1. What are Vanilla autoencoders

Vanilla autoencoders, also known as simple autoencoders, are a type of neural network architecture used for unsupervised learning and dimensionality reduction. They consist of an encoder network that compresses input data into a lower-dimensional representation and a decoder network that reconstructs the original data from the compressed representation. The goal is to minimize the reconstruction error, effectively learning a compact representation of the data.

1. What are Sparse autoencoders

Sparse autoencoders are a variant of autoencoders that incorporate a sparsity constraint on the activations of the hidden units in the encoder or decoder. This encourages the network to learn a more sparse and efficient representation, which can be useful for feature selection and extraction in applications like image denoising and anomaly detection.

1. What are Denoising autoencoders

Denoising autoencoders are trained to reconstruct clean data from noisy or corrupted input. They work by introducing noise to the input data and training the network to recover the original, clean data. This approach helps the model learn robust and useful features by focusing on eliminating noise.

1. What are Convolutional autoencoders

Convolutional autoencoders are a type of autoencoder designed for processing structured grid-like data, such as images. They utilize convolutional layers in both the encoder and decoder to capture spatial relationships and patterns in the data. These autoencoders are commonly used for image compression, denoising, and feature extraction.

1. What are Stacked autoencoders

Stacked autoencoders consist of multiple layers of autoencoders, where the output of one autoencoder serves as the input for the next. Stacking multiple layers enables the learning of hierarchical representations, which can capture complex features and patterns in the data. Stacked autoencoders are used for deep learning and feature learning tasks.

1. Explain how to generate sentences using LSTM autoencoders

LSTM autoencoders can be used for text generation, including sentence generation. To generate sentences, you typically use an LSTM-based autoencoder where the decoder LSTM is set up to produce text sequentially. Starting with an initial seed or context, the decoder LSTM generates words one at a time, taking into account the preceding words to ensure coherence and fluency.

1. Explain Extractive summarization

Extractive summarization is a text summarization technique that selects and extracts sentences or passages from the source text to create a summary. It identifies the most important and relevant content within the source document and preserves the original sentences without paraphrasing. Extractive summarization methods often use features like sentence importance scores to select the most salient sentences.

1. Explain Abstractive summarization

Abstractive summarization is a text summarization technique that generates a summary by paraphrasing and rephrasing the source content in a more concise and coherent manner. Unlike extractive summarization, abstractive methods can produce summaries that do not necessarily contain verbatim sentences from the source but capture the core ideas and meaning.

1. Explain Beam search

Beam search is a search algorithm used in natural language processing and machine translation. It is employed to find the most likely sequence of words or tokens in a probabilistic model, such as in machine translation models. Beam search maintains a set of candidate sequences and selects the most likely candidates at each step, helping to produce coherent and accurate translations or generations.

1. Explain Length normalization

Length normalization is a technique used in machine translation and text generation to adjust the probabilities of generated sequences based on their lengths. It helps prevent shorter sequences from being favored over longer ones, ensuring that the length of the output is more balanced and contextually appropriate.

1. Explain Coverage normalization

Coverage normalization is a mechanism used in abstractive text summarization. It tracks and penalizes repeatedly attending to the same parts of the source text during decoding. This helps the summarization model generate summaries that cover a wider range of information and reduce redundancy.

1. Explain ROUGE metric evaluation

ROUGE (Recall-Oriented Understudy for Gisting Evaluation) is a set of metrics used to evaluate the quality of machine-generated text, such as summaries or translations, by comparing them to reference (human-generated) text. ROUGE metrics measure aspects like precision, recall, and F1-score of n-grams, word overlap, and content similarity between the generated and reference text. It is commonly used in machine translation and text summarization evaluations to assess the quality of generated content.