

Semantic Roles for Semantic Parsing

Lessons Learned and Future Directions

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2023-06-29

TaCoS

Outline

Introduction

Superframes

Conclusions

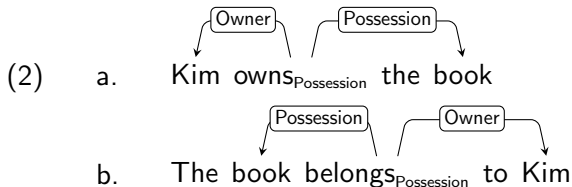
Outline

Introduction

Superframes

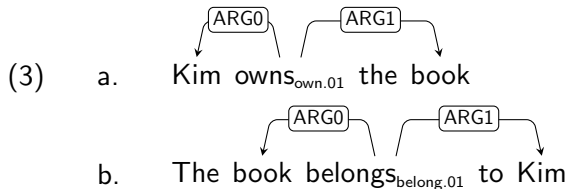
Conclusions

Why Semantic Roles?



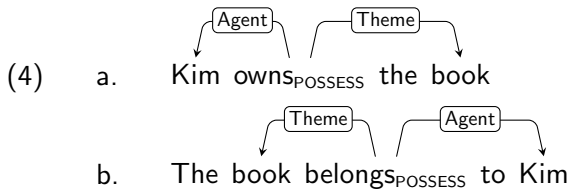
FrameNet (Baker et al., 1998)

Why Semantic Roles?



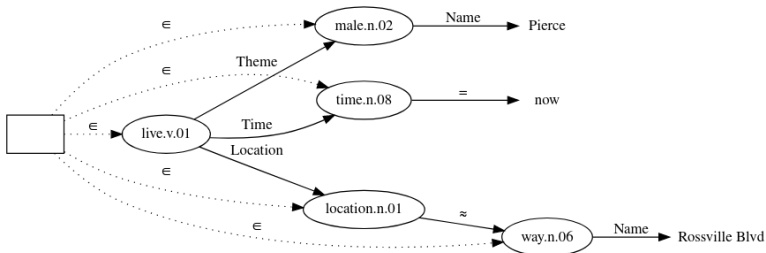
PropBank (Palmer et al., 2005)

Why Semantic Roles?



VerbAtlas (Di Fabio et al., 2019)

Semantic Roles in Meaning Representations



Discourse Representation Graphs (Abzianidze et al., 2017)

Semantic Roles in Meaning Representations

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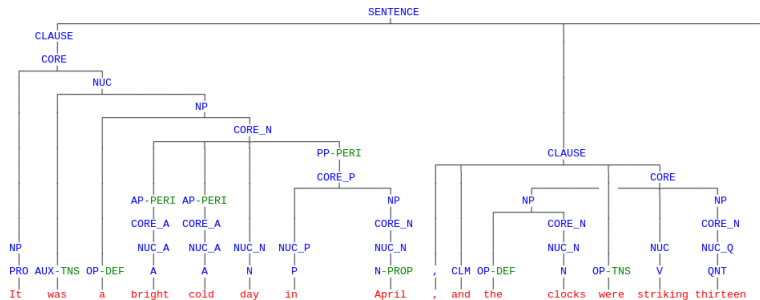
Snt3: He denied any wrongdoing.
(d/ deny-01
  :ARG0 (p/person
    :ref-person 3rd
    :ref-number Singular)
  :ARG1 (t/ thing
    :ARG1-of (d2/ do-02
      :ARG0 p
      :ARG1-of (w/ wrong-02)
      :modpred d))
  :aspect Performance
  :modstr FullAff)

