

Question-answer based on pdf

Question: How model Architecture works

Reply: The model architecture follows an encoder-decoder structure, where the encoder maps an input sequence of symbol representations to a sequence of continuous representations, and the decoder generates an output sequence of symbols one element at a time. The encoder and decoder both consist of a stack of identical layers, each of which has two sub-layers: a multi-head self-attention mechanism and a simple, position-wise fully connected feed-forward network. Residual connections are employed around each of the two sub-layers, followed by layer normalization. The self-attention mechanism allows the model to attend to different positions in the input or output sequence, while the feed-forward network provides non-linearity. The model also uses positional encoding to inject information about the relative or absolute position of the tokens in the sequence.

Question: how multi-head attention works

Reply: Instead of performing a single attention function with d_{model} -dimensional keys, values and queries, we found it beneficial to linearly project the queries, keys and values h times with different, learned linear projections to d_k, d_k and d_v dimensions, respectively. On each of these projected versions of queries, keys and values we then perform the attention function in parallel, yielding d_v -dimensional output values. These are concatenated and once again projected, resulting in the final values, as depicted in Figure 2. Multi-head attention allows the model to jointly attend to information from different representation subspaces at different positions. With a single attention head, averaging inhibits this. $MultiHead(Q, K, V) = Concat(head\ 1, \dots, head\ h)W_O$ where $head\ i = Attention(QW_{Q_i}, KW_{K_i}, VW_{V_i})$ Where the projections are parameter matrices $W_{Q_i} \in \mathbb{R}^{d_{model} \times d_k}, W_{K_i} \in \mathbb{R}^{d_{model} \times d_k}, W_{V_i} \in \mathbb{R}^{d_{model} \times d_v}$ and $W_O \in \mathbb{R}^{h d_v \times d_{model}}$. In this work we employ $h = 8$ parallel attention layers, or heads.