Network Emporium

Complex Networks | @networksvox
CSYS/MATH 303, Spring, 2016

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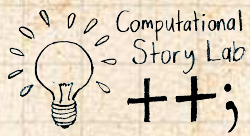

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Outline

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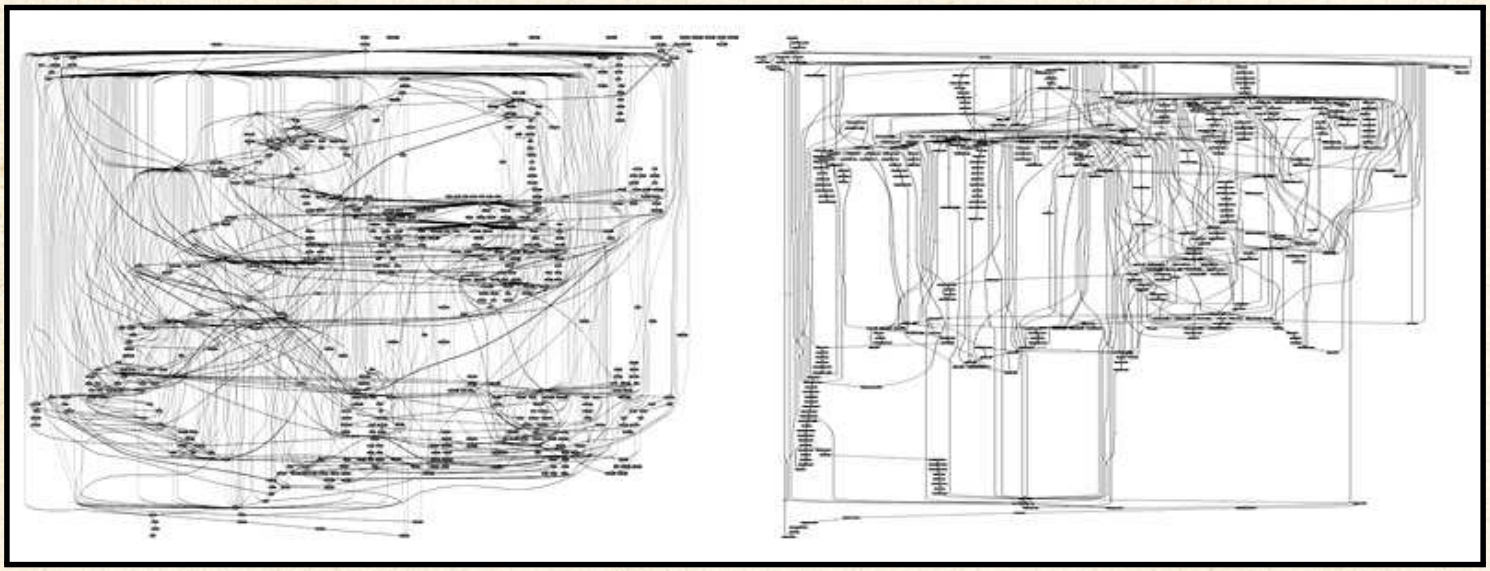
Dynamic networks: Server security

Serving one html page with an image:



- Map of system calls made by a Linux server running Apache and Windows server running IIS. Which is which?

Taken from http://www.visualcomplexity.com, 2006

On the universal structure of human lexical semantics

Hyejin Youn, Logan Sutton, Eric Smith, Cristopher Moore, Jon F. Wilkins, Ian Maddieson, William Croft, and Tanmoy Bhattacharya

“On the universal structure of human lexical semantics”

Youn et al.,
Proc. Natl. Acad. Sci., –, –, 2016. [?]

- Idea: Connect Swadesh words concepts which have are linked by polysemous words.
- 81 languages distributed geographically and phylogenetically.
- 22 concepts: stone, earth, sun, mountain, ...
- Method: translate concept terms into a language and back, finding which terms are linked by back translation.
- Online site to explore here:
  `http://hyoun.me/language/`.

