Tutorial on Universal Dependencies

Introduction

Joakim Nivre[1] Daniel Zeman[2] Filip Ginter[3] Francis M. Tyers[45]

[1]Department of Linguistics and Philology, Uppsala University, Sweden

[2]Institute of Formal and Applied Linguistics, Charles University in Prague, Czech Republic

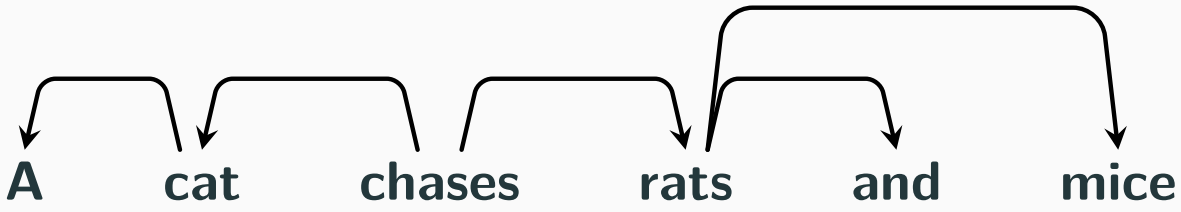
[3]Department of Information Technology, University of Turku, Finland

[4]Giela ja kultuvrra instituhtta, UiT Norgga árktalaš universitehta, Tromsø, Norway

