Tectogrammatical representation of English

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UFAL, May 23, 2014
Outline

- PEDT, PCEDT-En
- p,a,t layers
- PMLTQ search
- Verb complement
- Cleft and pseudocleft sentences
- Existential constructions
- *do* as pro-form (“dummy”-*do*)
- Complex noun phrase
- Tokenization of hyphenated words at the t and a layer
- Infinitive clause
- Gerundial clause
TR: with structure towards semantics

• Capture the linguistic meaning of each sentence (underlying syntax)

• Syntactic structure

• Semantic labeling

• Argument structure

• Coreference

• TFA
Mr. Carder also goes through periods when he buys stocks in conjunction with options to boost returns and protect against declines.

Pan Carder má rovněž období, kdy kupuje akcie ve spojení s opcemi, aby zlepšil výnosy a zabránil poklesům.
Issues to tackle

• Languages are different
• Conceptions of grammar are different!
  – missing categories
  – term mismatch
• Give a proof that TR in different languages are similar => synonymy requirement => higher abstraction => more focus on function
• Czech TR: more form-oriented
Prague Czech-English Dependency Treebank

Opinion is mixed prospects over three-month

názor se různí

over Prospects its three-month

t-tree zone=en

be enunc PRED is

opinion ACT Opinion

mixed PAT mixed

prospects REG over

#PersPron doll APP its

t-tree zone=cs

různit se PRED se různí

názor ACT Názory

mixed over Prospects its

tříměsiční

perspektivy

trimestr

its

three-month

one-month
p-layer

- original PTB
- manual tagging
- manual bracketing

added automatically:
- node id
- lemmatization

NO MANUAL REVISION!
English a-layer (with integrated m-layer)

- only automatic!!!
- a Treex script by Martin Popel
  - just a few manual m-tag revisions
- dependency structure
- labeling (afuns)
- tag
- lemma
- p_terminal.rf
- alignment.rf
t-layer vs. a-layer

- function words collapsed into content word nodes
- valency frames (in verbs)
- ellipsis restoration
- semantic labeling (functors)
- anaphora resolution
References to a-layer

- **a/lex.rf**: content words
- **a/aux.rf**: auxiliary words
CORPUS SEARCH
PMLTQ on the web

- https://lindat.mff.cuni.cz/services/pmltq/
Lawyers worry that if they provide information about clients, that data could quickly end up in the hands of prosecutors.

Právníci se obávají, že poskytnou-li informace o klientech, mohly by tyto údaje rychle skončit v rukou žalobců.
PMLTQ Search

t-node [ t_lemma = "be", t-node[functor = "PAT", gram/sempos ~ "^adj.*$", sibling{1,1} t-node [ gram/sempos = "v", a/aux.rf a-node [ m/tag = "TO" ] ] ] ]

Tree Query
q-12-05-12_151607
Tree Query
q-12-05-14_095029
Output filters:
>> for $n0.t_lemma,$n0.functor
give distinct $1,count(1 over $1),$2
sort by $1 asc,$3

Amazing 1
ambivalent 1
amendment 1
american 5
American 3
American 3
American 3
amicable 1
ample 1

NE
CNCS
CRIT
ACT
APP
BEN
LOC
NE
APP
LOC
NE
MANN
EXT
A FALSE FRIEND:
VERB COMPLEMENT ≠ DOPLNĚK
Czech verb complement

- free modifier of the verb
- related to object or to subject
  
  Tady si chlapci *sami* nakupují a *sami* si vaří.
  
  K tomu bych *rád* poznamenal, že ...
  
  Mareš pojednává o nezaměstnanosti *jako* o sociálním, kulturním a politickém *problému*.
  
  Pětatřicetiletý sportovec, který *první* na světě získal všechny zlaté medaile
  
  Do jara jdou Severočeši *posíleni* i po sponzorské stránce
  
  Viděl kočku, jak *chytá* myš
  
  Odcházela *plačíc*. 
Verb Complement (COMPL)

He spoke of him as of his father.
"Strategii zaměstnavatelů už vůbec nerozumím," naříká hospodářský mluvčí frakce křesťanských demokratů ve Spolkovém sněmu Rainer Haungs.

“saying: ”
Verb complement dependent on noun

farmers “are” landscape-shapers

Mr. Krenz “is” a heavy drinker
English verb complement

• has a copular relation to the object or the subject (*was X when doing Y*)
• from obligatory to optional
  – *Peter is kind/a kind man.* 
  – *We consider Peter a kind man.*
  – *We regard Peter as a kind man.*
  – *I know Peter as a kind man.*
  – *He looks good.*
  – *John, tired, went home.*
  – *As a kind man, Peter was very popular.*
  – *Being a kind man, Peter was very popular.*
  – *We painted the wall green.*
  – *He stood there, his hands in his pockets.*
  – *He came running.*
The balloon had been blown up so big that when somebody came along with a pin -- in this case the UAL deal -- we got a little pop.'
it would leave part of the executive branch **unfunded**
Difficult cases

**COMPL**
- *The door banged shut.*
- *She married young.* COMPL
- *They sat quiet.* COMPL
- *John met Mary crying.* COMPL
- *Julia, being a nun,* COMPL, spent much time in prayer.

**Non-COMPL**
- *The screw worked loose.* PAT
- *She dresses young.* MANN
- *The door fits tight.* MANN (adj)
- *They sat quietly.* MANN
- *John heard Mary crying/cry.* PAT
- *This drives me nuts.* DPHR
- *Julia, who was a nun,* DESCRIPT spent much time in prayer.
MINOR ENGLISH-SPECIFIC PHENOMENA
Cleft Sentences

• John broke a window. / It was John that broke the window.