(s3/ sentence
  :temporal((DCT :before s3d)
    (s3d :before s3d2))
  :modal((AUTH :FullAff s3p)
    (s3p :FullAff s3d)
    (s3d :Unsp s3d2))
  :coref(s2p :same-entity s3p))

```

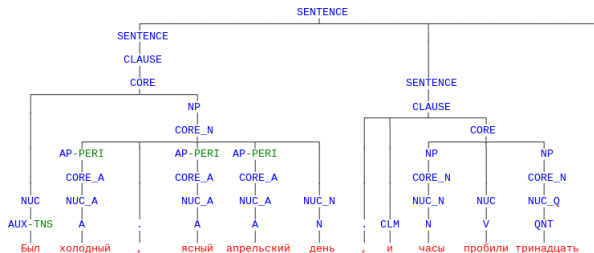
Uniform Meaning Representations (van Gysel et al., 2021)

RRGparbank



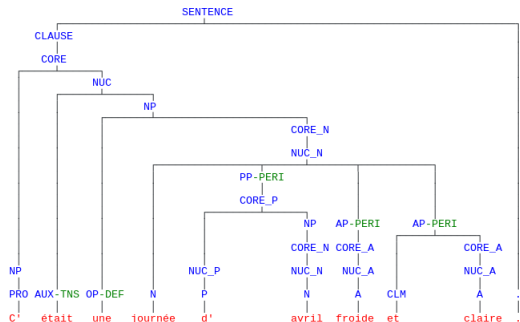
Bladier et al. (2022)

RRGparbank



Bladier et al. (2022)

RRGparbank



Bladier et al. (2022)

RRGparbank

Bladier et al. (2022)

RRGparbank Semantic Role Annotation

Joint Work with

- Tatiana Bladier
- Laura Kallmeyer

Annotators

- Selina Becker-Gierling
- Julia Hillebrand
- Alena Johnen
- Sabrina Kenter
- Robin Möllemann
- Anastasia Yablokova

RRGparbank Semantic Annotation: Example

It	was	a	bright	cold	day	in	April	,	and	the	clocks	were	striking	thirteen	.
											Agent		SIGNAL_INDICATE	Topic	

Annotation manual: <https://www.overleaf.com/project/6384d9cabbec7b57d9201abc>

RRGparbank Semantic Annotation: Status

Sentences	en	de	ru	fr
2+ independent annotations	3 389	3 370	663	0
1 annotation	1 735	1 708	5 133	1 672
no annotation	1 613	1 683	873	5 589

2023-06-28; annotators with < 100 annotations excluded

VerbAtlas Roles

Agent
Attribute
Beneficiary
Cause
Co-Agent
Co-Patient
Co-Theme
Destination
Experiencer

Extent
Goal
Instrument
Location
Material
Patient
Product
Purpose
Recipient

Result
Source
Stimulus
Theme
Time
Topic
Value

Coherent Roles across Frames?

Lemma	Frame	Roles									
