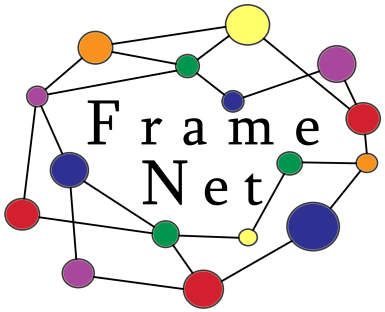

INTERNATIONAL COMPUTER SCIENCE INSTITUTE

Robust Semantic Analysis of Multiword Expressions with FrameNet

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Road Map

- Overview of FrameNet
  - Frames, Frame Elements, Lexical Units, Valence Descriptions, Frame-to-Frame Relations
  - FrameNet and NLP
- Introduction to Multiword Expressions (MWEs)
  - Types of MWEs
  - Syntactic and Semantic Characteristics of MWEs
  - Representational Issues in MWEs
- Multiword Expressions in FrameNet
  - FrameNet's treatment of (certain) MWEs
  - Navigating Lexicon and Grammar
  - Exploiting FrameNet Information on MWEs

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What is FrameNet?

- A unique knowledge base with information on the mapping of meaning to form through the theory of Frame Semantics (Fillmore 1975, 1985, Fillmore and Atkins 1986, Fillmore and Baker 2010, Fillmore 2012, Fontenelle 2003, Petruck 1996)
- A resource that provides rich semantics for the core English vocabulary based on manually annotated corpus evidence, including valence descriptions for each item analyzed

What's "in" FrameNet?

- ~ 1,200 semantic frames (including FEs)
- > 13,100 lexical units
- > 200,400 manually annotated examples
- nearly 1,800 frame-to-frame relations constituting a hierarchy of semantic frames

What's a Frame?

A Semantic Frame is a script-like structure of inferences, linked by linguistic convention to the meanings of linguistic units - here, lexical items - constituting a schematic representation of a situation, object, event, or relation providing the background structure against which words are understood. Each frame identifies a set of frame elements – participants in the frame.

Semantic Frames in FrameNet

- Situation: Being_attached, Being_necessary, Being_strong, Being_wet, etc.
- Event: Apply_heat, Borrowing, Catching_fire, Cooking_creation, Hiring, Revenge, etc.
- Object: Buildings, Containers, Intoxicants, Offenses, People_by_origin, etc .
- Relations: Locative_relation, Spacial_co-location, Interior_profile_relation, Similarity, etc.

What's "in" a Frame?

- Frame Definition

  a prose description of a situation involving various participants and other conceptual roles, each of which constitutes a frame element

- Frame Elements (FEs):

  semantic roles as the basic unit of a frame, defined specifically to each frame

- Lexical Units (LUs):

  pairing of a lemma and a frame, i.e. "word" in one of its senses; LU evokes a frame

Frame Elements: I

Triple of Information

Frame Element

- semantic role

Grammatical Function

- External, Object, Dependent

Phrase Type

- full range of PTs for language

Frame Elements: II

- Core Frame Element: uniquely define frame
  - Commercial_transaction: Buyer, Seller, Money, Goods
  - Giving: Donor, Recipient, Theme
  - Opinion: Cognizer, Opinion
- Non-core Frame Element: capture aspects of situations, events, more generally
  - Time
  - Place
  - Manner
  - Circumstances

Lexical Unit (LU)

- Pairing between a lemma and a frame
  - *hot* - It's hot outside today.
    - hot – ambient temperature
  - *hot* - The curry is really hot.
    - hot – spiceness
  - *hot* - She's one hot lady.
    - hot – desirability

FrameNet Methodology

- characterize frames
- collect words that fit the frames
- study corpus attestation of words ("lexical units")
- develop descriptive terminology (frame elements)
- annotate a subset of corpus examples to document syntactic and semantic behavior
- automatically summarize annotations to produce valence descriptions that show the grammatical realization of the frame elements

Example Frame: Revenge

The Revenge concept involves a situation in which

a) A has done something to harm B and
b) B takes action to harm A in turn
c) B's action is carried out independently of any legal or other institutional setting

Revenge: Vocabulary

- Nouns: *revenge, sanction, reprisal, retribution retaliation, vengeance….*
- Verbs: *avenge, revenge, retaliate, get back (at), get even, pay back, exact revenge, take revenge….*
- Adjectives: retributive, *vengeful, vindictive*

FN work: choosing FE names

- Develop a descriptive vocabulary for the components of each frame, called **frame elements** (FEs).

- Use FE names in labeling the constituents of sentences exhibiting the frame.

Revenge: Frame Elements

- Frame Definition: Because of some **injury** to something-or-someone important to an **avenger** (maybe himself), the **avenger** inflicts a **punishment** on the **offender**. The **offender** is the person responsible for the **injury**.
- Frame Elements:
  - Avenger,
  - Offender,
  - Injury,
  - Injured_party,
  - Punishment.

Annotating Examples

- Select sentences that exhibit common *collocations* and show all major syntactic contexts.
- Use the names assigned to FEs in the frame, and label the constituents of sentences that express these FEs.

Annotated Sentence

[Nora $_{\text{Avenger}}$] **retaliated** [against her boss $_{\text{Offender}}$] [for being dismissed $_{\text{Injury}}$] [by leaving with the office keys $_{\text{Punsihment}}$].

Summarizing Results

- Automatic processes summarize the results, linking FEs with information about their grammatical realization.

- Present results in the form of various reports in the public website, in XML format in the data release.

Revenge

retaliate.v

Definition:

COD: make an attack or assault in return for a similar attack.

