Grammars and Generation

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Joint work with Ben Gottesman, German Kruszewski, Shashi Narayan, Yannick Parmentier, Laura Perez-Beltrachini and Sylvain Schmitz

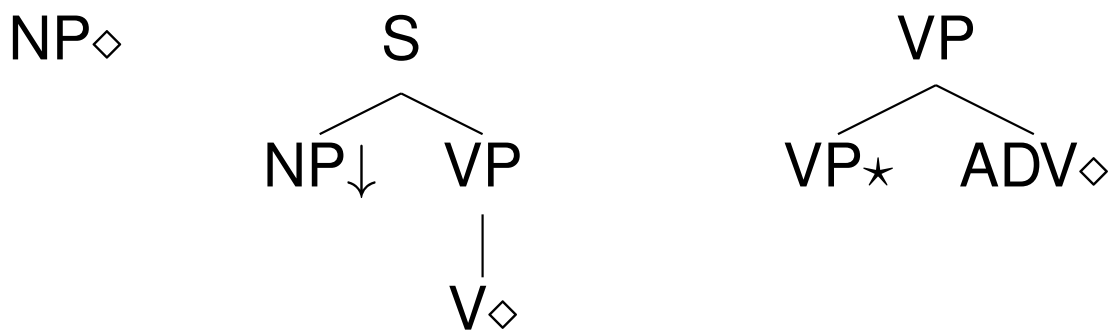
Grammars and Corpus 2018, Paris

Outline

Tree Adjoining Grammar

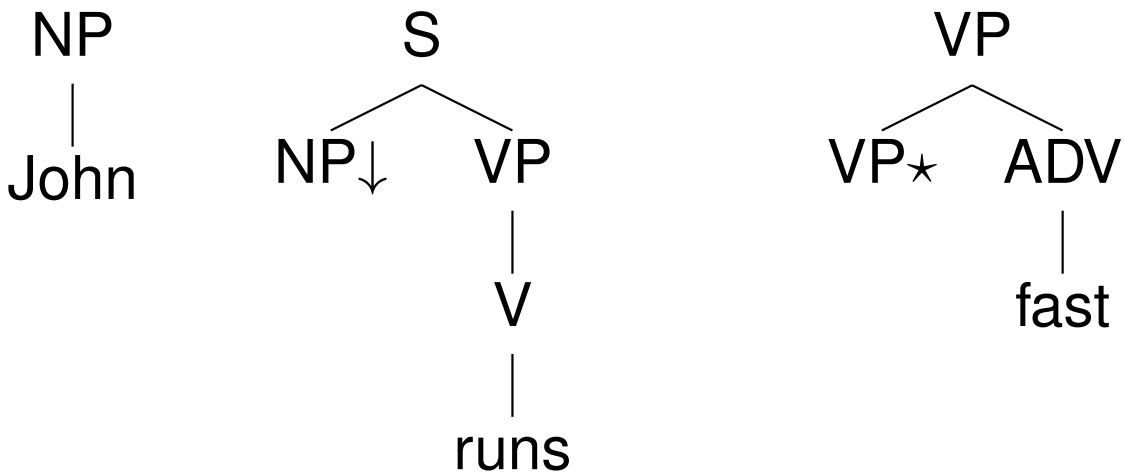
A set of trees

- Initial
- Auxiliary



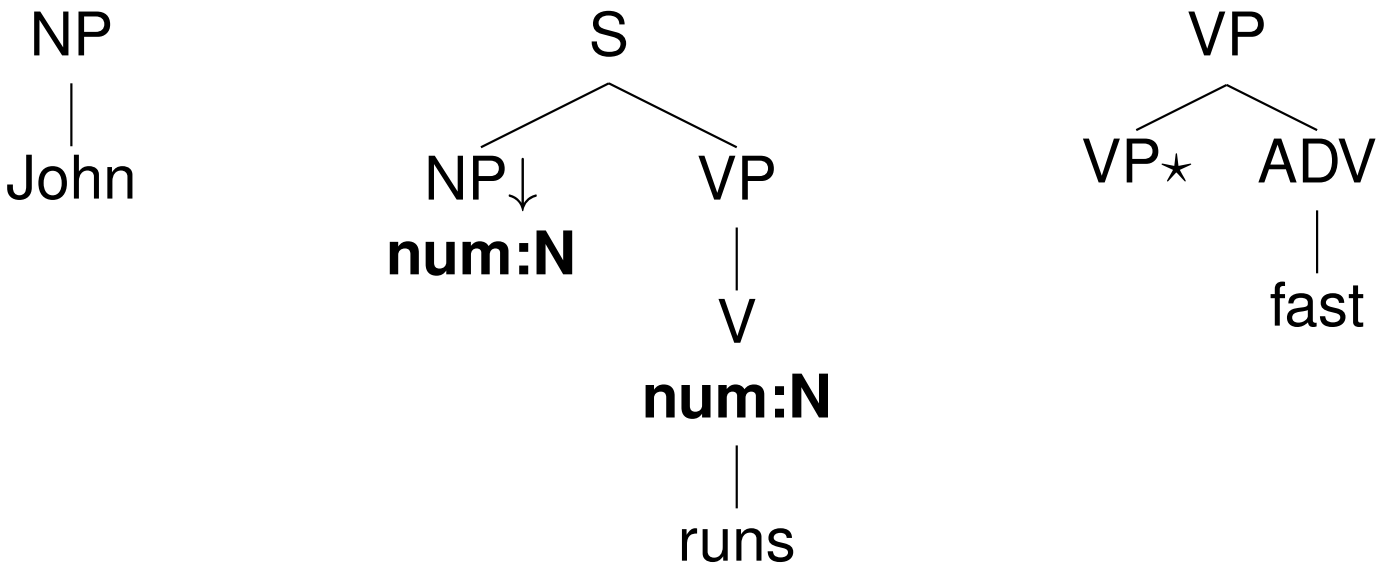
Lexicalised Tree Adjoining Grammar

Trees are lexicalised



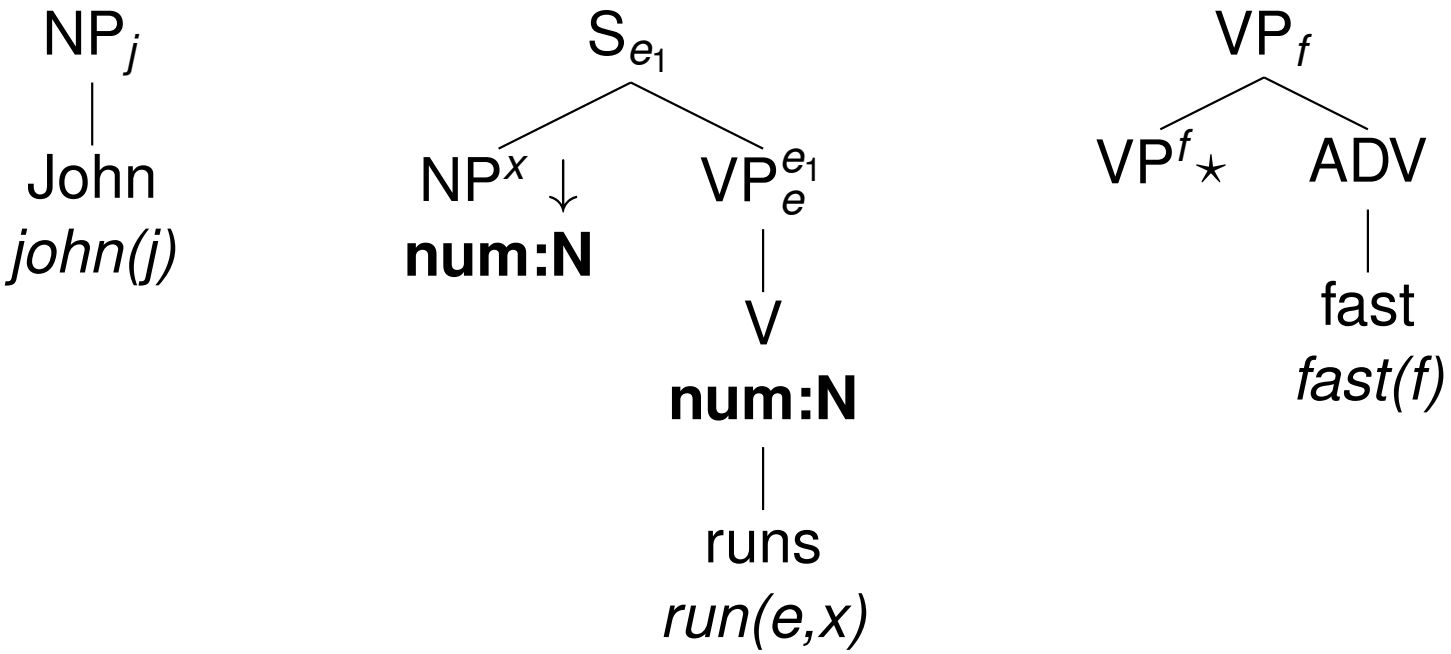
Feature-Based Lexicalised Tree Adjoining Grammar

