Lecture 9: Figurative Language
Lexical Semantics and Discourse Processing
MPhil in Advanced Computer Science
Simone Teufel
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Phenomenology

Automatic Approaches

Logical Metonymy
Regular Metonymy
Metaphor
Idioms

Reading


Types of Figurative Language

- Hyperbole (*mile-high ice cream cone*),
- Irony, Humour (*beauty is in the eye of the beer-holder*)
- Metonymy
  - Creative: *The ham sandwich is waiting for his check*.
  - Regular: *All eyes were on Germany, but Berlin seemed unwilling to lead the Union*.
  - Logical: *a fast plane*
- Metaphor
  - *He shot down all my arguments*.
- Simile
  - *She is like a rose*.
- Idiom
  - *He has a bee in his bonnet*. 
Phenomenology
Automatic Approaches
Logical Metonymy
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Logical Metonymy

Due to Pustejovsky (1991, 1995)

Additional meaning arises for particular verb-noun and adjective-noun combinations in a systematic way.

Verb (or adjective) semantically selects for an event-type argument, but syntactically selects for a noun.

The event is however predictable from the semantics of the noun.

Examples:

- Mary finished her beer.
  Mary finished **drinking** her beer.
- **easy problem**
  **difficult language**
- **good cook**
  **good soup**

Metonymy

Creative metonymy is hard to recognize automatically, because it depends on the understanding of the entire situation. AI bottleneck of knowledge representation.

Regular metonymy follows schemes:

- **PRODUCT-FOR-PRODUCER**: Press-men hoisted their notebooks and their Kodaks.
- **LOCATION-FOR-EVENT**: After Lockerbie, people were more careful about saying that.

- Very frequent phenomenon in language

Metaphor

Express one concept/situation in terms of another concept/situation (including all other participants, properties and events of that situation).

FEELINGS are LIQUIDS:

- A simple phone call had managed to **stir up** all these feelings.
- Now here I was, **seething** with anger
- **is a kind of pressure valve** for the release of pent-up nervous energy
- **... provide an outlet for creativity ...** Just ignore the turbulent feelings and turn your attention towards ...

ARGUMENT is WAR:

- **Parties go into battle** about how high to push the bar for skills
- **Villagers launch fight** to save their primary school from closure

Conceptual Metaphor Theory

Due to Lakoff and Johnson (1980)

Mapping between two cognitive domains

Source and target domains

Usually, source domain is more concrete/evocative
Mixed Metaphor

Combination of two incompatible metaphorical mappings:

- *If we can hit that bullseye then the rest of the dominoes will fall like a house of cards... Checkmate.*
  - Zapp Brannigan (Futurama)
- *it would somehow bring the public school system crumbling to its knees.*
- *biting the hand that rocks the cradle*
- *He took to it like a fish out of water.*
- *He wanted to get out from under his father’s coat strings.*
- *She’s been burning the midnight oil at both ends.*

Dead metaphor

**Dead metaphor**: The image that the metaphor invokes has been established in the language, i.e., is now contained in the “lexicon”. Creative, situational figurative images are excluded.

- *I simply cannot grasp this idea.*
- *This really made an impression on me.*

Often not perceived as metaphor.

Idioms

Minimal semantic constituents which consist of more than one word.

Definition: the meaning of an idiom cannot be inferred as a compositional function of the meaning of its parts.

- *pull somebody’s leg*
- *be off one’s rocker*

**Syntactic Variability Tests:**

- *?Arthur has a bee, apparently, in his bonnet.* (insertion)
- *?Arthur kicked the large bucket.* (modification)

Idioms: crosslingual issues

Level of translatability of idiom into another language is unpredictable.

- *“donner sa langue au chat” (give your tongue to the cat)*
- *“appeller un chat un chat” (call a cat a cat)*
Idiom or dead metaphor? Rephrasing Test

If rephrasing results in similar semantics, the multi-word entity is not a semantic constituent (thus a dead metaphor, not an idiom).

**Dead metaphors:**
- They tried to sweeten the pill. ≈ They tried to sugar the medicine.
- We shall leave no stone unturned in our search for the culprit. ≈ We shall look under every stone in our search for the culprit.

**Idioms:**
- John pulled his sister’s leg ≠ John tugged at his sister’s leg
- Arthur kicked the bucket ≠ Arthur tipped over the water receptacle

Logical Metonymy: Lapata and Lascarides (2003)

- a fast { landing? } plane
- flying? 
- I enjoyed { reading? } the book
- writing? 
- eating?

What is missing for full automatic recognition is the implicit verb (fly(ing) and read(ing)).

Cooccurrences of plane–fly and fly–fast and like-reading and read–book in corpus can give us the answer.

