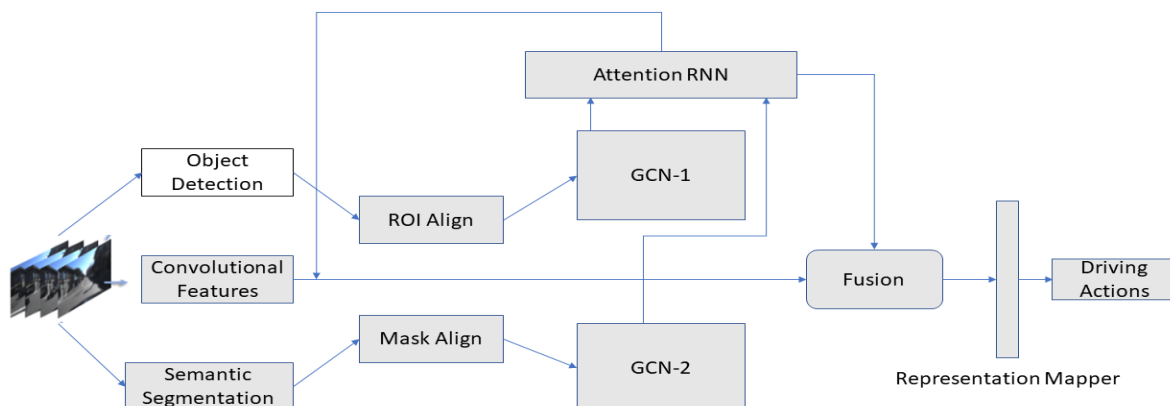
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4. Reference

1. Learning 3D-aware Egocentric Spatial-Temporal Interaction via Graph Convolutional Networks [Link]
2. Reading between the Lanes: Road Layout Reconstruction from Partially Segmented Scenes [Link]
3. Towards a Multi-hypothesis Road Representation for Automated Driving [Link]