Frame Elements and Their Syntactic Realizations

The Frame Elements for this word sense are (with realizations):

Frame Element	Number Annotated	Realization(s)
Avenger	(39)	CNI.-- (2) NP.Ext (37)
Injured_Party	(1)	PP[on].Dep (1)
Injury	(38)	DNI.-- (35) PP[against].Dep (2) PP[for].Dep (1)
Instrument	(3)	PP[with].Dep (3)
Manner	(1)	AVP.Dep (1)
Offender	(39)	DNI.-- (36) PP[against].Dep (2) PP[on].Dep (1)
Place	(1)	PP[at].Dep (1)
Punishment	(39)	PP[in].Dep (2) PP[with].Dep (3) INI.-- (19) AVP.Dep (2) PPing[by].Dep (12) DNI.-- (1)
Time	(2)	AVP.Dep (2)

Valence Description

- semantico-syntactic combinatorial possibilities
  - meaning-form-function mappings
  - FrameNet Valence Description
    - Frame Element
    - Grammatical Function
    - Phrase Type

Valence: Mapping Meaning to Form

Revenge
retaliate.v

Number Annotated	Patterns				
1 TOTAL	Avenger	Injured_Party	Offender	Punishment	
(1)	NP Ext	PP[on] Dep	DNI --	INI --	
3 TOTAL	Avenger	Injury	Instrument	Offender	Punishment
(3)	NP Ext	DNI --	PP[with] Dep	DNI --	INI --
1 TOTAL	Avenger	Injury	Manner	Offender	Punishment
(1)	NP Ext	DNI --	AVP Dep	DNI --	INI --
1 TOTAL	Avenger	Injury	Offender	Place	Punishment
(1)	NP Ext	DNI --	DNI --	PP[at] Dep	PP[with] Dep
31 TOTAL	Avenger	Injury	Offender	Punishment	
(1)	CNI --	DNI --	DNI --	PP[in] Dep	
(1)	CNI --	DNI --	DNI --	PP[with] Dep	
(2)	NP Ext	DNI --	DNI --	AVP Dep	
(9)	NP Ext	DNI --	DNI --	INI --	
(1)	NP Ext	DNI --	DNI --	PP[in] Dep	

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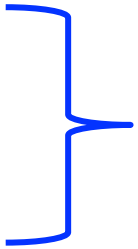
Frame-to-Frame Relations in FN

- Inheritance
- Using
- Subframes
- Precedes
- Perspective_on
- See also
- Inchoative_of
- Causative_of



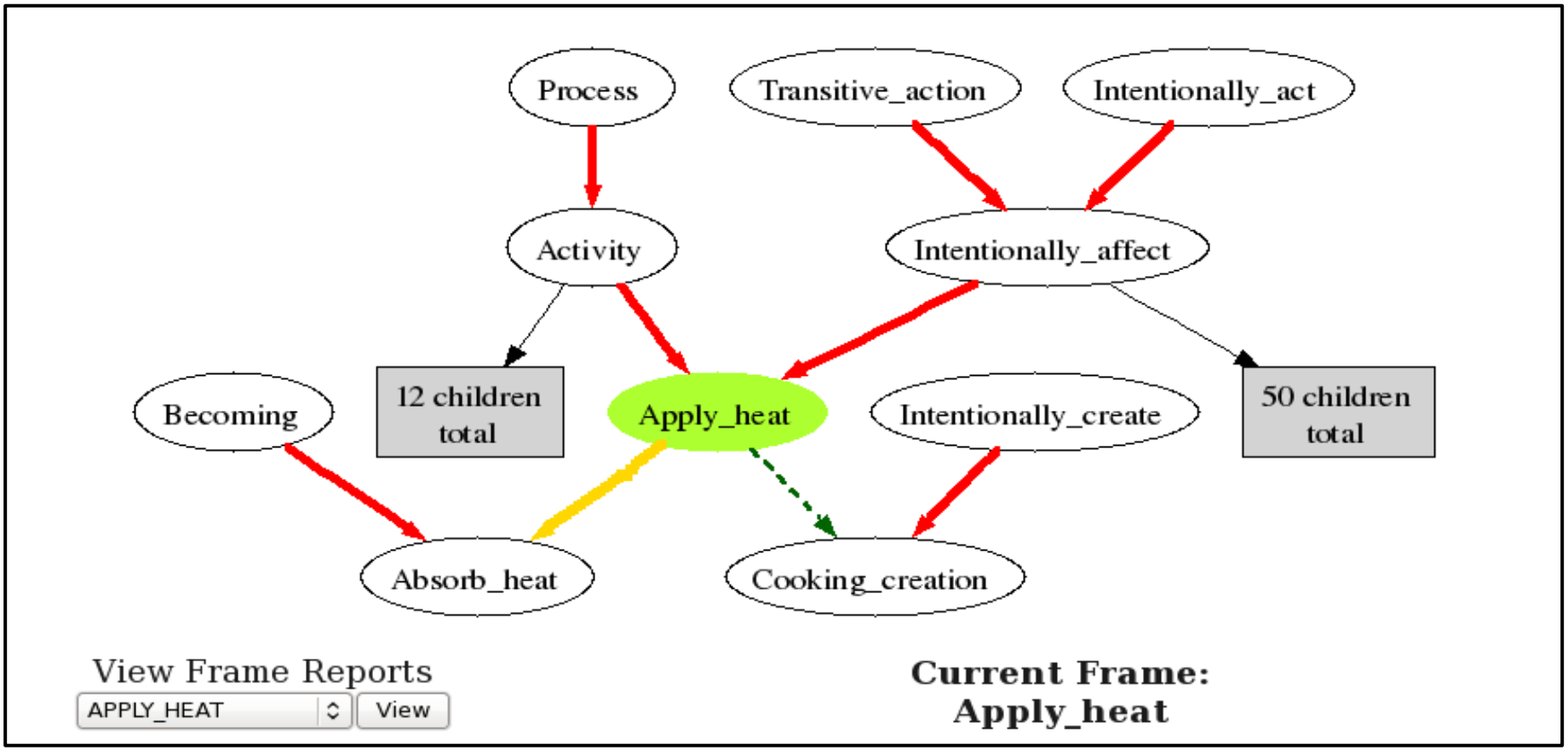
regular lexical relations

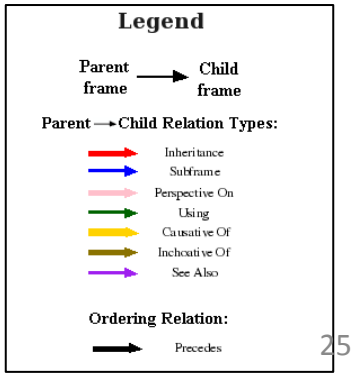
Inheritance

- Relationship between a more general frame, the parent frame, and a more specific one, the child
- Child frame elaborates parent frame
- Corresponding entities, FE, frame relation, and semantic characteristics, in both child and parent
- Child frame entity is the same as or more specific than in parent frame

