



PropBank, VerbNet & SemLink

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PropBank

- 1M words of WSJ annotated with predicate-argument structures for verbs.
 - The **location** & **type** of each verb's arguments
- Argument types are defined on a per-verb basis.
 - Consistent across uses of a single verb (sense)
- But the same tags are used (Arg0, Arg1, Arg2, ...)
 - Arg0 \approx proto-typical agent (Dowty)
 - Arg1 \approx proto-typical patient

PropBank Example:

cover (smear, put over)

- Arguments:
 - Arg0 = causer of covering
 - Arg1 = thing covered
 - Arg2 = covered with
- Example:

John covered the bread with peanut butter.

PropBank:

Trends in Argument Numbering

- **Arg0** = proto-typical agent (*Dowty*)
Agent (85%), Experiencer (7%), Theme (2%), ...
- **Arg1** = proto-typical patient
Theme (47%), Topic (23%), Patient (11%), ...
- **Arg2** = Recipient (22%), Extent (15%), Predicate (14%), ...
- **Arg3** = Asset (33%), Theme2 (14%), Recipient (13%), ...
- **Arg4** = Location (89%), Beneficiary (5%), ...
- **Arg5** = Location (94%), Destination (6%)

(Percentages indicate how often argument instances were mapped to VerbNet roles in the PropBank corpus)

PropBank: Adjunct Tags

- Variety of ArgM's (Arg#>5):
 - TMP: when?
 - LOC: where at?
 - DIR: where to?
 - MNR: how?
 - PRP: why?
 - REC: himself, themselves, each other
 - PRD: this argument refers to or modifies another
 - ADV: others

VerbNet

- Organizes verbs into **classes** that have common syntax/semantics linking behavior
- Classes include...
 - A list of **member verbs** (w/ WordNet senses)
 - A set of **thematic roles** (w/ selectional restr.s)
 - A set of **frames**, which define both syntax & semantics using thematic roles.
- Classes are organized hierarchically

VerbNet - *cover contiguous_location-47.8*

<i>No Comments</i>	contiguous_location-47.8 <i>Members: 37, Frames: 1</i>	POST COMMENT	CL CO
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QuickTime?and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

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VerbNet Thematic Roles

- Actor
- Actor1
- Actor2
- Agent
- Asset
- Attribute
- Beneficiary
- Cause
- Destination
- Experiencer
- Extent
- Instrument
- Location
- Material
- Patient
- Patient1
- Patient2
- Predicate
- Product
- Proposition
- Recipient
- Source
- Stimulus
- Theme
- Theme1
- Theme2
- Time
- Topic
- Value

