

The FrameNet Project

- ▶ Creating a highly detailed lexicon of English based on **Frame Semantics**
- ▶ Related projects for German, Spanish, Japanese, Italian, B. Portuguese, ...
- ▶ Human- and machine-readable output
- ▶ Documenting the combinatory potential of nouns, verbs, adjectives, etc by manually annotating corpus examples

FN v. Dictionary



Annotation Report (recent data) [View Damaging frame](#) [View Lexical Entry](#) | [Top of Frame Index](#)

damage.v

Frame Elements	Core Type
Agent	Core
Character of and/or goal	Extra-Thematic
Device	Peripheral
Instrument	Peripheral
Location	Peripheral
Participant	Peripheral
Place	Case
State	Peripheral
Subject	Extra-Thematic
Tool	Extra-Thematic
Result	Extra-Thematic
Subactor	Extra-Thematic
Time	Peripheral

- T-PPty-(1)
 1. **Two stations** were attacked and **DAMAGED** **by rockets**, and most of them stopped broadcasting.
- T-PPty-(2)
 1. When **the Soviet Union** was **DAMAGED** **by missile**, common assent declared that enough was enough. **As**
- T-Waccident,way travel-(1)
 1. **Waddy** **seemingly** **remotely** **T-C1**
- T-MP-(1)
 1. **Conrad** had said much earlier that "At least **the first** can not easily let it go... nor will to **DAMAGED**
 2. If **we** have treated it roughly and **DAMAGED** **to** **rework**, it will never work correctly until you have had that needle renewed.
 3. However, it is possible for **the engine and large motor** to **DAMAGE** **them**.
- T-PP-(1)
 1. The Maxxar had played American football until **he** had come off his Harley-Davidson at eighty miles an hour and **collared** **bludgeoned** **the** **the** **the**.

Frame-Semantik als Theorie

- ▶ A non-modular theory of meaning; assumes no distinction between linguistic semantics and conceptualization
- ▶ A holistic theory of meaning (cf. Gestalt-psychology); *not* looking to decompose meaning into features (Merkmale)
- ▶ Experientialist and ethnographic
- ▶ Encoding view rather than decoding view

Semantische Merkmale ...

	Weiblich	Männlich
Kuh	Kuh/cow	Stier/bull
Schaf	Zibbe, Mutterschaf/ewe	Schafbock/ram
Katze	Katze/cat	Kater/tomcat
Hund	Hündin/bitch	Rüde/male dog

... reichen nicht immer: Nichtgläubige/Non-believers

- ▶ Apostasie/apostasy (v. Kirchentreue)
- ▶ Häresie/heresy (v. Orthodoxie)
- ▶ Non-theist (v. Theismus/theism)
- ▶ Agnostizismus/agnosticism (cf. skepticism)
- ▶ Atheismus/atheism

Semantische Frames: kleine Geschichten

- ▶ Frame: Semantic frames are schematic representations of situations involving various participants, props, and other conceptual roles, each of which is called a frame element (FE)
- ▶ The situations include events, states, and relations
- ▶ Frames are connected to each other via frame-to-frame relations

Frame Elements (FEs)

- ▶ Frame Element (FE): The participants, props and roles of a frame. These can include agents, inanimate objects, elements of the setting, and properties/parameters of the situation
- ▶ The syntactic dependents (broadly construed) of a predicating word correspond to the frame elements of the frame (or frames) associated with that word.
- ▶ Each FE is defined relative to a single frame.
 - ▶ FN does **not** assume a set of universal semantic roles that applies to all predicates
 - ▶ Any connections between FEs of different frames have to be made explicitly.

Lexical Unit (LU)

- ▶ The pairing of a morphological lemma with a meaning; a word sense.
- ▶ The meaning is *partially* expressed by the relation between the lemma and a FN frame, i.e. between lexical form(s) and the semantic frame they evoke.
- ▶ Includes inflected forms *sehen, sieht, gesehen*
- ▶ Includes multi-word expressions (MWEs): *Abflug machen, rot sehen*, etc.
- ▶ May be any part of speech: verbs, nouns, adjectives, prepositions, etc. (*wie.prep, ähnlich.a, gleichen.v, Unterschied.n*)

Example: Revenge frame

- ▶ This frame concerns the infliction of punishment in return for a wrong suffered. An **Avenger** performs a **Punishment** on a **Offender** as a consequence of an earlier action by the Offender, the **Injury**.
- ▶ The Avenger inflicting the Punishment need not be the same as the **Injured_Party** who suffered the Injury, but the Avenger does have to share the judgment that the Offender's action was wrong.
- ▶ The judgment that the Offender had inflicted an Injury is made without regard to the law.

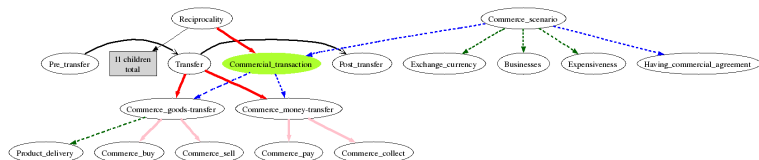
Revenge Frame: Annotation

- ▶ [They *AVENGER*] took **revenge** [for the deaths of two loyalist prisoners *INJURY*]
- ▶ The next day, [the Roman forces *AVENGER*] took **revenge** [on their enemies *OFFENDER*]...
- ▶ [The ban *PUNISHMENT*] is [Prince Charles's *AVENGER*] **revenge** [for her refusal to spend Christmas with the rest of the royals... *INJURY*]

