1. What are Vanilla autoencoders

Vanilla autoencoders, also known as basic or traditional autoencoders, are a type of unsupervised learning model used for dimensionality reduction and feature learning. They consist of an encoder and a decoder, which are trained to reconstruct the input data by learning a compressed representation in the latent space.

1. What are Sparse autoencoders

Sparse autoencoders are a variation of autoencoders that are designed to learn sparse representations of the input data. Unlike vanilla autoencoders, which aim to reconstruct the input data while compressing it into a lower-dimensional space, sparse autoencoders encourage the latent representations to have a sparse activation pattern, meaning that only a small subset of neurons in the latent layer are activated for a given input.

1. What are Denoising autoencoders

Denoising autoencoders are a type of autoencoder designed to reconstruct clean or denoised input data from corrupted or noisy versions. They learn to remove or reduce the effects of noise during the training process, making them useful for both denoising tasks and feature learning in the presence of noisy data.

1. What are Convolutional autoencoders

Convolutional autoencoders are a variant of autoencoders that utilize convolutional neural network (CNN) layers for both the encoder and decoder components. These autoencoders are specifically designed to process structured grid-like data, such as images, where local spatial dependencies play a crucial role.

1. What are Stacked autoencoders

Stacked autoencoders, also known as deep autoencoders or deep belief networks, are a type of neural network architecture that consists of multiple layers of stacked autoencoder modules. Each module in the stack is an autoencoder, which consists of an encoder and a decoder, and is trained in an unsupervised manner to learn progressively more abstract representations of the input data.

1. Explain how to generate sentences using LSTM autoencoders

To generate sentences using LSTM autoencoders, you can follow a sequence-to-sequence framework where the LSTM autoencoder is trained to reconstruct the input sequences. Once trained, you can leverage the learned latent space to generate new sentences by decoding from randomly sampled latent vectors.

Data Preparation

Encoder-Decoder Architecture

Training

1. Explain Extractive summarization

Extractive summarization is a text summarization technique that involves extracting important sentences or passages from a given document to create a concise summary. Instead of generating new sentences, extractive summarization identifies and selects the most relevant and informative parts of the source text as the summary. It aims to capture the essence of the document while preserving the original wording.

1. Explain Abstractive summarization

Abstractive summarization is a text summarization technique that aims to generate a concise summary by understanding the source text and expressing its key information in a more human-like and creative manner. Unlike extractive summarization, which selects sentences directly from the source text, abstractive summarization involves generating new sentences or phrases that may not exist in the original document.

Text Understanding

Sentence Generation

1. Explain Beam search

Beam search is a search algorithm commonly used in natural language processing tasks, such as machine translation and text generation, to generate high-quality and coherent sequences. It is particularly useful in tasks where the output space is large and the objective is to find the most likely sequence given a set of candidate options at each step.

1. Explain Length normalization

Length normalization is a technique commonly used in natural language processing tasks, particularly in machine translation and text generation, to address the bias towards shorter sequences that can occur in scoring or ranking-based approaches. It aims to ensure that longer sequences are not penalized unfairly or disadvantaged compared to shorter ones during the evaluation or comparison process.

In many language generation tasks, longer sequences tend to have lower probabilities or scores compared to shorter sequences due to the nature of the underlying models or algorithms. This can lead to a bias towards shorter outputs, as shorter sequences may have a higher likelihood or score purely due to their length.

1. Explain Coverage normalization

Coverage normalization is a technique used in abstractive text summarization to address the problem of repetition in generated summaries. When generating summaries, abstractive models may sometimes produce repetitive phrases or neglect important content that should be included. Coverage normalization helps alleviate this issue by incorporating coverage information into the decoding process.

1. Explain ROUGE metric evaluation

ROUGE (Recall-Oriented Understudy for Gisting Evaluation) is a set of evaluation metrics commonly used to assess the quality of text summarization systems. It measures the similarity between a generated summary and one or more reference summaries. ROUGE metrics focus on capturing the recall aspect of the summaries, evaluating how well the generated summary covers important content from the references.