Tree nodes are labelled with feature-structures

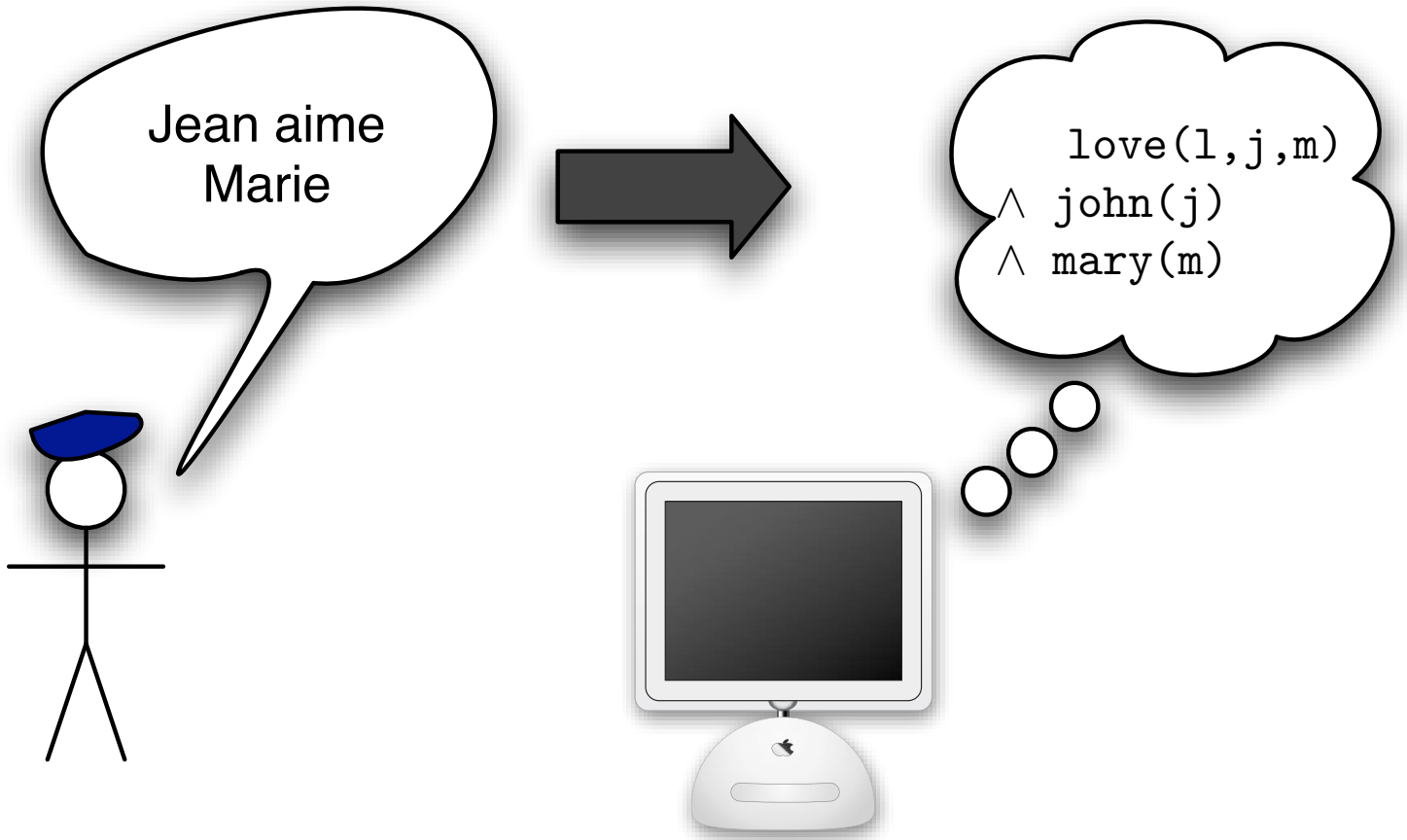


Feature-Based Lexicalised Tree Adjoining Grammar with Semantics

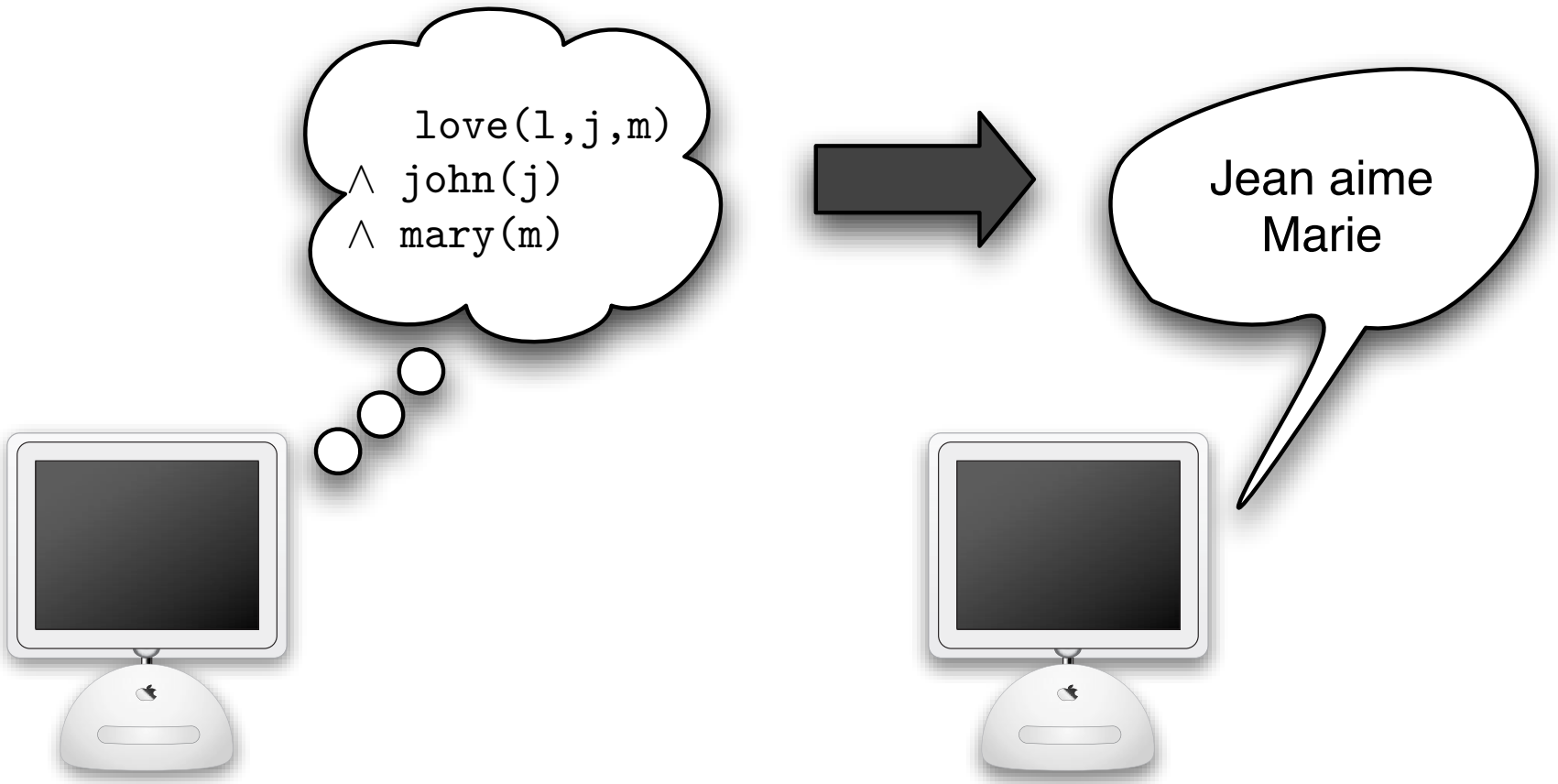
Trees are assigned a semantics



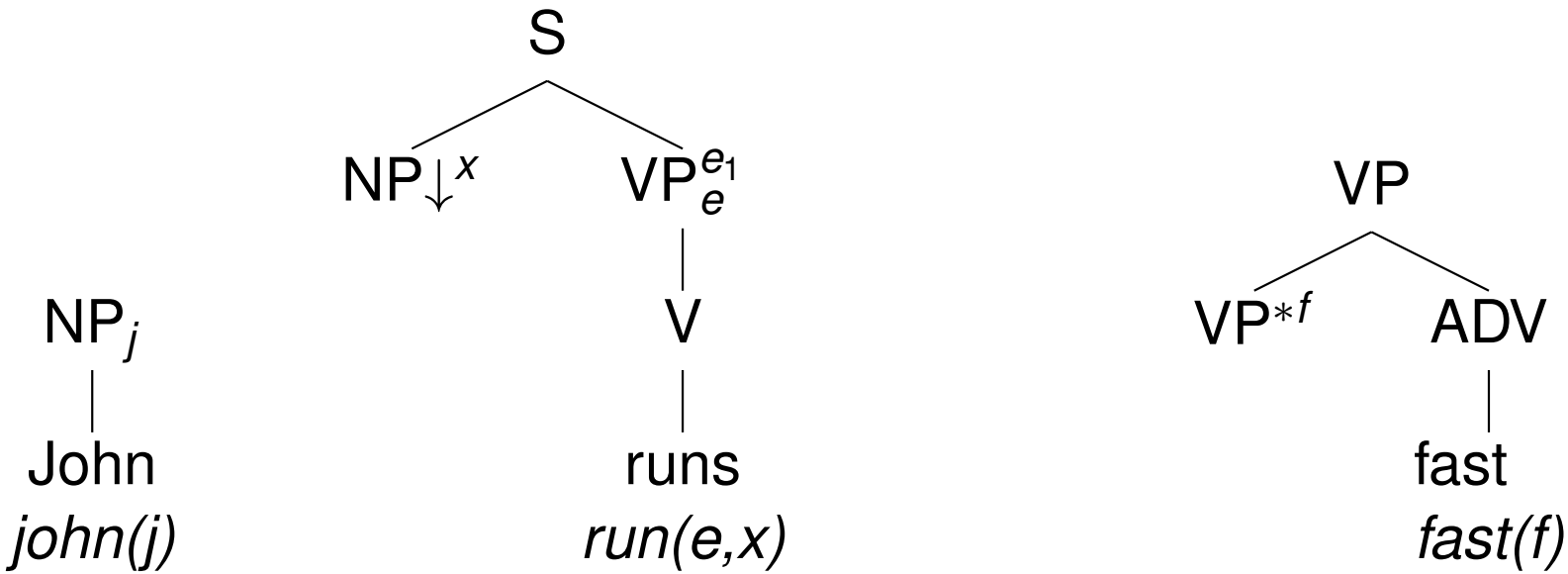
Grammar in Action: Parsing



Grammar in Action: Generation

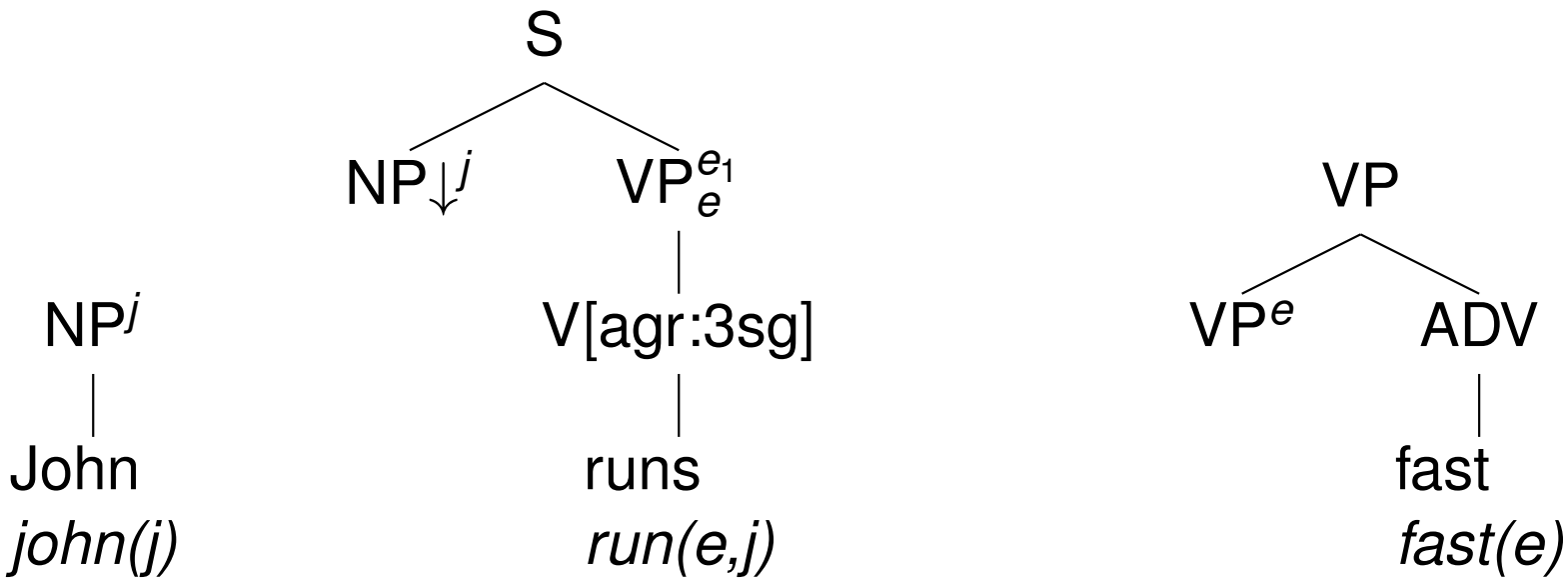


Grammar-Based Generation



john(j), run(e,j), fast(e)

Grammar-Based Generation



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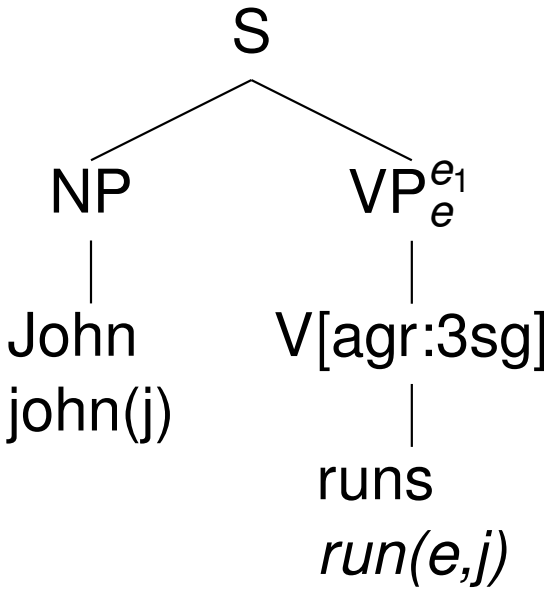
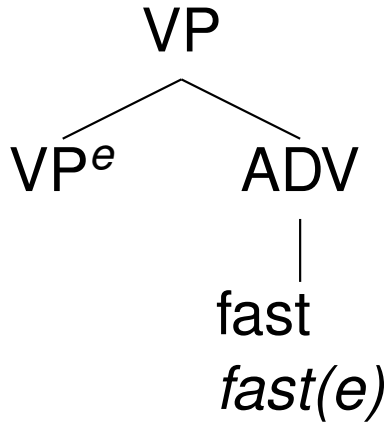
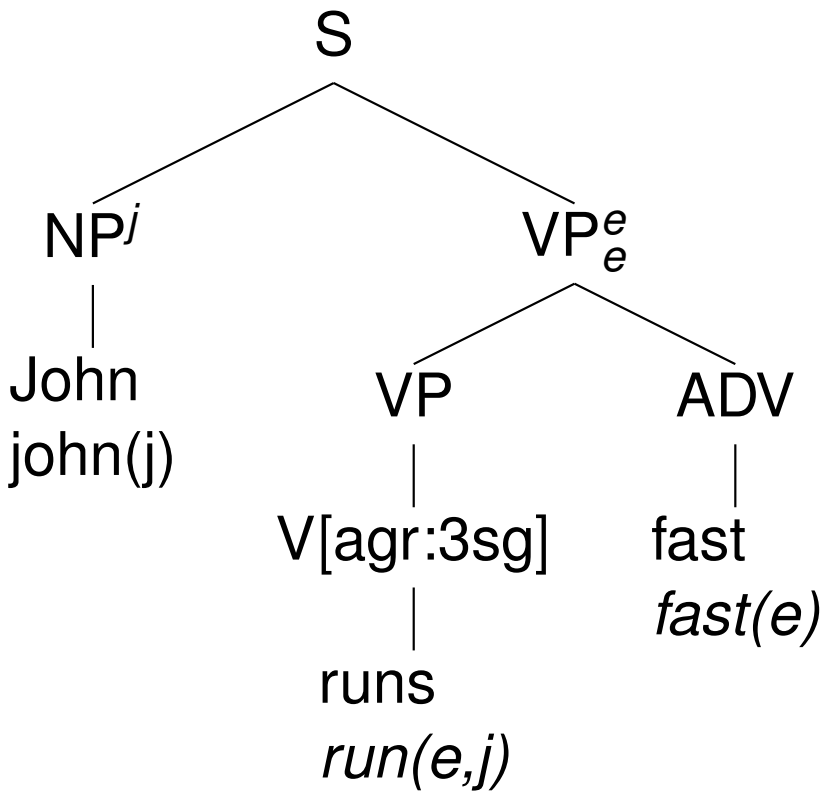




`John runs`

Grammar-Based Generation



`John runs fast`

Separating Grammar from Lexicon

Since each tree is lexicalised, the resulting grammar can be very large. In practice, we therefore

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- abstract over lexical items in the grammar

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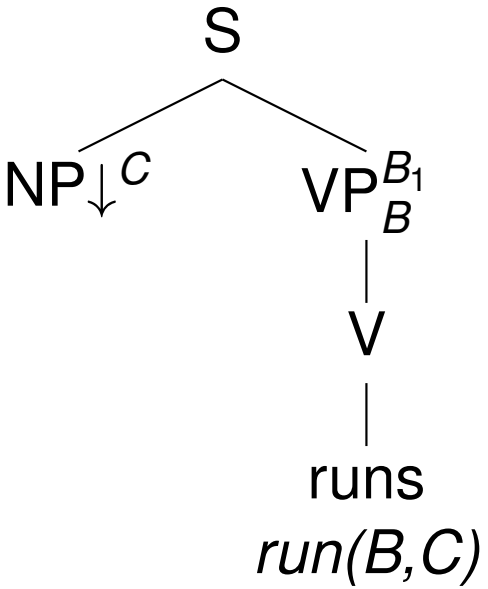
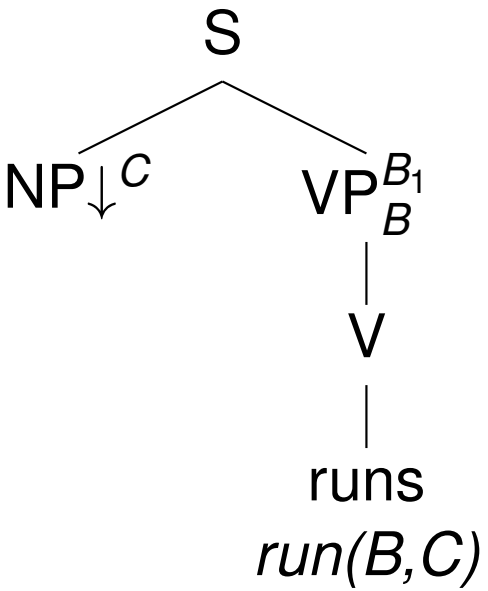
- abstract over lexical items in the grammar
- use a lexicon to determine which grammar tree is lexicalised/anchored by which lexical items

Separating Grammar from Lexicon



Separating Grammar from Lexicon



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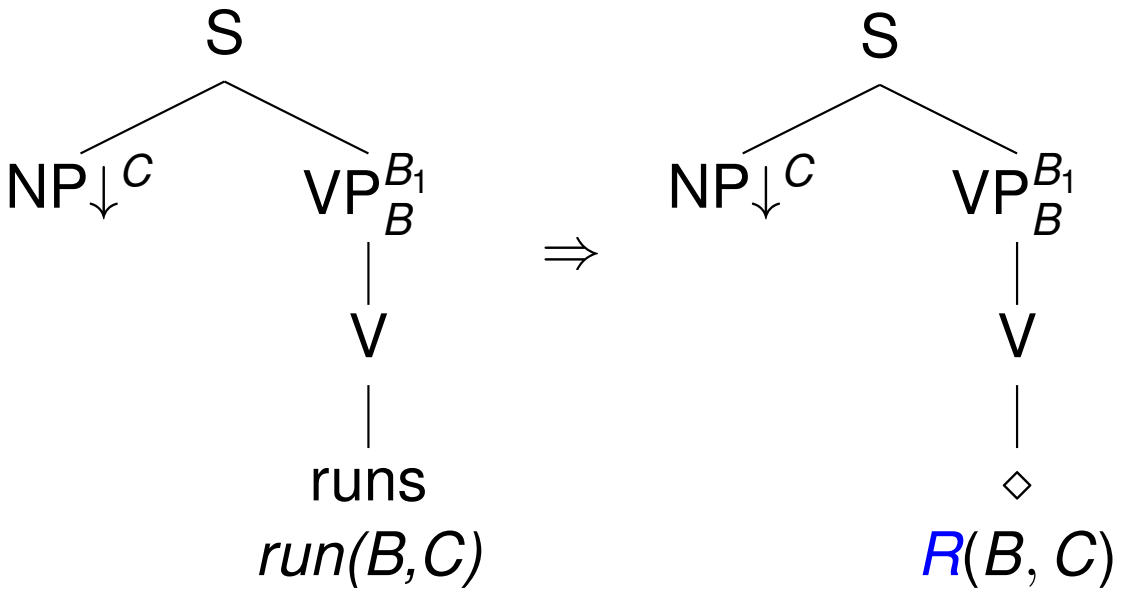

