1. What are Vanilla autoencoders
2. What are Sparse autoencoders
3. What are Denoising autoencoders
4. What are Convolutional autoencoders
5. What are Stacked autoencoders
6. Explain how to generate sentences using LSTM autoencoders
7. Explain Extractive summarization
8. Explain Abstractive summarization
9. Explain Beam search
10. Explain Length normalization
11. Explain Coverage normalization
12. Explain ROUGE metric evaluation

Answer:

1. Vanilla autoencoders: Vanilla autoencoders are neural networks used for unsupervised learning that aim to learn a compressed representation of input data in an encoding step and then reconstruct the original input data in a decoding step. They consist of an encoder network that compresses the input data and a decoder network that reconstructs the input data from the compressed representation.
2. Sparse autoencoders: Sparse autoencoders are a type of autoencoder that imposes sparsity constraints on the encoded representation. This is done by adding a penalty term to the loss function that encourages the encoder to produce a sparse representation.
3. Denoising autoencoders: Denoising autoencoders are a type of autoencoder that is trained to reconstruct the original input data from a noisy version of the input. The idea is to force the autoencoder to learn a robust representation of the input data that is not affected by noise.
4. Convolutional autoencoders: Convolutional autoencoders are a type of autoencoder that uses convolutional layers in the encoder and decoder networks. They are commonly used for image data and can learn spatially localized features in the input data.
5. Stacked autoencoders: Stacked autoencoders are a type of autoencoder that consists of multiple layers of encoders and decoders. The output of one layer of encoders is fed into the next layer of encoders, and the output of one layer of decoders is fed into the next layer of decoders.
6. LSTM autoencoders for sentence generation: LSTM autoencoders can be used for generating new sentences. The basic idea is to train an autoencoder to encode sentences into a fixed-length vector and then decode this vector back into a sentence. The decoder is then used to generate new sentences by feeding it with random vectors.
7. Extractive summarization: Extractive summarization is a technique of summarizing a document by selecting the most important sentences from it. This can be done by ranking the sentences based on their relevance to the document and selecting the top-ranked sentences.
8. Abstractive summarization: Abstractive summarization is a technique of summarizing a document by generating new sentences that capture the essential meaning of the document. This requires understanding the meaning of the document and generating new sentences that convey the same meaning.
9. Beam search: Beam search is a search algorithm used in natural language processing tasks such as machine translation and text generation. It is used to generate the most likely output sequence from a large set of possible sequences. It works by keeping track of a fixed number of the most likely sequences at each step and pruning the rest.
10. Length normalization: Length normalization is a technique used in machine translation and text generation to prevent the model from generating excessively short or long output sequences. This is done by dividing the log-likelihood of the generated sequence by its length raised to a power.
11. Coverage normalization: Coverage normalization is a technique used in abstractive summarization to ensure that the generated summary covers all important aspects of the original document. This is done by keeping track of the attention weights assigned to each input token and adding a penalty term to the loss function if some tokens are not attended to sufficiently.
12. ROUGE metric evaluation: ROUGE (Recall-Oriented Understudy for Gisting Evaluation) is a set of metrics used for evaluating the quality of a generated summary or machine translation output. The metrics compare the generated output to one or more reference summaries and calculate various statistics such as precision, recall, and F1 score.