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Resolutions/Wishes for 2022! :)

① Start presenting to display the poll results on this slide.

Unsupervised Representation Learning

UTMIST Study Group

Agenda

Module 4

- Unsupervised Learning
 - Autoencoders
 - Natural Language Processing
 - Word Embeddings
-

1 Unsupervised Learning

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What comes to mind when you think of Unsupervised Learning?

① Start presenting to display the poll results on this slide.

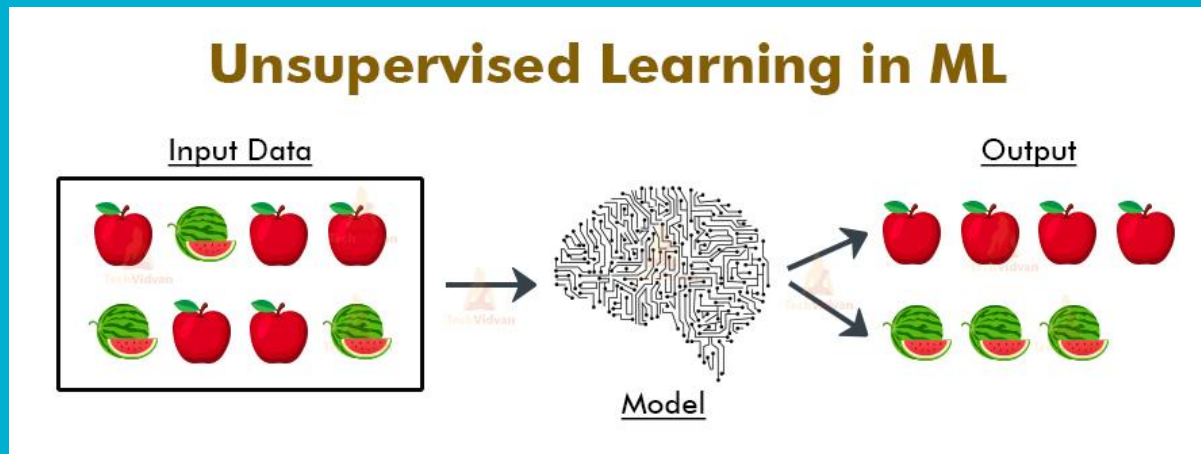
Unsupervised Learning

What?

- No labels

Why?

- Extract data structure
- Less costly data



<https://techvidvan.com/tutorials/wp-content/uploads/sites/2/2020/07/Unsupervised-Learning-in-ML-1.jpg>

2

Autoencoders

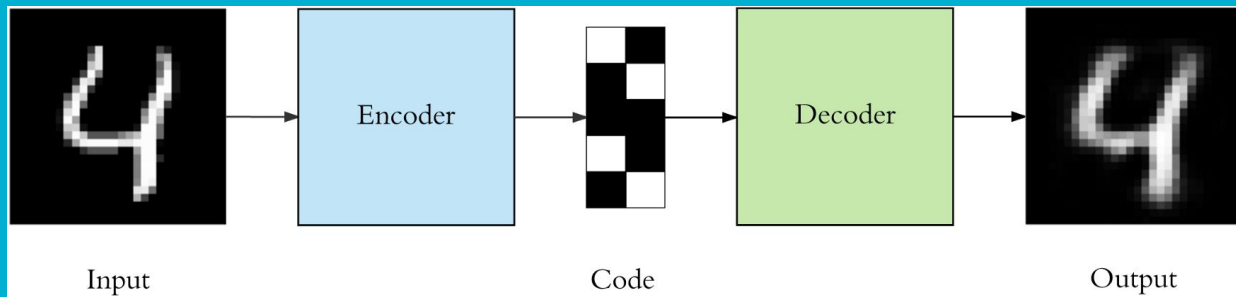
Autoencoders

Definition

- Compress input
- Reconstruct output

Applications

- Compress data
- Reduce dimensionality
- Learn Features
- Unsupervised pre-training