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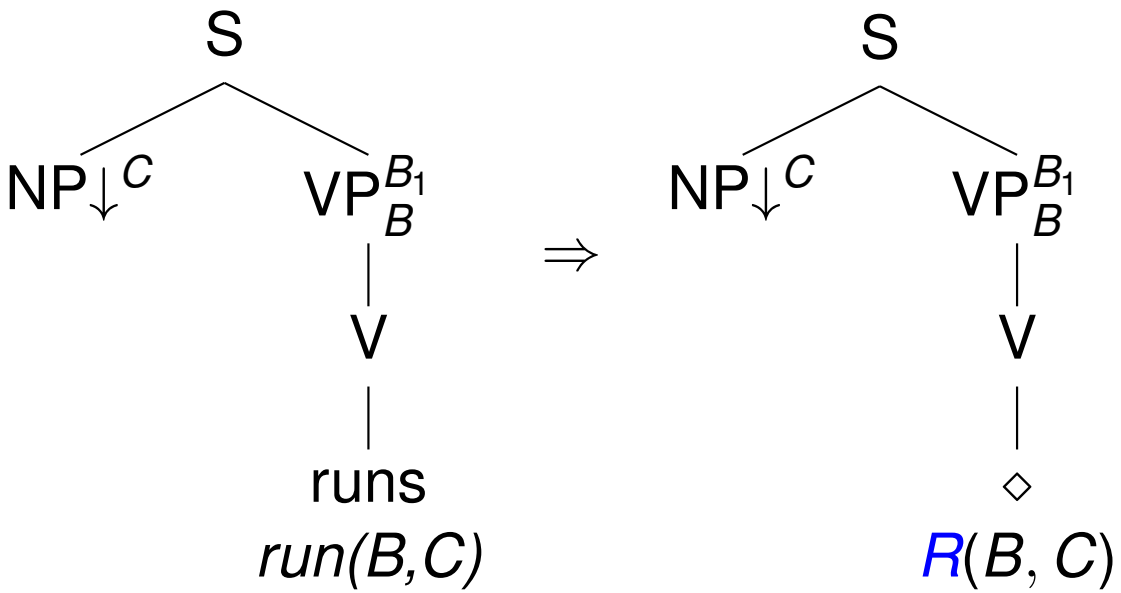
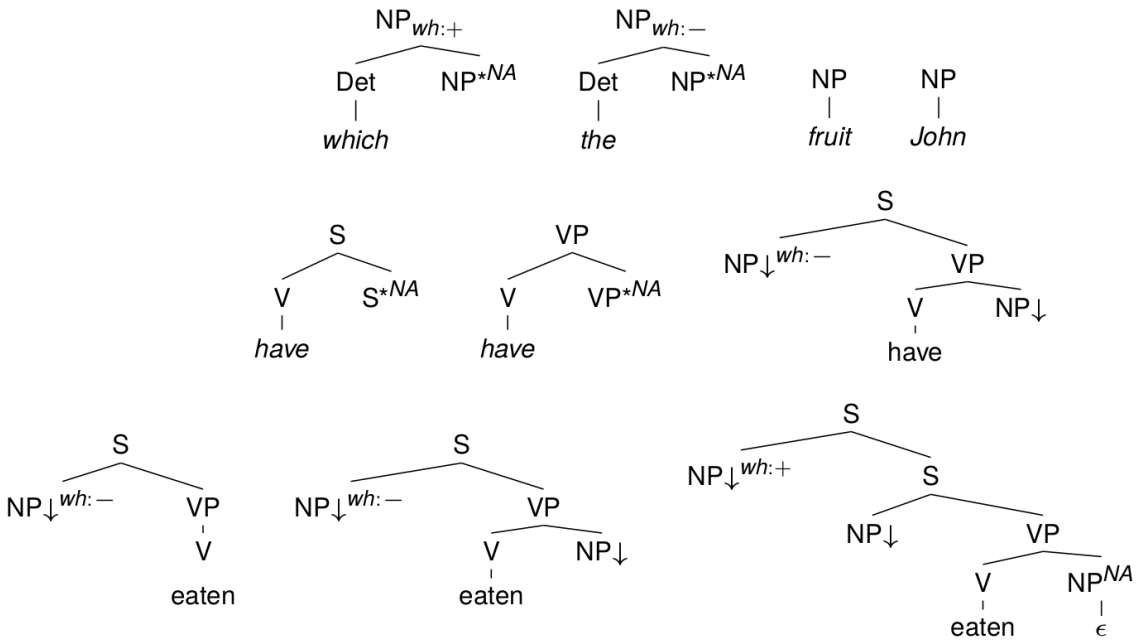


Semantics: *departure*
Tree: nx0V
Syntax: CanonicalSubject
Anchor: *departs*

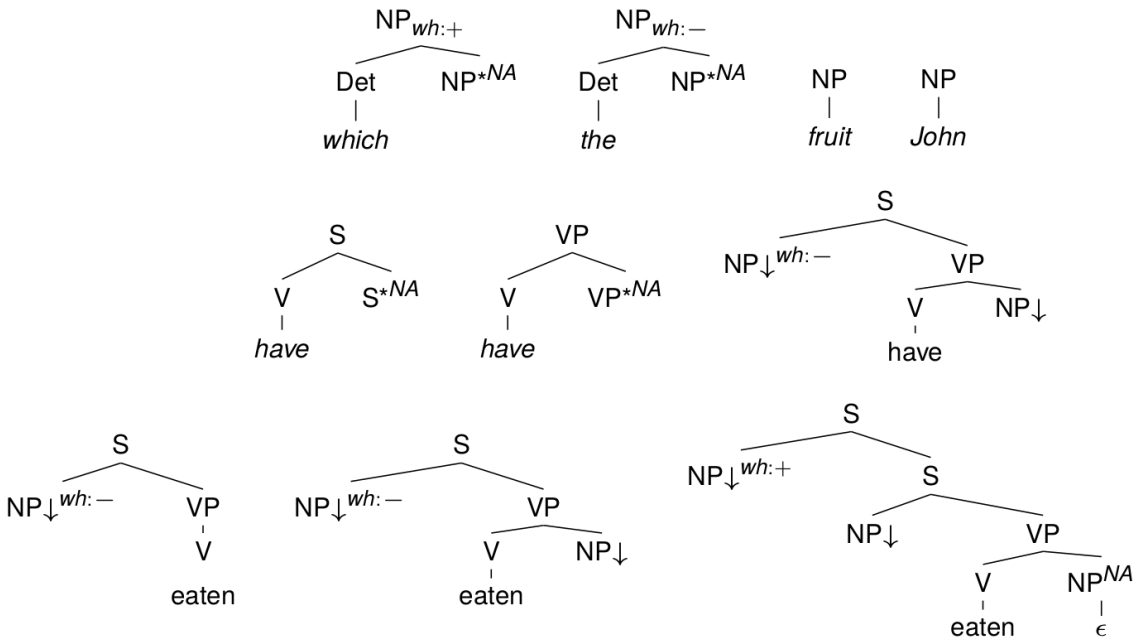
Semantics: *arrival*
Tree: nx0V
Syntax: CanonicalSubject
Anchor: *arrives*

...

Which fruit has John eaten?



Which fruit has John eaten?



TAG for French: 6,000 trees
(Leroux, Crabbé and Parmentier 2006)

Creating and Curating Forests of TAG trees

How to write them ?

XMG, a grammar writing environment

How to verify them ?

Error Mining: Using Generation to debug the grammar

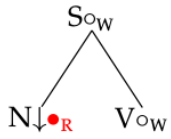
XMG

A declarative framework for specifying tree based unification grammars

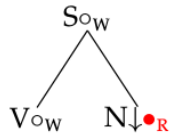
B. Crabbe, D. Duchier, C. Gardent, J. Leroux and Y. Parmentier
XMG, eXtensible Meta Grammar.
In Computational Linguistics, 39:3, Pages 581-620.

XMG Tree Fragments

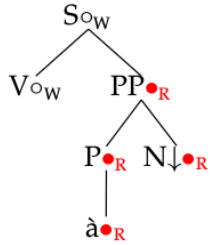
CanonSubj →



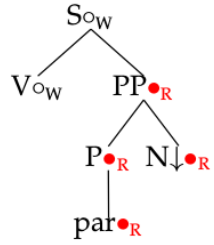
CanonObj →



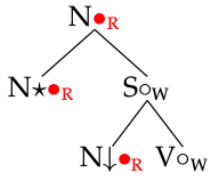
CanonIndirObj →



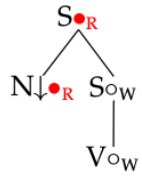
CanonByObj →



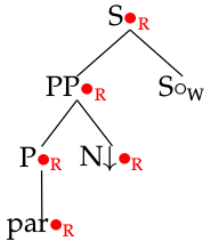
RelatSubj →



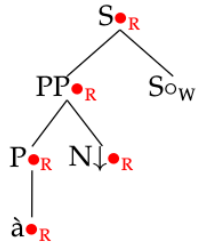
WhObj →



WhByObj →

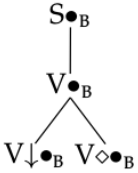


WhIndirObj →

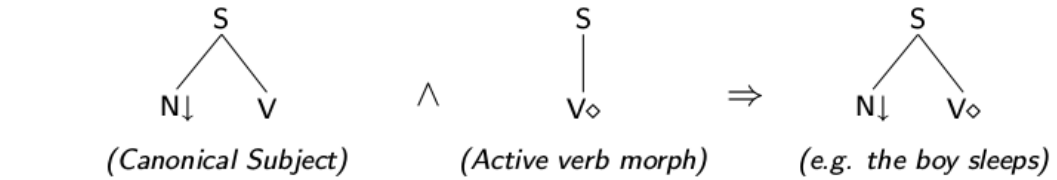


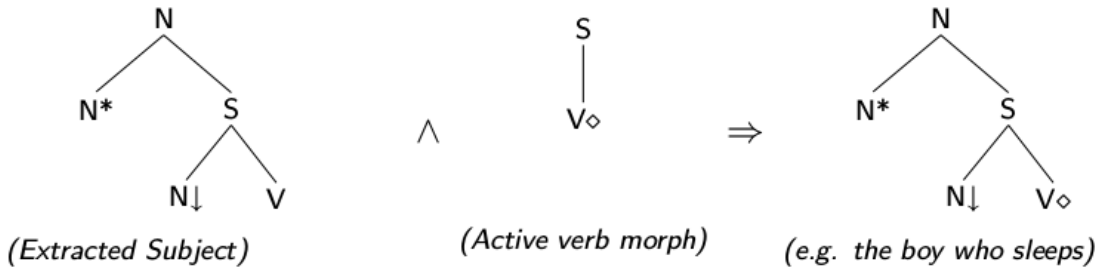
ActiveVerbForm →

PassiveVerbForm →

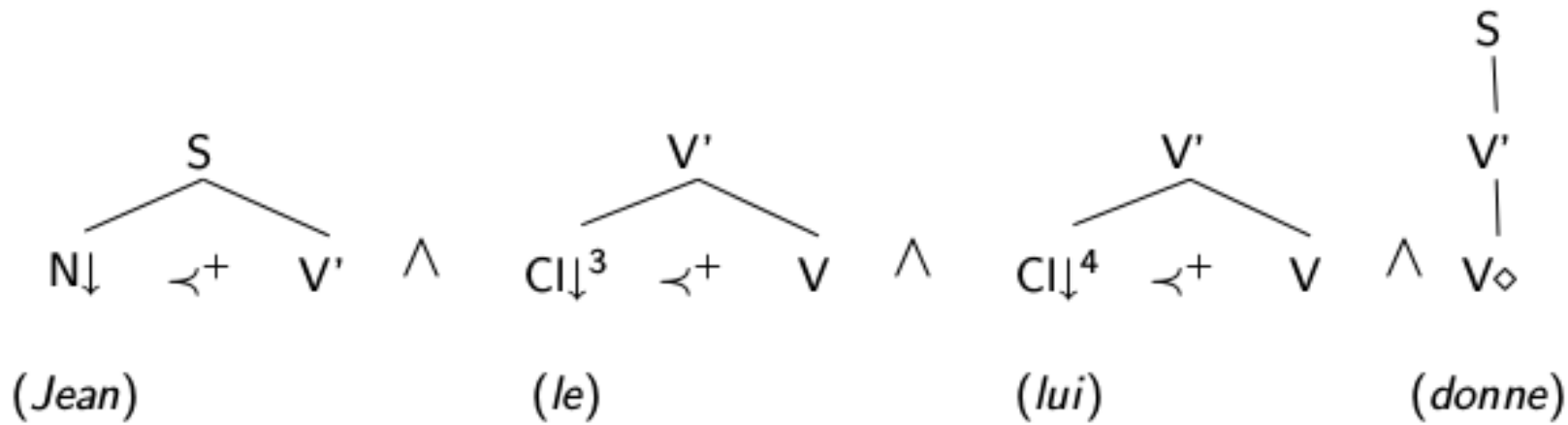


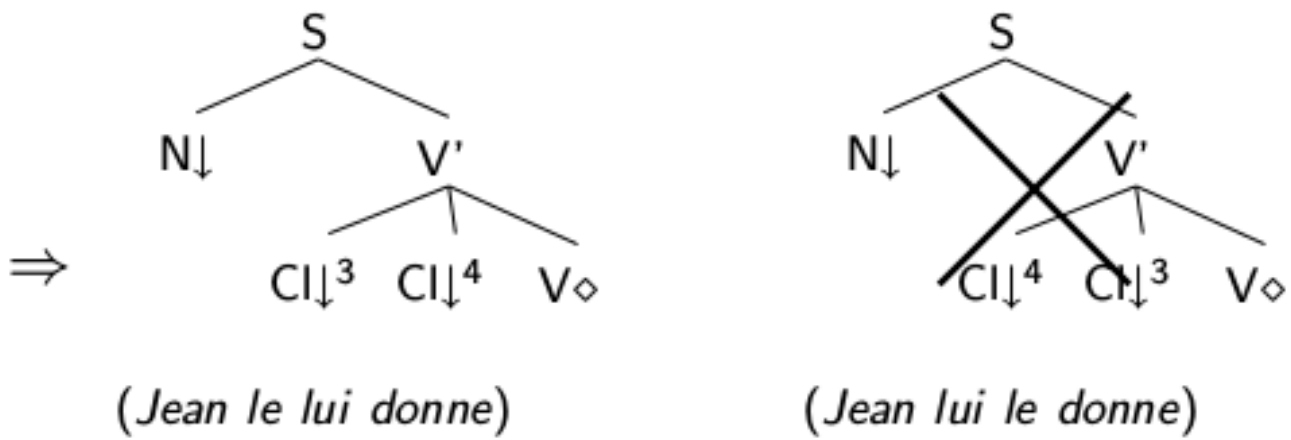
Creating Trees with XMG





Applying General Principles





Compact Grammar Specifications

293 tree fragments $\Rightarrow$ 6,000 TAG tree

Large Scale XMG Grammars

FrenchTAG: a Tree Adoining Grammar for French (Benoît Crabbé)

SemTAG: XMG-based XTAG extended with semantics (Claire Gardent)

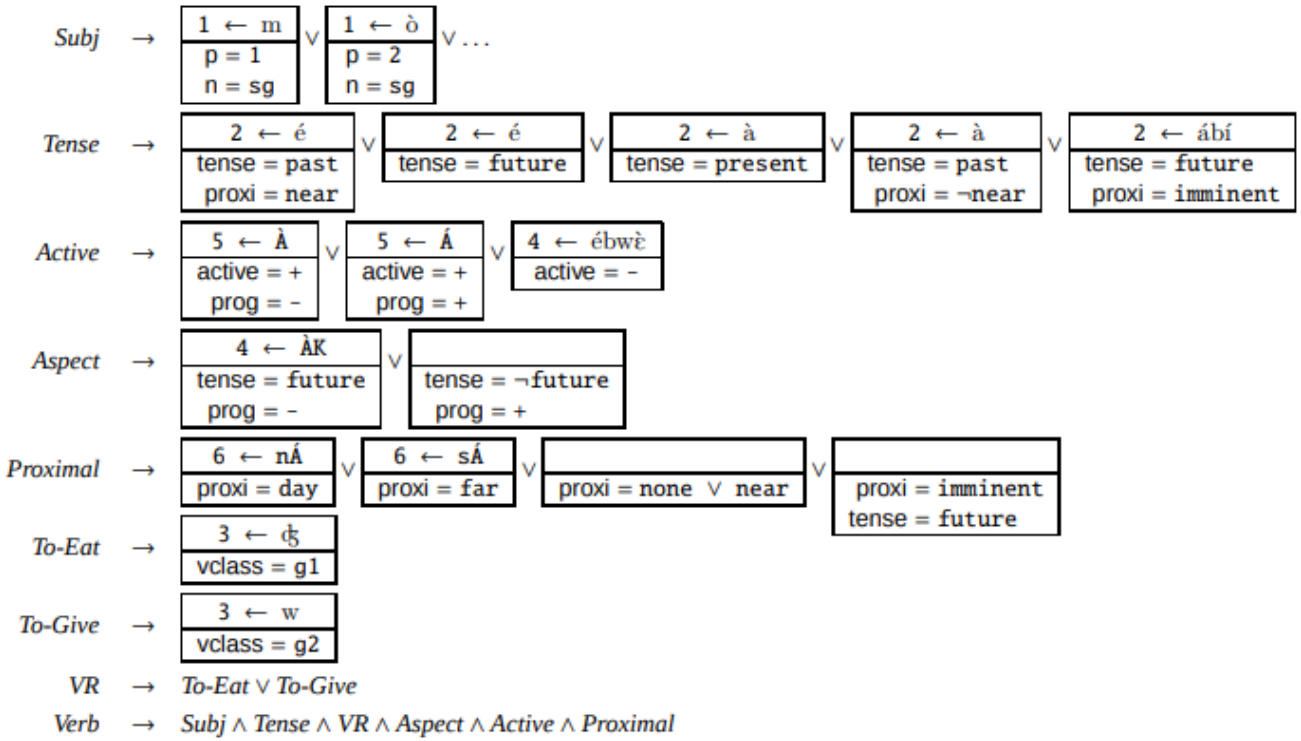
FrenchTAG + MWE: a FrenchTAG grammar updated with a number of Multi Word Expressions (Agata Savary)

