Assignment 8

1. What is the main issue with vanilla RNNs when dealing with long-term dependencies in sequences?

2. Explain the purpose of the attention mechanism in neural networks. How does it enhance the model's ability to process sequential or spatial data?

3. In a sequence-to-sequence model with attention, if the encoder processes a sequence of length 10 and the decoder generates a sequence of length 8, how many alignment scores need to be computed in total?

4. Break down the four components of a Long Short-Term Memory (LSTM) cell. How does each component contribute to addressing the challenges of learning long-term dependencies?

5. If you were to visualize attention weights in a sequence-to-sequence model, what would high attention weights indicate? How does attention help the model focus on relevant parts of the input sequence during decoding?

6. Describe the role of Region Proposal Networks (RPNs) in object detection frameworks like Faster R-CNN.

7. How does semantic segmentation differ from object detection?

8. Describe the idea behind using fully convolutional networks for semantic segmentation. How do these networks differ from traditional convolutional networks in handling segmentation tasks?