[5]Arvutiteaduse instituut, Tartu Ülikool, Estonia

Introduction

- Increasing interest in multilingual NLP
  - Multilingual evaluation campaigns to test generality
  - Cross-lingual learning to support low-resource languages
- Increasing awareness of methodological problems
  - Current NLP relies heavily on annotation
  - Annotation schemes vary across languages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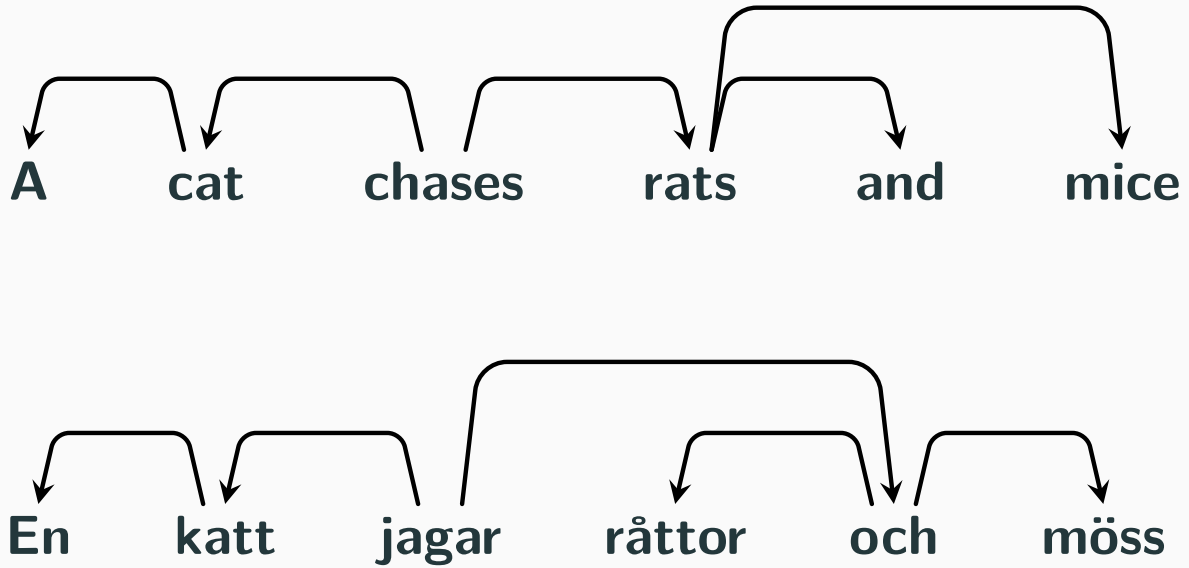
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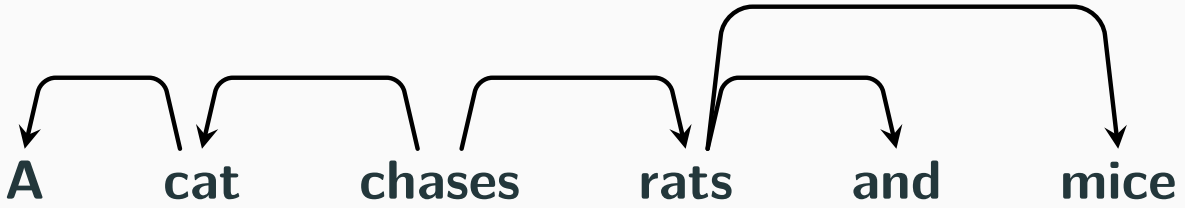
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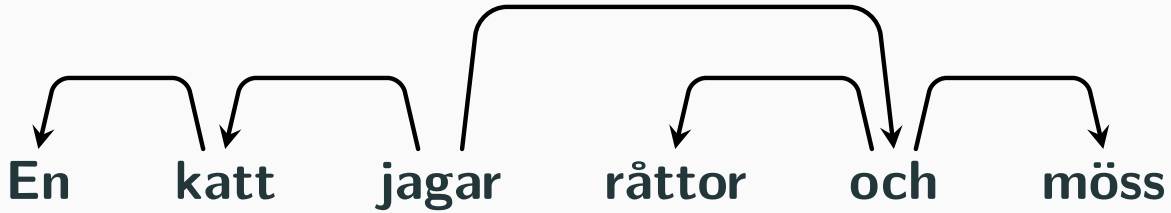
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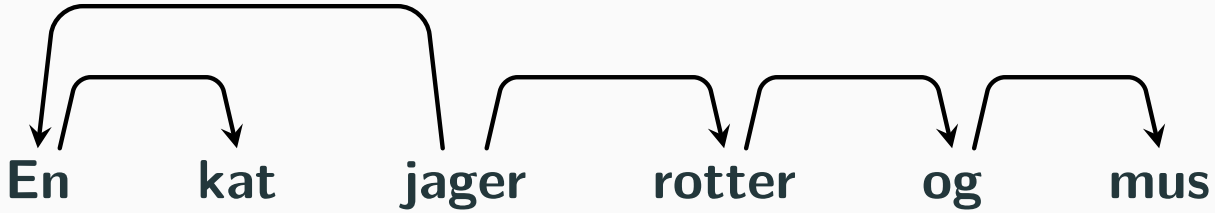