XMG_GC_metagrammar: a Tree Adjoining Grammar for Guadeloupean Creole (Emmanuel Schang)

Interaction Grammar for French (Guy Perrier)

XMG-based XTAG: a Tree Adjoining Grammar for English based on XTAG (Katya Saint-Amand, Claire Gardent)

Ikota Morphology



Morphological Lexicon: 600+ trees

Denys Duchier, Brunelle Magnana Ekoukou, Yannick Parmentier, Simon Petitjean and Emmanuel Schang

Describing Morphologically-rich Languages using Metagrammars: a Look at Verbs in Ikota

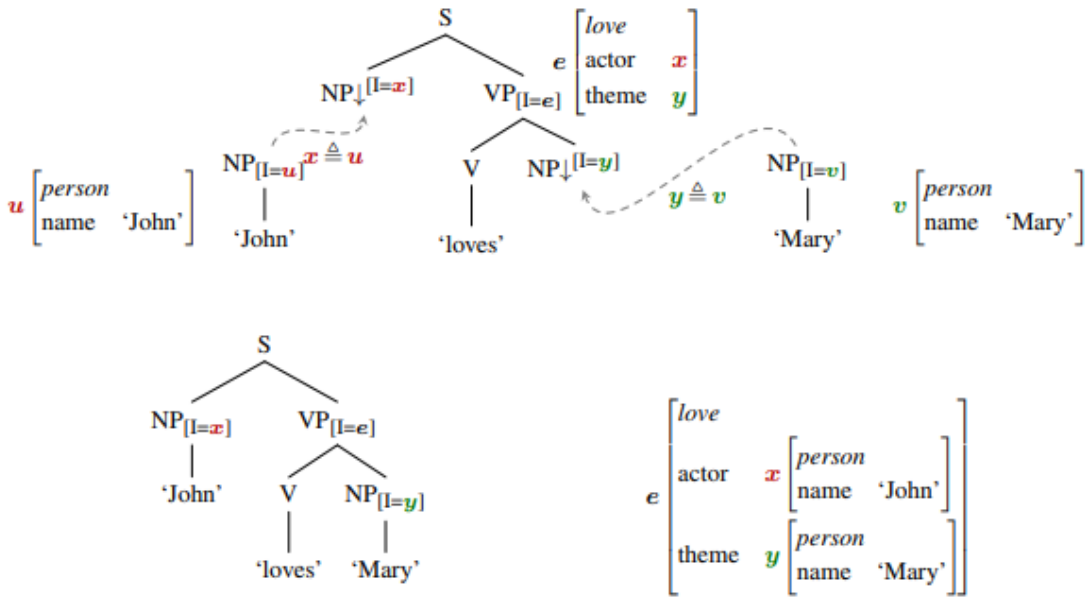
Proceedings of the Workshop on Language Technology for Normalisation of Less-Resourced Languages SaLTMiL 8 - AfLaT, 2012

XMG Extensions

Simon Petitjean, Denys Duchier and Yannick Parmentier.
XMG 2: Describing Description Languages
LACL 2016

Laura Kallmeyer's TreeGrasp ERC Project

LTAG with Frame Semantics



Depictive grammar: an LTAG grammar fragment with semantic frames for English depictives (Benjamin Burkhardt)

Spotting Errors

Grammar traversal

Statistical Error Mining

GraDe (Grammmar Debugger)

Top-Down Grammar Traversal

Outputs the sentences generated by the grammar

User-Defined parameters control the search to ensure (i) termination and (ii) interesting linguistic coverage.


Claire Gardent and Eric Kow
Spotting overgeneration suspects.
ENLG 2007


Claire Gardent and German Kruszewski
Generation for Grammar Engineering
INLG 2012

GraDe Example: Checking for Coherence

For each grammar rule anchored by a verb, can we find at least one derivation?

```
family: VERB_FAMILY
cat: s
features: [mod:ind]
max_results: 1
max_adjunctions:
   {N: 1, NP: 0, V:1, VP: 1, ADJ: 0, S: 0}
depth: 5
```

Checking for Grammar Coherence

Tree Family	Trees	Fails	Fails/Trees
CopulaBe	60	1	1%
ilV	2	0	0%
n0V	10	0	0%
n0ClV	9	0	0%
n0ClVn1	45	2	4%
n0ClVden1	36	3	8%
n0ClVpn1	29	3	10%
n0Vn1	84	3	3%
n0Vn1Adj2	24	6	25%
n0Van1	87	3	3%
n0Vden1	38	3	7%
n0Vpn1	30	3	10%
ilVcs1	2	0	0%
n0Vcs1	30	23	74%
n0Vas1	15	10	66%
n0Vn1Adj2	24	0	0%
s0Vn1	72	9	12%
n0Vs1int	15	12	80%
n0Vn1n2	24	0	0%
n0Vn1an2	681	54	7%

Approximately 10% of the verb trees fail to licence a complete derivation.

Syntactic Variants

Which syntactic variants does the grammar generate for a given verb type ?

```
family: n0V
cat: s
features: [mod:ind]
max_results: all
adjunctions:
  {N: 2, NP: 0, V:1, VP: 1, ADJ: 0, S: 0/1}
depth: 5
```

Example Output

Elle chante (She sings), La tatou chante-t'elle? (Does the armadillo sing?), La tatou chante (The armadillo sings), Chacun chante -t'il (Does everyone sing?), Chacun chante (Everyone sings), Quand chante chacun? (When does everyone sing?), Quand chante la tatou? (When does the armadillo sing?) Quand chante quel tatou? (When does which armadillo sing?), Quand chante Tammy? (When does Tammy sing?), Chante-t'elle? (Does she sing?) Chante -t'il? (Does he sing?), Chante! (Sing!), Quel tatou chante ? (Which armadillo sing?), Quel tatou qui chante ..? (Which armadillo who sings ..?) Tammy chante-t'elle? (Does Tammy sing?), Tammy chante (Tammy sings), une tatou qui chante chante (An armadillo which sings sings), C'est une tatou qui chante (It is an armadillo which sings), ...

Some incorrect cases

Chacun chante-t'elle?
(*Everyone sings?*)
Missing agreement constraint between the inverted subject clitic and the subject.

La tatou qui chante-t'elle?
(*The armadillo which does she sing?*)
Missing constraint on the inverted subject clitic
(should be disallowed in embedded clauses)

Generation-Based Grammar Analysis

- Can all rules in the grammar be used in at least one derivation?
- Are all possible syntactic realisations of the verb and of its arguments generated and correct?
- Does the grammar correctly capture the interactions between basic clauses and modifiers?
- etc.

Statistical Error Mining

Generate from large corpus of input meaning representations

Divide the input into FAIL and PASS

Use statistics to identify subtrees (forms) in the set of inputs which frequently associate with failure and rarely with success

Shashi Narayan and Claire Gardent

Error Mining with Suspicion Trees: Seeing the Forest for the Trees

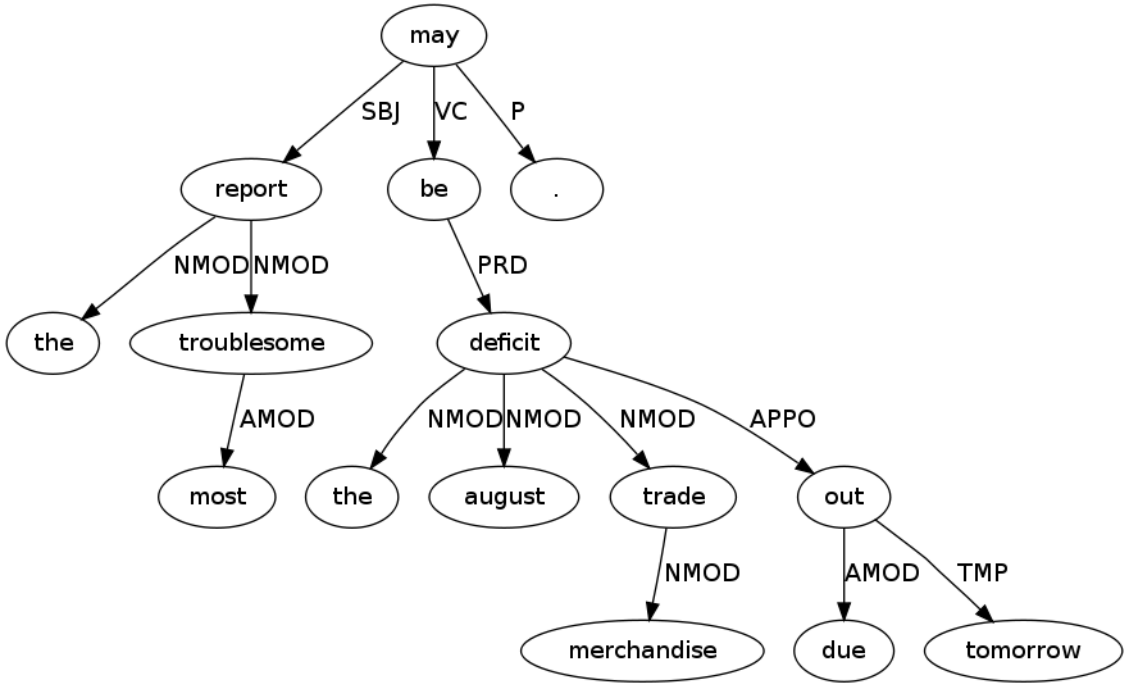
COLING 2012

Claire Gardent and Shashi Narayan

Error Mining on Dependency Trees

ACL 2012

Error Mining using Generation



The most troublesome report is the August merchandise trade effect deficit due out tomorrow.

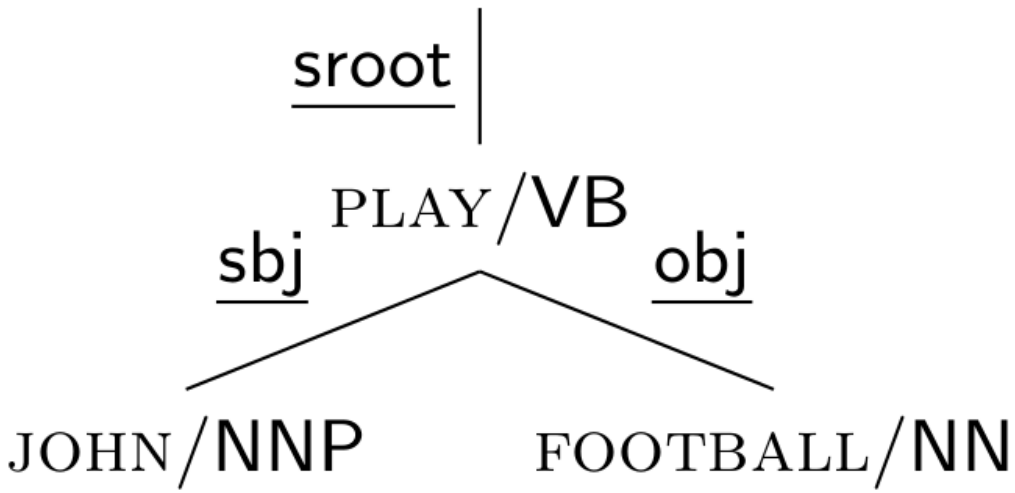
Error Mining on trees

Input tree $\Rightarrow$ FAIL | PASS

Calculate a suspicion score for each subtree in the input

Structure the suspicious subtrees into a tree

Suspicious Forms



Subtrees of the input dependency trees labelled with lemma, parts-of-speech and/or dependency information

Suspicion Score Metrics

Adapted from ID3 decision tree algorithm

The suspicion score of a form *f*

$$S_{score}(f) = \frac{1}{2}(\text{Fail}(f) * \ln count(f) + \text{Pass}(\neg f) * \ln count(\neg f))$$

FAIL score

$$\text{Fail}(f) = \frac{count(f|\text{FAIL})}{count(f)}$$

PASS score

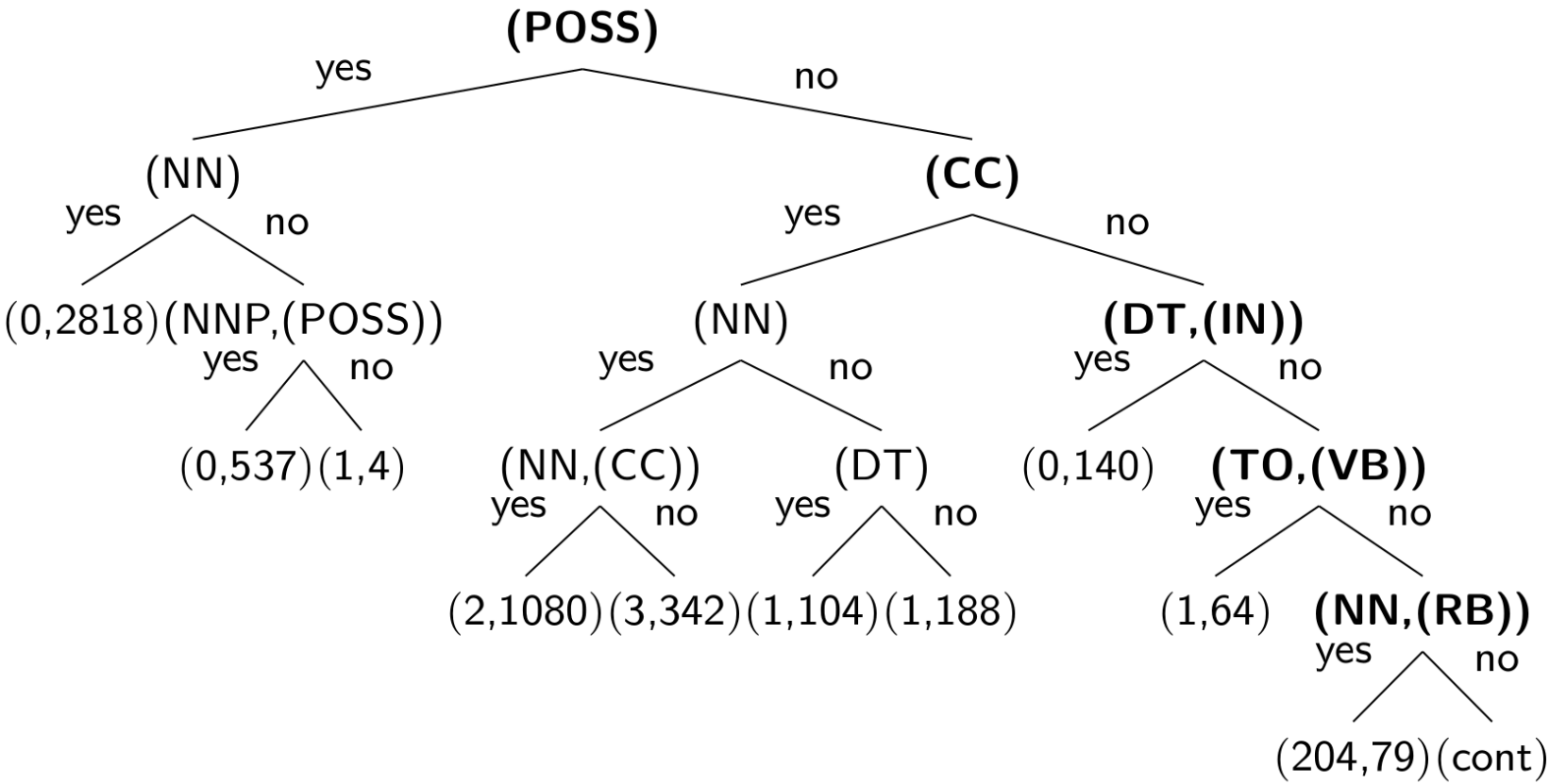
$$\text{Pass}(\neg f) = \frac{count(\neg f|\text{PASS})}{count(\neg f)}$$

Ranked List of Suspicious Forms

1. **(POSS)**
2. (NNP, (POSS))
3. **(CC)**
4. (NN, (POSS))
5. (NN, (NNP, (POSS)))
6. (NN, (NN, (POSS)))
7. (NN, (CC))
8. (NNP, (NNP), (POSS))
9. (NN,(NNP,(NNP),(POSS)))
10. (NN, (NNP, (NNP)))
11. (CC, (JJ))
12. (JJ, (CC))
13. (NNP, (NNP, (POSS)))
14. (NN, (NN), (POSS))
15. **(DT, (IN))**
16. ...