know.v.01	KNOW	Experiencer	Theme	Topic	Attribute	Source					
believe.v.01	BELIEVE	Agent	Theme	Attribute							
think.v.03	THINK	Agent	Theme	Attribute							
wish.v.01	REQUIRE_NEED_WANT_HOPE	Agent	Theme	Beneficiary	Goal	Source	Cause	Co-Theme			
walk.v.01	GO-FORWARD	Agent	Source	Destination	Extent	Instrument	Location	Cause	Goal		
walk.03	MOVE-ONESELF	Theme	Location	Agent	Extent	Source	Destination	Attribute	Patient	Result	
walk.v.10	TRAVEL	Theme	Location	Source	Destination						

Why Are Semantic Roles So Confusing?

Traditional semantic roles tend to conflate three types of information:

1. “core relation”
 - e.g., a Location argument hints at a location or motion frame
2. aspect
 - Source, Goal
3. agentivity
 - e.g., is the subject of *think*, *own*, *walk* (necessarily) an Agent??

The Remedy

Separate core relation, aspect, and agentivity!

1. core relation: e.g. location/motion, possession, part-whole...
2. aspect: distinguish final from initial/intermediate participants
3. agentivity: ignore it

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Superframes

1. a very coarse set of frames, hence *superframes*
2. organized by core relation, always binary with an ARG1 (“domain”) and an ARG2 (“range”)
3. designed for semantic annotation of all (UD) dependencies between content words, i.e., both arguments and modifiers
4. designed to work with states, processes, and events (collectively called *scenes*)

Core Relations (1/2)

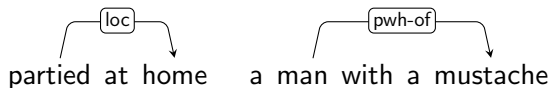