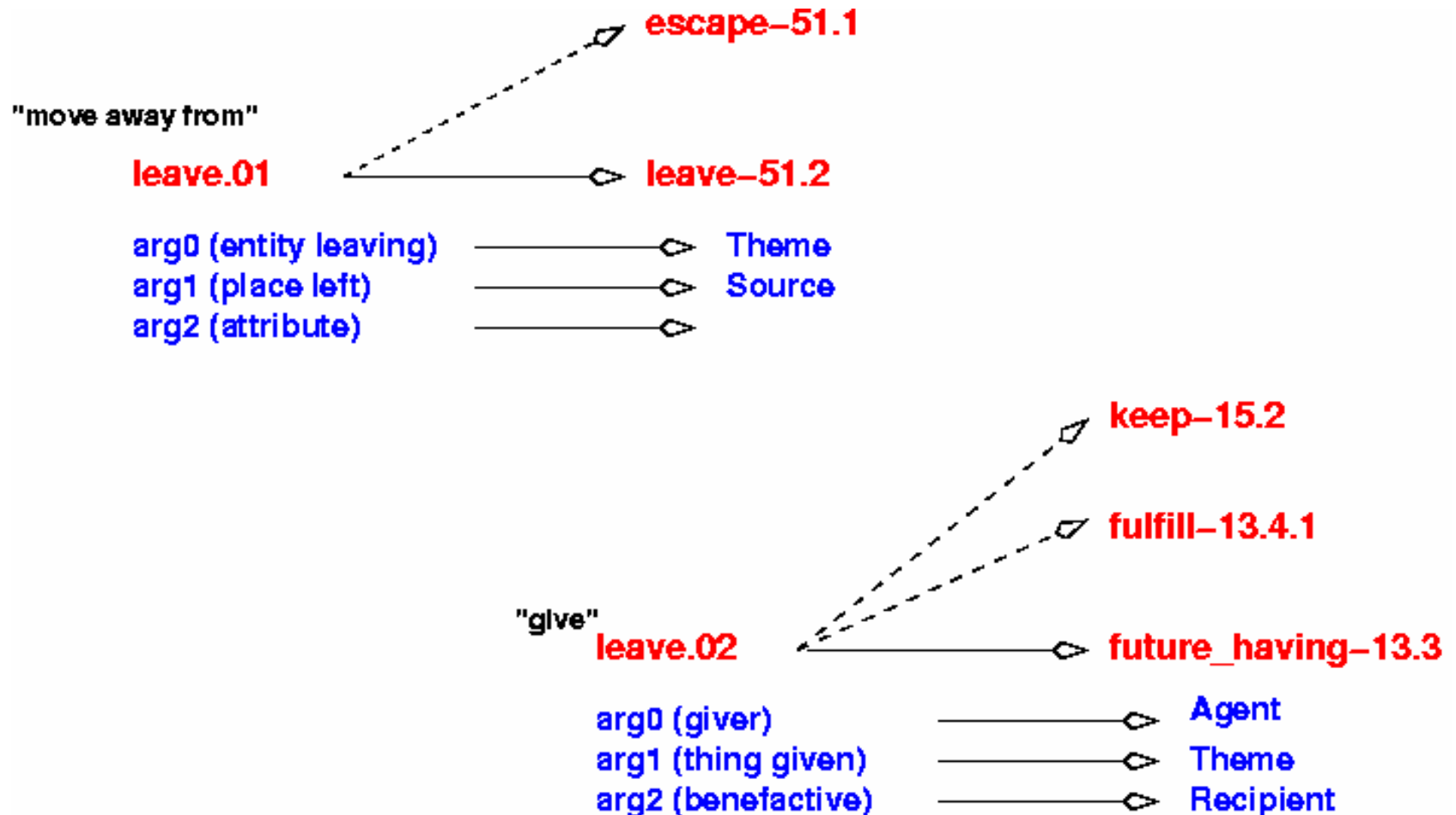
SemLink: Mapping Lexical Resources

- Different lexical resources provide us with different information.
- To make useful inferences, we need to *combine* this information.
- In particular:
 - **PropBank** -- How does a verb relate to its arguments?
Includes **annotated text**.
 - **VerbNet** -- How do verbs w/ shared semantic & syntactic features (and their arguments) relate?
 - **FrameNet** -- How do verbs that describe a common scenario relate?
 - **WordNet** -- What verbs are synonymous?
 - ...

What do mappings look like?

- 2 Types of mappings:
 - **Type mappings** describe which entries from two resources might correspond; and how their fields (e.g. arguments) relate.
 - Potentially many-to-many
 - Generated manually or semi-automatically
 - **Token mappings** tell us, for a given sentence or instance, which type mapping applies.
 - Can often be thought of as a type of classifier
 - Built from a single corpus w/ parallel annotations
 - Can also be thought of as word sense disambiguation
 - Because each resource defines word senses differently!

