

# Linking VerbaLex with FrameNet: Case Study for the Indicate Verb Class

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- Current frame-based lexical resources of Czech:
  - VerbaLex
  - Vallex
- FrameNet – lexical resource of English based on Frame Semantics.
- Similar projects for German, Spanish, Japanese, etc.
- Aim of the work:
  - ① to build a FrameNet-like lexicon of Czech

- since 1990 at the Berkeley university.
- based on frame semantics (C. J. Fillmore)
- exemplification in corpus data
- 8 frame-to-frame relations
- lexical Unit (LU) – pairing of a word with its meaning
- Frame Elements (FEs) – semantic roles belonging to the frame
- currently, FrameNet includes about:
  - 10,000 lexical units (6,100 fully annotated)
  - 850 semantic frames
  - 135 000 sentences annotated in the corpus

## Apply\_heat

### **Definition:**

A Cook applies heat to Food, where the Temperature\_setting of the heat and Duration of application may be specified.

A Heating\_instrument, generally indicated by a locative phrase, may also be expressed. Some cooking methods involve the use of a Medium (e.g. milk or water) by which heat is transferred to the Food.

A less semantically prominent Food or Cook is marked Co\_participant.

### **Usage:**

Sally FRIED an egg in butter.

Sally FRIED an egg in a teflon pan.

Ellen FRIED the eggs with chopped tomatoes and garlic.

# Apply\_heat

### Frame elements:

`Container` – The Container holds the Food to which heat is applied.

`Cook` – The Cook applies heat to the Food.

`Food` – Food is the entity to which heat is applied by the Cook.

`Heat_instr` – This FE identifies the entity that directly supplies heat to the Food.

`Temp` – This FE identifies the `Temperature_setting` of the `Heating_instrument` for the Food.

### Lexical units:

bake.v, barbecue.v, blanch.v, boil.v, braiandse.v, broil.v, brown.v, char.v, coddle.v, cook.v, deep fry.v, fry.v, grill.v, microwave.v, parboil.v, poach.v, roast.v, saute.v, scald.v, sear.v, simmer.v, singe.v, steam.v, steep.v, stew.v, toast.v

# FrameNet annotation – example

20. THERE<sub>Existence</sub> WERE<sub>Existence</sub> ONLY<sub>Sole\_instance</sub> TWO<sub>Cardinal\_numbers</sub> MEN<sub>People</sub> IN<sub>Locative\_relation</sub> *the* ROOM<sub>Building\_subparts</sub>, *Sir* Henry *and* Stapleton. *They* SAT<sub>Posture</sub> *with their profiles towards me* ON<sub>Locative\_relation</sub> *either* SIDE<sub>Part\_orientational</sub> *of the round table*. *Both of them were* SMOKING<sub>Ingest\_substance</sub> *cigars*, *and* COFFEE<sub>Food</sub> *and wine were in front of them*. Stapleton *was* TALKING<sub>Chatting</sub> *with animation*, *but the baronet* LOOKED<sub>Appearance</sub> *pale and distrait*. *Perhaps the* THOUGHT<sub>Cogitation</sub> *of that lonely* WALK<sub>Self\_motion</sub> *across the ill - omened* MOOR<sub>Biological\_area</sub> *was weighing heavily upon his mind*.

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- [X] **THERE WERE** **only two men** **in the room**, Sir Henry and Stapleton .
- [X] There were **ONLY** **two men** in the room , Sir Henry and Stapleton . **DNI**
- [X] There were only **two men** **IN** **the room**, Sir Henry and Stapleton .
- [X] **They** **SAT** **with their profiles towards me** **on either side of the round table** .
- [X] **Both of them** were **SMOKING** **cigars**, and coffee and wine were in front of them .

