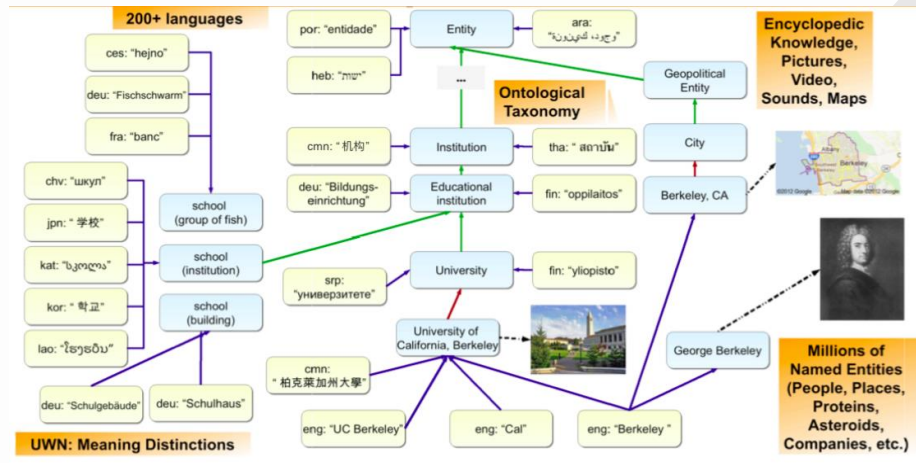




deti

universidade de aveiro
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WordNet



David Mendonça n° 107360 Master's in Robotics and Intelligent Systems
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Daniel Emídio n° 108986 Master's in Informatics Engineering

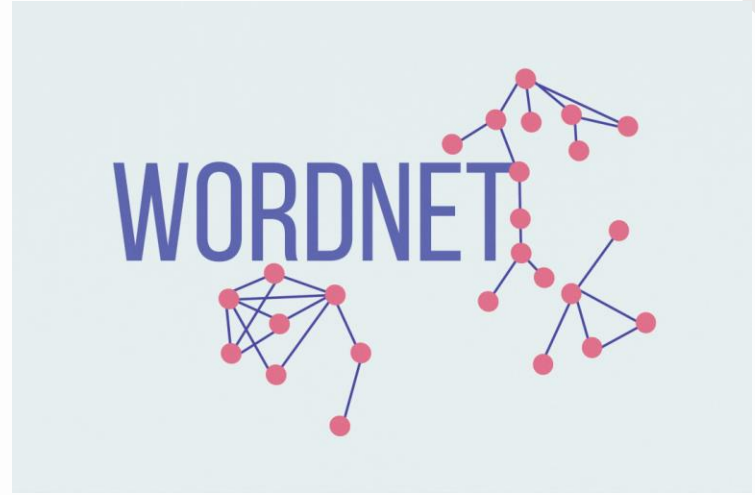
Introduction

What is WordNet?

Is a large lexical database of **semantic relations** of a given language, linking based on there:

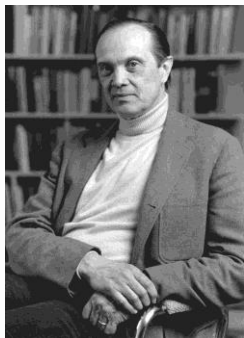
- Synonyms
- Antonyms
- Hypernym
- Hyponyms
- Meronyms

Nouns, verbs, adjectives and adverbs are grouped into **synsets**.



Introduction

Some history about WordNet



Created by:

- George A. Miller
- Princeton University
Cognitive Science Lab

Received the 2006
Antonio Zampolli Prize

Organization that provides:

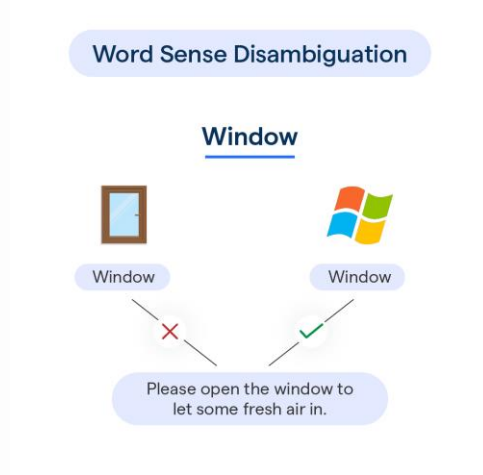
- Platforms for discussion and sharing
- WordNets for other languages

“Any system that hopes to process natural languages as people do must have information about words and their meanings.”