`Apply_heat` ***inherits*** `Intentionally_affect`

FrameGrapher



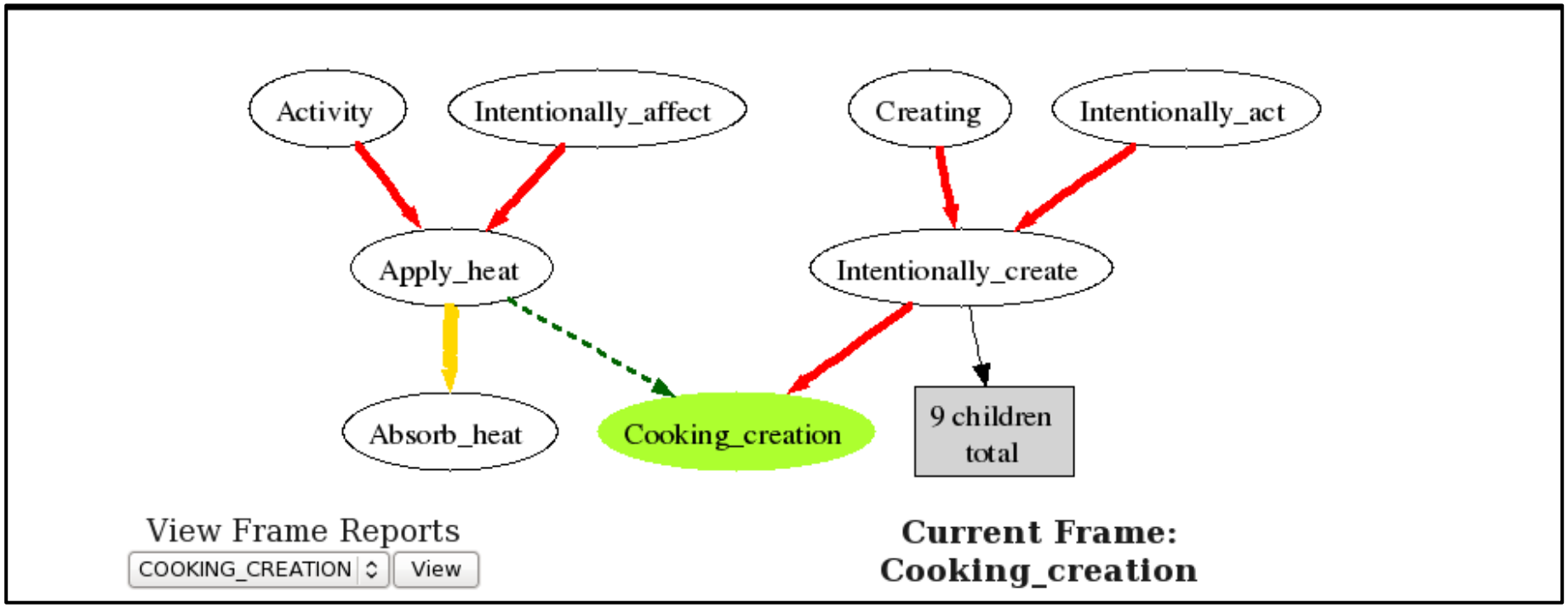


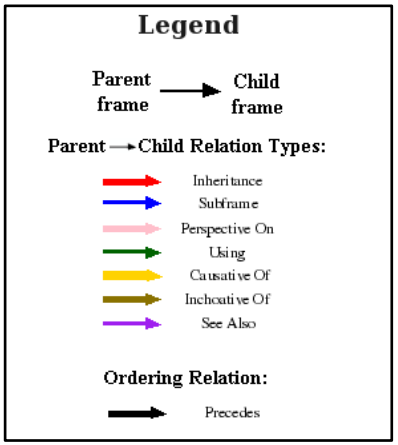
Using (weak inheritance)

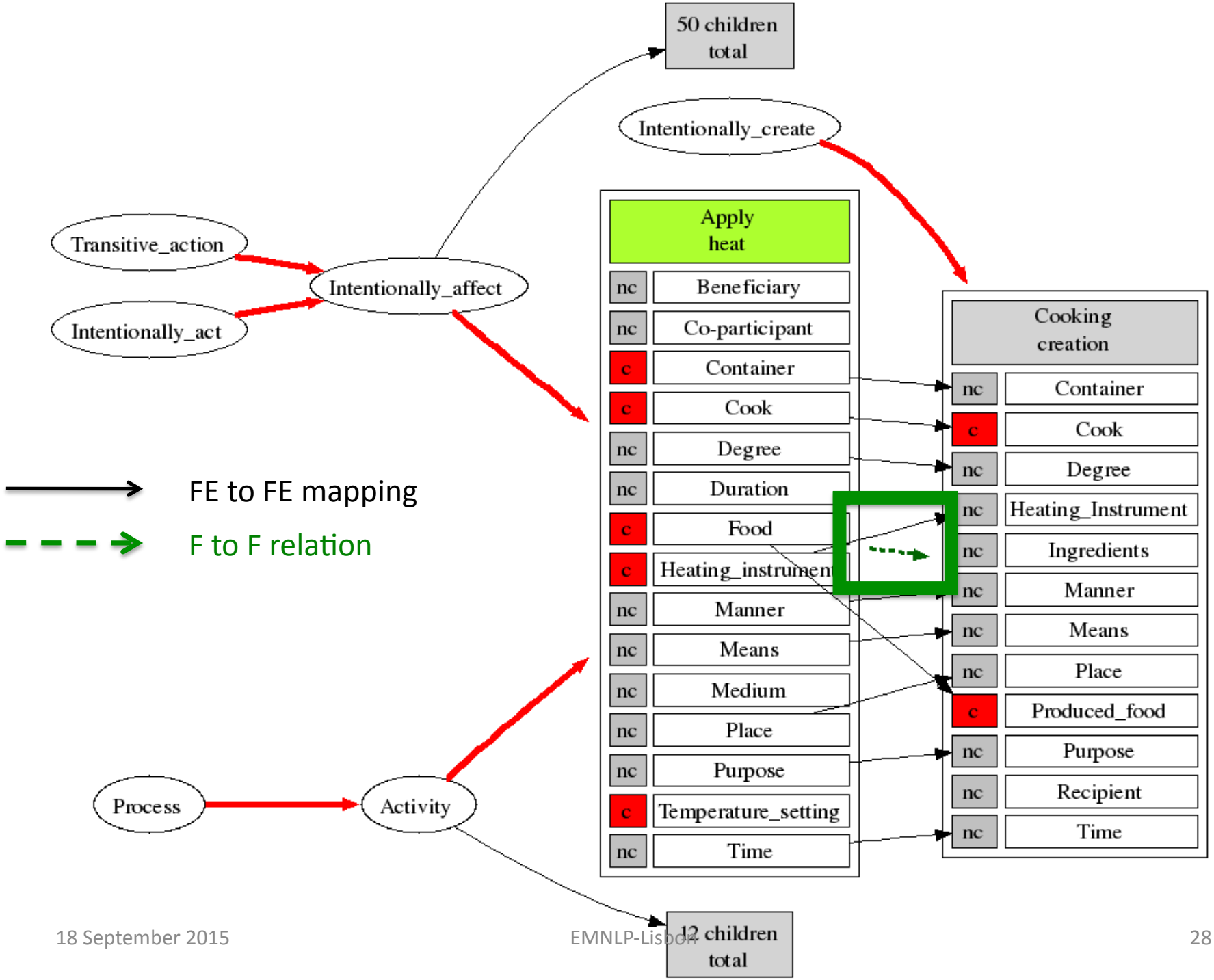
- …a relationship between a more general frame (*parent*) and a more specific frame (*child*) in which only *some* of the FEs in the parent frame have a corresponding entity in the child frame; if correspondences exist, they are more specific.