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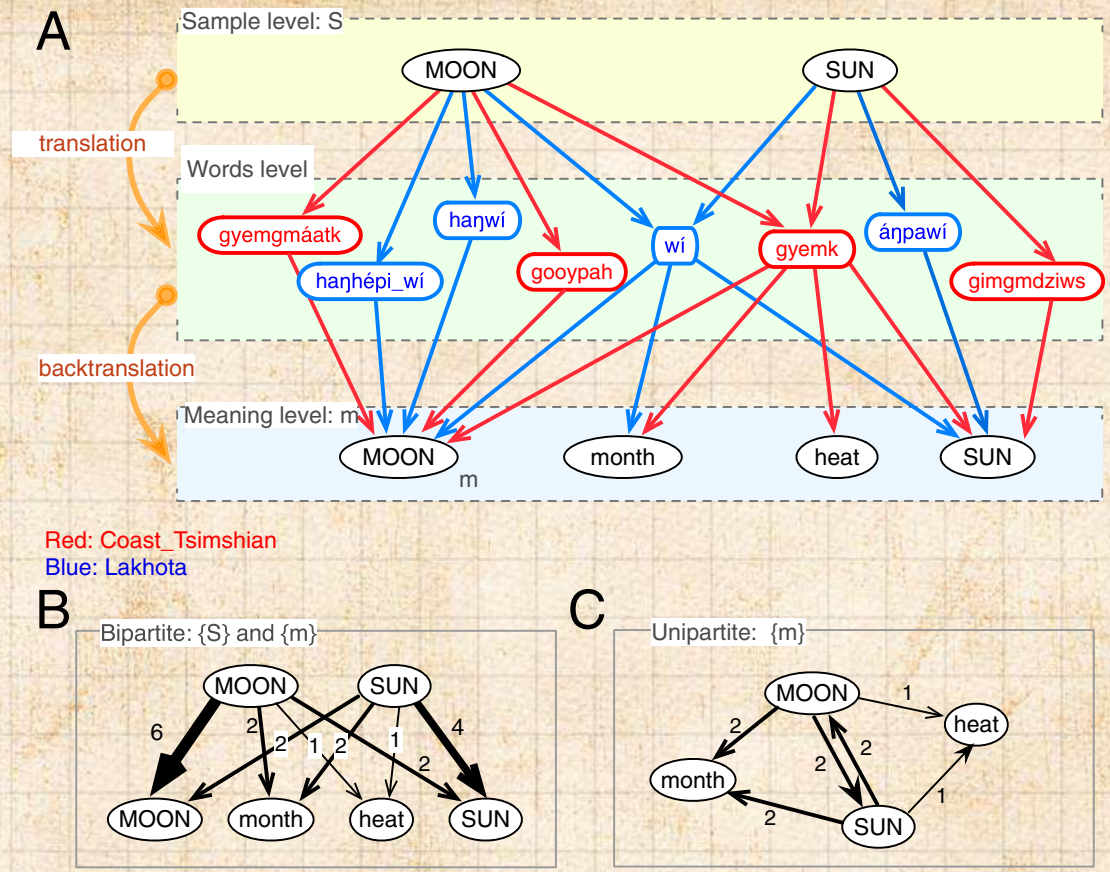

Fig. 1. Schematic figure of the construction of semantic networks. (*A*) Bipartite semantic network constructed through translation (links from the first layer to the second layer) and back-translation (links from the second layer to the third layer) for the cases of MOON and SUN in two American languages: Coast Tsimshian (red links) and Lakhota (blue links). We write the starting concepts from the Swadesh list (SUN, MOON) in capital letters, whereas other concepts that arise through translation (month, heat) are in written in lowercase letters. (*B*) We link each pair of concepts with a weight equal to the number of translation–back-translation paths. (*C*) Resulting weighted graph. More methodological information can be found in *SI Appendix*, section II.