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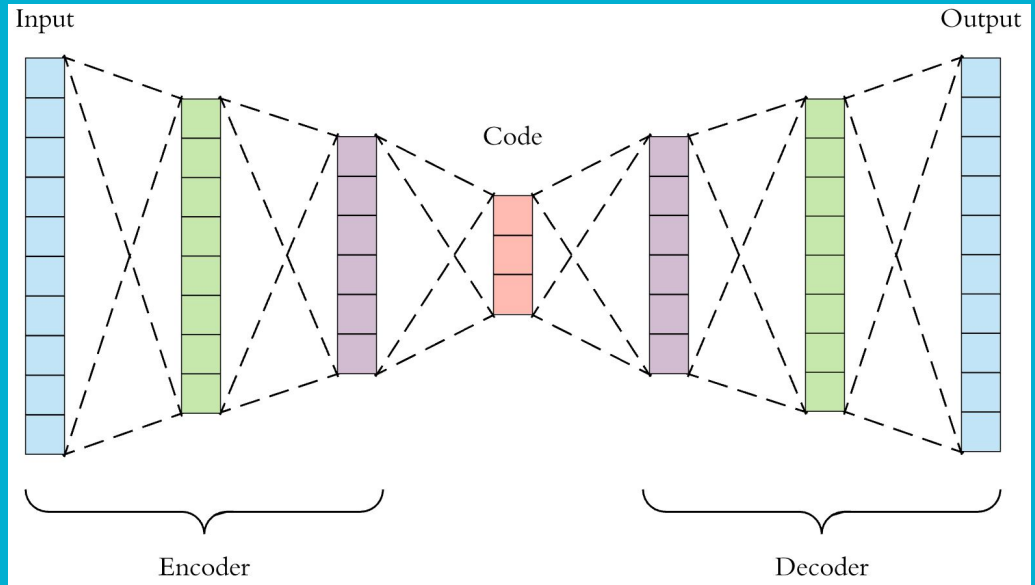
Architecture

Structure

- Artificial neural network
- Symmetrical

Hyperparameters

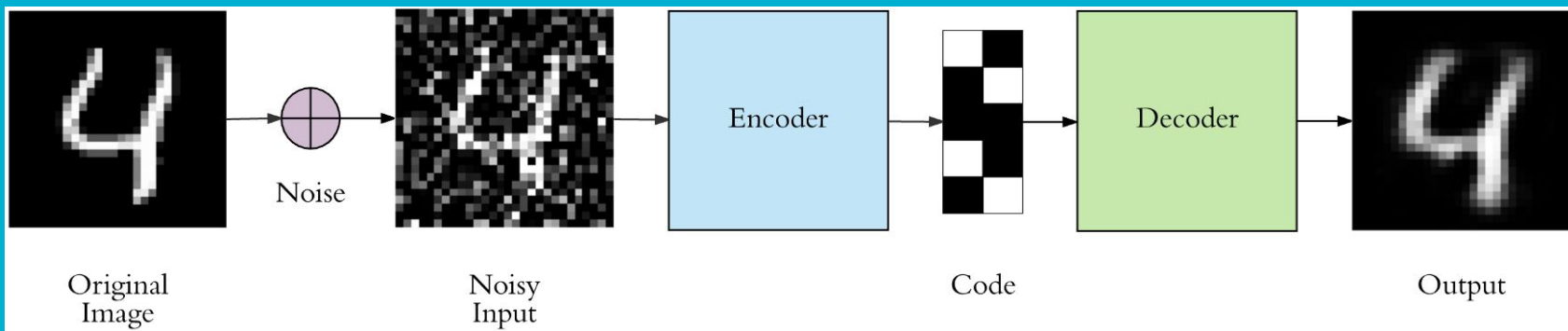
- Code size
- # layers
- # neurons/layer



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Denoising Autoencoders

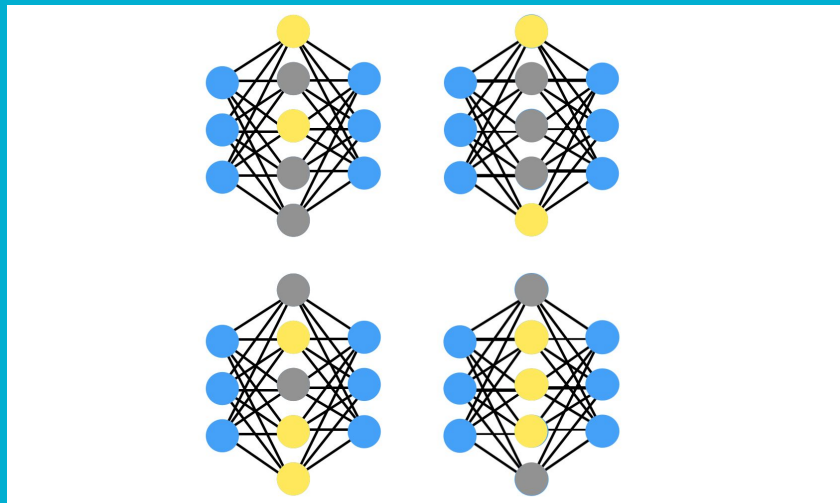
- Add noise to input
- Force autoencoder to learn useful features
- Recover original input



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Sparse Autoencoders

- Regularization to force autoencoder to learn useful features
- Sparsity constraint: only a fraction of nodes would be active



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3. Natural Language Processing

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What are some possible applications of NLP in real life?