• It was a window John broke.
The Pronoun *it*

- **anaphorical** - own TR node:
  - *a hat* – *it*.

- **deictic/exclamative** - own TR node:
  - It/They is/are my kid(s).
  - It’s me!

- **anticipatory/expletive** – auxrf at the predicate verb:
  - *<it>* is a pleasure **to be here**.ACT.
  - *I find <it>* a **pleasure**.EFF **to be here**.PAT

- **prop** – auxrf at the predicate verb:
  - *<it>* is late.TWHEN
Anticipatory/Expletive *it*
What John needs is a long rest. The thing John needs is a long rest.
Existential constructions

There is nothing to be seen.

There is nowhere to go.
Auxiliary *do*

*John likes candy but Mary doesn’t*  
\(<\textit{like candy}> = \text{ellipsis}\)

*John likes candy. Does Mary \(<\textit{like candy}>? = \text{ellipsis}\)*

*Do you like candy? Yes, I \textit{do}. ≠ \text{ellipsis}*

TOTAL UNDERSPECIFICATION: COMPOUND NOUN PHRASES
two new mortgage securities-based mutual funds totaling $701 million
Mike Greece Former Air Force Career Officer New York

These would deserve multi-word expression annotation.
FUNCTORS IN ADJECTIVES
Dependency or own meaning?

• entity nouns vs. event/property nouns
  – RSTR, DESCR vs. participants and adjuncts
• nominalizations: -ing, -ment, -ion, -er, -ence...
  – American. ACT interference, demand
  – American. LOC educators, right, church, singer, showroom
  – Reagan consulted the American allies – LOC?
  – American share of Japan’s market – ACT?
  – Critics also say American companies. LOC? [abroad!!!!] charge too much.
Semantically very explicit adjectives

• past
• wooden
• unfortunate
• old bread. RSTR X old scout, old friend. THL
• late. TWHEN afternoon X the late. RSTR president
• plain. EXT nonsense, plain girl. RSTR
PROBLEMATIC TOKENIZATION
Hyphenated words

• number of t-nodes, t_lemma
• number of a-nodes, m_lemma, m/tag
  – non-compositional: *high-flying*
  – number+noun: *three-day*
  – preposition+noun: *per-share*
  – comparisons: *cornflake-size, lady-like*
  – x+common participle: *LA-based, red-colored*
  – x+uncommon participle: *red-haired*
  – verb+preposition: *hoped-for*
  – Latin preposition: *pre-, anti-, re-, counter-, pro-
  – x+only
  – *non+X*
  – ...
STRUCTURE MISMATCH:
ENGLISH NON-FINITE PHRASES
John seems to understand.
Infinitive-Raised Object

John expects Mary to leave.
John hears Mary cry.
Infinitive – control with object

Peter told Mary to leave.
Infinitive Governed by a Predicative Attribute

John is eager to please.
[objsubj=osub3]: John is difficult to please.
Crystal breaks easily. (/at the slightest touch. COND)
This flat must have cost a lot to furnish.
Adverbial adjective

*She was quick to shut the door.*
Infinitive phrases – coreference in purpose clauses

- Work began immediately to adapt the existing buildings to accommodate the rows of big glass bolthead flasks that Nicholson favoured for the preparations.
- Once these stores are loaded, a process of CICR begins to activate either the IP 3 Rs or RYRs to release calcium.
- As was his custom, Sukarno adapted Nehru's actual words to reflect his own hostility to the Dutch and his growing admiration for Japan.
- Purchasers of health care have tried to adjust their expected intervention rates to allow for activity in the private sector...
- The Romans also followed on these lines but adapted the construction to suit their more complex needs.
- She adapted her personal life to suit his wishes, and rationalised her way out of emotional pain caused by Sartre's philandering.
She used to be with Grand Metropolitan and now, apparently, they've had to appoint men to fill her post.

During most of the sixteenth century, condemnation of women who employed a wet-nurse to suckle their babies was minimal.

but they have to employ more capital to build the new prettily-lit, out-of-town shops that the British want.

Those who employ linguistics to study literature form some kind of social network with distinct practices and a skeletal institutional framework, defined at least by overt inter-disciplinary norms.
ACT-MEANS alternation

• *John broke the window with a hammer.*
• *The hammer broke the window.*
  – *John used the hammer to broke the window.*
Purpose clause or attributive infinitive?

• Last autumn the Hypertrophic Cardiomyopathy Association launched a campaign to raise awareness of hypertrophic cardiomyopathy and, together with the Sports Council's National Sports Medicine Institute, announced a pilot screening programme to detect the condition among young athletes.

• In some ranges, you can buy decor panels to fit the front of specially designed built-in appliances, making them match the cupboards.

• Letters from home contained frequent reminders to show appreciation.

• He accepted the invitation to speak at the conference.
Intransitive = control, transitive = purpose clause

- *particles* begin to vibrate
- Duke of Gloucester, who with others began a civil war to remove the King's favourites from Court.
Gerund/Present Participle

• can also be used as adjective or noun (see PTB tags)
• modified by
  – an adverb = gerundial clause, verbal frame
  – an adjective = noun, noun frame (not existent yet)
• transitive verbs: direct object without of = gerundial clause
Gerundial Clauses

His leaving no address was most inconvenient.
I hate killing animals.
NLP ISSUES
TR parse

• no TR parser from plain text
• phrase-structure-to a-layer
• a-layer to t-layer
• => never better than phrase-structure parsers
• training data small + too many structures to learn
The biggest problems

• already at a-layer
• coordinations
• appositions
• several participants of the same type
• no chance to get the sequence *v-obj-infinite clause* correct
• unreliable ellipsis restoration
Example

This will enable her to enjoy the work more fully on a second visit.
Explore, exploit, enjoy!