Using Parallel Texts and Lexicons for Verbal Word Sense Disambiguation

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- WSD for texts where translation exists
- Pre-annotation
- Any text, using MT?

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  - dependency-based

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  - PDT 2.5 – 800kW Czech news texts
  - PCEDT 2.0 – 1.1MW parallel English-Czech, based on PTB-WSJ
    - PTB-WSJ translated into Czech

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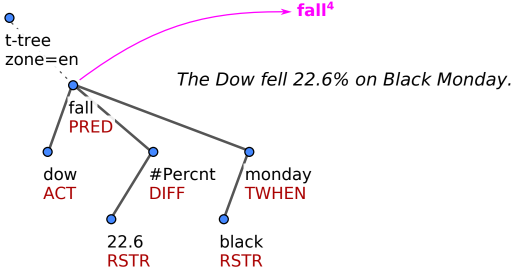

- t-trees: nodes for content words only
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  - grammatemes – grammatical functions (not shown)

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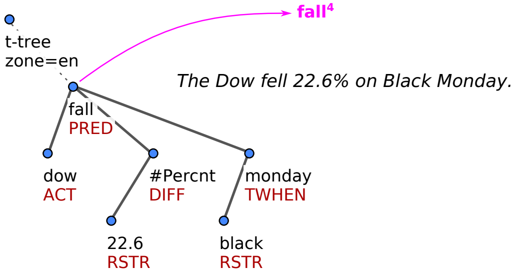

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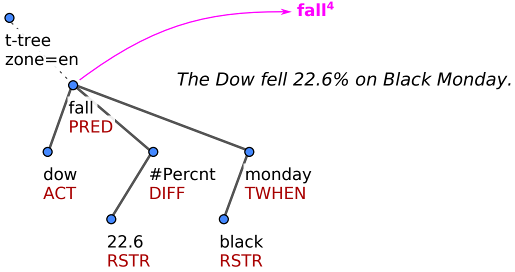

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- ID links to a valency lexicon

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- Czech – PDT-Vallex
  - built with PDT (and PCEDT), bottom-up
  - almost 12k frames, over 7k verbs

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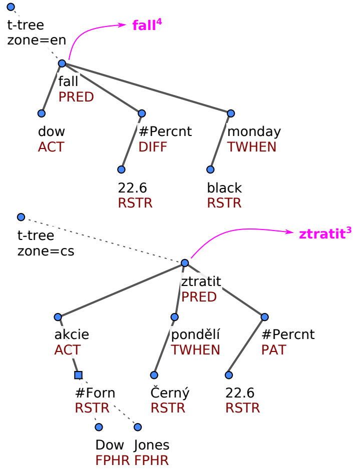

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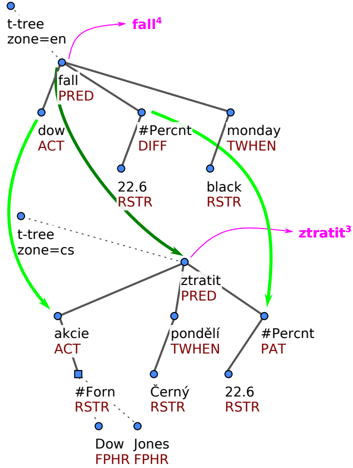

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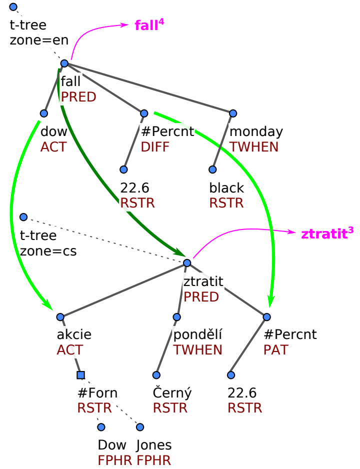

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66%	72%	verb token PCEDT 2.0 coverage

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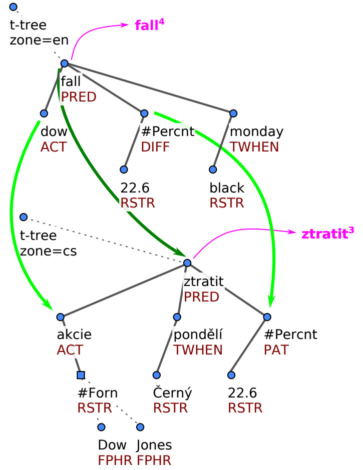

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- Data:
  - PCEDT 2.0 (parallel)
  - PDT 2.5 (monolingual, Czech)

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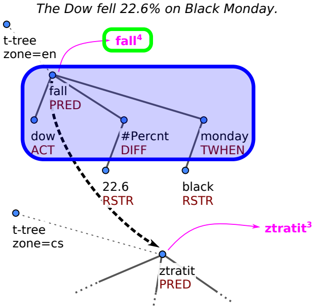