Relation	Description	ARG1 (d)	ARG2 (r)
cmp	comparison	compared	compared to
loc	location	located	location
prc	precedence	successor	predecessor
pss	possession	possessed	possessor
pwh	part-whole	part	whole
qnt	quantity	of what	how much
soc	social	somebody	relative/org/task...

Core Relations (2/2)

Relation	Description	ARG1 (d)	ARG2 (r)
acc	accompaniment	accompanied	accompanier
ast	asset	scene	asset
cau	causation	effect	cause(r)
mnr	manner	scene	manner
mns	means	end	means
msg	message	topic	comment
pcp	participation	participant	scene
rcp	recipient	scene	recipient
snd	sender	message	sender
tmp	temporal	what	when/how long/how often...
xpl	explanation	explained	explanation

Annotation of Modifiers

Plain core relation or its inverse (denoted by -of).



Applies equally to scenes like *partied* and entities like *man*.

Annotation of Core Arguments

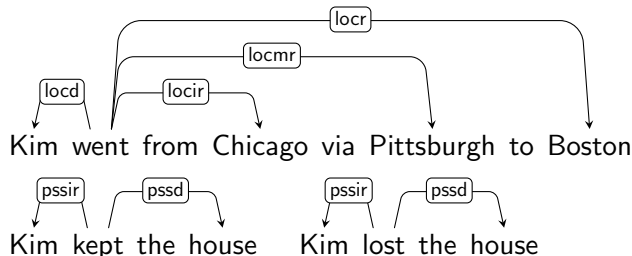
Suffix d for ARG1, r for ARG2.



No distinction between states like *owns* and events like *went*.

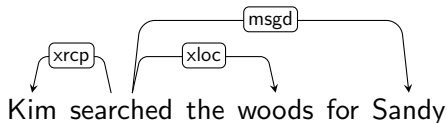
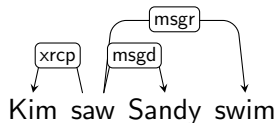
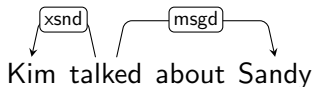
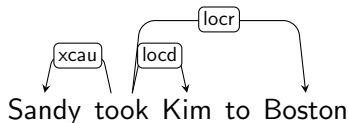
Initial and Intermediate Range Roles

For events; suffixes ir and mr.

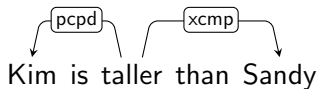
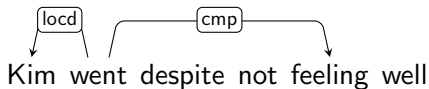
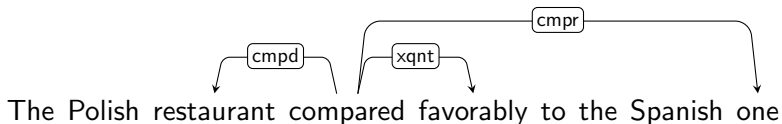
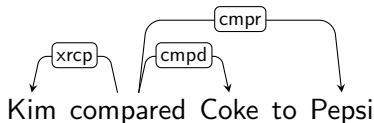
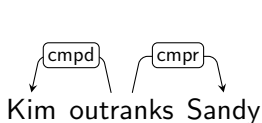