But: conditioning on both associations at the same time will result in data sparseness

Therefore: probabilistic model used separates the two associations

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Corpus-based recognition of metonymy

Markert and Nissim (06):
- Supervised learning problem: country and organisation names are classified as metonymical or not
- Manually annotate large training corpus (1,000 examples of each from the BNC)
- Good human agreement
- Use grammatical information as features
- Roughly 20% of country names are used metonymically, and 33% of organisation names.
Metonymy: examples

Countries:
- Or have you forgotten that America did once try to ban alcohol and look what happened!
- At one time there were nine tenants there who went to America.

Organisations:
- BMW and Renault sign recycling pact.
  - How I bought my first BMW.

Features:
- Grammatical function (subj, premod, gen, obj, PP, pred, subjpassive, iobj, other)
- Number, definiteness of determiner
- Lexical head

Results:
- 87% correct for country names (EMNLP 2002 paper)
- 76% correct for organisations (IWCS 2005 paper)

Automatic Approaches to Metaphor Recognition

- Selectional restrictions of metaphorically used word in literal interpretation are violated (Wilks 79)
- is-a metaphors violate WN-hyponymy relation: all the world is a stage (Krishnakumaran and Zhu, 2007)
- Or use manually created metaphor-specific knowledge bases (Martin 1980; Narayanan 1999; Barnden and Lee 2002).

A Symbolic Approache to Metaphor Interpretation

SLIPNET (Veale and Hao 2008) relates two concepts via definitions, allowing for deletions, insertions and substitutions.

Goal: to find a connection between source and target concepts.

Example:

Make-up is a Western Burqa

\[ \text{make-up} \Rightarrow \]
- typically worn by women
- expected to be worn by women
- must be worn by women
- must be worn by Muslim women

\[ \text{burqa} \Leftarrow \]
### Metaphor Recognition (Shutova et al. 2010)

- Start from seed set including a potentially metaphorical verb
- Model possible target domain $\rightarrow$ cluster its arguments and subject
- Most “abstract” cluster corresponds to target concept cluster
- Model possible source domain $\rightarrow$ cluster the verbs that go with these arguments

<table>
<thead>
<tr>
<th>Target concept cluster</th>
<th>Source domain cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>desire hostily anxiety passion excitement doubt fear</td>
<td>gulp drain stir empty pour sip spill swallow drink pollute seep flow drip purify ooze pump bubble splash ripple simmer boil tread</td>
</tr>
</tbody>
</table>

stir excitement $\rightarrow$ swallow anger
cast doubt $\rightarrow$ spark enthusiasm

### Shutova et al: Paraphrasing Example

<table>
<thead>
<tr>
<th>Initial ranking</th>
<th>SP reranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>hold back truth</td>
<td>-13.09 contain 0.1161 conceal</td>
</tr>
<tr>
<td>-14.15 conceal 0.0214 keep</td>
<td></td>
</tr>
<tr>
<td>-14.62 suppress 0.0070 suppress</td>
<td></td>
</tr>
<tr>
<td>-15.13 hold 0.0022 contain</td>
<td></td>
</tr>
<tr>
<td>-16.23 keep 0.0018 defend</td>
<td></td>
</tr>
<tr>
<td>-16.24 defend 0.0006 hold</td>
<td></td>
</tr>
<tr>
<td>stir excitement</td>
<td>-14.28 create 0.0696 provoke</td>
</tr>
<tr>
<td>-14.84 provoke 0.0245 elicit</td>
<td></td>
</tr>
<tr>
<td>-15.53 make 0.0194 arouse</td>
<td></td>
</tr>
<tr>
<td>-15.53 elicit 0.0061 conjure</td>
<td></td>
</tr>
<tr>
<td>-15.53 arouse 0.0028 create</td>
<td></td>
</tr>
<tr>
<td>-16.23 stimulate 0.0001 stimulate</td>
<td></td>
</tr>
<tr>
<td>-16.23 raise ~0 raise</td>
<td></td>
</tr>
<tr>
<td>-16.23 excite ~0 make</td>
<td></td>
</tr>
<tr>
<td>-16.23 conjure ~0 excite</td>
<td></td>
</tr>
</tbody>
</table>

### Summary

- Logical Metonymy can be solved by individual associations of implicit verb with explicitly mentioned lexical items
- Problem with Lapata/Lascarides (2003): word senses all conflated
- Regular Metonymy can be solved by supervised classification with features similar to supervised WSD.
- Metaphors can be recognised by seed clustering and paraphrased by lexical similarity and selectional restrictions.
- Shutova et al.’s system: precision is high ($\sim$ 80%), but recall is very low (0.25%)

### Metaphor Interpretation by literal paraphrase

Input: *A carelessly leaked report*
Output: *A carelessly disclosed report*

- Find lexically similar candidates for replacement (standard distributional semantics approach)
- Use a Resnik-type selectional restriction filter to filter out metaphorical expressions (those that have low selectional restriction strength), so that only literal ones are left over.

\[
A_R(v, c) = \frac{1}{S_R(v)} \frac{P(c|v)}{P(c)} \log \frac{P(c|v)}{P(c)}
\]