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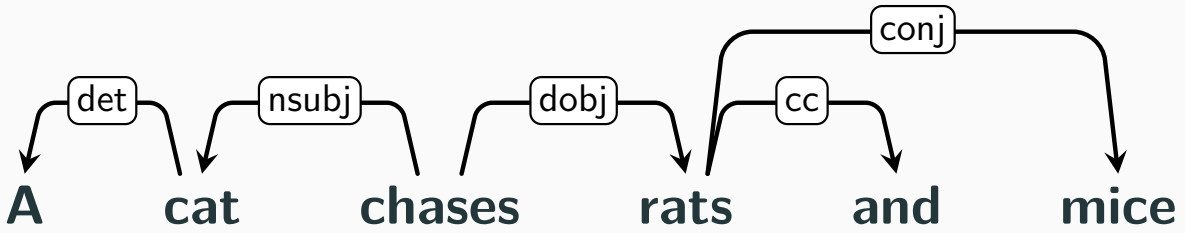
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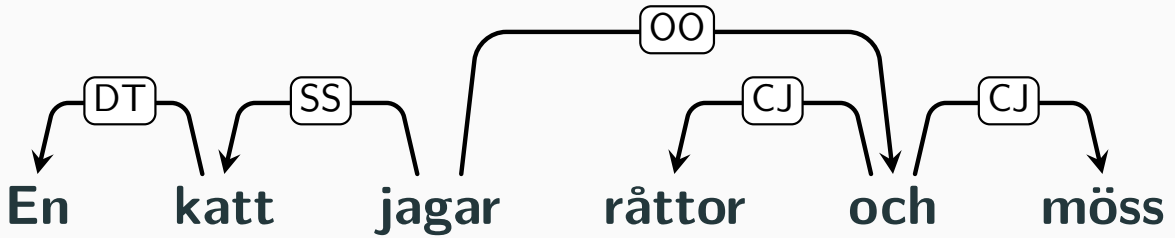
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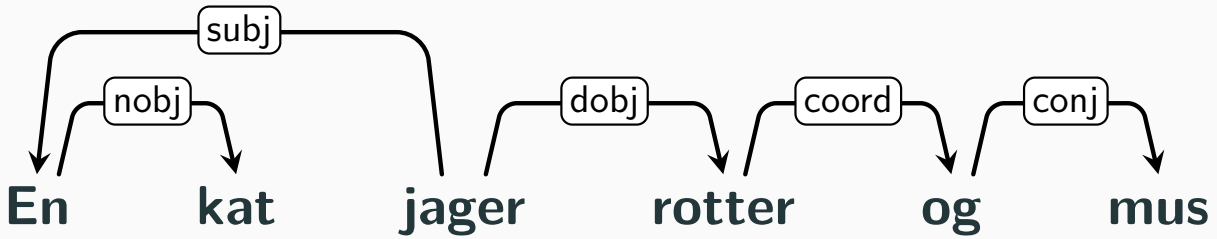
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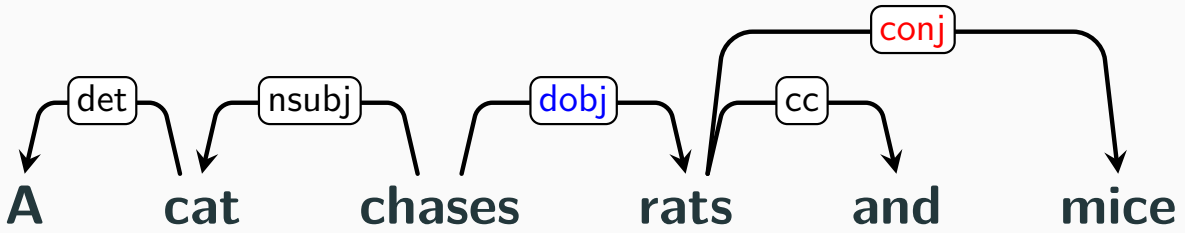
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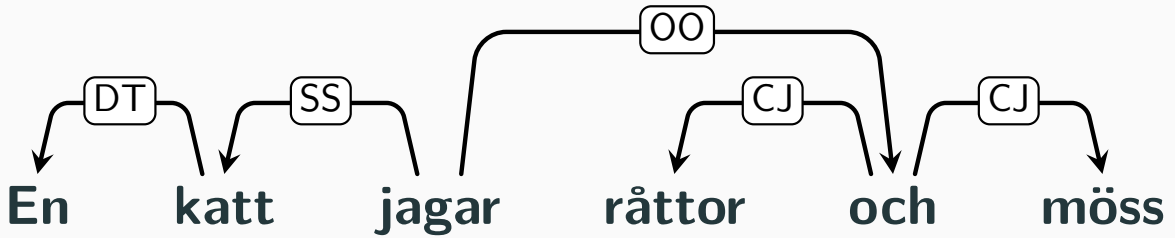
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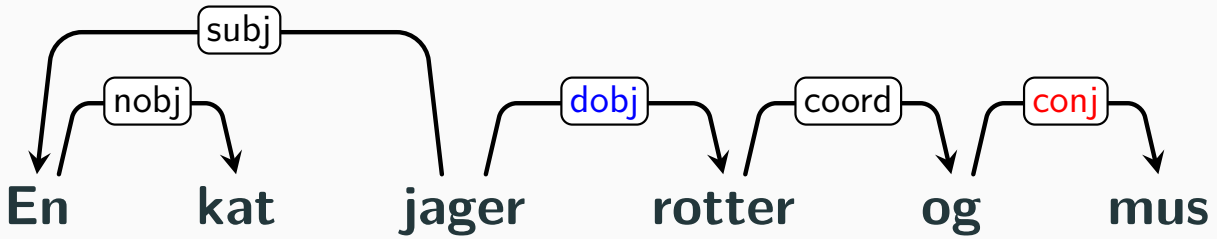
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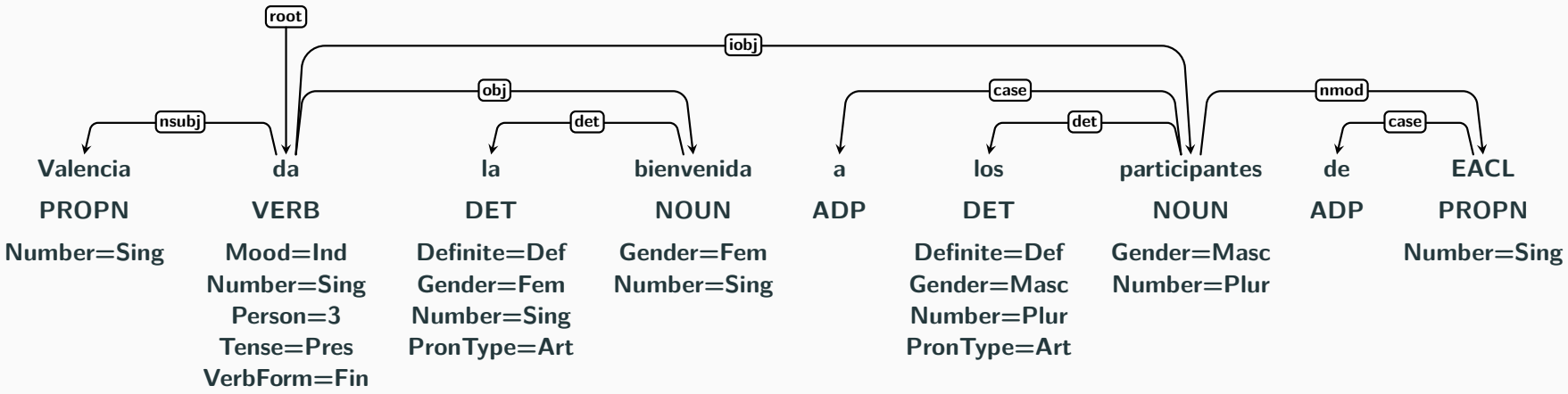
Why is this a problem?

