

Advanced Deep Learning with Python
Spring Semester 2022
Course Assignment
Neural Machine Translation at the Word Level

- I. Provide an extensive theoretical description of the RNN-based Machine Translation approach that was adopted throughout the computational project “Word Level Machine Translation” that was presented in class. You should focus on describing the various components of the Encoder – Decoder network architecture both mathematically and graphically.
- II. Provide an extensive theoretical description of the Attention Mechanisms proposed for the problem of Neural Machine Translation presented by the following papers (both papers are available on gunet):
 - a. **“Neural Machine Translation by jointly learning to Align and Translate”** by Bahdanau et al. and
 - b. **“Effective Approaches to Attention-based Neural Machine Translation”** by Luong et al.Identify the major difference between the aforementioned approaches and the one presented in class. Elaborate on the major differences between the two attention mechanisms provided by Bahdanau et al. and Luong et al.
- III. Extend the existing code project by implementing both attention mechanisms.
- IV. Extend the existing code project by implemented the transformer model presented in the paper **“Attention is all you need”** by Vaswani et al.
- V. Your code should provide a comparative evaluation of the various models in terms of the testing accuracy and the quality of machine translation.