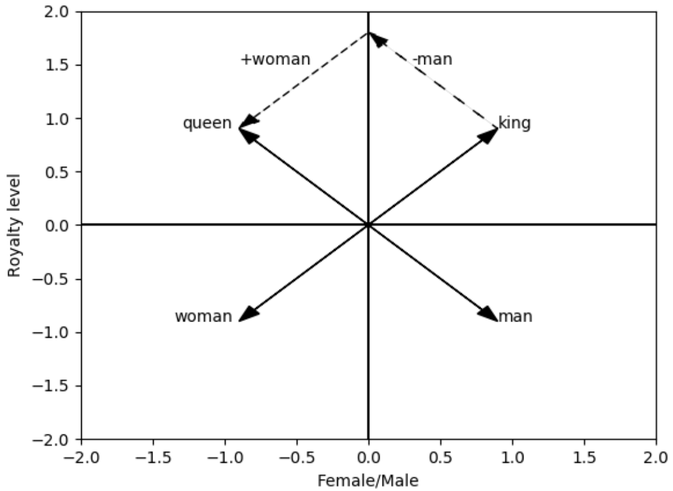
Natural language processing



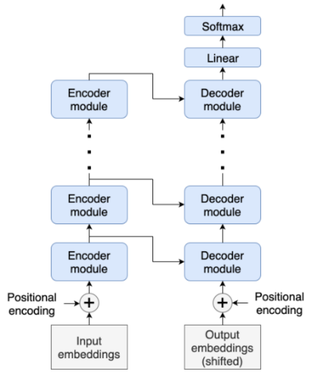
Word vector arithmetic: King - Man + Woman = Queen

Word embedding schemes

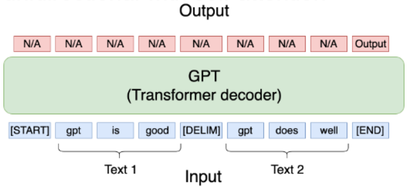
Embedding scheme	Notes
word2vec	The "classic," derived using heuristics.
GloVe	Mathematically derived.
wordpieces	Handles out-of-vocabulary words by working on subwords.
FastText	Extension of word2vec to handle out-of-vocabulary words.
ELMo	Same word results in different embeddings depending on context.

Transformer-based architectures

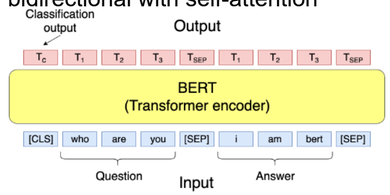
Transformer: Encoder-decoder architecture with both attention and self-attention



GPT: Transformer decoder, unidirectional with self-attention



BERT: Transformer encoder, bidirectional with self-attention



Traditional techniques

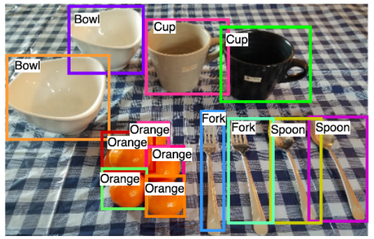
Technique	Description	Application examples
n-gram	Simple statistical language model. Computes probability of word sequence.	Find likely sentence candidate in speech recognition. Text auto-completion.
skip-gram	Extension of n-gram model.	See above.
bag-of-words	Unordered document summarization technique.	Building block in sentiment analysis and document comparison.
bag-of-ngrams	Extension of bag-of-words with some notion of word order.	See above.
character-based bag-of-ngrams	Bag-of-word but working on characters instead of words.	Determine similarities between words.

Computer vision

Network	Key properties
LeNet, LeNet-5	CNN before DL boom.
AlexNet	First DL-based ImageNet winner.
VGGNet	Demonstrated importance of depth.
Inception	Complex building block with parallel paths. Used by GoogLeNet.
ResNet	Introduced skip connections. Much deeper than previous networks.
EfficientNet	Explored trade-offs between multiple dimensions for more efficient architecture.
MobileNets, Exception	Depthwise separable convolutions for more efficient implementation.
Inception v2, v3, v4, Inception-ResNet, ResNeXt	Deep hybrid architectures.

Networks for classification; also used as backbone in other models

Detection

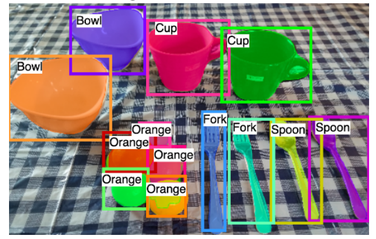


Models: R-CNN, Fast R-CNN, Faster R-CNN

Semantic segmentation

Models: Deconvolution network, U-Net

Instance segmentation



Model: Mask R-CNN