- Hard to compare empirical results across languages
- Hard to usefully do cross-lingual structure transfer
- Hard to evaluate cross-lingual learning
- Hard to build and maintain multilingual systems
- Hard to make comparative linguistic studies
- Hard to validate linguistic typology
- Hard to make progress towards a universal parser

Universal Dependencies

http://universaldependencies.org



- Part-of-speech tags
- Morphological features
- Syntactic dependencies

Goals and Requirements

- Cross-linguistically consistent grammatical annotation
- Support multilingual NLP and linguistic research
- Build on common usage and existing de facto standards
- Complement – not replace – language-specific schemes
- Open community effort – anyone can contribute!

The UD Philosophy

- Maximize parallelism – but don't overdo it
  - Don't annotate the same thing in different ways
  - Don't make different things look the same
  - Don't annotate things that are not there
- Universal taxonomy with language-specific elaboration
  - Languages select from a universal pool of categories
  - Allow language-specific extensions

Design Principles

- Dependency
  - Widely used in practical NLP systems
  - Available in treebanks for many languages
- Lexicalism
  - Basic annotation units are words – syntactic words
  - Words have morphological properties
  - Words enter into syntactic relations
- Recoverability
  - Transparent mapping from input text to word segmentation

Morphological Annotation

Le	chat	chasse	les	chiens	.
le	chat	chasser	le	chien	.
DET	NOUN	VERB	DET	NOUN	PUNCT
Definite=Def Gender=Masc Number=Sing	Gender=Masc Number=Sing	Mood=Ind Number=Sing Person=3 Tense=Pres VerbForm=Fin	Definite=Def Gender=Masc Number=Plur	Gender=Masc Number=Plur	

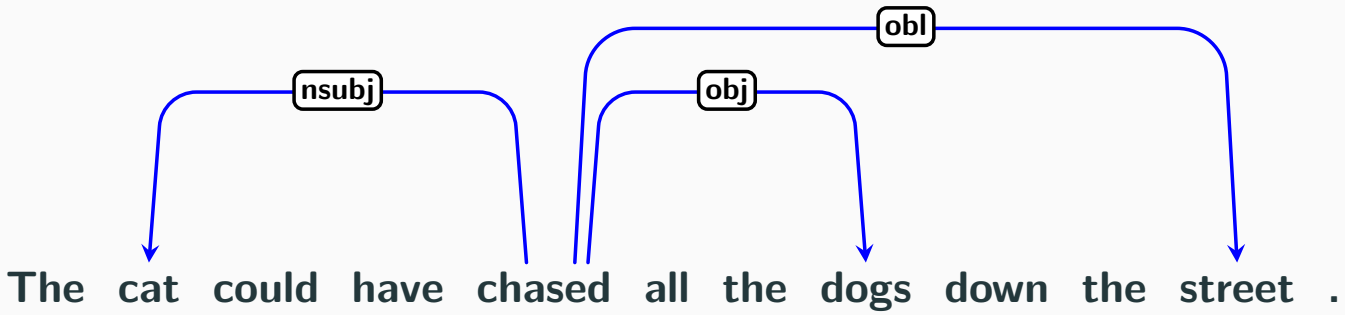
- Lemma representing the semantic content of a word
- Part-of-speech tag representing its grammatical class
- Features representing lexical and grammatical properties of the lemma or the particular word form

Syntactic Annotation

The cat could have chased all the dogs down the street .