Tree of suspicious forms

The Right Frontier shows the most important sources of errors

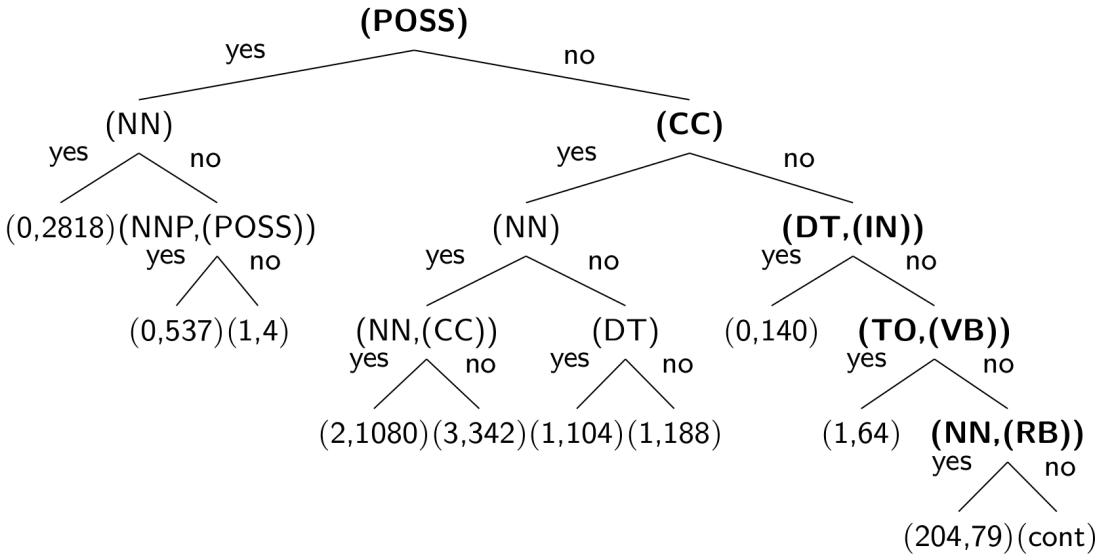


Building the Tree of suspicious forms

The decision tree algorithm recursively partitions the data by

1. selecting the most suspicious form
2. splitting the data into two subsets, a subset of the data that contain that suspicious form (yes) and a subset that does not (no) .

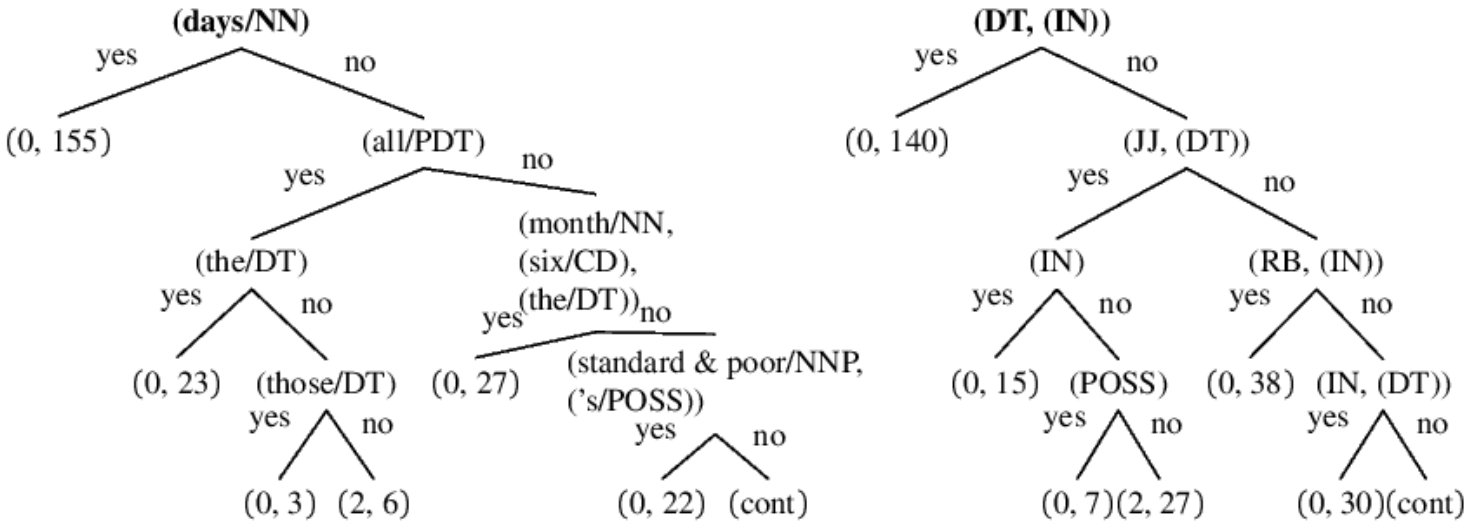
Example Suspicion Tree



- **(POSS)** A mismatch between input and grammar representation
  (DAD/NN, (JOHN/NNP, ('S/POSS)))
  (DAD/NN, ('S/POSS, (JOHN/NNP)))
- **(CC)** conflicting feature values in the grammar of NP coordination
- **(DT, (IN))** POS tag mismatch
  some DT/PRP of the audience

  ...

Different Views highlight Different Errors

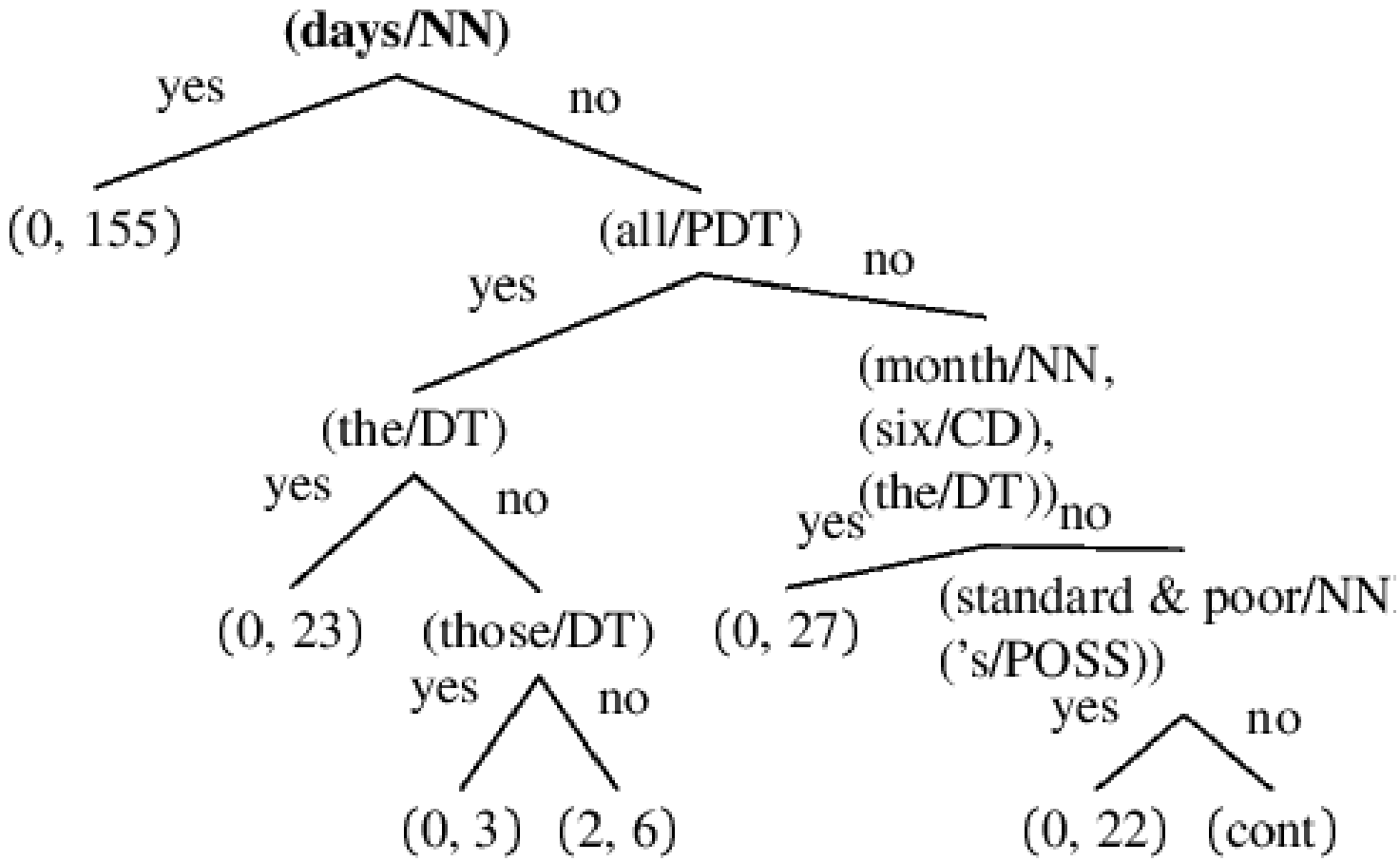


(days/NN) POS tag assignment error.
DAYS/NN *mapped to the wrong TAG family*

(DT, (IN)) POS tag mismatch
some DT/PRP of the audience

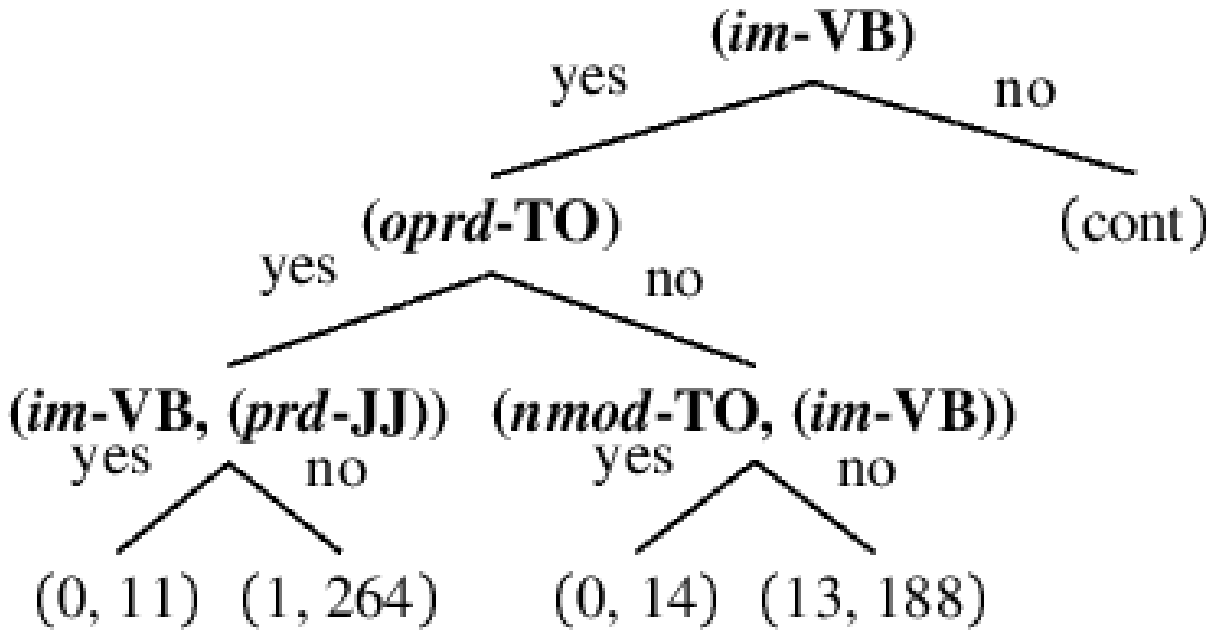
Cases that always fail

Single source of error



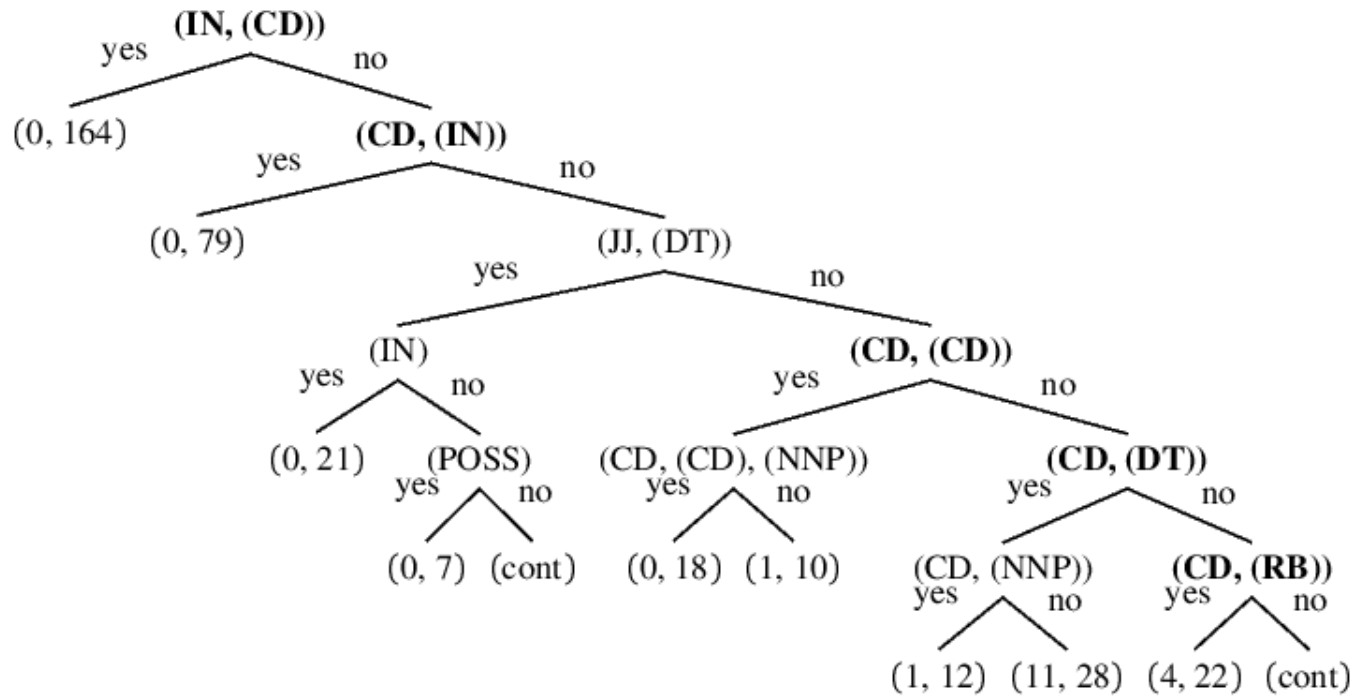
Cases that always fail

Several sources of error



- (*im*-VB) – *infinitival verbs*.
- (*oprd*-TO) – control / raising cases
- (*im*-VB, (*prd*-JJ)) – adjectival complement
- (*nmod*-TO, (*im*-VB)) – infinitival is a noun modifier

Cases that sometimes fail



Cardinals lead to generation failure in the contexts shown but not in all context (CD does not occur)

Experiment

Surface Realisation Challenge Dataset (Belz et al. 2011).
26,725 input dependency trees derived from the Penn Treebank

XMG induced FB-LTAG Grammar (K. Alahverdziehva)

Grammar-Based Surface Realiser (Narayan and Gardent, COLING 2012)

Results

Corrections

- 11 rewrite rules (Gen-1, Dt-4, Adv-1, Inf-3, Aux-1 and Final-1),
- 2 grammar corrections and
- a few lexicon updates

	Input Data	Initial Failures	Final Failures
S-ALL	26725	19280 (*72.1*)	5157 (*19.3*)

- Sentence length – min:1, max:134, avg:22
- Coverage: 81.74% , BLEU:0.73 (for the covered data)

Generating Grammar Exercises

Generate sentences

Use the detailed linguistic information output by the generator to select and build exercises

Three types of exercises: FIB, Shuffle and Reformulation

C. Gardent and L. Perez-Beltrachini.

Using FB-LTAG Derivation Trees to Generate Transformation-Based Grammar Exercices.
TAG+11: The 11th International Workshop on Tree Adjoining Grammars and Related Formalisms, Paris, France, September 2012.