  `Cooking_creation` ***uses*** `Apply_heat`

FrameGrapher






50 children total
Intentionally_create
Transitive_action
Intentionally_affect
Intentionally_act
Apply heat
nc Beneficiary
nc Co-participant
c Container
c Cook
nc Degree
nc Duration
c Food
c Heating_instrument
nc Manner
nc Means
nc Medium
nc Place
nc Purpose
c Temperature_setting
nc Time
Cooking creation
nc Container
c Cook
nc Degree
nc Heating_Instrument
nc Ingredients
nc Manner
nc Means
nc Place
c Produced_food
nc Purpose
nc Recipient
nc Time
FE to FE mapping
F to F relation
Process
Activity
12 children total

Subframes

- …a relationship that characterizes the different (typically, ordered) parts of a complex event in terms of the sequences of states of affairs and transitions between them, each of which can itself be described as a frame.

`Getting_a_job` is a subframe of `Employee_scenario`

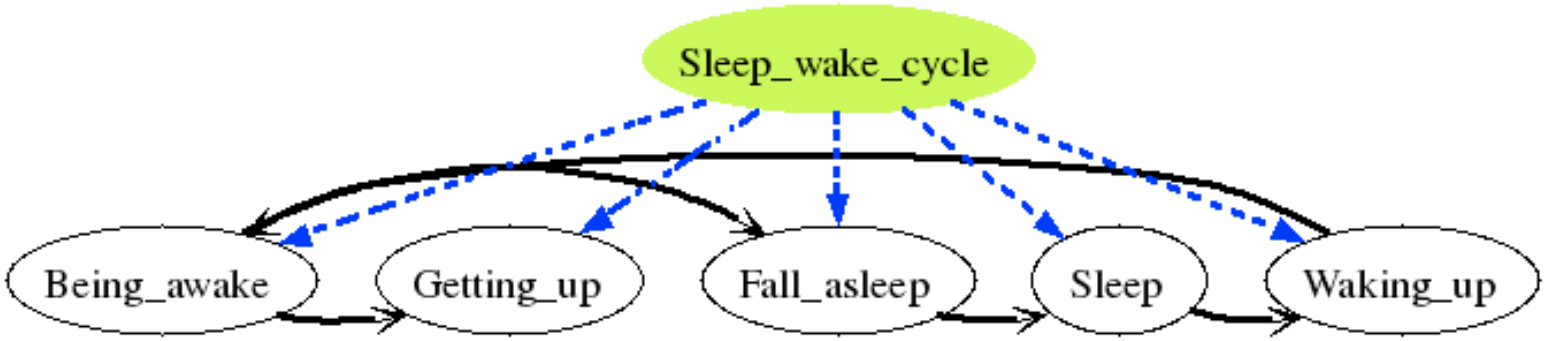
`Hiring` is a subframe of `Employer_scenario`

Precedes

...captures the temporal ordering of subevents within a complex event. The relation holds between component subframes of a single complex frame, and provides additional information to the set of Subframe relations