Annotation of Non-core Arguments

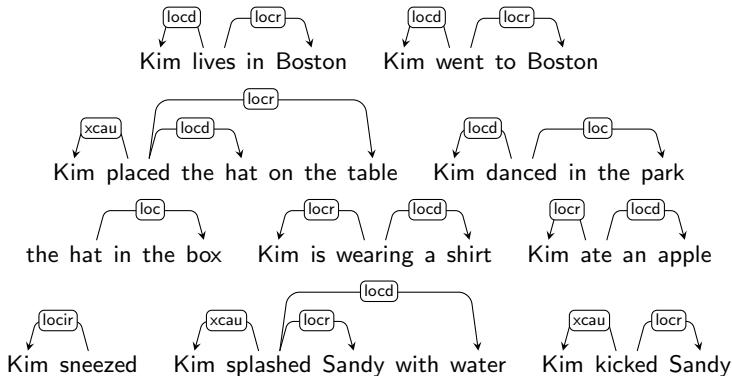
Prefix x; somewhat free but very common xcau/xsnd/xrcp.



Comparison (cmp)



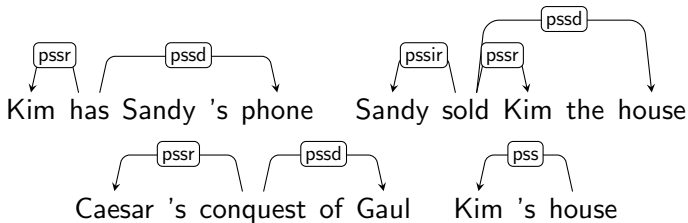
Location (loc)



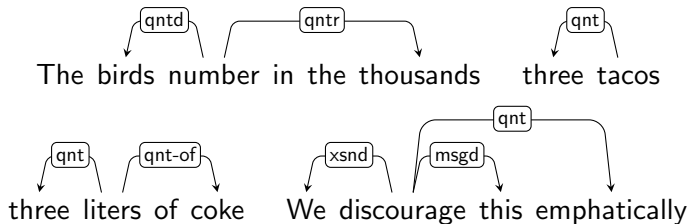
Precedence (prc)



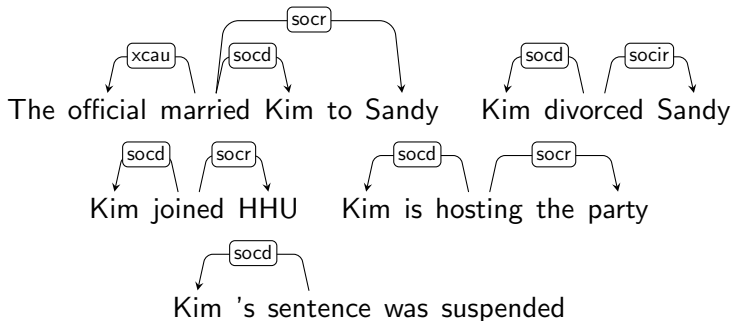
Possession (pss)



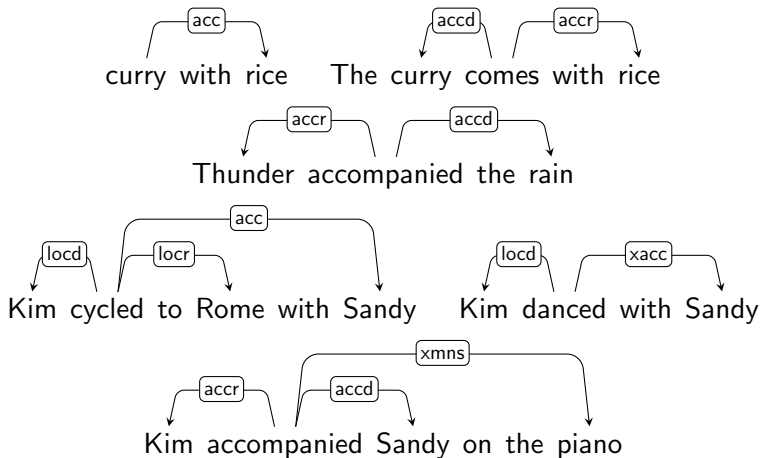
Quantity (qnt)



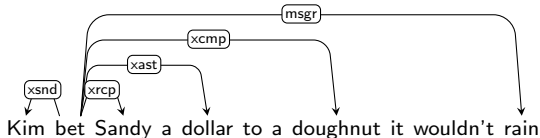
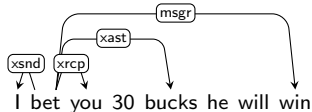
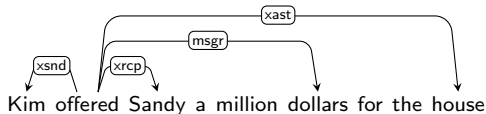
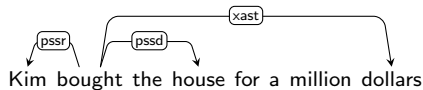
Social (soc)



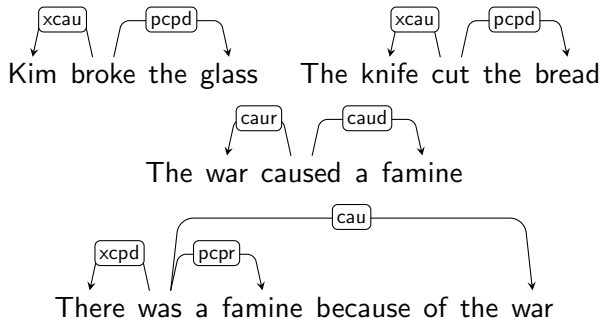
Accompaniment (acc)



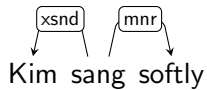
Asset (ast)



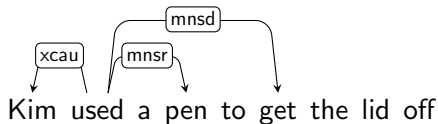
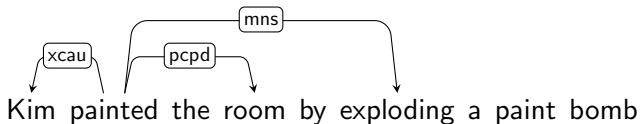
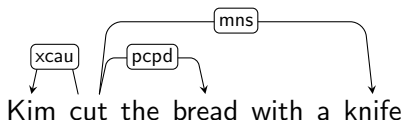
Causation (cau)



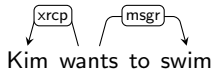
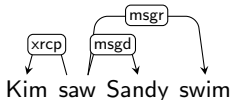
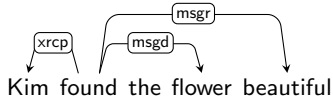
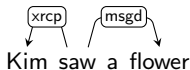
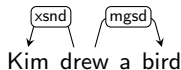
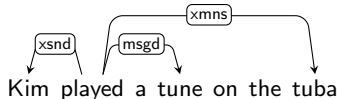
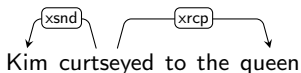
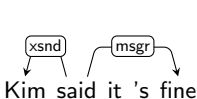
Manner (mnr)



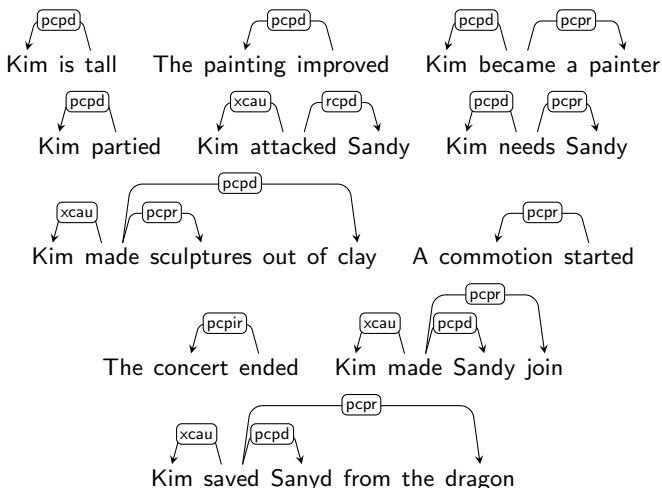
Means (mns)



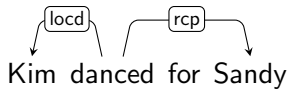
Message (msg)



Participation (pcp)



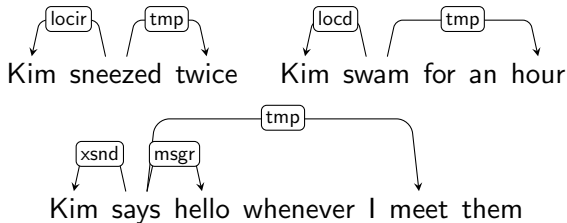
Recipient (rcp)



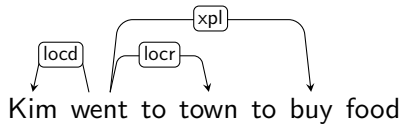
Sender (snd)



Temporal (tmp)



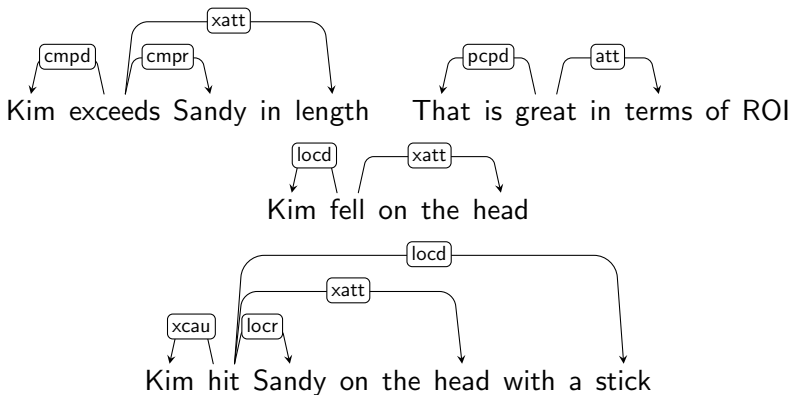