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- syntactic labels

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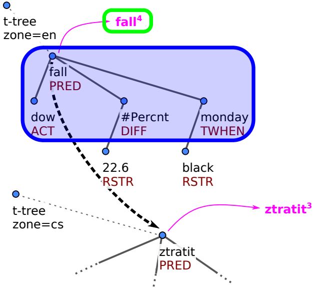

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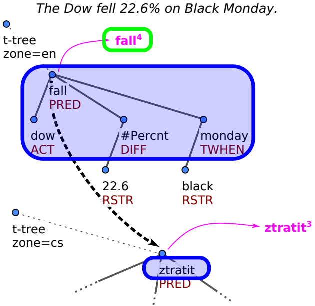

B. + **Aligned lemma** features – using word alignment
   - 1 feature per lemma

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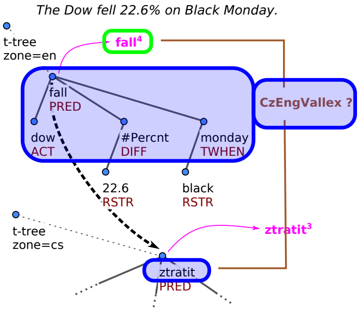

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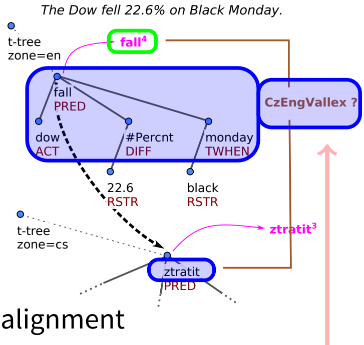

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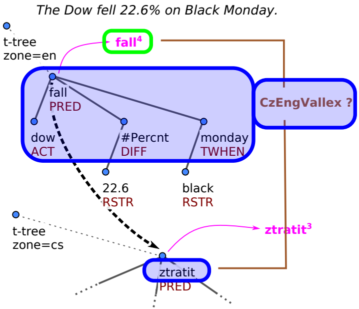

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   - dense: shared for all lemmas

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monolingual	82.39
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  - dense feature, helps in rarer verbs
- Also cases where the parallel information introduces noise
  - but positive cases prevailing

Examples (English WSD improved by Czech data)

EN: *But those machines are still **considered** novelties, […]*

CS: *Ale tyto stroje […] jsou stále **považovány*** ('believe to be') *za novinky.*

- **consider**^{1} ('think about') monolingual → **consider**^{2} ('believe to be') aligned lemmas, val. lexicon

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EN: *This* ***feels*** *more like a one-shot deal.*

CS: *Teď to* ***vypadá*** ('looks like') *spíš na jednorázovou záležitost.*

- **feel**[4] ('have a feeling') monolingual, aligned lemmas → **feel**[5] ('look like') val. lexicon

Examples (parallel information introduces noise)

EN: *Laptops […] have become the fastest-growing […] segment , with sales* ***doubling*** *this year.*

CS: *Laptopy […] se staly, díky letošnímu* ***zdvojnásobení*** (‘doubling’ (noun)) *objemu prodeje, nejrychleji rostoucím segmentem […]*

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  monolingual → aligned lemmas, val. lexicon

EN: *“We didn’t even get a chance to* ***do*** *the programs we wanted to do.”*

CS: *„Nedali nám žádnou šanci* ***uskutečnit*** (‘accomplish’) *plány, které jsme měli připravené.“*

- **do**^{6} (‘perform a function, run’) → **do**^{2} (‘perform an act’)
  monolingual, aligned lemmas → val. lexicon

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- Try to obtain valency lexicon mapping automatically
- Incorporate MT (use machine-translated parallel texts)
  - this would make it comparable to monolingual WSD

Thank you for your attention

Contact us

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Examples (Czech WSD improved by English data)

CS: *[…] čemu lidé z televizního průmyslu **říkají*** ('call') *stanice „s nejvyšší spontánní znalostí".*

EN: *[…] what people in the television industry **call** a "top of mind" network.*

- **říkat**^{7} ('say') → **říkat**^{4} ('call')
  monolingual aligned lemmas, val. lexicon

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CS: *[…] čemu lidé z televizního průmyslu **říkají*** (‘call’) *stanice „s nejvyšší spontánní znalostí“.*

EN: *[…] what people in the television industry **call** a “top of mind” network.*

- **říkat**[7] (‘say’) monolingual → **říkat**[4] (‘call’) aligned lemmas, val. lexicon

CS: *Jestliže investor **neposkytne*** (‘does not provide, give, lend’) *dodatečnou hotovost […]*

EN: *If the investor doesn’t **put up** the extra cash […]*

- **poskytnout**[2] (‘give’, light verb) monolingual, aligned lemmas → **poskytnout**[1] (‘provide’) val. lexicon