`Being_awake` **precedes** `Falling_asleep`

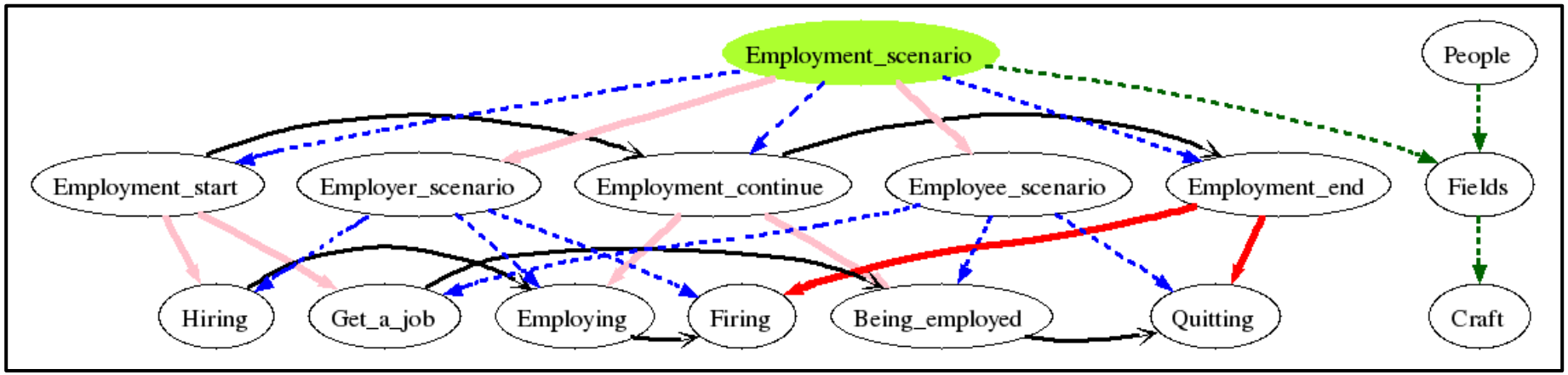
Subframes and Precedes

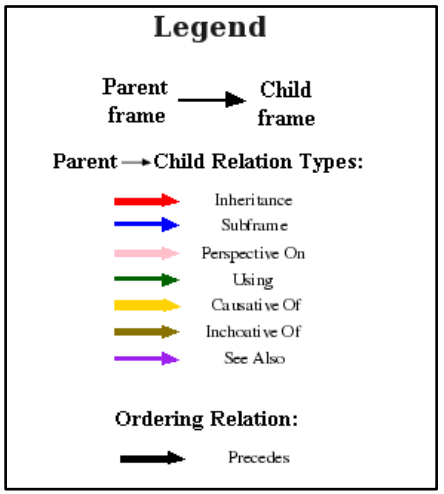


Subframes

Precedes

FrameGrapher





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NLP needs Frame Semantics

- Frames provide generalizations about lexical units at a useful level of abstraction, e.g. Operate vehicle covers drive.v, fly.v, paddle.v, sail.v, etc. useful for paraphrase
- Roles (Frame Elements) are also more meaningful than traditional semantic role labels, e.g. Driver in Operate vehicle for all the types of vehicle tells us more than just Agent.
- Frames represent conceptual gestalts--more than just the sum of their parts

NLP and FrameNet

- Automatic Semantic Role Labeling (ASRL)
  - Gildea and Jurafsky 2002
  - Das et al. 2010. Probabalistic Frame Semantic Parsing.
  - Chen et al. NAACL-HLT 2010. SEMAFOR
  - Das et al. 2014. *Computational Linguistics*, 40.1:9-56
  - Hermann et al. ACL 2014. Automatic Frame Induction
  - Chang et al. LAW 2015. Controlled crowd-sourcing of annotation (work with Google)

Decisive Analytics Corporation

- Long-term collaboration with FrameNet via a series of subcontracts, e.g. current work on
  - Spatial relations
  - Negation, tense, mood and aspect
- Some of DAC's products:
  - Network extraction
  - Attitude analysis
  - Semantic search

Decisive Analytics Corporation

- Network Extraction
  - use frame labeled data to produce entity network
  - filtering focuses analysis
  - relational modeling reorganizes network into meaningful clusters based on frame data
- Attitude Analysis
  - map FN to Attitudes semi-manually
  - exploit FN heirarchy of frames to prepopulate Holder/ Target mapping for Frame Elements
  - generate FN-based queries from simple text
- Semantic Search
  - execute queries over frames, frame elements, and “terms”
  - results in several different forms

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Introduction

- Challenge of MWEs for NLP
- Defining MWE
- Distinguishing MWE from construction

Sag et al. 2002

- MWEs: A Pain in the Neck for NLP
  - rough definition: “idiosyncratic interpretations that cross word boundaries (or spaces)”
  - ubiquitous in language and across genres
  - “words with spaces” treatment poses problems
    - flexibility
    - lexical proliferation
  - Relevant Issues
    - Idiomaticity
    - Compositionality
    - Productivity
    - …

Baldwin and Kim (2010): Idiomaticity of MWEs

- lexical: components not part of language
  - *ad hoc* (for this < Latin) for a specific purpose
  - *plus ça change* (more it changes < French)
  - qué tal (how are you < Spanish)
- syntactic: "non-compositional" syntax
  - *by and large* (prep conj adj) – adv.
  - what's up? (Q-word-cop v. + adv.) – interjection ("Hi")

Baldwin and Kim (2010): Idiomaticity of MWEs

- semantic: varying degrees of compositionality
  - *back and forth*
  - *taxi driver* (NN compounds generally)
  - *blow hot and cold*
  - *middle of the road*
- pragmatic: tied to specific situation or context
  - *good evening*
  - *lights out*
- statistical: high frequency, relative to component words or alternative phrasings of same expression
  - *immaculate performance* vs. *spotless performance*
  - *black and white* vs. *white and black*

Baldwin and Kim (2010): Other Characteristics of MWEs

- crosslingual variation
  - Committee on Culture
    - Spanish: Comisión de la Cultura (…of the…)
    - French: Commission de la Culture (…of the…)
    - Italian: Commissione per la Cultura (…for the…)
- paraphrasable with one word
  - take advantage of → exploit
  - blow the whistle on → report
- proverbiality: describe/explain recurrent situation of social interest
  - piss off = annoy
  - drop off = fall asleep

informal

- prosody: related to semantic idiomaticity
  - sóft spot (vs. soft spót)

MWEs in NLP

- Workshops:
  - 11th Workshop on MWEs (2015 NAACAL/HLT)
  - 12th Workshop on MWEs (2016 ACL)
- Additional Publications:
  - *ACM Transactions on Speech and Language Processing (TSLP)* - Special issue on multiword expressions: From theory to practice and use, pt.1 V 10.2, June 2013
  - *ACM Transactions on Speech and Language Processing (TSLP)* - Special issue on multiword expressions: From theory to practice and use, pt.2 V.10.3, June 2013

Definition of MWE

- Fillmore & Ide (2002)
  - any expression made up of more than one lexical item which does not fit a canonical syntactic pattern and/or which *exhibits some features of meaning, form, or distribution that cannot be predicted from its component parts and its syntactic organization.*
- Baldwin & Kim (2010) following Sag et al. (2002)
  - Multiword expressions (MWEs) are lexical items that: (a) can be decomposed into multiple lexemes; and (b) *display lexical, syntactic, semantic, pragmatic and/or statistical idiomaticity*