L. Perez-Beltrachini, C. Gardent and G. Kruszewski

Generating Grammar Exercices.
The 7th Workshop on Innovative Use of NLP for Building Educational Applications, NAACL-HLT Worskhop 2012, Montreal, Canada, June.

Grammar Exercises

Built from a single sentence.

[FIB] Complete with an appropriate personal pronoun.

(S) *Elle adore les petits tatous*

(She loves the small armadillos)

(Q) _____ adore les petits tatous (gender=fem)

(K) elle

[Shuffle] Use the words below to make up a sentence.

(S) *Tammy adore les petits tatous*

(Tammy loves the small armadillos)

(Q) tatous / les / Tammy / petits / adore

(K) Tammy adore les petits tatous.

Grammar Exercises

Built from a pair of syntactically related sentences

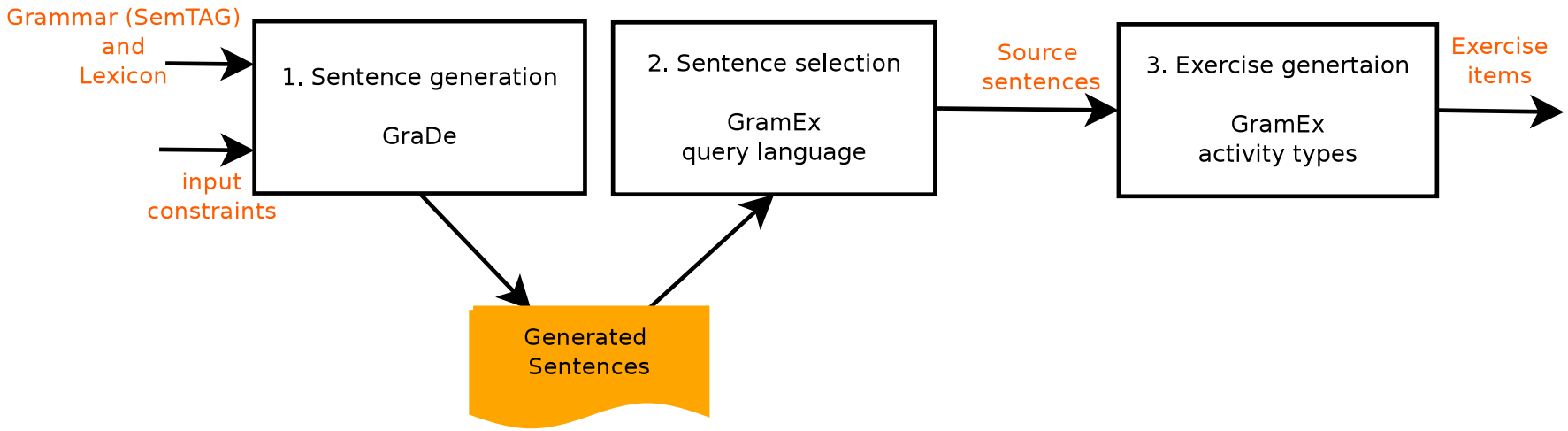
[Reformulation] Rewrite the sentence using passive voice

(Q) C'est Tex qui a fait la tarte.
(It is Tex who has baked the pie.)

(K) C'est par Tex que la tarte a été faite.
(It is Tex by whom the pie has been baked.)

Active/Passive, NP/Pronoun, Assertion/Wh-Question, Assertion/YN-Question

The *GramEx* framework: generating and selecting sentences to build exercises



Creating a grammar exercise

aime(e,be,bi),bijou(bi),les(bi),betty(be)

Creating a grammar exercise

aime(e,be,bi),bijou(bi),les(bi),betty(be)

Bette aime le bijou.

C'est Bette qui aime les bijoux.

Bette aime les bijoux.

Creating a grammar exercise

aime(e,be,bi),bijou(bi),les(bi),betty(be)

Bette aime le bijou.

C'est Bette qui aime les bijoux.

Bette aime les bijoux.

Goal: Plural form of irregular nouns.
Exercise type: Fill-in-the-blank.

Creating a grammar exercise

aime(e,be,bi),bijou(bi),les(bi),betty(be)

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C'est Bette qui aime les bijoux.

Bette aime les bijoux.

Goal: Plural form of irregular nouns.
Exercise type: Fill-in-the-blank.

1. Select sentences
   $\mathrm{NP}[num = pl \wedge plural = irreg]$
   $\wedge$ *CanonicalOrder*

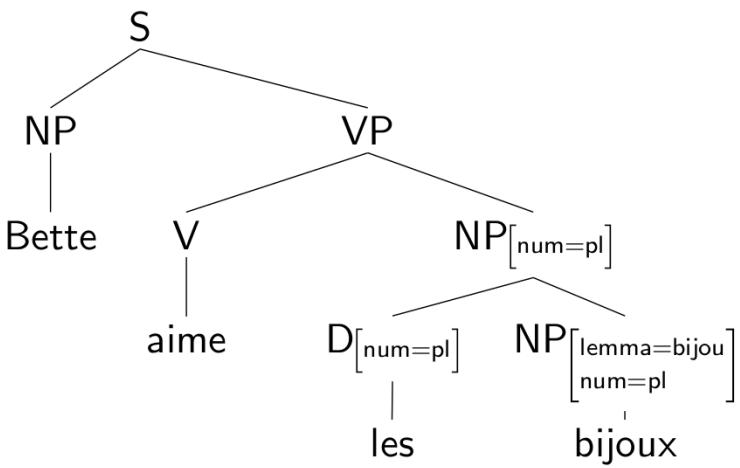
Creating a grammar exercise

aime(e,be,bi),bijou(bi),les(bi),betty(be)

Bette aime le bijou.

C'est Bette qui aime les bijoux.

Bette aime les bijoux.



$\{CanonicalObject,\ CanonicalSubject,\ ActiveVerb\}$

Goal: Plural form of irregular nouns.
Exercise type: Fill-in-the-blank.

$\Downarrow$

1. Select sentences
   $\text{NP}[num = pl \wedge plural = irreg]$
   $\wedge$ *CanonicalOrder*

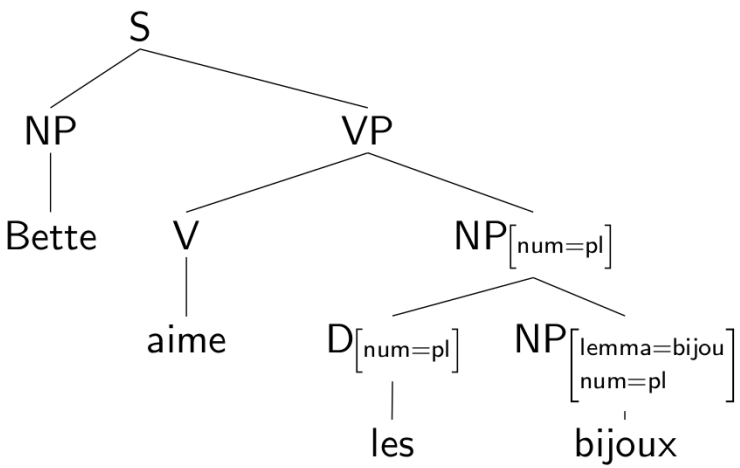
Creating a grammar exercise

aime(e,be,bi),bijou(bi),les(bi),betty(be)

Bette aime le bijou.

C'est Bette qui aime les bijoux.

Bette aime les bijoux.



{*CanonicalObject*, *CanonicalSubject*, *ActiveVerb*}

Goal: Plural form of irregular nouns.
Exercise type: Fill-in-the-blank.

$\Downarrow$

1. Select sentences
   $\text{NP}[num = pl \wedge plural = irreg]$
   $\wedge$ *CanonicalOrder*

2. Process the selected sentence
   $\text{NP}[num = pl] \Rightarrow$ blank
   $\text{NP}[lemma = bijou] \Rightarrow$ hint

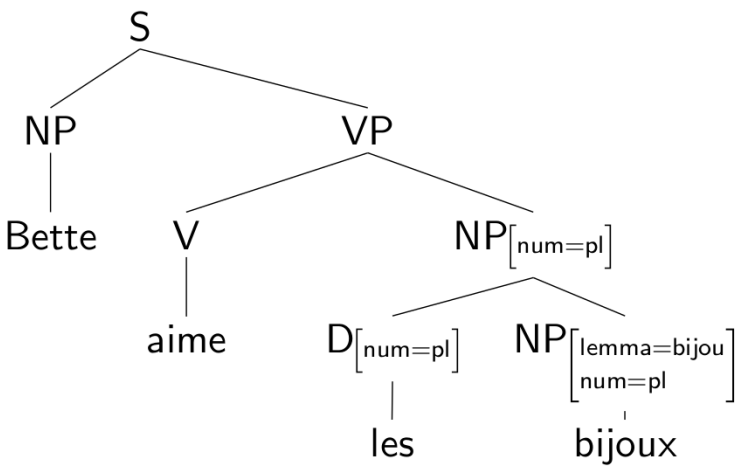
Creating a grammar exercise

aime(e,be,bi),bijou(bi),les(bi),betty(be)

Bette aime le bijou.

C'est Bette qui aime les bijoux.

Bette aime les bijoux.



{*CanonicalObject*, *CanonicalSubject*, *ActiveVerb*}

Goal: Plural form of irregular nouns.
Exercise type: Fill-in-the-blank.

⇓

1. Select sentences
   NP[$num = pl \wedge plural = irreg$]
   $\wedge$ *CanonicalOrder*

2. Process the selected sentence
   NP[$num = pl$] $\Rightarrow$ blank
   NP[$lemma = bijou$] $\Rightarrow$ hint

   (Q) Bette aime les _____. (bijou)

   (K) bijoux

Selecting appropriate sentences

GramEx's boolean constraint language: syntax and use

Boolean constraint language

- conjunction, disjunction and negation of morpho-syntactic and syntactic properties

Describes the linguistic requirements imposed by pedagogical goals

- Permits retrieving appropriate sentences from the DB

Selecting appropriate sentences

Some examples

Pedagogical goal: *Pre/post nominal irregular adjectives*

[Epith $\wedge$ flexion: irreg]

✓ *Tammy a une voix douce* (Tammy has a soft voice)

X *Tammy a une jolie voix* (Tammy has a nice voice)

Pedagogical goal: *Prepositions with infinitives; Simple Clause*

POBJinf $\wedge$ CLAUSE

POBJinf $\equiv$ (DE-OBJinf $\vee$ A-OBJinf)

CLAUSE $\equiv$ Vfin $\wedge \neg$Mod $\wedge$ $\neg$CCoord $\wedge$ $\neg$Sub

✓ *Tammy refuse de chanter* (Tammy refuses to sing)

X *Jean dit que Tammy refuse de chanter* (John says that Tammy refuses to sing)

Transformation-based grammar exercices

Finding syntactically related sentences (e.g. active/passive)

(Q) C'est Tex qui a fait la tarte.

(It is Tex who baked the pie.)

X *(K) Tex a fait la tarte.*

(Tex baked the pie.)

X *(K) La tarte a été faite par Tex.*

(The pie was baked by Tex.)

X *(K) C'est par Tex que la tarte sera faite.*

(It is Tex who will bake the pie.)

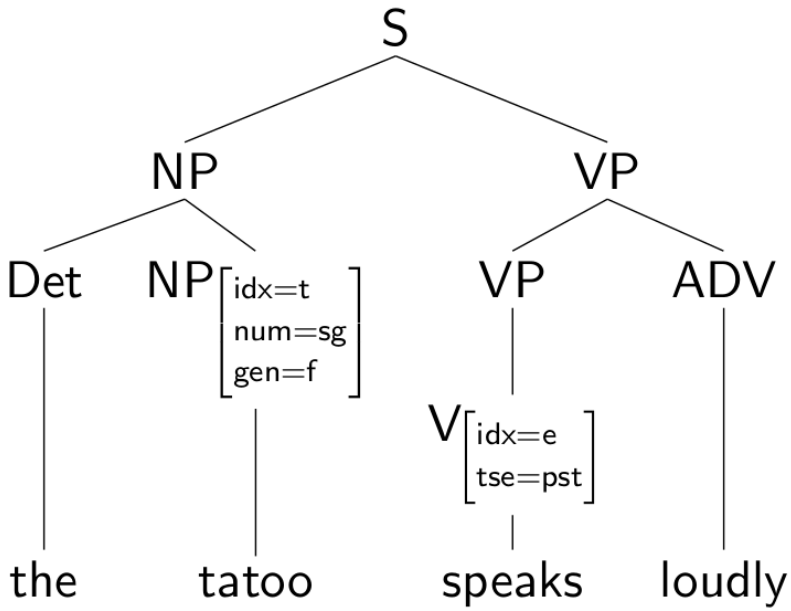
X *(K) Est-ce que la tarte a été faite par Tex ?*

(Has the pie been baked by Tex ?)

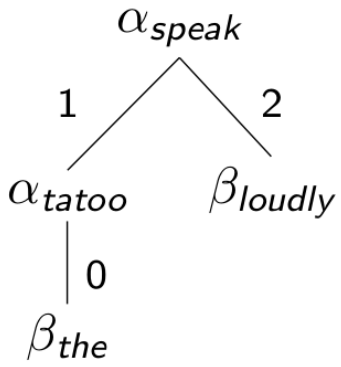
✓ *(K) C'est par Tex que la tarte a été faite.*

(It is Tex by whom the pie was baked.)

Derived and Derivation Tree



(a) Derived tree

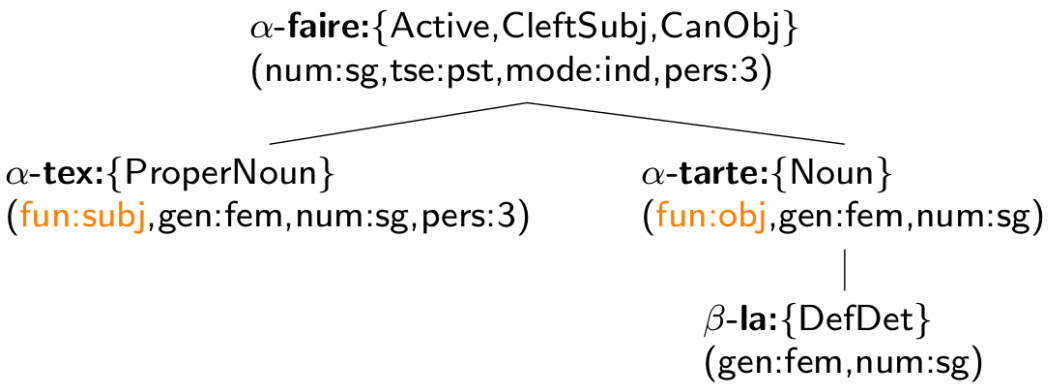


(b) Derivation tree

Creating transformation-based grammar exercises

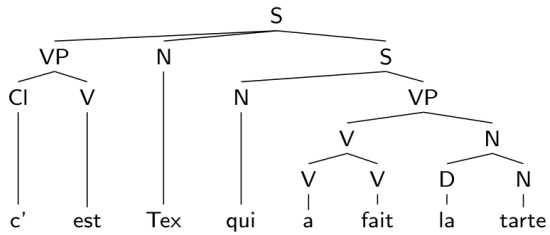
- Define tree filters on pairs of derivation trees
- Retrieve sentences pairs that match those tree filters

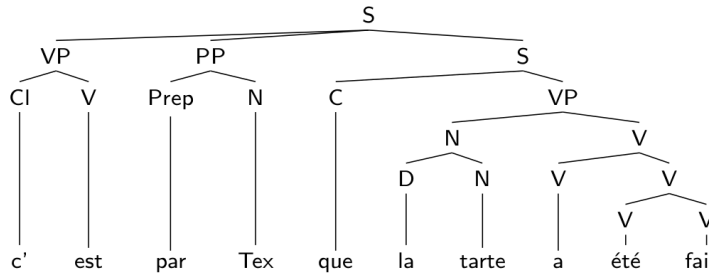
Why Derivation Trees?