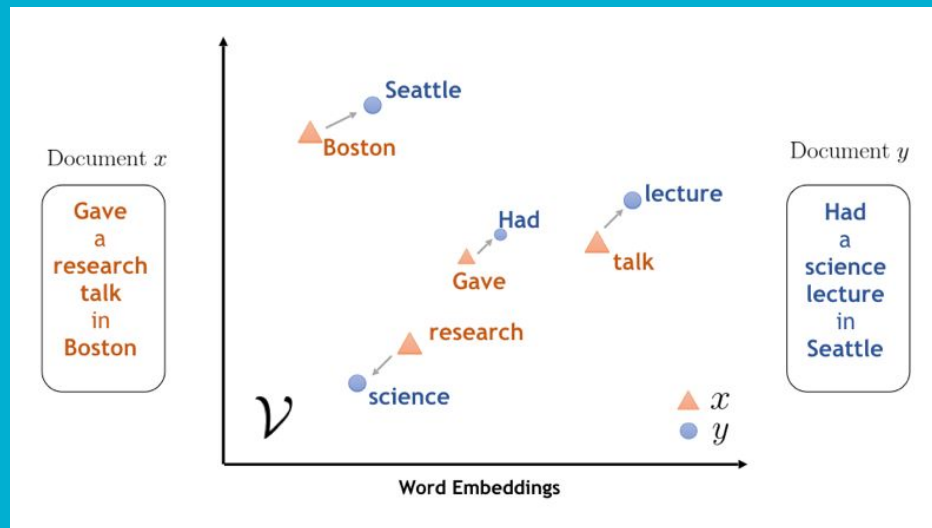
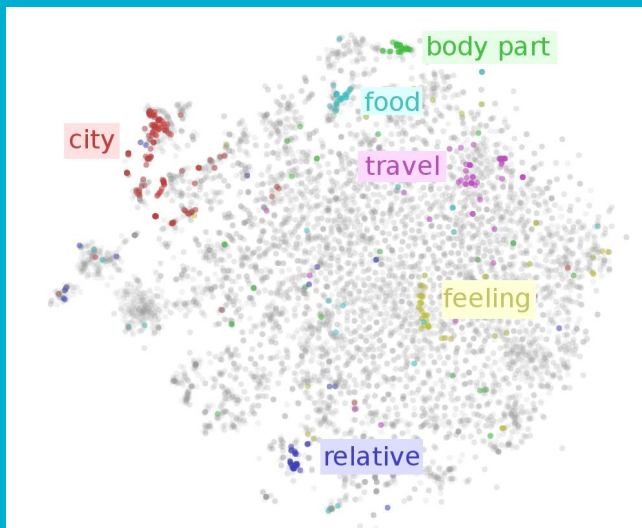
① Start presenting to display the poll results on this slide.



Machines can understand meaning behind words.

Word Embeddings

- Vector representation of a word
- Words with similar meaning are closer spatially

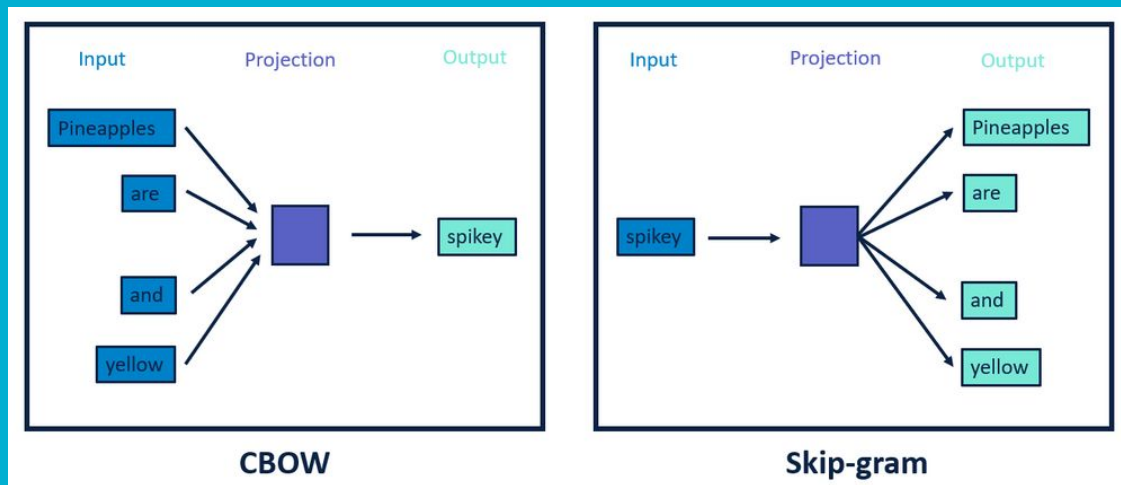


Word2Vec

Model for learning the embedding

CBOW: predict target word

Skip-Gram: predict context words



<https://community.alteryx.com/t5/image/serverpage/image-id/45458iDEB69E518EBA3AD9/image-size/large?v=v2&px=999>

4 Discussion

Thank You! :)