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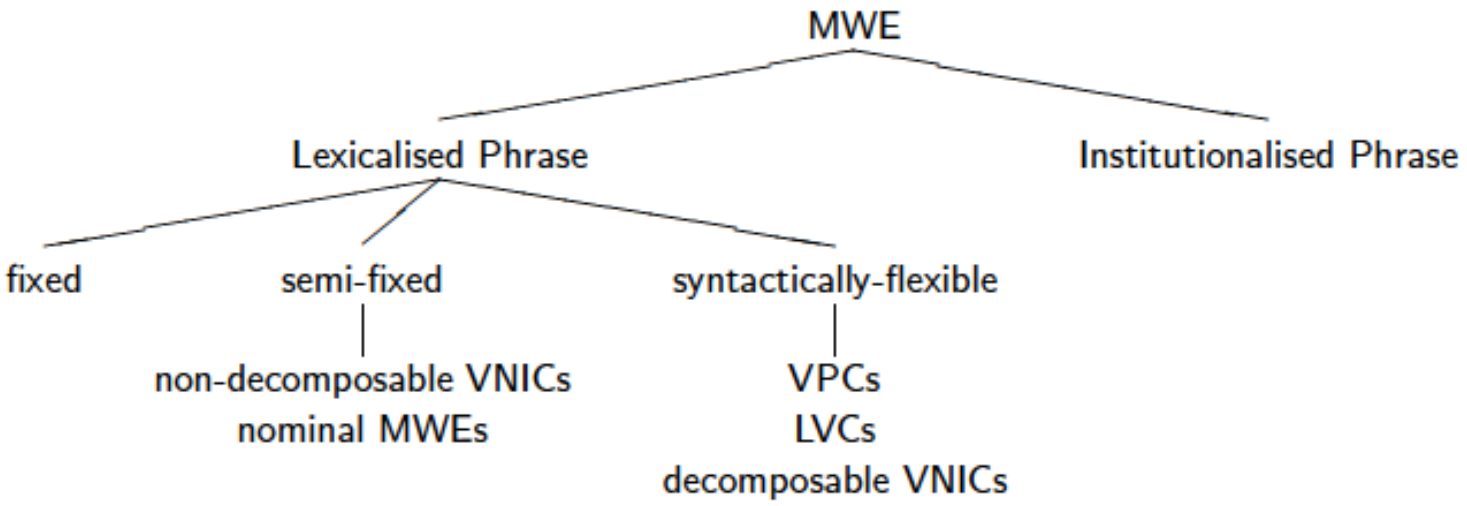
Types of MWEs

Baldwin & Kim (2010)

- identify MWEs in form-al terms (nominal, verbal, prepositional)
- classify MWEs based on their syntactic and semantic propoerties, distinguishing between *lexicalized* MWEs and *institutionalized* MWEs

Baldwin & Kim (2010): MWE Classification



Baldwin & Kim: MWE Classification

- lexicalized: explicitly encoded in the lexicon
  - Fellbaum 20XX identifies those MWUs that must be included in the lexicon
- institutionalized: only statistically idiomatic

Baldwin & Kim: Lexicalized MWEs

- fixed MWEs: do not undergo morphosyntactic or internal modification
  - by and large (cf. *by and larger)
  - *ad hominem* (*ad quamplurimos homines)
  - The Bronx (*Bronx, *A Bronx)
- semi-fixed MWEs: lexically-variable forms with hard restrictions on word order and composition, allowing variation in inflection, pronoun and determiner choice
  - shoot the breeze (shot the breeze, shooting the breeze)
  - The Rolling Stones (vs. A Rolling Stones' concert)
  - find my/your/his/her place
  - NN compounds
- syntactically flexible
  - Verb-Particle: turn the blanket down/turn down the blanket
  - Light Verbs: make a decision, give a lecture, take revenge
  - decomposable VP idioms: kick the bucket, spill the beans

Taxonomy of MWEs (Fillmore and Ide 2002)

- Grammatically Regular Idioms
- Idiomatic Syntactic Constructions
- Extragrammatical Idioms

Grammatically Regular Idioms

Type	Examples
Full-sentence idiom	*The fur* is *flying*.
Full-sentence idiom with variable	*Somebody up there likes* me.
VP idiom	Somebody *let the cat out of the bag*.
Preposition selection	We *object to* your proposal. I am quite *fond of* cats. After the *attack on* the station Get *out of* here.
Particle selection	Let's *cut out* early.
Particle and preposition selection	Why *put up with* that?
Support verb plus noun.	She *took* little *advantage of* the opportunity. Let's *pay* careful *attention to* their needs.
Pertinative adjective + Noun	military policy (cf. military demeanor) educational practices (cf. educational experience) economic board (cf. economical housewife)

Idiomatic Syntactic Constructions

- structure goes beyond the canonical, requiring appeal to special interpretation principles
- "peripheral" constructions with varying degrees of productivity and lexical restrictions
- parsable if grammar has details of constructions, requires recognition of patterns expressed in terms of grammatical categories and lexical sets, cannot depend on combinatorial requirements of lexical heads
- examples
  - *day in day out*, *year in year out*
    - CU-in-CU-out
  - my gem of a wife, her jerk of a husband
    - N_1 evaluates N_2 in N_1 of N_2 phrase
  - another five pages (*another many pages), a mere thirty dollars
    - singular determiner + quantified plural N

Extragramatical Constructions

- Exclusively identified and characterized by lexical form, don't have canonical syntax
- Examples
  - Ed doesn't eat fish, *let alone* sea urchin.
    - He just wants to be let alone.
  - *First off*, Molly needs a place to live.
    - She always insists on being *first off* the plane.

Questions for Linguistics and NLP

Where is the dividing line?

Does identifying a line matter?

Does identifying a line matter for NLP?

Construction vs. MWE
June 2015 MWE Workshop

- Baldwin: Where is the dividing line between idiomatic constructions and MWEs?

- Michaelis: I don't know.

Useful Heuristic?

- Highly abstract forms (e.g. Subject-Predicate) tend to be viewed as constructions.
- Forms with one or more fixed lexical items tend to be viewed as MWEs.

- Where is the dividing line?
- Does identifying a dividing line matter for NLP?