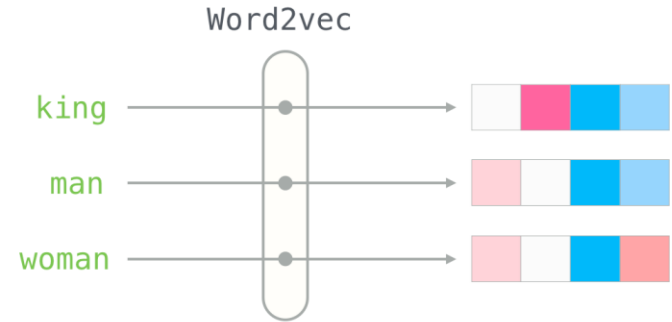
— **George A. Miller**

Introduction

The impact of WordNet in NLP and AI



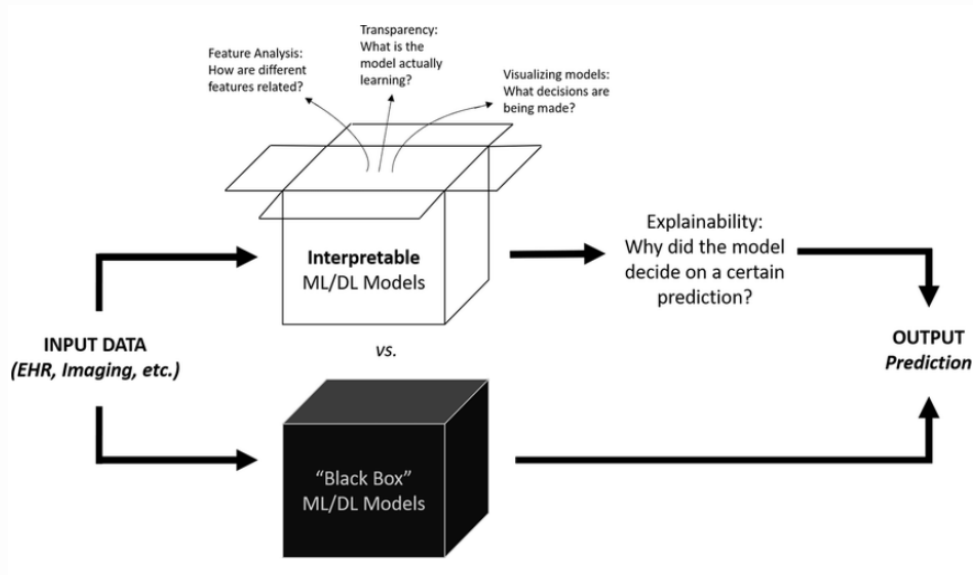
Word Sense Disambiguation (WSD)



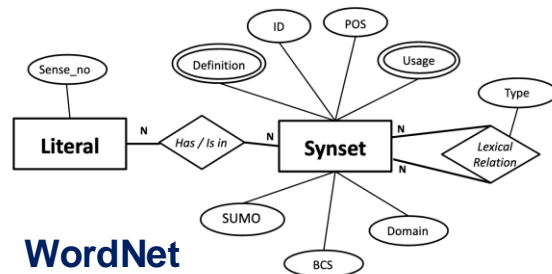
Embeddings training

Introduction

The impact of WordNet in NLP and AI



Interpretable



WordNet

"Black Box"



