PAPEL:
a lexical ontology for Portuguese

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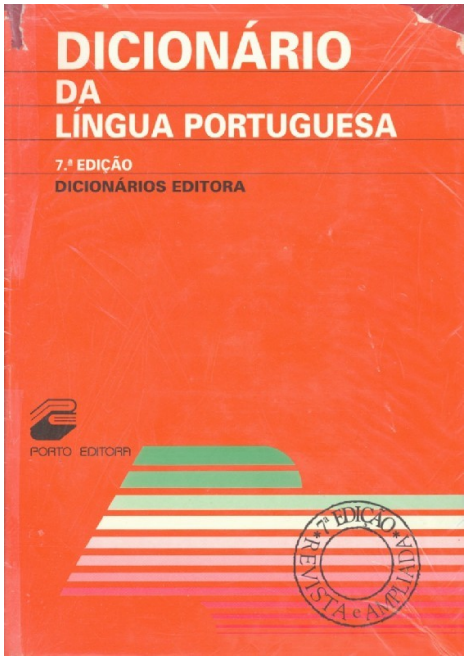
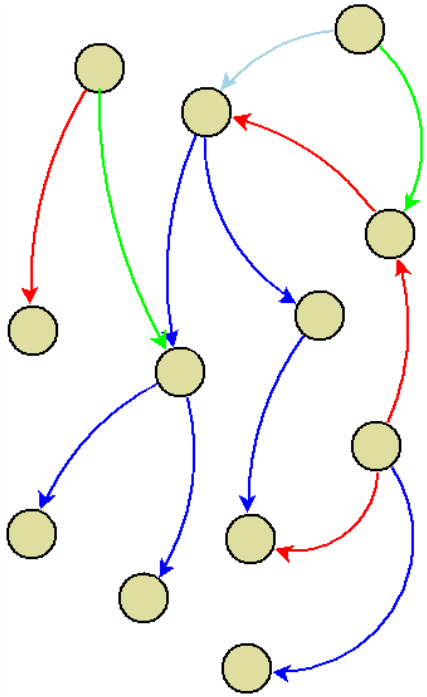
Project objectives

- PAPEL stands for Palavras Associadas Porto Editora Linguateca





MRDs as a source of semantic knowledge

- **Since 1970's (Calzolari 1977, Amsler 1981, ...)**
- **Typical definition structure: genus + differentia**
  - *genus:* the superordinate concept
  - *differentia:* properties for distinction between instances of the same superordinate concept.
- **Restricted and predictable vocabulary**

Similar resources

- **Princeton WordNet (Miller 1990)**
  - freely available
  - widely used by NLP researchers
  - created “from scratch”
  - synsets + relations
  - different kinds of relations for words of different grammatical categories
  - Hypernymy/Hyponymy, Meronymy/Holonymy.

Similar resources

- **Microsoft's MindNet (Richardson et al. 1998)**
  - automatically created with tools to extract relations from MRDs
  - a large amount of relations: Attributive modification, Causation, Classifier, Goal, Hypernymy, Intensifier, Location, Manner, Means...
  - a web interface: MNEX (*http://atom.research.microsoft.com/mnex/*)

Similar resources

- **FrameNet (Baker et al. 1998)**
  - description of semantic frames
- **WordNet.BR (Dias da Silva 2004)**
  - as far as we know only contains the Synonymy and Antonymy relations.
- **WordNet.PT (Marrafa et al. 2006)**
  - little information shared
  - website/search interface has not been working for the past year...

Building PAPEL

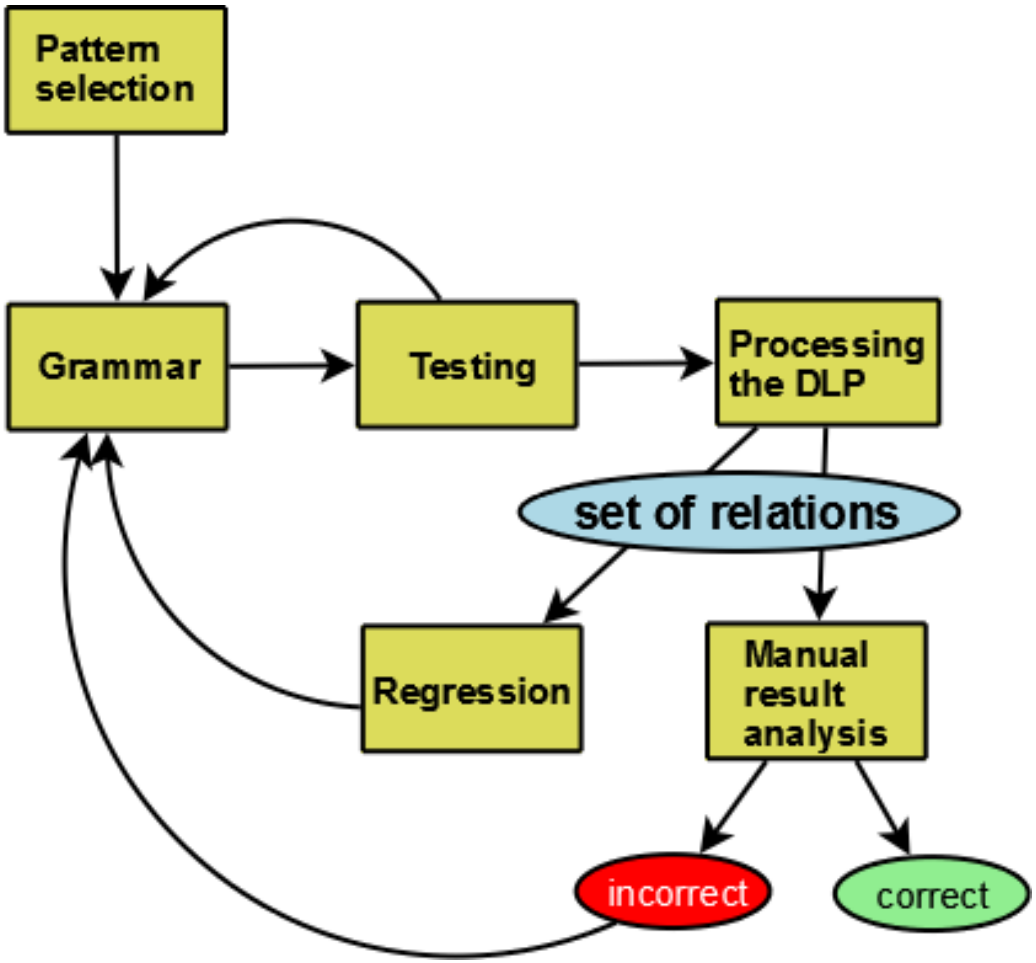
Examples of relations to include:

Relation	Read	Example
HIPERONIMO-DE(X, Y)	X is a HIPERONIMO-DE Y	HIPERONIMO-DE(animal, cão)
HIPONIMO-DE(X, Y)	X is a HIPONIMO-DE Y	HIPONIMO(cão, animal)
CAUSADOR-DE(X, Y)	X is a CAUSADOR-DE Y	CAUSADOR-DE(vírus,doença)
RESULTADO-DE(X, Y)	X is a RESULTADO-DE Y	RESULTADO-DE(doença, vírus)
MEIO-PARA(X, Y)	X is a MEIO-PARA Y	MEIO-PARA(chave, abrir)
FINALIDADE-DE(X, Y)	X is a FINALIDADE-DE Y	FINALIDADE-DE(abrir, chave)
PARTE-DE(X, Y)	X is a PARTE-DE Y	PARTE-DE(roda, carro)
INCLUI(X, Y)	X INCLUI Y	INCLUI(carro, roda)
LOCAL-DE(X, Y)	X is a LOCAL-DE Y	LOCAL-DE(restaurante, comer)
OCORRE-EM(X, Y)	X OCORRE-EM Y	LOCALIZADO-EM(comer, restaurante)

Building PAPEL

- **Quantitative studies about the patterns used in the definitions.**
- **Using the chart parser PEN with specific grammars to extract relations.**
- **Semantic relations from definitions:**
  - `Y - um tipo de X` → HIPERONIMO(X, Y)

Building PAPEL



Detailed example

- **CAUSADOR-DE: relation between an agent (the causer) and a result (the caused)**
- **Examples of (simplified) rules:**
  - {causad|originad|provocad|produzid|gerad|motivad|suscitad}{o|os|a|as} FREQ* PREP CAUSADOR
  - efeito PREP CAUSADOR
  - devido {a|ao|à|às|aos} CAUSADOR
    - `concussão (s.f.) - choque violento` **`originado por`** `uma explosão`
      - CAUSADOR-DE(explosão, concussão)

Detailed example

- **RESULTADO-DE: inverse of CAUSADOR-DE**
- **Examples of (simplified) rules:**
  - que {causa|origina|provoca|produz|motiva|gera|suscita} RESULTADO
  - {causar|originar|provocar|produzir|motivar|gerar|suscitar} RESULTADO
    - `incomodidade (s.f.) - o` **`que causa`** `mal-estar ou desconforto`
      - RESULTADO-DE(mal-estar, incomodidade)
      - RESULTADO-DE(desconforto, incomodidade)

Detailed example

Examples of current problems:

- Specific relations inside the definition:
  - estetoscópio (s.m) – instrumento para auscultar a respiração, as batidas do coração e outros **sons produzidos pelo corpo**.
    - CAUSADOR-DE(corpo, estetoscópio)
- Negation of patterns:
  - respeitar (v. tr.) – não **causar** dano
    - RESULTADO-DE(dano, respeitar)

Current precision

Relation name	Runs	Hits	Tagged	Tagged correct	Tagged incorrect	Precision
CAUSADOR-DE	4	5657	3354	3222	132	0,96
RESULTADO-DE	4	1693	1070	972	98	0,91
FINALIDADE-DE	1	1348	192	184	8	0,96
MEIO-PARA	1	826	286	258	28	0,9
TODO-DE	2	1908	193	190	3	0,98
PARTE-DE	2	811	202	171	31	0,85

Number of definitions in the whole DLP = 237,246

Further work

- **Improvements to PEN**
- **Using a broad-coverage parser like PALAVRAS (Bick 2000)**
- **Construction of the network:**
  - grouping the words into synsets
  - word sense desambiguation

The end...

Questions/suggestions?

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