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Syntactic Characteristics of MWEs

- range of syntactic configurations
  - nominal: surgeon general, airline employee complaint
  - verbal: take a shower, run the bath
  - adverbial: in short, first and foremost
- need not be well-formed
  - ✓kick the bucket, answer the door (cf. *answer a door)
  - by and large (cf. thick and thin, heart and soul, etc.)
  - on top (cf. on the top, *on bottom) on leave, in school, in court, to hospital
  - say when (*say whether), and then some (*and then any)

Syntactic Characteristics of MWEs

- may not allow modification
  - in medical school,
  - *in appellate court,
  - *to local hospital
- vary in degree of fixedness
  - spic and span (cf. *spic and very span), on air
  - kick the bucket (cf. *the bucket was kicked), fill one's shoes
  - *turn in* the work/*turn* the work *in*, made a decision/a decision was made)

Semantic Characteristics

- reduced semantic transparency
- reduced or absent compositionality
- highly idiomatic

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Representation of MWEs

- Sag et al. (2002) Lexical Representation
  - words with spaces: only works for fixed MWEs
  - other
- Heid (2008) Multi-layered annotation of MWE parts
  - [[by$_{prep.}$ and$_{conj.}$ large$_{adj}$.]]$_{adv}$
- Schneider (2014)
  - formal representation of shallow token groupings into "strong" MWEs (noncompositional expressions and proper names included) and "weak" collocations

Representational Issues: Creating Standards

- International Standard for Language Engineering
  - Calzolari, Lenci, and Zampolli (2001)
    - includes proposals for the representation of support verbs and noun-noun compounds cross-linguistically
- Cross-lingual Multi-word Expression Lexicons for Language Technology (XMELLT)
  - N. Ide (Vassar) 2000-2001 NSF Grant
  - Calzolari et al. 2002

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  - Representational Issues in MWEs
- Multiword Expressions in FrameNet
  - FrameNet's treatment of (certain) MWEs
  - Navigating Lexicon and Grammar
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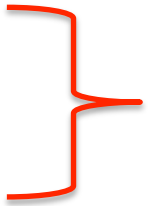
Revenge MWEs

- *get back (at)*
  - Tim got back at Peter for…
  - *Tim got back.
- *get even*
  - Tim got with Peter for…
  - Tim got even for…
- *pay back*
- *take revenge*
- *exact revenge*



N B. register difference

MWEs in FrameNet

Support Constructions: ~ 2750

- Support Vs: make a decision; host a reception; launch an attack
- Support Ps: under construction; with success; in doubt

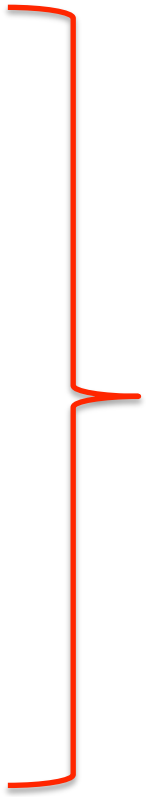
As Lexical Units in FN database: ~830

Not in Count

- Noun-Noun Compounds: wine bottle, armchair, etc.
- Transparent Nouns: glass of milk, herd of cows, etc.

FrameNet's treatment of MWEs

- Support Verbs
  - make decision
  - take revenge
  - give advice
  - turn blue
  - get happy
- Transparent Nouns
  - herd of sheep
  - box of toys
  - lock of hair
- Compound Nouns



discrepencies between syntactic and semantic head

Support Verbs

- syntactic object idiosyncratically selects the verb (not reverse)
  - make a decision
  - say a prayer
  - file a complaint
- may profile phase of complex event
  - make a promise
  - keep a promise
- lexical functions that present (different) subjects of transitive actions
  - give a test vs. take a test
  - perform surgery vs. undergo a surgery

FrameNet Treatment of Support Verb Constructions

- NOUN evokes the frame
  - hold a discussion `Discussion`
  - conduct research `Research`
  - make a deal `Make_agreement_on_action`
- Analyze Support Vs in terms of evoked frame

Discussion Frame

Core Frame Elements

Interlocutor_1

Interlocutor_2

Interlocutors

Topic

Non-Core Frame Elements

Amount of Discussion

Time

Means

Last week the President [*held* $_{\text{Supp}}$] [exhaustive **DISCUSSIONS**] with the Foreign Minister via Skype

FrameNet Treatment of Support Verb Constructions

- Adjective evokes the frame
  - get happy `Emotion_directed`
  - turn blue `Color`
- Analyze Support Vs in terms of evoked frame

  Jasper's face [*turned*$^{\text{Supp}}$ [[a dark$_{\texttt{Color}.\text{Descriptor}}$]] **BLUE**$_{\texttt{Color}.\text{Color}}$] in the cold lake.

Types of Transparent Nouns

- Aggregates
  - bunch, group, collection, herd, school, flock
- Quantities
  - flood, number, scores, storm
- Types
  - breed, class, ilk, kind, type, sort
- Portions and Parts
  - half, segment, top, bottom, part
- Unitizers
  - glass, bottle, box, serving
- Evaluations
  - gem, idiot, prince

Transparent Nouns

- Aggregates
  - bunch of grapes, group of problems, flock of birds
- Quantities
  - flood of email, number of calls, scores of papers,
- Types
  - breed of dog, class of words, type of flower
- Portions and Parts
  - half an ounce, piece of paper, top of mountain
- Unitizers
  - glass of juice, bottle of perfume, serving of soup
- Evaluations
  - jerk of a husband, gem of a wife, dream of a house

FrameNet Treatment of Transparent Nouns

- Analyzes [N_1 of N_2] from the perspective of N_1

  N_1 = transparent N and syntactic head

  determines integration of semantics

  N_2 = semantic head

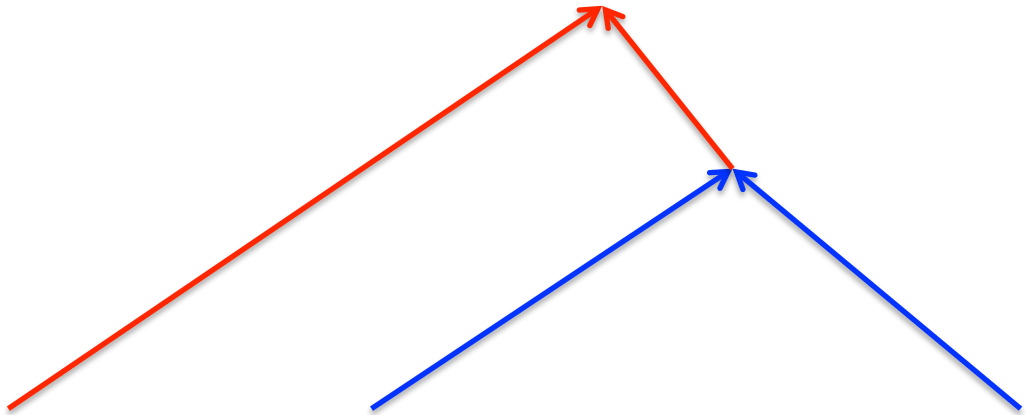
  …[a piece$_{\texttt{Part_Piece.Piece}}$ [of cake$_{\texttt{Part_Piece.Whole}}$]]