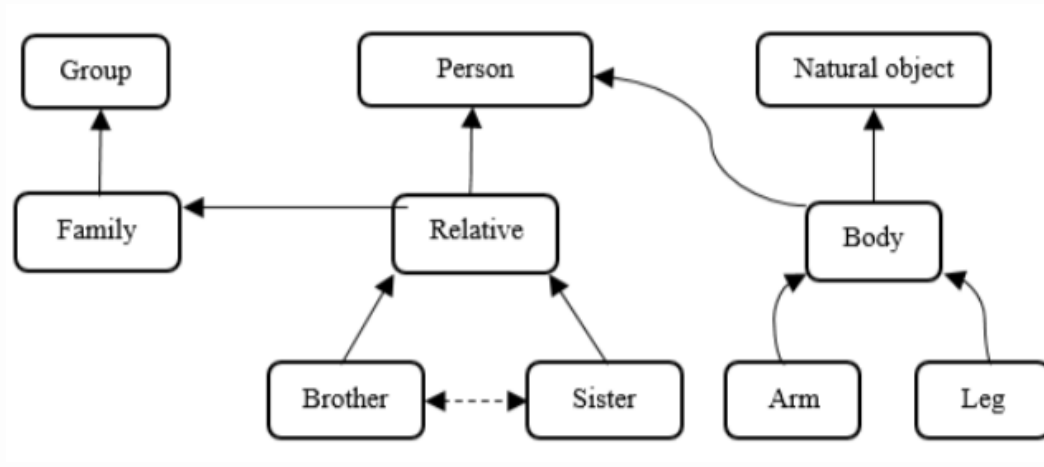
Comparison

Aspect	WordNet	Embeddings/LLMs
Data Source	Manually curated	Trained on large datasets
Context Handling	No context	Captures deep contextual meaning
Adaptability	Static	Continuously updated and adaptable
Multilingual Support	Limited	Strong multilingual support
Semantic Depth	Defined relations	Captures similarity and nuance

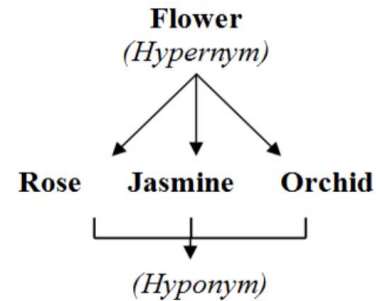
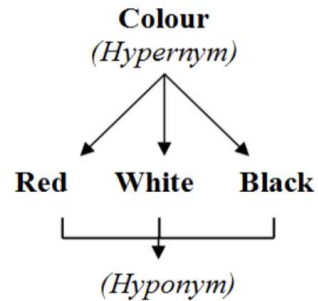
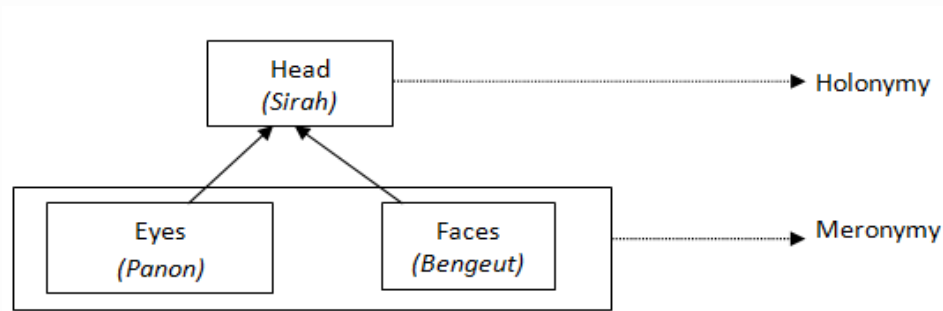
Structure

Synset

This library represents the **synsets** and their relations in a graph based structure



Semantic relationships

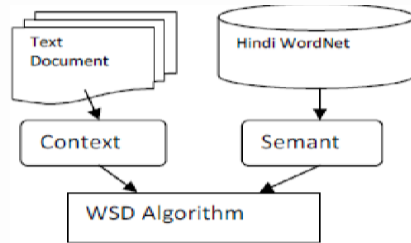


Semantic relationships

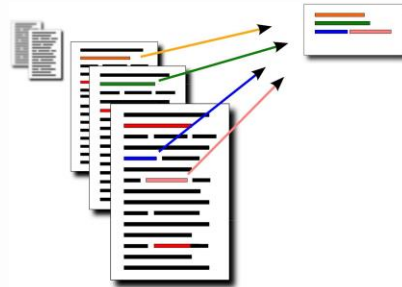
Semantic Relation	Description	Example
Hypernymy (superordination)	"Is-a" relation (a more general category)	<i>Dog</i> is a hyponym of <i>animal</i>
Hyponymy (subordination)	"Is-a" relation (a more specific category)	<i>Labrador</i> is a hyponym of <i>dog</i>
Meronymy (part-of)	Part-whole relation	<i>Wheel</i> is a meronym of <i>car</i>
Holonymy	Whole-part relation (opposite of meronymy)	<i>Car</i> is a holonym of <i>wheel</i>
Antonymy	Oppositional relation	<i>Hot</i> ↔ <i>Cold</i>
Troponymy	A specific way of performing an action (subtype of hyponymy)	<i>Walking</i> is a troponym of <i>moving</i>
Entailment	One action implies another	<i>Sleeping</i> entails <i>lying down</i>
Synonymy	Equivalence relation	<i>Fast</i> = <i>Quick</i>