- lexicon of Czech verb valencies developed at Faculty of Informatics MU
- directly connected to WordNet
- Deep (semantic) valencies on two levels:
  - 1st level – 29 semantic roles (similar to Fillmore's semantic cases)
  - 2nd level – part of the top ontology from EuroWordNet
- currently more than 26,000 frames

Synset: *dobývat:1, těžit:2, lámat:3*

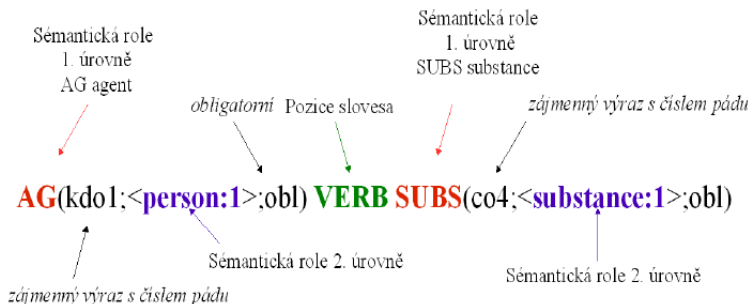


Figure: VerbaLex frame example: to mine something



# Linking VerbaLex with FrameNet

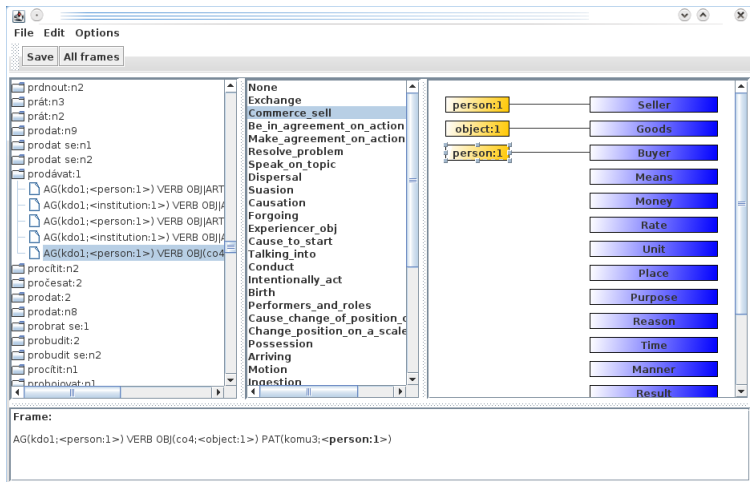


Figure: Semi-automatic linking tool.

- *Indicate* – one of 111 semantic classes defined in VerbaLex
- 136 verb senses
- 27 CZWN synsets
- 119 valency frames

FrameNet frame name	VerbaLex frames
Telling	30
Reasoning	22
Reveal_secret	14
Gesture	11
Expressing_publicly	7
Forgiveness	5
Communication	4
Sign	3
<b>Others</b>	<b>9</b>
<b>None</b>	<b>9</b>

**Table:** Assigned FrameNet frames.

# Problems in the frame linking

- Inadequacy of frame definitions in the corresponding semantic domain or area.
- Insufficient coverage of the domain in Berkeley FrameNet (i.e. English lexical units and corresponding frames have not been defined yet).
- (too fine-grained senses in FrameNet)

## frame element is missing:

*Jeho pohled nám naznačil, že nemluví pravdu.*

AG (co1; <quality:1>) VERB PAT (komu3; <person:1>)  
INFO (const; <info:1>)

### FrameNet frame **Sign**:

Indicated (INFO)

Indicator (AG)

Degree

## frame element is too general

*Ta zpěvačka demonstrovala svou lásku ke zvířatům.*

AG(kdo1;<person:1>) VERB ACT(co4;<act:2>)  
PAT(komu3;<animal:1>)

FrameNet frame **Expressing\_publicly:**

Communicator (AG)

Content

Medium

### frame element is too specific

*Ten pes cenil zuby na kočku za stromem.*

AG<animal:1> VERB DPHR<zuby> PAT  
<person:1|animal:1>

#### FrameNet frame **Gesture**:

Addressee (PAT)

Body\_part (DPHR)

Communicator (AG) ?

Indicated\_entity

Message

- 99% VerbaLex frames linkable to FrameNet
- 82% VerbaLex frames directly linkable without any modifications of their FEs
- linking VerbaLex with FrameNet is a good starting point for building FrameNet in Czech



Thank you for your attention.