- Content words are related by dependency relations
- Function words attach to the content word they modify
- Punctuation attach to head of phrase or clause

Syntactic Annotation



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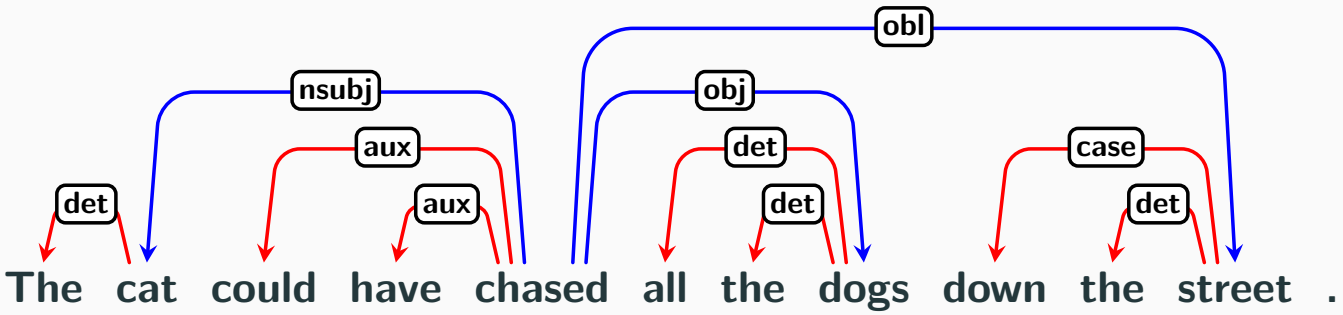

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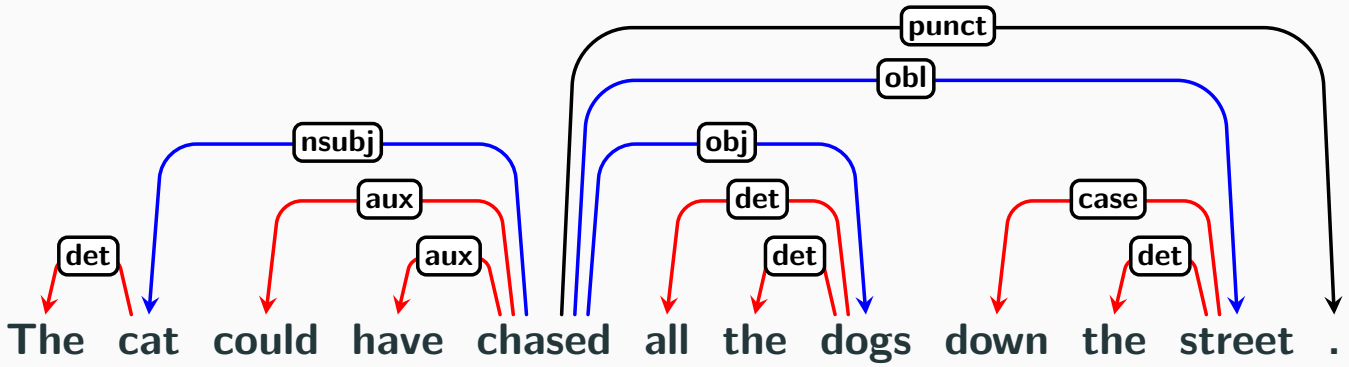

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CoNLL-U Format

ID	FORM	LEMMA	UPOSTAG	XPOSTAG	FEATS	HEAD	DEPREL	DEPS	MISC
1	Le	le	DET	_	_	2	det	_	_
2	chat	chat	NOUN	_	_	3	nsubj	_	_
3	boit	boire	VERB	_	_	0	root	_	_
4-5	du	_	_	_	_	_	_	_	_
4	de	de	ADP	_	_	6	case	_	_
5	le	le	DET	_	_	6	det	_	_
6	lait	lait	NOUN	_	_	3	obj	_	SpaceAfter=No
7	.	.	PUNCT	_	_	3	punct	_	_

- Revised and extended version of CoNLL-X format
- Two-level segmentation and enhanced dependencies

Where are we today?

- Brief history of UD:
  - First guidelines launched in October 2014
  - Treebank releases (roughly) every six months
  - Version 2 in December 2016 (guidelines) and March 2017 (treebanks)
- UD in numbers:
  - 50 languages
  - 70 treebanks
  - 164 contributors
  - 8000+ downloads
- Current UD events:
  - CoNLL shared task on UD parsing
  - First UD workshop (Gothenburg, May 22)
  - Next release in November (v2.1)

Outline

1. Introduction [Joakim]
2. Cross-linguistically consistent syntactic annotation [Fran]
3. Word segmentation and morphological annotation [Dan]

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4. Infrastructure, resources and tools for UD [Filip]
5. Making use of UD in NLP and linguistics [Joakim]
6. Adding a new language to UD [Fran]
7. CoNLL shared task on UD parsing [Dan]

Questions?