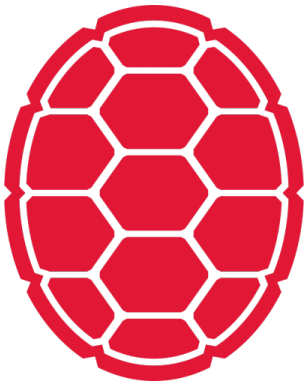

Distributional Semantics

Natural Language Processing: Jordan Boyd-Graber

University of Maryland

SLIDES ADAPTED FROM YOAV GOLDBERG AND OMER LEVY

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- How similar is “pasta” to “pizza”
- Computers often use one-hot representations
- Or fragile knowledge bases
- Distributional Hypothesis (Harris, 1954; Firth, 1957)
- Know the word by the company it keeps

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- Use images?
  - How our eyes do it!
  - We lose information
  - OCR is often preprocessing step
- Use strings?
  - Wasteful of memory
  - Is dOg different from Dog?
  - What about “ dog” and “dog”?

What we've already done

- Typically, want to do preprocessing (case, whitespace)
- Can also remove plurals, verb forms, etc. (more later)
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- Typically, want to do preprocessing (case, whitespace)
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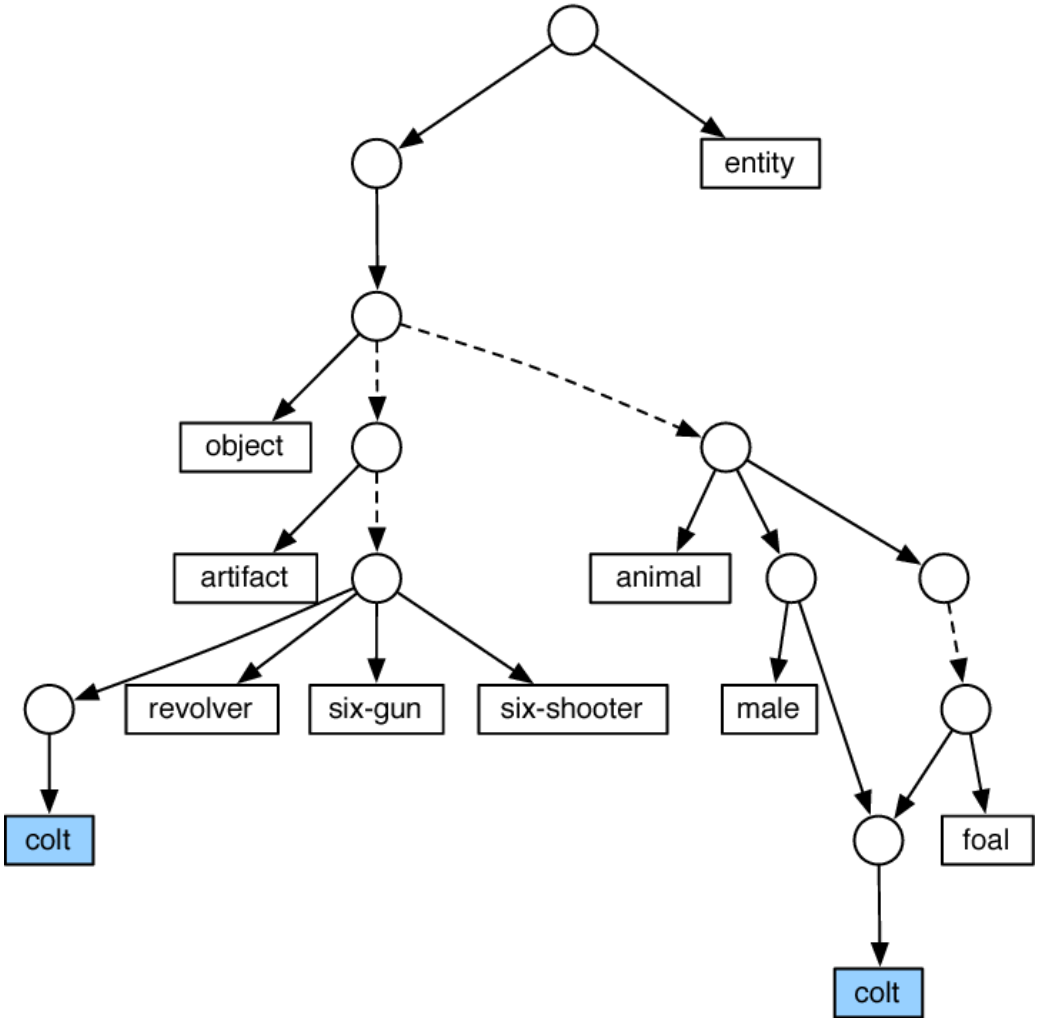
- Then, you can represent each word as an **integer**
  - Memory efficient
  - Removes connections between words

What about a dictionary?



