

→ Dictionary network - $G = (V, E)$ such that

V ~~are~~ words is a set of words $\{w_1, w_2, \dots, w_n\}$
 E is an edge ~~such that it goes for~~ connecting
vertices according to $E \xrightarrow{R} V$

- Language consists of words.
- Words in a language have meaning.
- words were used according to a set of rel rules and relationship R .
- What is the 'meaning' of a word?
- ~~the~~ Dictionary is a collection of pairs of words and their definitions D .
- The dictionary is a source compiled to a logical equivalence between the term defined and an expression whose meaning has already been specified.

~~of a~~ ~~definition~~ ~~in the~~ ~~order.~~ Ref: Abraham Kaplan Kaplan, Abraham (11, May, 1946) Definition and specification of meaning. The Journal of Philosophy, Volume 43, Issue 11, Pages 251-282
~~Questions~~ Choices faced by a lexicographer

- Do I focus the senses of individual words
- which readings of a word do I consider relevant.
- Which type of meaning do I have to define.
- Which linguistic perspective do I take
- Which definitional format do I use?

Ref: A Practical guide to Lexicography edited by J. van. Sterkenburg

- Lexicographers are tasked with constructing dictionaries.
- A person trained to be a lexicographer would have been trained to define words according to a given ~~understan~~. model of a language which is assumed to be universally accepted.
- A collection of definitions such ~~tho~~ as Wiktionary defines words according to a language model, accepted.
- This language model can be thought of how ~~a~~ ~~part~~ any person speaking and understanding the language ~~will be able to use it~~ uses and understands the language.
- This can give ~~us~~ us an opportunity to understand how language is generated and understood by the mind. Thus Dictionary ~~networks~~ like Wiktionary can be used to study the cognition of a language as they contain ~~the~~ definitions of words according to a model that ~~approximately~~ coincides with various different models of the same language.

- semantic

Semantic description is concerned with definition defining the individual meanings of words. However, semantic information in dictionaries goes beyond the description of separate words and words meanings. Words in fact, do not exist in isolation do not exist at all, but they are related to each other in various ways:

- Synonyms
- Antonyms
- Hypernym
- Polysemous.

There ~~is~~ are also grammatical relationships that exist in the gap definitions of the words that is present due to how the lexicographer frames the definitions.

① This is also implied by the other papers also where the following studies were conducted and the following were the results.

2 - Dictionaries as Networks: Identifying the graph structure of Ogden's Basic English.

- The definition of a word involves recursively new words, and new senses and meanings.
- Loop is an essential element of the growth process of networks. Words within loops tend to be introduced into the English language at similar time Levary et al (2012).
- Abbott et al (2012) compare the functioning of the human mind when searching for memories with a random walk in a semantic network.

- Dictionary \rightarrow a Dictionary $\xrightarrow{\text{Re-processing}}$ $(w, \text{Def}(w))$

where $\text{Def}(w) = \{w_1, w_2, \dots, w_k\} \in V$

Network is built from these words.

- Collection of properties of the built graph from a number of resources - (Leskovec, 2014)
- small world property
- n - size of the network
- m - number of edges that allow for an estimation of edges its density
- α - refers to the exponent of the degree distribution function $C P_k \sim k^{-\alpha}$ where P_k is the fraction of the nodes that have degree k , $\{in/out\}$ degree)

$C1 \& C2$ clustering coefficients.

r coefficient r indicates whether the high degree vertices in the network associate (have links) preferentially with other high-degree vertices or not

- Graph has two parts
 - Giant weakly connected component
 - Disconnected components
- Giant weakly connected component consists of
 - Giant strongly connected component
 - Giant in component
 - Giant out component.
 - Tendrils.
- Frequency of occurrence studied
 - classical centrality measures
 - Degree
 - PageRank
 - betweenness centrality and closeness
 - closeness centrality
- Similarities among words - big (bidirectional) cliques which are not rare in dictionaries are formed by words with similar meanings.
- Core/Periphery characterization - categorization of the nodes of the network
 - Core - central densely connected set
 - Periphery - denotes sparsely connected and non-central set of nodes that are linked to the core.
 - Types of cores mentioned pg-7 &
- Hypothesis
 - Ogden's set has good correlation with central node in the dictionary network.
 - The meaning of words is essentially a network property and not an individual one
 - Group centrality existence
 - Strong notion of connectivity - two words are connected if they are mutually used in the definition of the other: Bidirectional components of the graph \leftrightarrow .

Conclusion

- Dictionary networks share a common network.

Loops and self references in the construction of Dictionaries.

Asking this →
to what was
previously said about
recognition. Or
adding words in an
order, the growth
of the network will
be how a learner's
understanding of the
language will grow.
This can be
used somewhere.

- Addition of new words to a dictionary serves two purposes -
 - Increase the rate at which a particular topic can be communicated by introducing a new word to label a concept previously represented by a string of existing words (the definition of a concept). The second is to introduce a new previously incommunicable concept of the language.

- Human lexicon as a network
- Directed dictionary networks
- Str.H: The strongly connected nature of the core suggests that definitional loops play an important role in shaping the underlying topology of the dictionary graph.
- Loops are particularly interesting as they represent a form of self-reference
- Investigation of the role of loops in a large network looking at the construction of a dictionary.

This can be →
related to what was
said in the last
paper about
different types of
components suggested
in it. Those components
and categorization can
also have semantic
information.

- H: New concepts can be introduced only by the insertion of a loop into the graph. These loops coalesce into larger connected components, which have are semantically coherent.

- Kant, Logik ein Handbuch zu Vorlesungen, Logische
Achtus der Komparation, Reflexion and und Abstraktion,
section I § 6 (1800) concepts are generated by
performing three types of logical operations on a
set of mental images: comparison, reflection and
abstraction.

↳ Relate this to formation, manipulation and
destruction of mental representation in the mind.

→ Find a model that can be used to relate the concepts being
suggested above with how the brain creates its mental
representations to create a model.

- H: New concepts must be self referential contained and as
such the collection of words used to represent them
must be self-referential.
- A concept is created at the time t if and only if there
exists a word at time t that was not definable
before time t .
- Cycles in the dictionary fall into classes: short (≤ 5)
and long (> 5). Short loops appear to be a unique
feature arising from meaningful connections between

- long loops are generally formed from semantic misinterpretations
- Also: long loops would be essentially non-existent in a dictionary with manual semantic tagging
- The links within these longer loops, however, are simultaneously involved in small loops, and as a result the loops generally follow a logical progression of ideas
- conflicting idea presented here: The core does not reflect large-scale conceptual interdependence in the lexicon but rather exists as an artifact of imperfect dictionary construction
- Also says meaningful connections between the connected components do of course exist

→ Read into the idea of singular vectors in Pg. 6