Example: Revenge LUs

- ▶ `avenge.v`, `avenger.n`, `get_back.v`, `get_even.v`, `payback.n`,
`retaliate.v`, `retaliation.n`, `retribution.n`, `retributive.a`,
`retributory.a`, `revenge.n`, `revenge.v`, `vengeful.a`, `revenger.n`,
`sanction.n`, `vengeance.n`, `vengeful.a`, `vindictive.a`

Commercial_transaction



Mögliche Anwendungen

- ▶ Frames provide a kind of semantic normalization (paraphrase)
- ▶ The frame hierarchy helps you draw inferences
- ▶ Information access tasks
 - ▶ Information extraction
 - ▶ Question answering
- ▶ Textual Entailment
- ▶ Modeling sentence processing

Making frames

- ▶ Criteria
- ▶ Frame-to-frame relations
- ▶ FE-to-FE relations

Defining frames, or How to divide up experience

- ▶ Encoding view: which words are used to talk about X?
- ▶ Challenge: knowing which X's there are
- ▶ Making frame distinctions is to some degree a craft/art rather than a science
- ▶ The guiding principle for frame division is that lexical units in a frame should be (near)-paraphrases

How to ensure paraphraseability

- ▶ Lexical units should have same number and types of frame elements in explicit and implicit contexts
- ▶ LUs should have same perspective (kaufen v. verkaufen)
- ▶ Interrelations between participants should be the same for all LUs (e.g. Purpose FEs)
- ▶ Basic ontological type for a frame element ought to be broadly constant across uses – FN treats the difference between *want ice cream* and *want to eat ice cream* by having metonymically related FEs in an Excludes relation)
- ▶ To some degree, take into account selectional preferences (Mass motion (fliessen, strömen, rauschen))
- ▶ LUs should entail and presuppose the same events/states

What doesn't lead to frame distinctions

- ▶ Deixis (*bringen* v. *holen* [Bringing frame])
- ▶ Register (*verpfuschen* v. *Scheisse bauen*)
- ▶ Antonymy (*heiss* v. *kalt*; *loben* v. *tadeln*)
- ▶ Variety/dialect (*Brötchen* v. *Semmel*)
- ▶ Syntactic constructions (e.g. active v. passive voice)

Frame-to-frame relations

- ▶ Inheritance (is-a)
- ▶ Perspective on (Commerce: *arbeiten für* v. *beschäftigen*)
- ▶ Subframe, Precedes (Crime scenario: *verhaften, verhören, anklagen, ...*)
- ▶ Causative of, Inchoative of (*heften, s. heften, haften*)
- ▶ Using (*gesprächig, reden*)
- ▶ See also

FE-to-FE relations across frames

- ▶ Every frame-to-frame relation is accompanied by one or more FE-to- FE relations.
- ▶ At the moment, there is only one type of FE-FE relation, which is "subtype of"

Workflow in the FrameNet project

- ▶ Defining Frames
 - ▶ In traditional lexicography, you get a set of words and you are to define all their senses
 - ▶ In FrameNet, you pair frames with words that can evoke the
 - ▶ Typically, you go from one frame to a semantically adjacent frame
- ▶ Subcorporation/Data extraction
 - ▶ Regular expressions to extract data
 - ▶ British National Corpus
 - ▶ American National Corpus
- ▶ Annotation
- ▶ Checking annotations (automatic, manual)
- ▶ Reports and data distribution

Annotation I

- ▶ Two types of annotations
 - ▶ lexicographic annotation
 - ▶ unrelated sentences containing a particular lexical unit
 - ▶ annotators select clear examples
 - ▶ annotation of full-text/running-text for all predicates and their frames
 - ▶ all lemmas for which there is an analysis are annotated
 - ▶ all instances have to be labeled, not just the clear ones

Annotation II

- ▶ No complete sense inventory
- ▶ Mostly only one annotator
- ▶ Automatic consistency checks
- ▶ Some human checking
- ▶ Occasional agreement testing

Annotation III

- ▶ There is a chance of feedback from Annotation to Vanguarding
- ▶ The people who define frames also annotate, or used to annotate
- ▶ Team members share offices, it's easy to discuss
- ▶ Most team members are students of linguistics
- ▶ Frame development can thus be an iterative process

Salsa workflow

- ▶ Annotation on top of syntactic trees with different tool
- ▶ Two annotators, two adjudicators, final meta-adjudication
- ▶ Exhaustive annotation of all tokens, not just good examples
- ▶ Complete coverage constraint
 - ▶ All senses of a lemma have to be annotated
 - ▶ Uses FrameNet inventory to the degree possible: if a Frame exists, annotators are pointed to the English description
 - ▶ Missing frames are handled by making proto-frames (Unknown-frames)

Salsa workflow II

- ▶ Project has an applied focus
- ▶ Less focus on creation of new frames, linguistic analysis
- ▶ Clearer division of labor between vanguard and annotators

Can't this be done faster, cheaper, automatically?

- ▶ Can't get rid of vanguarding
 - ▶ FN does not and cannot re-use on existing sense inventories since there isn't one that follows frame semantics
 - ▶ FN wants to be really accurate about the number and nature of the participants in each frame.
 - ▶ unsupervised learning can only take you so far; FN believes human judgment has a role to play
- ▶ Efforts at semi-automatic, rule-based annotation not that successful
 - ▶ Pre-annotate collocates with FEs

Efforts to automate Frame(Net)-related tasks

- ▶ Frame Assignment as Word Sense Disambiguation
- ▶ Automatic semantic role labeling (ASRL)
- ▶ LU induction (finding new LUs for known frames)
- ▶ Frame induction (finding new frames with their FEs)