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Overview

- A freely-available largescale commonsense knowledge base
- Includes words and common phrases.
- ConceptNet is a knowledge graph that connects words and phrases of natural language (terms) with labeled, weighted edges (assertions).



Newest version 5.6.4

Example



Origin

ConceptNet has been developed as part of **the Open Mind Common Sense project**, a Media Lab project to collect the things that computers should know in order to understand what people are talking about, which then grew into an **international**, **multi-homed project** called the **Common Sense Computing Initiative**.

Version	Time	Description	
ConceptNet 2	2004	 packed Python data structure, along with code to read it and operations that could be performed only in English 	
ConceptNet 3	2007	 made ConceptNet into a SQL database English and Brazilian Portuguese 	
ConceptNet 4	2008	 revised and normalized the database structure incorporated contributions from other projects added a Web API English, Chinese, Japanese, Brasil, Dutch 	
ConceptNet 5	2012		

Data sources

- ConceptNet 5 is built from the following sources:
 - Open Mind Common Sense (OMCS) and sister projects in other languages
 - Information extracted from parsing **Wiktionary**, in multiple languages
 - "Games with a purpose" designed to collect common knowledge
 - Open Multilingual WordNet, a linked-data representation of WordNet and its parallel projects in multiple languages
 - JMDict, a Japanese-multilingual dictionary
 - **OpenCyc**, a hierarchy of hypernyms provided by Cyc, a system that represents common sense knowledge in predicate logic
 - A subset of **DBPedia**, a network of facts extracted from Wikipedia infoboxes

Data size

- Over 21 million edges
- Over 8 million nodes
- English: 1,500,000 nodes
- There are 83 languages in which it contains at least 10,000 nodes.

Term

- ConceptNet represents **terms**(words and phrases of natural language) in a standardized form
 - Lowercased
 - Non-punctuation tokens
 - Unicode word segmentation
- Namespace
 - c: concept
 - r: relation
 - lang: en....
- URI
 - English term "United States": /c/en/united states
 - Relations: /r/PartOf



Term

- Not in lemmatized form
 - Using the FormOf relation
 - (driving, FormOf, drive)
 - Both "driving" and "drive" can be looked up in ConceptNet.
- Often a common word in its undisambiguated form.
 - /c/en/lead, even though it has multiple meanings.
 - Allows for more specific, disambiguated versions of a term
 - /c/en/lead/n
 - Use the relation SenseOf

Relation

- Closed class of selected relations
- 36 relations



- As a new feature in ConceptNet 5.5, some relations are designated as being symmetric, such as *SimilarTo*. The directionality of these edges is unimportant
- These relations are given artificial names in English, but apply to all languages.
 - Symmetric relations: Antonym, DistinctFrom, EtymologicallyRelatedTo, LocatedNear, RelatedTo, SimilarTo, and Synonym
 - Asymmetric relations: AtLocation, CapableOf, Causes, CausesDesire, CreatedBy, DefinedAs, DerivedFrom, Desires, Entails, ExternalURL, FormOf, HasA, HasContext, HasFirstSubevent, HasLastSubevent, HasPrerequisite, HasProperty, InstanceOf, IsA, MadeOf, MannerOf, MotivatedByGoal, ObstructedBy, PartOf, ReceivesAction, SenseOf, SymbolOf, and UsedFor

Relation Example

Relation	Example	
/r/RelatedTo	learn ↔ erudition	
/r/ExternalURL	knowledge \rightarrow <u>http://dbpedia.org/page/Knowledge</u>	
/r/FormOf	slept → sleep	
/r/PartOf	gearshift → car	
/r/HasProperty	ice \rightarrow cold	
/r/Synonym	sunlight ↔ sunshine	
/r/SimilarTo	mixer \leftrightarrow food processor	
/r/MadeOf	bottle → plastic	
/r/CausesDesire	having no food \rightarrow go to a store	
/r/LocatedNear	chair \leftrightarrow table	
/r/DistinctFrom	$red \leftrightarrow blue; August \leftrightarrow September$	

You can find more examples here: https://github.com/commonsense/conceptnet5/wiki/Relations

Another Example



Web API

• Use standard Python request library

```
>>> import requests
>>> obj = requests.get('http://api.conceptnet.io/c/en/example').json()
>>> obj.keys()
dict_keys(['view', '@context', '@id', 'edges'])
>>> len(obj['edges'])
20
>>> obj['edges'][2]
{'@id': '/a/[/r/IsA/,/c/en/example/n/,/c/en/information/n/]',
 'dataset': '/d/wordnet/3.1',
 'end': {'@id': '/c/en/information/n',
  'label': 'information',
  'language': 'en',
  'sense_label': 'n',
  'term': '/c/en/information'},
 'license': 'cc:by/4.0',
 'rel': {'@id': '/r/IsA', 'label': 'IsA'},
 'sources': [{'@id': '/s/resource/wordnet/rdf/3.1',
   'contributor': '/s/resource/wordnet/rdf/3.1'}],
 'start': {'@id': '/c/en/example/n',
  'label': 'example',
  'language': 'en',
  'sense_label': 'n',
  'term': '/c/en/example'},
 'surfaceText': [[example]] is a type of [[information]]',
 'weight': 2.0}
```

You can find more APIs here: https://github.com/commonsense/conceptnet5/wiki/API

Web

	北京	Chinese 🗘	Search
これ 北京 A Chinese term in Concep Sources: the PTT Pet Game, CC-CEDICT : View this term in the API	tNet 5.6 2017-10, German Wiktionary, English Wiktionary, and French Wiktionary		Documentation FAQ Chat Blog
Synonyms	Related terms	北京 has	Etymologically derived terms
en beijing ⁽ⁿ⁾ f pékin ⁽ⁿ⁾ h 北上广 h 北上广 f beijing f peking f peking f prc government h 北京 h 北京	an capital → an northern → an province →	⊉ 中國 → ₱ 大陸 →	』 北京 → ᡂ 베이징 →
北京 is a type of	Derived from	Etymologically related	Links to other sites
zh 首都 → zh 首府 →	zh 北 ⁽ⁿ⁾ →	en beijing → fr pékin → ro beijing →	en.wiktionary.org 北京 fr.wiktionary.org 北京

http://conceptnet.io/

ConceptNet vs WordNet

- WordNet is optimized for lexical categorization and word-similarity determination
- ConceptNet is optimized for making practical context-based inferences over real-world texts.
- ConceptNet extends semantic relations from the triplet of synonym, *is-a*, and *part-of*, to a present repertoire of twenty semantic relations.

example

- Location Of (A,B): **Books** are in the **library**.
- Used For (A,B): Forks are used for eating.
- Subevent Of (A,B): After waking up in morning, he checked his email.

Papers using ConceptNet



Bauer L, Wang Y, Bansal M. Commonsense for Generative Multi-Hop Question Answering Tasks EMNLP18

Zhou H, Young T, Huang M, et al. Commonsense Knowledge Aware Conversation Generation with Graph Attention IJCAI18

Reference

- ConceptNet 5.5: An Open Multilingual Graph of General Knowledge
- Representing General Relational Knowledge in ConceptNet 5
- Introduction to WordNet, HowNet, FrameNet and ConceptNet
- http://conceptnet.io/
- https://github.com/commonsense/conceptnet5

Thanks!