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- Brown clusters: automatically built tree
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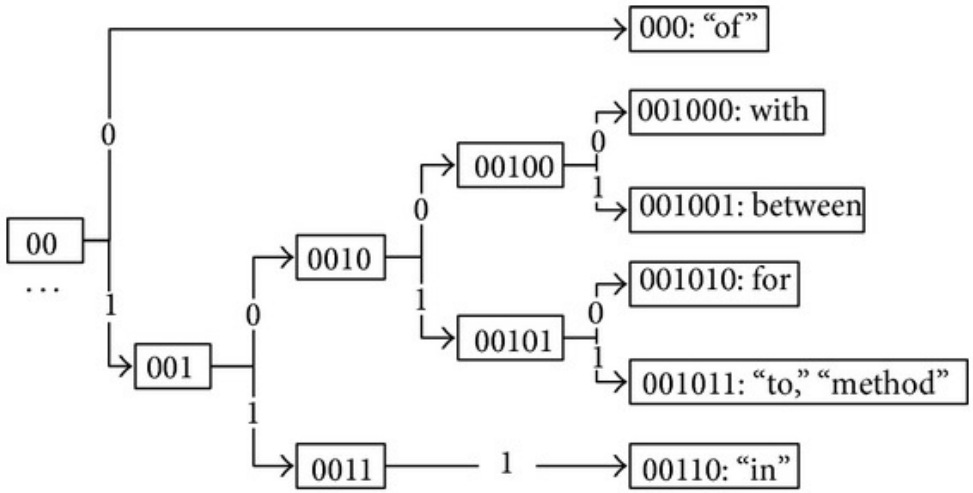

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a dish of Italian origin consisting of a flat, round base of dough baked with a topping of tomato sauce and cheese, typically with added meat or vegetables.

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a dish originally from Italy consisting of dough made from durum wheat and water, extruded or stamped into various shapes and typically cooked in boiling water.

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- Infinitely deep rabbit hole!

Intuition (from Boroni)

Marco saw a furry little wampimuk hiding in the tree

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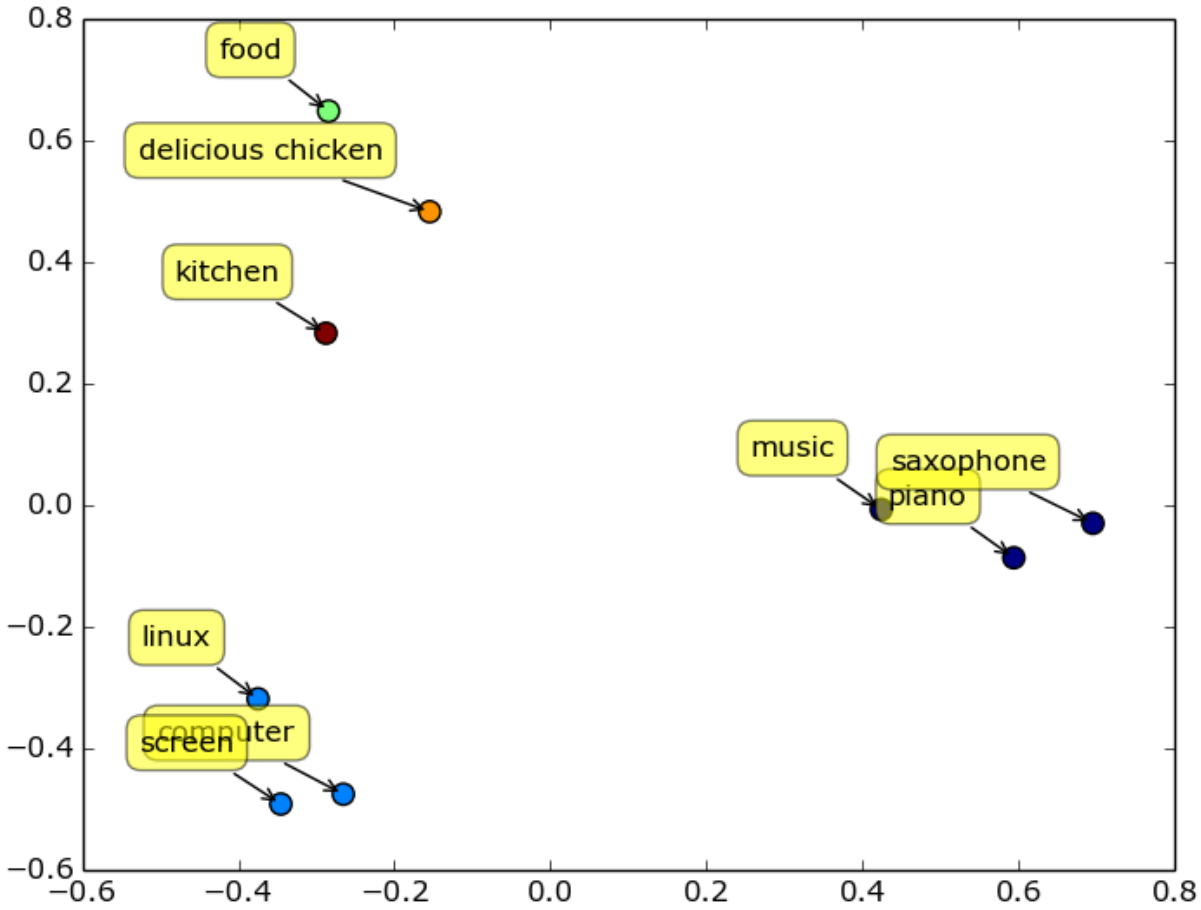
Continuous Representation!



Definitions

Distributional Word Representation

Encoding a word's meaning from how it is used in a corpus

Distributed Representation

Encoding a word's meaning in a compact, dense, low-dimensional representation

Usefulness

- Multimodal
- Multilingual
- Useful downstream feature