Transparency

- facilitates recognizing some types of discrepancies between syntactic and semantic structure in
  - support verb constructions
    - V + N
    - V governs N syntactically, but N is semantic head
  - N_1 of N_2 Construction
    - N_2 is semantic head
    - round of golf

Compound Nouns

- lexicalized compounds
  - picture frame, bookstore
    - w/o regard to typographical convention
- productive compounds



bookstore sales person responsibility agreement

FrameNet Treatment of Compound Nouns

Head of the compound evokes the frame

N_1N_2 (where N_2 is Head)

[wine bottle] = `Containers`

The[[wine$_{\texttt{Containers.Use}}$] [**BOTTLE**$_{\texttt{Containers.Container}}$]]
stood on the shelf.

Road Map

- Overview of FrameNet
  - Frames, Frame Elements, Lexical Units, Valence Descriptions, Frame-to-Frame Relations
  - FrameNet and NLP
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Traditional Distinction

- Lexicon: set of items associated with categories and denotations

- Grammar: set of rules about combining items in lexicon

Lexicon-Constructicon

- FrameNet Lexicon: repository of information about "words" in contemporary English based on the semantic frames, or common scenes and situations that the words describe.
- FrameNet Constructicon: repository of information about grammatical constructions in contemporary English that constitute the basic building blocks of the the language.

Lexicon-Constructicon

Capturing meaningful units in language requires both lexicon and constructicon (Fillmore 2006), as does characterizing MWEs for identification and representation in natural language processing.

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NLP Applications

- Informaiton Retrieval
- Event Tracking
- Question-Answering

require information about events and their participants

- FrameNet provides information about events and their participants, also for MWEs:
  - support verbs
  - transparent nouns
  - compound nouns

Example

Horatio took a bit of a dirt nap.

Support V:	*take* a dirt nap
Transparent N:	a bit of a dirt nap
Compound N:	dirt nap

Support Verb

take a dirt nap

take a nap = nap.v

cf. have a nap, get a nap

Analyzed in terms of `Sleep` frame, one of whose LUs is *nap*.n

Transparent Nouns

…a bit of a dirt nap

- N_1 of N_2, where N_2 identifies the whole of which N_1 is a part; N_2 = semantic head
- N_1 and N_2 also happen to be MWEs
  - * He took bit of dirt nap

Transparent Nouns

[a bit$_{Part}$] [of a dirt nap$_{Whole}$]

Core Frame Elements

Part: identifies the part of the larger whole

Whole: identifies the undivided entity

Compound Nouns

dirt nap: N_1 N_2 where N_2 = semantic head

non-compositional

dirt + nap = ????

non-productive

*sand nap

catnap, afternoon nap

Example

Horatio [*took*$^{\text{Supp}}$ {**A BIT** [of a DIRT NAP$^{\text{Target}}$ }]

[ ] Support Verb Construction

{ } Transparent Noun

NN Compound

Example

1. [Horatio$_{\texttt{Dead_or_alive.Protagonist.}}$] [*took*$^{\text{Supp}}$ {a bit of a **DIRT NAP**$^{\text{Target}}$ }]

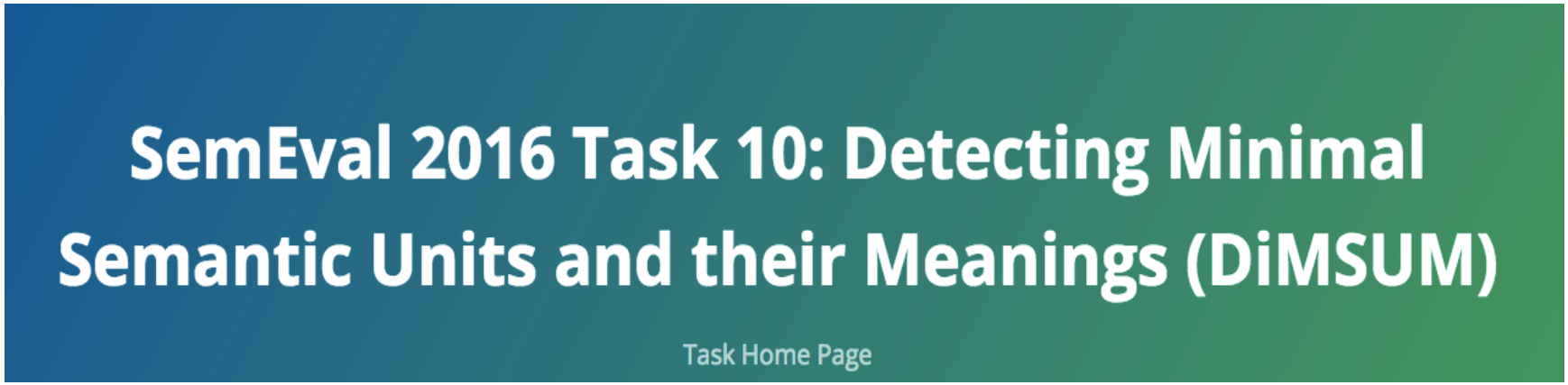
2. Horatio [*took*$^{\text{Supp}}$ {**A BIT**$^{\text{TARGET}}$ [[of a dirt nap]$_{\texttt{Hedging.Hedged\_content}}$]}]

Conclusions

- FrameNet provides a wealth of information about the semantics of MWEs
- NLP would benefit from exploiting that information
- FrameNet plans major reconfiguration of data preentation

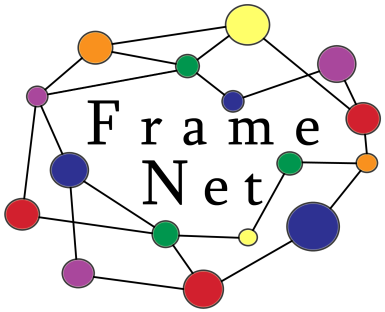
STAY TUNED!

Opportunity!



http://dimsum16.github.io/

In the open condition, systems may use any and all available resources.



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Thanks!

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