WordNet Applications

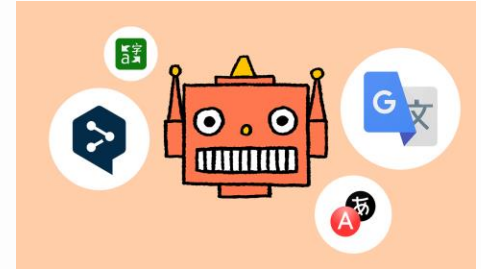
Word-sense disambiguation



Automatic text summary



Machine translation



Expand searches



Plagiarism detectors



grammarly

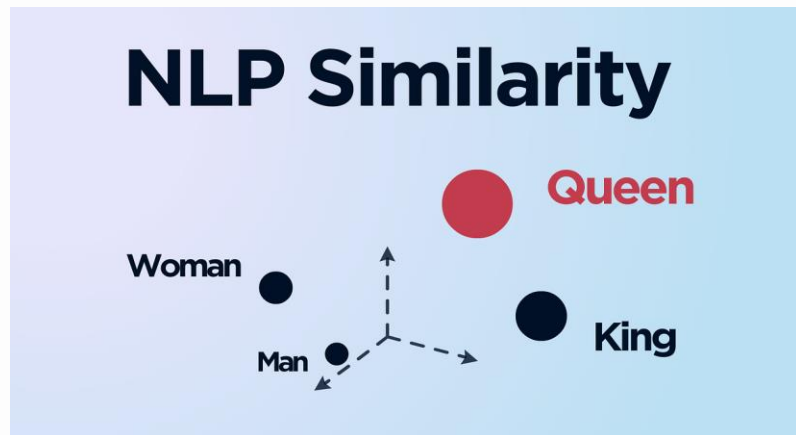


turnitin

WordNet Applications

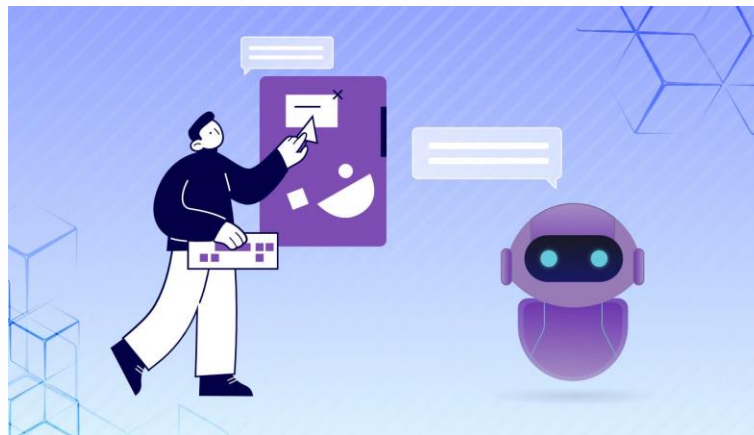
Similarity between words

The core use of WordNet in NLP systems is the measurement of the distance among words and synsets.



Conversational agents

Mapping user interest through semantic networks and identify related entities. It also allows the detection of contextual nuances.



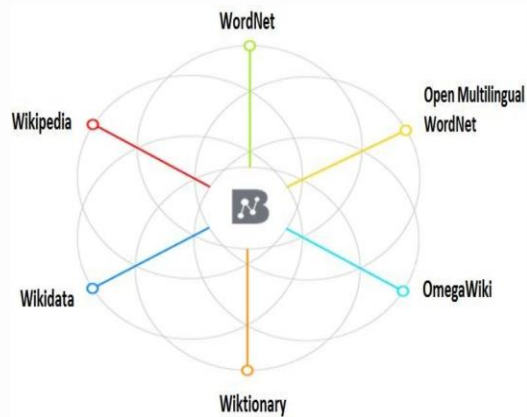
Tools



- Wordnet Pack



- NLTK Library



- BabelNet



- EuroWordNet

Limitations

Static and manually curated	WordNet is not dynamically updated, which limits its adaptability to new words and language changes
Limited coverage	Struggles with slang, new terms, and informal language
No multilingual support	WordNet is focused primarily on English, with limited support for other languages

References

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- <https://www.linkedin.com/pulse/wordnet-word-sense-disambiguation-wsd-nltk-aswathi-nambiar/>
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- <https://archive.illc.uva.nl/EuroWordNet/>
- <https://en.wikipedia.org/wiki/BabelNet>

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Thank You

“The limits of my language mean the
limits of my world”

—Ludwig Wittgenstein