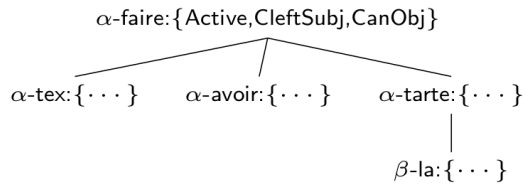


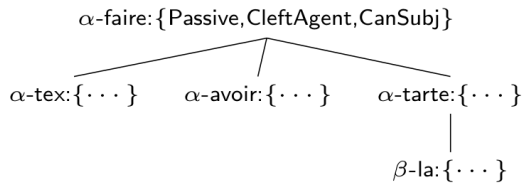
Detailed syntactic information

Why Derivation Trees?







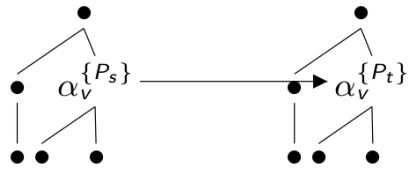


More compact than derived trees. Allow fewer and simpler filters.

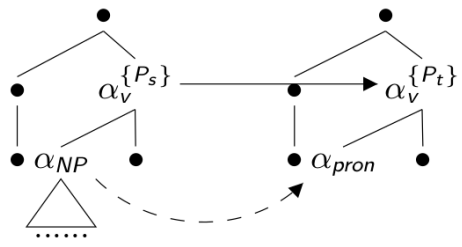
Derivation Tree Filters

Tree filter types

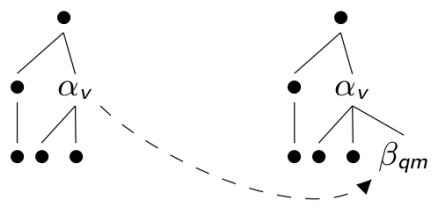
Tree filter types



e.g. `active/passive`
$\bullet_s\{\text{Active}, \text{CleftSubj}, \text{CanObj}\}$
$\leftrightarrow \bullet_t\{\text{Passive}, \text{CleftAgent}, \text{CanSubj}\}$



e.g. `NP/Pronoun`
$\bullet_s\{\text{CanSubj}\} \leftrightarrow \bullet_t\{\text{CliticSubj}\}$



e.g. `Assertion/YN-Question`
$\varnothing \leftrightarrow \bullet_q\{\text{questionMark}\}$

Meaning Preserving Transformations

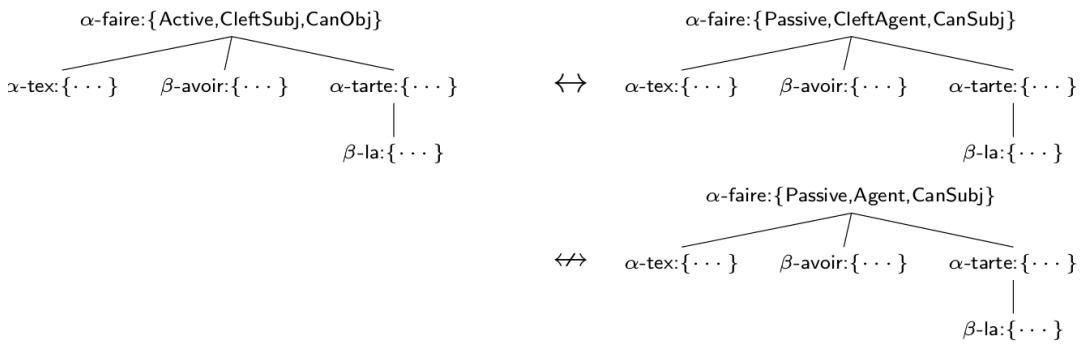
Same core meaning (e.g. active/passive)

(Q) *C'est Tex qui a fait la tarte.* ↔ (K) *C'est par Tex que la tarte a été faite.*
(It is Tex who has baked the pie) (It is by Tex that the pie has been baked)

↮ (K) *La tarte a été faite par Tex.*
(The pie has been baked by Tex)

(Q) *C'est Tex qui a fait la tarte.* ↔ (K) *C'est par Tex que la tarte a été faite.*
(It is Tex who has baked the pie) (It is by Tex that the pie has been baked)

↮ (K) *La tarte a été faite par Tex.*
(The pie has been baked by Tex)



$\bullet_s$ {Active, CleftSubj, CanObj}
$\leftrightarrow \bullet_t$ {Passive, CleftAgent, CanSubj}

Meaning Altering Transformations

Related core meaning: content deleted, added or replaced (e.g. Assertion/Wh-Question)

α-dort:{ CanSubj }
|
α-tatou:{ ... }
|
β-chante:{ ... }
|
β-petit:{ ... }
|
β-le:{defDet}

Le petit tatou qui chantera dort.
The small armadillo that will sing sleeps

α-dort:{ whSubj }
|
α-tatou:{ ... }
|
β-petit:{ ... }
|
β-quel:{ WhDet }

Quel petit tatou dort?
Which small armadillo sleeps?

α-dort:{ whSubj }
|
α-tatou:{ ... }
|
β-quel:{ WhDet }

Quel tatou dort?
Which armadillo sleeps?

α-dort:{ whSubj }
|
β-qui:{ WhPron }

Qui dort?
Who sleeps?

Evaluation

Correctness

- around 80% of the automatically generated exercises are correct (Manual annotation of a sample of generated exercises)

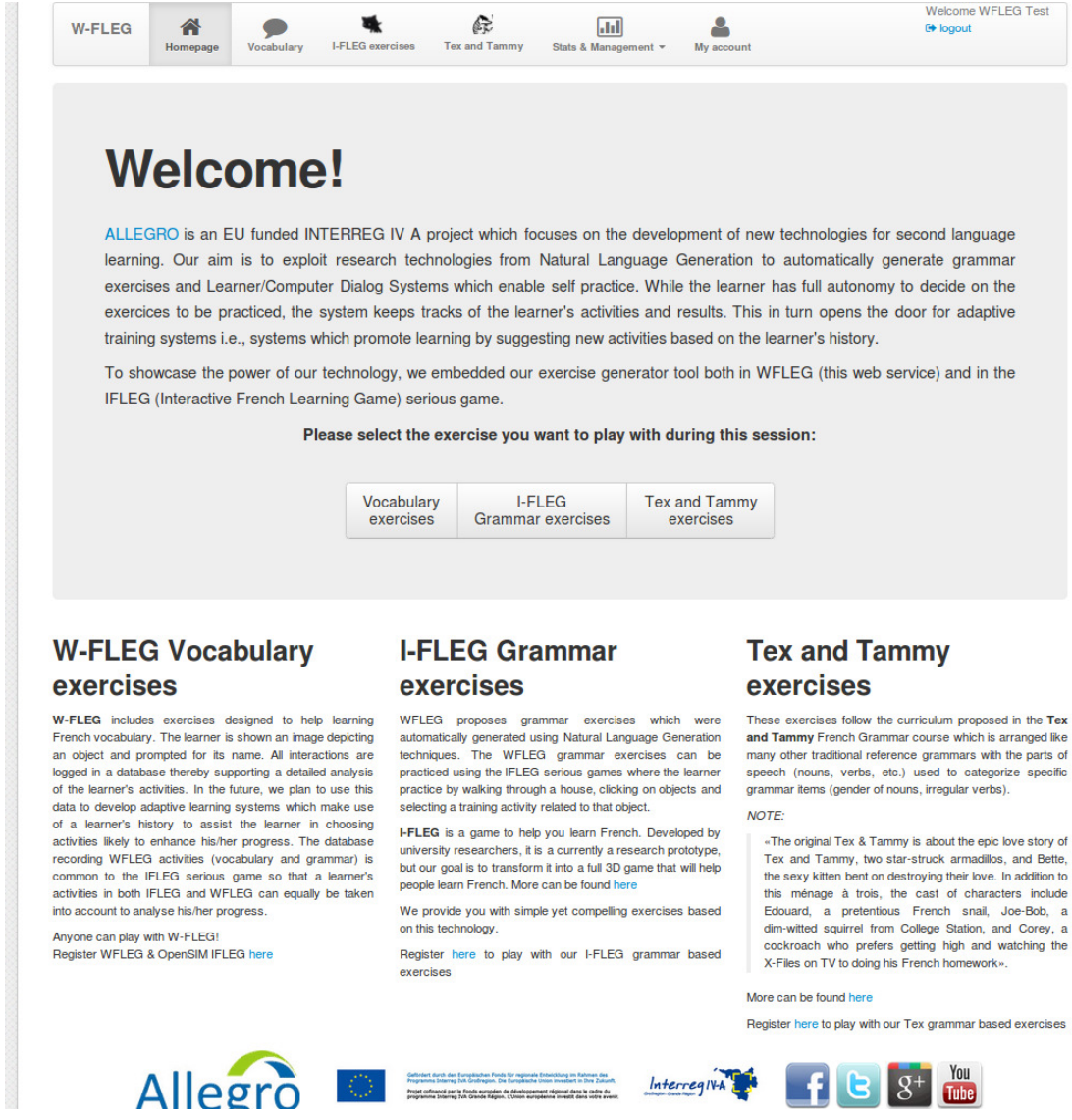
Productivity

- 52 input formulae $\Rightarrow$ around 5000 exercises
  (using SemFraG and lexicon tailored to *Tex's French Grammar* vocabulary)

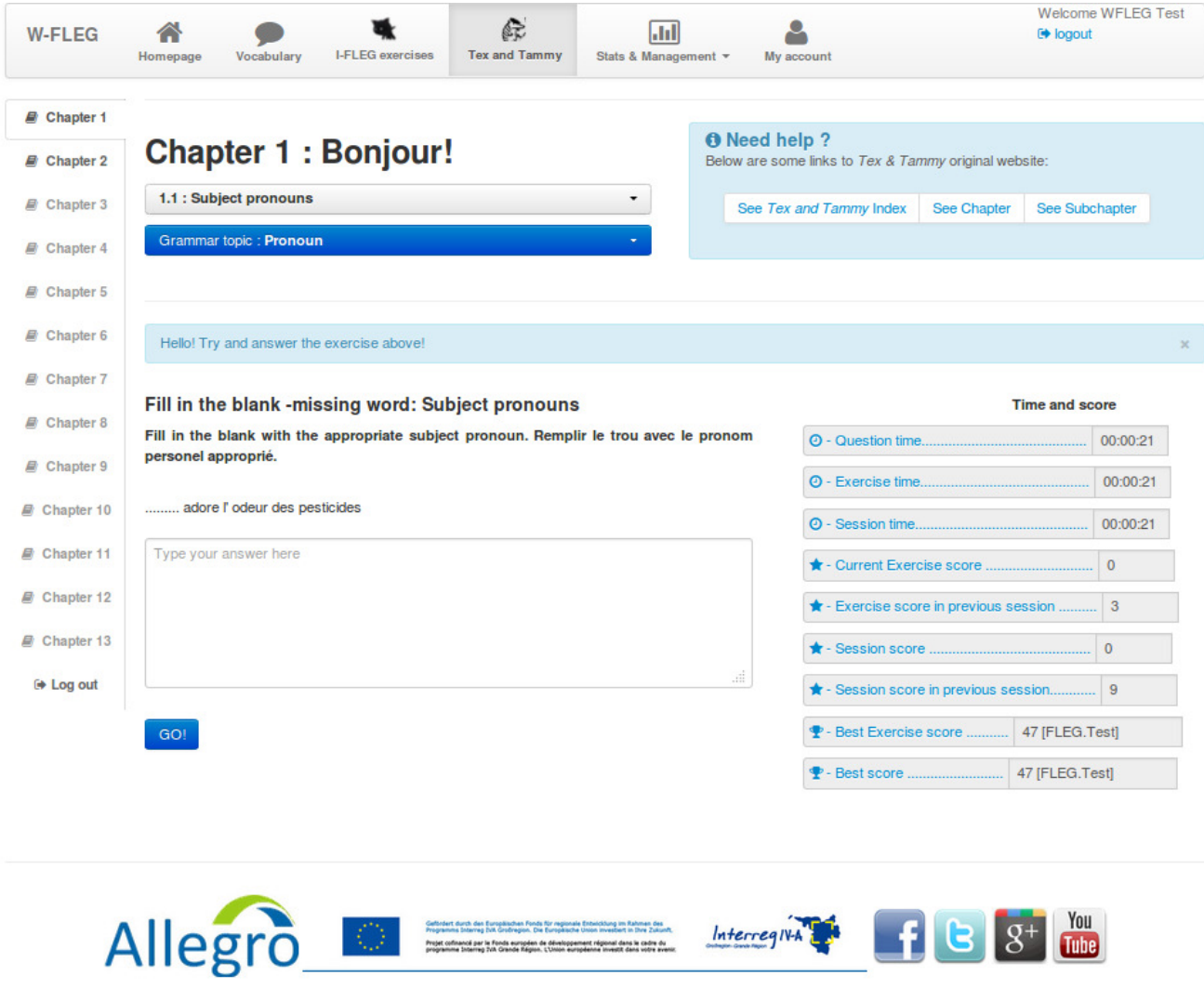
Integration

- Exercises generated by *GramEx* are integrated in I-FLEG (serious game) and WFLEG (web interface)

WFLEG


W-FLEG
Homepage
Vocabulary
I-FLEG exercises
Tex and Tammy
Stats & Management
My account
Welcome WFLEG Test
logout
Welcome!
ALLEGRO is an EU funded INTERREG IV A project which focuses on the development of new technologies for second language learning. Our aim is to exploit research technologies from Natural Language Generation to automatically generate grammar exercises and Learner/Computer Dialog Systems which enable self practice. While the learner has full autonomy to decide on the exercices to be practiced, the system keeps tracks of the learner's activities and results. This in turn opens the door for adaptive training systems i.e., systems which promote learning by suggesting new activities based on the learner's history.
To showcase the power of our technology, we embedded our exercise generator tool both in WFLEG (this web service) and in the IFLEG (Interactive French Learning Game) serious game.
Please select the exercise you want to play with during this session:
Vocabulary exercises
I-FLEG Grammar exercises
Tex and Tammy exercises
W-FLEG Vocabulary exercises
W-FLEG includes exercises designed to help learning French vocabulary. The learner is shown an image depicting an object and prompted for its name. All interactions are logged in a database thereby supporting a detailed analysis of the learner's activities. In the future, we plan to use this data to develop adaptive learning systems which make use of a learner's history to assist the learner in choosing activities likely to enhance his/her progress. The database recording WFLEG activities (vocabulary and grammar) is common to the IFLEG serious game so that a learner's activities in both IFLEG and WFLEG can equally be taken into account to analyse his/her progress.
Anyone can play with W-FLEG!
Register WFLEG & OpenSIM IFLEG here
I-FLEG Grammar exercises
WFLEG proposes grammar exercises which were automatically generated using Natural Language Generation techniques. The WFLEG grammar exercises can be practiced using the IFLEG serious games where the learner practice by walking through a house, clicking on objects and selecting a training activity related to that object.
I-FLEG is a game to help you learn French. Developed by university researchers, it is a currently a research prototype, but our goal is to transform it into a full 3D game that will help people learn French. More can be found here
We provide you with simple yet compelling exercises based on this technology.
Register here to play with our I-FLEG grammar based exercises
Tex and Tammy exercises
These exercises follow the curriculum proposed in the Tex and Tammy French Grammar course which is arranged like many other traditional reference grammars with the parts of speech (nouns, verbs, etc.) used to categorize specific grammar items (gender of nouns, irregular verbs).
NOTE:
«The original Tex & Tammy is about the epic love story of Tex and Tammy, two star-struck armadillos, and Bette, the sexy kitten bent on destroying their love. In addition to this ménage à trois, the cast of characters include Edouard, a pretentious French snail, Joe-Bob, a dim-witted squirrel from College Station, and Corey, a cockroach who prefers getting high and watching the X-Files on TV to doing his French homework».
More can be found here
Register here to play with our Tex grammar based exercises
Allegro
Interreg IV-A

