1. What are Vanilla Autoencoders?

Basic neural networks that learn to compress data into a lower-dimensional code (encoding) and then reconstruct the original input from this code (decoding). Used for unsupervised feature learning and dimensionality reduction.

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2. What are Sparse Autoencoders?

Autoencoders with an added sparsity constraint on the hidden layer activations, forcing most neurons to be inactive. This helps learn more meaningful, compressed representations.

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3. What are Denoising Autoencoders?

Autoencoders trained to reconstruct the original input from a **corrupted or noisy** version. This forces the model to learn robust features that capture the true data structure.

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4. What are Convolutional Autoencoders?

Autoencoders that use convolutional layers instead of fully connected layers. They work well on image data by preserving spatial structure during encoding and decoding.

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5. What are Stacked Autoencoders?

Multiple autoencoders stacked layer-by-layer, where the output of one encoder becomes the input to the next. Used for learning hierarchical features.

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6. How to Generate Sentences Using LSTM Autoencoders?

- Use the encoder LSTM to compress input sentences into fixed-length vectors.
- Use the decoder LSTM to generate sentences by decoding these vectors, often one word at a time.
- The decoder predicts the next word based on the previous output and hidden state.

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7. Explain Extractive Summarization

Selects important sentences or phrases directly from the source text to create a summary. It does not generate new text but extracts key parts.

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8. Explain Abstractive Summarization

Generates a summary by understanding the content and rewriting it in new words, potentially producing more concise and natural summaries.

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9. Explain Beam Search

A search algorithm used in sequence generation that keeps track of the top "beam width" number of candidate sequences at each step, rather than just the best one, to find more likely sequences.

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10. Explain Length Normalization

A technique used in beam search to prevent bias toward shorter sequences by adjusting the score of candidate sequences based on their length.

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11. Explain Coverage Normalization

Addresses the problem of repeating the same content in generated sequences by keeping track of which parts of the input have been covered and penalizing repeated attention.

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12. Explain ROUGE Metric Evaluation

ROUGE is a set of metrics used to evaluate automatic summarization and translation. It compares overlap of n-grams, sequences, or word pairs between the system-generated summary and reference summaries.