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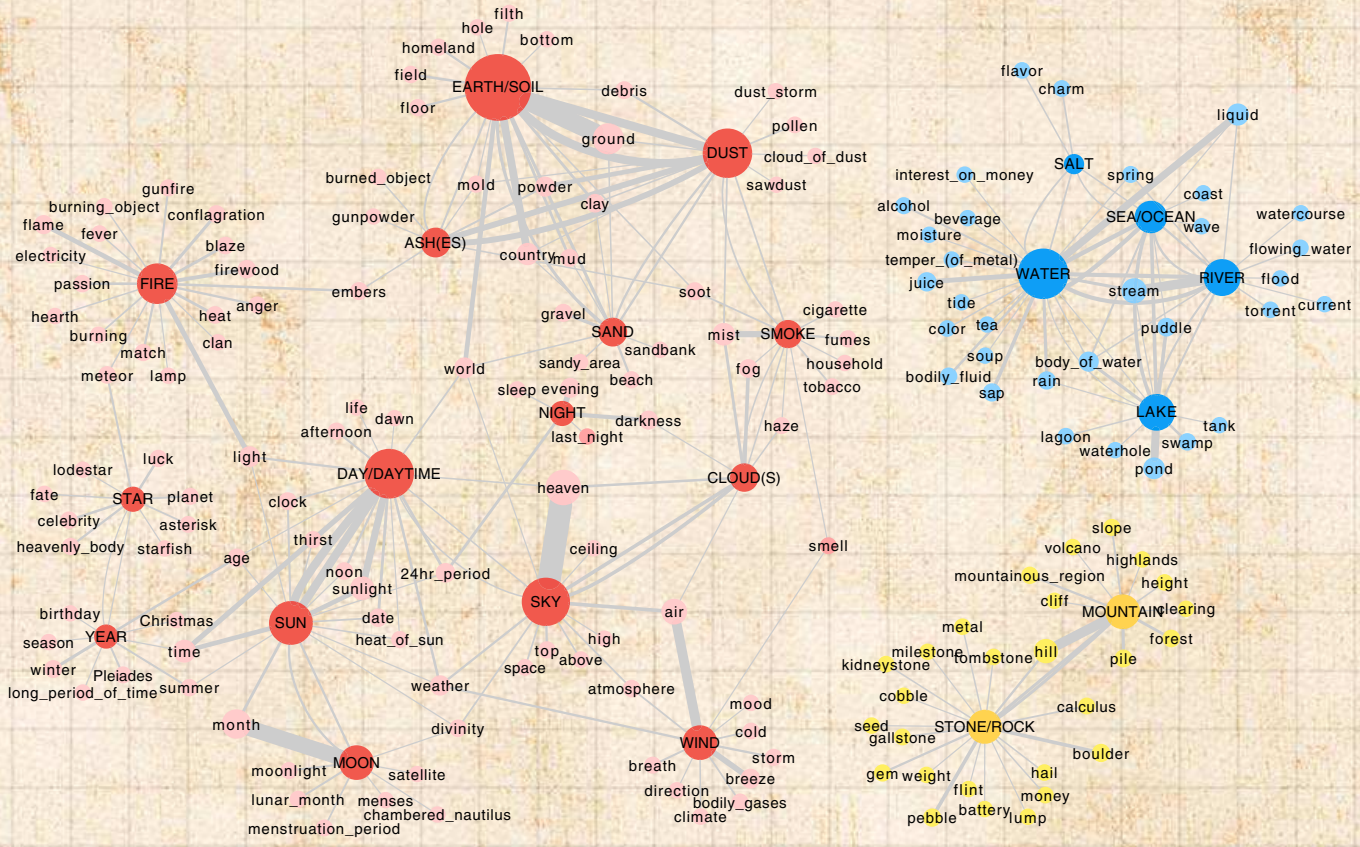

Fig. 2. Semantic network inferred from polysemy data. Concepts are linked when polysemous words cover both concepts. Swadesh words (the starting concepts) are capitalized. The size of a node and the width of a link to another node are proportional to the number of polysemies associated with the concept and with the two connected concepts, respectively. Links whose weights are at least 2 are shown, and their directions are omitted for simplicity. The thick link from SKY to heaven, for example, shows that a large number of words in various languages have both SKY and heaven as meanings. Three distinct clusters, colored in red, blue, and yellow, are identified. These clusters may indicate a set of relationships among concepts that reflects a universal human conceptual structure in these domains.

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