

# 1 Abstract

gazeNet is a new framework for creating event detectors. The primary objective of this work is the update of the existing gazeNet by Zemblys et al. [2018] to current standards. In modifications this includes both in the used programming language i.e. Python2 to Python3 as well as the used packages. The existing code has also been modified to be interpretable on Windows-machines.

Furthermore an interface is provided to facilitate the application of the pre-trained gazeNet. This is done by providing a template for a script, which converts eye-tracking-data provided by the user in the appropriate format for gazeNet.

# 2 Introduction

The use of neural networks presents a new way of event detection in eye-tracking-data. Zemblys et al. [2018] presents gazeNet as one of the first approaches in the application of the technology. As much as the work of Zemblys, Niehorster, and Holmqvist [2018] represents a milestone in the evaluation of eye-tracking-data, since usability was not a priority, the use of gazeNet can be cumbersome, as it requires operation via a commandline and knowledge about the data structure being used.

# 3 gazeNet

The original gazeNet architecture by Zemblys et al. [2018] was inspired by Deep Speech 2 dee, an end-to-end speech recognition neural network. gazeNet was implemented using the pyTorch6 neural network framework (version 0.2.0 4) and the starter code from Sean Naren.7 Our network has two onvolutional layers followed by three bidirectional recurrent layers with a fully connected layer on top. The convolutional layers use 2D filters with a size of 2 x 11 and are meant to extract deep features from raw input data, while the recurrent layers model event sequences and are responsible for detecting onsets and offsets of fixations, saccades and PSOs. Zemblys et al. [2018]

The presented framework gazeNet consists of various scripts written in python which allow the user to prepare raw data, augment data, train gazeNet and evaluate raw data.

- 3.1 Update to gazeNet 1.1
- 3.2 Update to Python 3
- 3.3 Platform Independence
- 3.4 Validation of gazeNet 1.1
- 4 Conversion script

## References

- Deep speech 2: End-to-end speech recognition in english and mandarin. *Proceedings of Machine Learning Research*, 2015.
- Raimondas Zemblys, Diederick C Niehorster, and Kenneth Holmqvist. gazenet: End-to-end eye-movement event detection with deep neural networks. *Behavior research methods*, 2018.