Explanation (xpl)



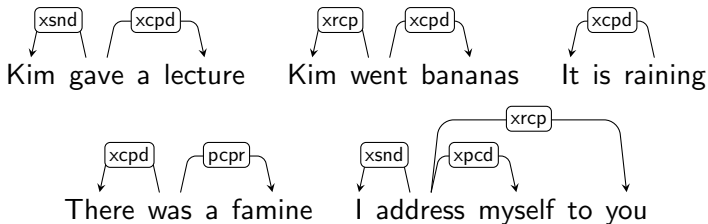
Non-role Relations

Relation	Description
att	attribute
cpd	complex predicate
dim	discourse marker
dpc	depictive
exp	expletive
rsd	resultative: affected entity
rsr	resultative: result

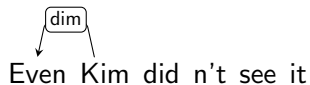
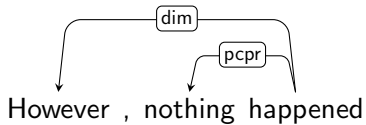
Attribute (att)



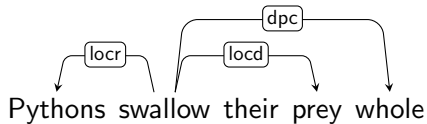
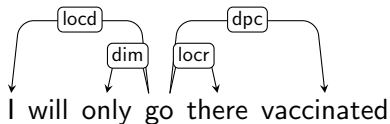
Complex Predicate (cpd)



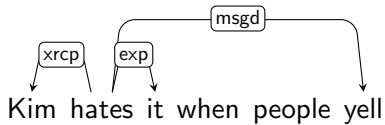
Discourse Marker (dim)



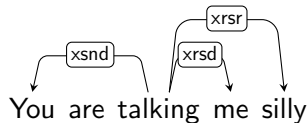
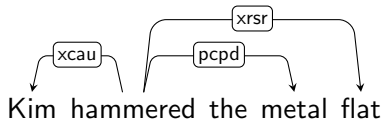
Depictive (dpc)



Expletive (exp)



Resultative (rsd, rsr)



Outline

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Superframes

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Summary

- large parts of RRGparbank now annotated with VerbAtlas
- new idea: Superframes, a lexicon-free semantic argument/modifier classification scheme
- seeks to improve upon existing schemes; separates core relation from aspect from agentivity
- unified coarse core relation inventory for arguments, modifiers; states, processes, events

What Now?

1. Finish annotation manual v0 (any day now!)
2. Pilot annotation
3. Acquire funding
4. Annotate
5. Acquire more funding
6. Annotate
7. ???
8. Profit (show superior IAA, downstream performance, establish as standard)

Thank you!

Bibliography I

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