Mapping from PB to VerbNet



Mapping Issues

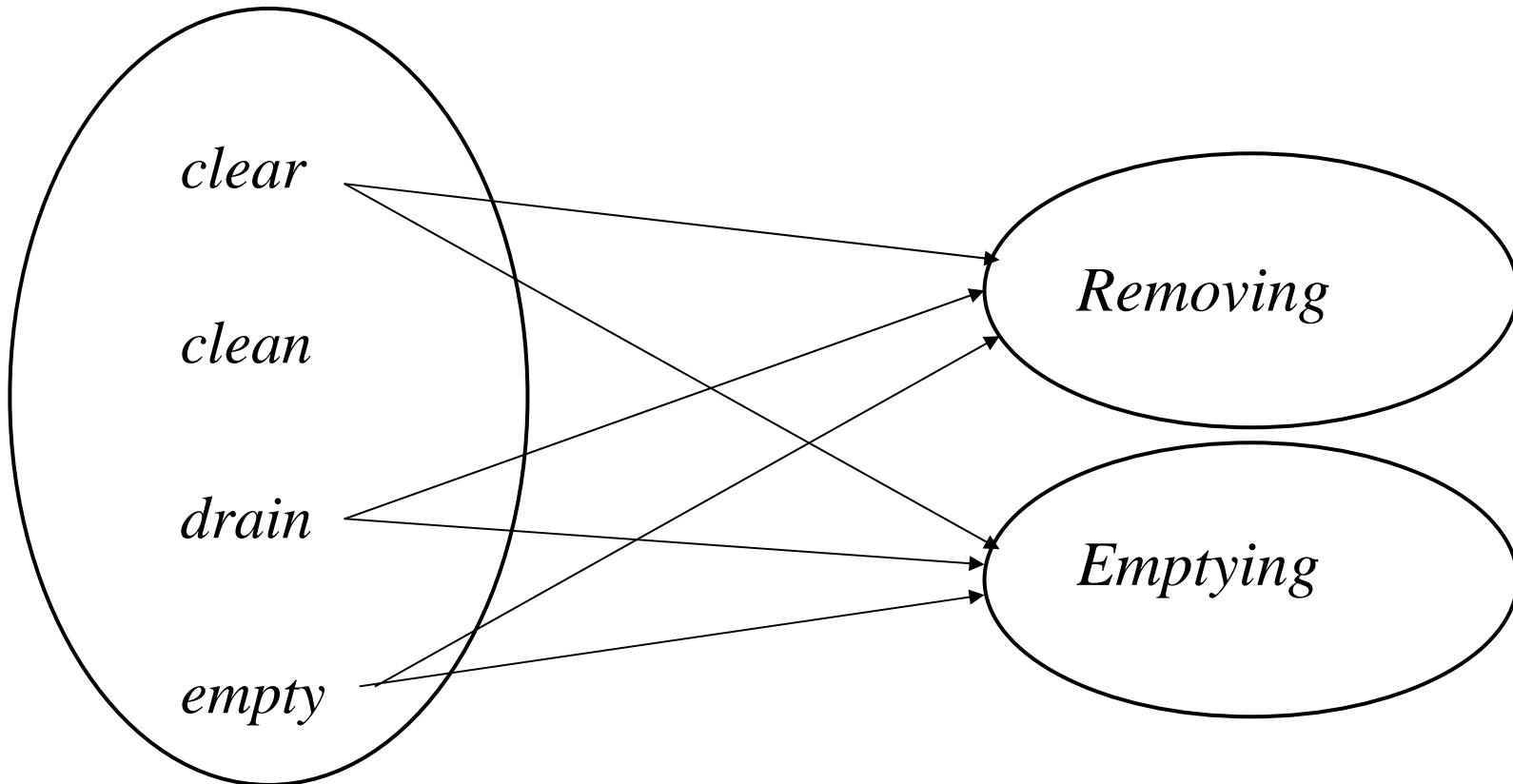
- Mappings are often many-to-many
 - Different resources focus on different distinctions
- Incomplete coverage
 - A resource may be missing a relevant lexical item entirely.
 - A resource may have the relevant lexical item, but not in the appropriate category or w/ the appropriate sense
- Field mismatches
 - It may not be possible to map the field information for corresponding entries. (E.g., predicate arguments)
 - Extra fields
 - Missing fields
 - Mismatched fields

Mapping Issues (2)

VerbNet verbs mapped to FrameNet

- VerbNet clear-10.3

- FrameNet Classes



Mapping Issues (3)

VerbNet verbs mapped to FrameNet

VN Class: *put 9.1*

Members: *arrange**, *immerse*,
lodge, *mount*, *sling***

Thematic roles:

- agent (+animate)
- theme (+concrete)
- destination (+loc, -region)

Frames:

- ...

*different sense
** not in FrameNet

FrameNet frame: *place*

Frame Elements:

- Agent
- Cause
- Theme
- Goal

Examples:

- ...

