Making WordNet Data (Retro)Fit for a Multilingual Dictionary

Problems with WordNet as Lexicography

Inadequate Definitions

English definitions are indicative, not definitive

- One English meaning ascribed to multiple terms in multiple languages
- Mixed quality, e.g. *elevator car*: where passengers ride up and down
- Not accurate for all members, e.g. *eat, feed*: take in food; used of animals only
- Tautologies, e.g. *visit*: pay a brief visit
- Outright errors, e.g. *law practice*: the practice of law

Translation Term Problems

- Incorrect glosses, often matching the wrong sense of homographs
- "Kitchen sink" collections of somewhat related terms
- Semantic drift - correct glosses of English terms that are a bit off from synset definition
- Meanings mostly assumed from English definitions
- No information beyond lemmatic spelling – what is usually known is that one form of a term is a near equivalent of something in English

Erratic Coverage

- Missing senses, e.g. *light*: traffic signal
- Missing terms, e.g. *lightsaber*
- Spotty relationships, e.g. no pair between *boat* and *ship*, but a tie for *jalopy* and *bus*
- Random named entities, often figures of US or UK cultural significance from a by-gone era
- Cultural focus on US and UK concepts, e.g. *shortstop* (inherent to any English-based elicitation list)

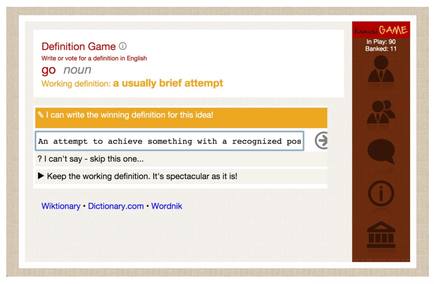
Licenses and Limitations

- Many Wordnets are not copyright-available for further use or modification
- Many Wordnets are done/ dormant – no changes planned or possible
- Active Wordnets are opaque about how public or professionals can contribute new data or change existing data

Solutions: WordNet as Seed Data

Crowd Review of Existing Data

- Competition for best-written definitions per concept/spelling entity
  - If PWN definition is good, it will win
- Validation/ rejection of bilingual matches by bilingual speakers
  - English <-> Wordnet X
  - Wordnet X <-> Wordnet Y



Data in Own Languages

- Definitions of terms in their own language
  - *dedo* in Portuguese is different from the English elicitation term
  - Own-language **definitions** can be translated to English or other languages
- Usage examples from own-language sources, e.g. blogs and tweets
- Additional lexical data
  - Inflected forms
  - Pronunciations
  - Etc, etc, etc…

More Data for English Terms

- Descriptions of differences between synset members, e.g. *snuggle* vs. *nestle*
- User-curated usage examples, video links, images
- Geo-tagged pronunciations
- Geo-tagged usage sightings
- Lexicalized etymologies for historical and comparative linguistics
- BabelNet and other linked data
- Etc… (bringing in data from wheels that have already been invented, working with partners on new ways to enhance English data)

More Terms, More Languages

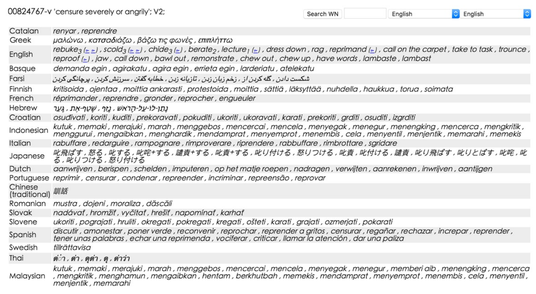
- Compare WordNet to other sources to find omissions
  - Terms from bilingual dictionaries can address cultural bias
  - Candidates for WordNet inclusion could be selected based on popularity (search logs, number of languages that choose to translate)
- When Kamusi processes produce entries linked to WordNet in languages that do not already contain them, WordNets for those languages are created or expanded
  - Data merged from existing sources is directly matched to synset senses

Lumping and Splitting

Synsets: From Lumps to Lemmas

- All English members of a synset are ascribed the same meaning and usage examples
- Most other languages are ascribed the same meaning

200+ terms lumped together for *rag*:



PWN: Vertical Focus

- Synsets conceived as clusters for ontological relationships
  - Meronyms/ holonyms
  - Hypernyms/ hyponyms, etc
- Objective was understanding about psychology, not linguistics
- "Definitions" intended for group identification, not lexical precision
- Translations attached post hoc, not by design
  - Naïve bilingual model of raw horizontal equivalence

Synsets *Are Not* (necessarily) Synonyms

- Within a language, subtle differences exist for important reasons, e.g. nuance among {*approximate, estimate, gauge, guess, judge*}
- Larger English synsets inspire very large translation synsets
- Translation introduces semantic drift
  - especially notable in larger synsets
- 1/(#English terms)^2 odds that a term in one translation language will equate with a given term in another language

Synsets *Are* Topical Relationships

- Synset definition describes the semantic relationship
- Synset relations perform like horizontal ontologies
  - Members share a certain property (topic) but independent essences
- Members should generally have independent definitions and examples in addition to synset topical guides
- Imputed translations among languages should be seen as only topically indicative until human verified

OMW: One Big Concept, Separated per language

- Terms from one language Wordnet can be seen together with:
  - "Same" idea terms in that language
  - English synset definition
  - Matching clusters from other languages
- Each term in one cluster is parallel to each term in all other clusters

11 Japanese terms = 20 Arabic terms:

見立てる, 見積る, 予算+する, 目算, 積もる, 目算+する, 見積もる, 予算, 積る, 推算, 推算+する

ثمّن, حكم على, قارب, ثمن, كان رأيا, حكم قضائيا, قيّم, قدر, تبأر, فصل, خمن, خَمَّنَ, حزر, قوم, استنتج, قاس, عين سعة شيء ما, ظن, قدّر, حاكم

Kamusi: Separate Concepts, Linked

- Synset members within a language are separate entities with own specific meanings
- Each pair across languages is an independent relationship to be diagrammed and validated
- ~100,000 synsets = ~10,000,000 pairs

Substitutes

Degree of *equivalence* between terms:

1. Parallel – basically the same idea
2. Similar – substantial overlap, but noteworthy differences
3. Explanatory – invented term in one language to fill lexical gap for a concept indigenous to another

- A term can be *parallel* to one synset/ translation set member but *similar* or *explanatory* to another (programming complexity)
- Differences can be elaborated in definition-like field

Joints

Degree of *separation* between terms:

- WordNet data has (often faulty) presumption of 1◦ manual validity for
  - Same-language synset members
  - Links to English
- Relationships via intermediate languages are mapped transitively, i.e. A <-> B <-> C <-> D
  - A and D are 3rd generation links (3◦)
- For GWN data, "B" is always English, most computed pairs are 2◦
- Evaluating predicted bilingual joints is future work via crowd systems

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ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

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