Introduction to session 3, linguistic approaches

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imbecile

/ˈɪmbɪsiːl/

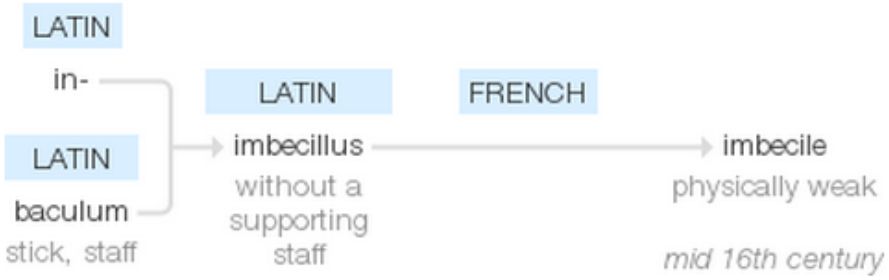
noun *informal*
noun: **imbecile**; plural noun: **imbeciles**

1. a stupid person.
   synonyms: fool, idiot, cretin, moron, dolt, halfwit, ass, dunce, dullard, simpleton, nincompoop, blockhead, ignoramus, clod; More
   informal dope, thickhead, ninny, chump, dimwit, dummy, dum-dum, dumb-bell, jackass, bonehead, fathead, numbskull, dunderhead, airhead, pinhead, lamebrain, pea-brain, birdbrain, dipstick, donkey, noodle;
   informal nit, nitwit, twit, numpty, clot, muppet, plonker, berk, prat, pillock, wally, wazzock, divvy;
   informal bozo, turkey, goofus;
   vulgar slang knobhead;
   vulgar slang asshat
   "I'd have to be an imbecile to do such a thing"
   antonyms: genius

adjective
adjective: **imbecile**

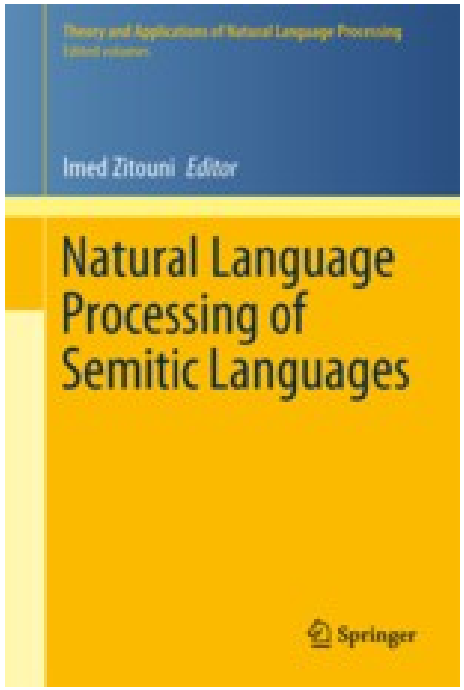
1. stupid; idiotic.
   "try not to make imbecile remarks"

Origin



mid 16th century (as an adjective in the sense 'physically weak'): via French from Latin *imbecillus*, literally 'without a supporting staff', from *in-* (expressing negation) + *baculum* 'stick, staff'. The current sense dates from the early 19th century.

References



- Natural Language Processing of Semitic Languages Zitouni, Imed (Ed.), Springer Berlin Heidelberg, 2014.

Computational linguistics for non western European languages

- Phonemes → (orthographic) words
  with problems of euphony, etc.
- Words → segmented tagged sentences
  morphological formation rules
- Sentences → phrasal constituents
  syntactic analysis
- Phrasal constituents → meaning
  anaphora, discourse analysis

Morphological processing

- Necessary for later tasks (information retrieval, question answering, text summarization, machine translation, **text reuse detection**, …)
- Most of the successful POS tagging approaches are based on machine learning (HMM, Average Perceptron, Maximum Entropy, SVM, …)
- However, languages with rich morphological rules (e.g. Semitic languages, Sanskrit, …) make it inefficient to learn the rules from a training corpora.

Morphological processing

- The additional complexity for the morphological processing of semitic languages comes mainly from the **non-concatenative rules**.
- E.g., in Hebrew the **root** p.t.x denoting a notion of opening, combines with the **pattern** maCCeC denoting tools and instruments to yield “key”.
- Moreover, classical bounded morphemes working as affixes still apply (derivational and inflectional morphology)...

Morphological processing

- The additional complexity for the morphological processing of Sanskrit comes from the specification of relationships by inflectional and derivational morphology (instead of using position as in western European languages), and from rich prosodic changes (e.g., vidyA (“knowledge”) + Apyate (“is attained”) → vidyApyate).
- Positional grammars and constituency parsers become irrelevant, dependency parsers have to be used.

Morphological processing

- The morphological rules for word formation and sentence formation are not one-one, introducing non-determinism (necessary (?) for poetry...).

Morphological processing

- The common approach is to derive a tagger (i.e., an interpreter for finite state machine) from a structured lexicon (i.e., a repository of grammatical information) by using another finite state automaton (usually called a transducer).
- A transducer is a finite state machine with two tapes (input and output) that computes a **relation** between two formal languages (i.e. sets of strings).
- Transducers can be composed :

  Words → words split up at morpheme boundaries

  Split up words → morphemes description

Ouverture

- If I were to work on computational linguistics, I would be tempted to explore the work of Gérard Huet.
- Gérard Huet developed the Zen toolkit library in OCaml for computational linguistics introducing a generic data structure (decorated lexical trees) for deriving taggers from lexicon structures.
- A very well founded approach that has been applied to Sanskrit *(Héritage du Sanskrit, Dictionnaire sanskrit-français*).
- How would this approach apply to semitic languages ?
- How to combine it with machine learning approaches ?