WFLEG


W-FLEG
Homepage
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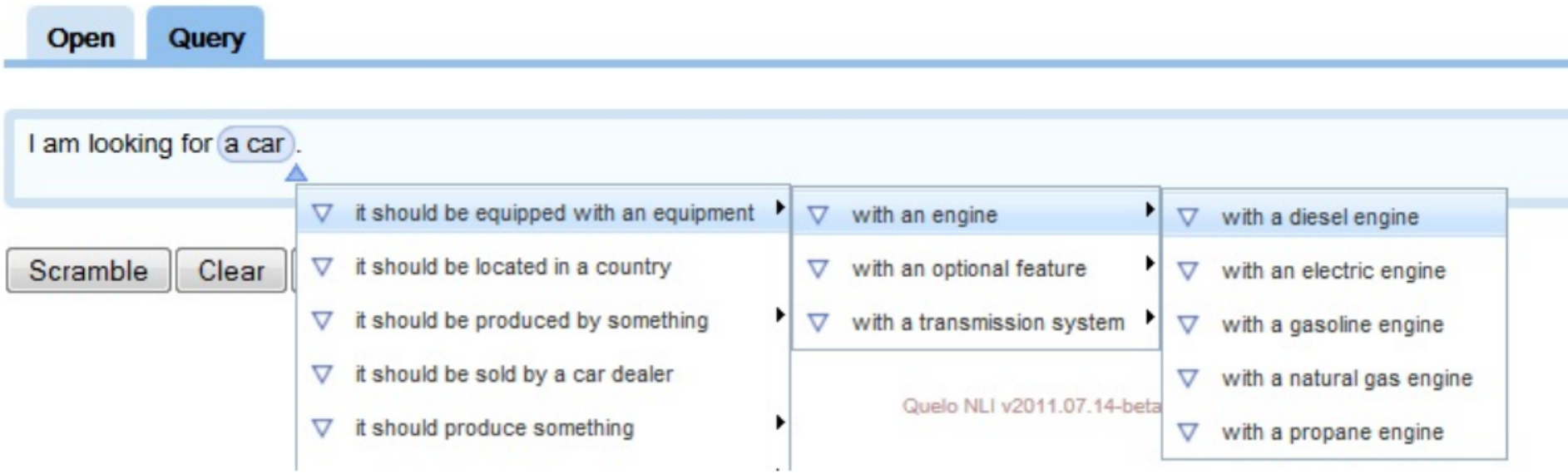
Tex and Tammy
Stats & Management
My account
Welcome WFLEG Test
logout
Chapter 1
Chapter 2
Chapter 3
Chapter 4
Chapter 5
Chapter 6
Chapter 7
Chapter 8
Chapter 9
Chapter 10
Chapter 11
Chapter 12
Chapter 13
Log out
Chapter 1 : Bonjour!
1.1 : Subject pronouns
Grammar topic : Pronoun
Need help ?
Below are some links to Tex & Tammy original website:
See Tex and Tammy Index
See Chapter
See Subchapter
Hello! Try and answer the exercise above!
Fill in the blank -missing word: Subject pronouns
Fill in the blank with the appropriate subject pronoun. Remplir le trou avec le pronom personel approprié.
..... adore l' odeur des pesticides
Type your answer here
GO!
Time and score
- Question time 00:00:21
- Exercise time 00:00:21
- Session time 00:00:21
- Current Exercise score 0
- Exercise score in previous session 3
- Session score 0
- Session score in previous session 9
- Best Exercise score 47 [FLEG.Test]
- Best score 47 [FLEG.Test]
Allegro
Interreg IV-A
You Tube

WFLEG


W-FLEG
Homepage
Vocabulary
I-FLEG exercises
Tex and Tammy
Stats & Management
My account
Welcome WFLEG Test
logout
Consult Scores
Update Profile
Tex and Tammy grammar exercises
Amount of tests done 616
Average score 43.67 %
Average time 00:01:39
Tests results
Progress ratio
Progress ratio in %
Adjective
Pronoun
Verb
Noun
Determiner
Adjective morphology
verb être conjugation: present
Determiner: definite articles
verb avoir conjugation: present
Possessive determiner
Subject pronouns
Singular noun gender : masculine and feminine
Determiner: indefinite articles
-er verbs in present
Type of exercises done
Tests results
Total score with Amount of tests done
Wrong answers
Correct answers
Last Tests results
Amount of tests done
Date of the tests
Score of the last tests done
Response time of the last tests done
Score
Time
I-FLEG Grammar exercises

Natural Language Interfaces



Incremental Query Refinement

The user queries the KB using NL

- Possible extensions of the current user query are computed by an automated reasoner
- Each formal extension is then verbalised using NLG
- grammar based generation is used to convert KB formulae into text
- a statistical module is used to choose the best output


L. Perez-Beltrachini and C. Gardent
Incremental Query Generation
EACL 2014. Gothenburg, Sweden, April 2014.


C. Gardent and L. Perez-Beltrachini
A Statistical, Grammar-Based Approach to Micro-Planning
Computational Linguistics, 43:1, March 2017.

A Statistical Grammar-Based Approach

Input = KB Query

$$\texttt{Professor} \sqcap \texttt{Researcher} \sqcap \exists \texttt{teach.LogicCourse} \sqcap \exists \texttt{worksAt.AlicanteUniversity}$$

I am looking for a professor who is a researcher and teaches a course on logic. He should work for Alicante University.

Microplanning Task: Segment, lexicalise, aggregate and realise

A Statistical Grammar-Based Approach

The grammar

- Enforces grammaticality
- Accounts for language variability (paraphrasing)

The Statistical Module (Hypertagger)

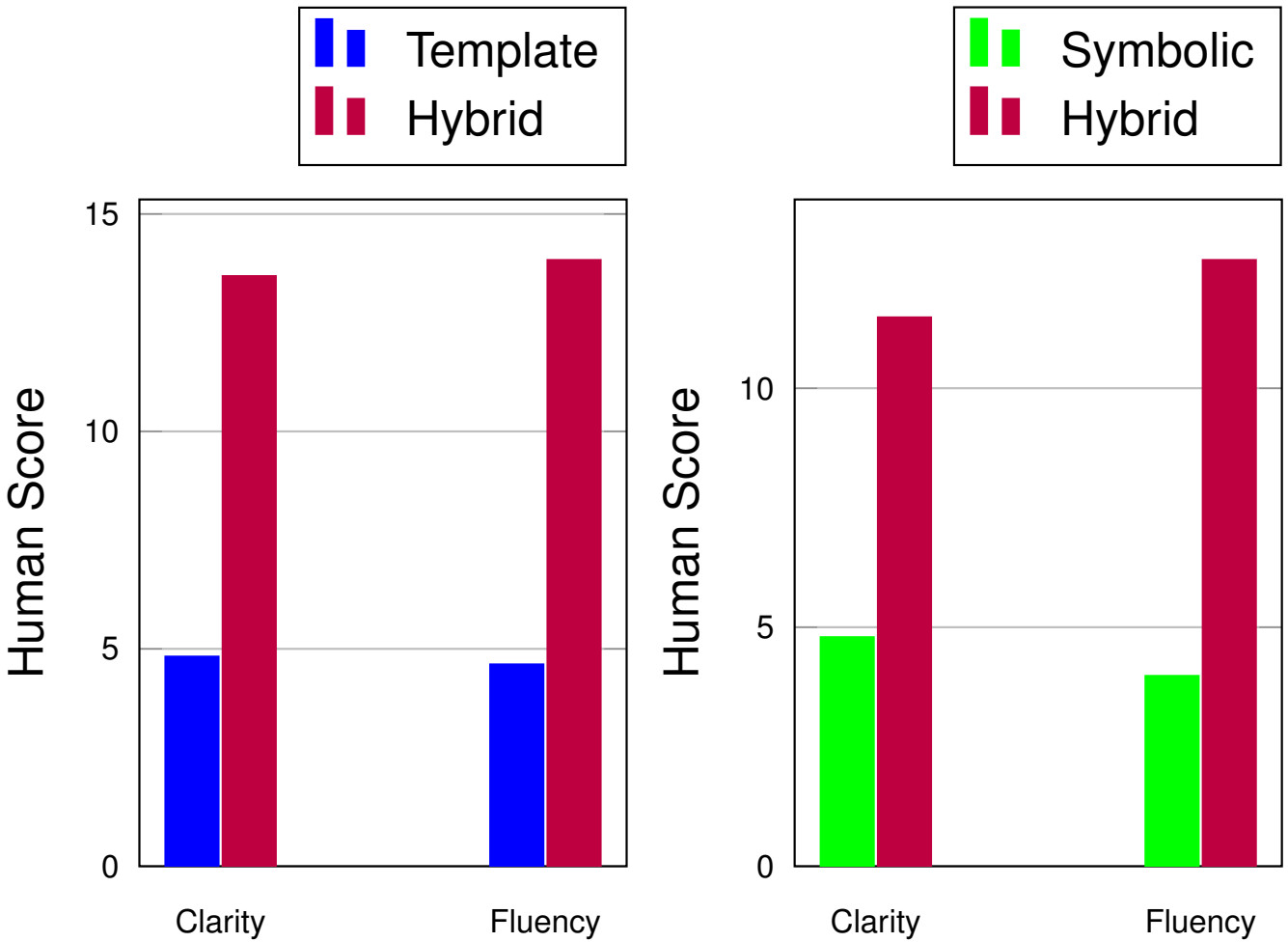
- Enforces microplanning choices (fluency)
- Enhances efficiency (speed)

Results: Output quality

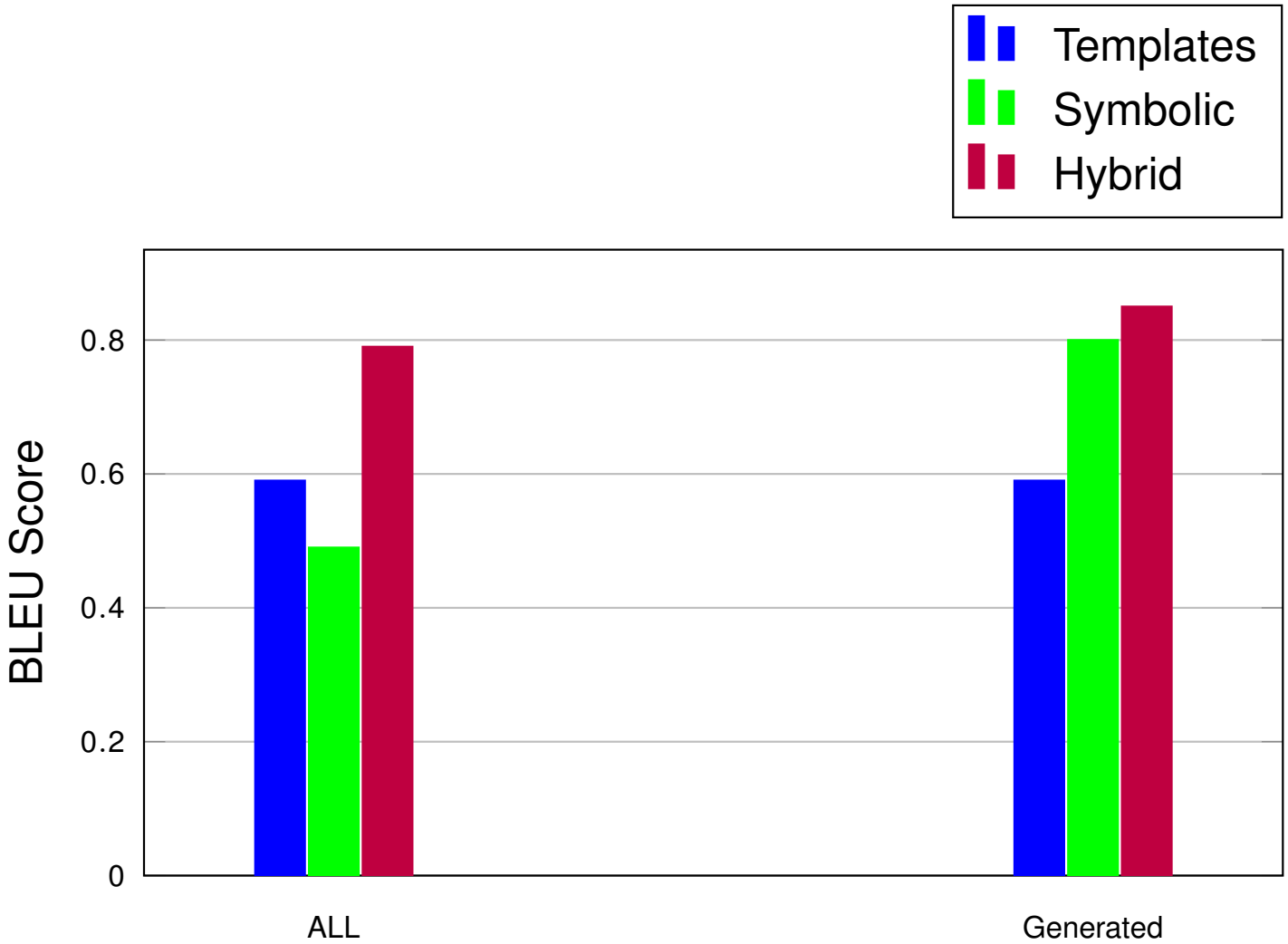
Human Evaluation

- 48 input queries
- from 13 knowledge bases (2 not used in training corpus)
- 24 raters
- Online evaluation
- Sliding ruler
- Scale 0-50
- Latin Square design

Results: Output quality



Results: Output quality (BLEU Scores)



Example Ouput: Sentence Segmentation

3 relations, 4 concepts: 1 sentence
I am looking for a used car whose color should be white, which should be located in a France and whose model should be a toyota 4 runner.

4 relations, 5 concepts: 2 sentences
I am looking for a new car whose exterior color should be beige and whose body style should be a utility vehicle. The new car should run on a natural gas and should be located in a country.

3 relations, 5 concepts: 2 sentences
I am looking for a new car whose body style should be a utility vehicle, an off road. The new car should run on a natural gas and should be located in a country.

Example Output: Syntactic Variation

*I am looking for a car dealer **located in a country** and who should sell a car whose make should be a toyota. The car should run on a fuel and should be equipped with a manual gear transmission system. (Participial)*

*I am looking for a car dealer who sells a car whose model is a toyota. **It should be located in a country**. (Sentence with Pronominal Subject)*

*I am looking for a new car, an off road whose body style should be a utility vehicle. The new car should run on a natural gas **and should be located** in a country. (Coordinated VP)*

*I am looking for a car produced by a car make. The car make should be the make of a toyota. The car make **should be located** in a city and should produce a land rover freelander. (Canonical Declarative Sentence)*

Example Output: Aggregation

VP Coordination

NewCar `(...)` $\sqcap \exists$`runOn.NaturalGas` $\sqcap \exists$`locatedInCountry.Country`

I am looking for a new car (...). This new car (should run on natural gas and should be located in a country)$_{VP}$. *N1 (V1 N1 and V2 N2)*

Relative Clause Coordination

CommunicationDevice $\sqcap \exists$`assistsWith.Understanding`
$\sqcap \exists$`assistsWith.HearingDisability`

I am looking for a communication device (which should assist with a understanding and which should assist with a hearing disability)$_{RelCl}$.

Example Output: Aggregation

NP Coordination

$\texttt{CarDealer} \sqcap \exists \textbf{sell}.\texttt{CrashCar} \sqcap \exists \textbf{sell}.\texttt{NewCar}$

I am looking for a car dealer who should sell (a crash car and a new car)$_{NP}$.

N-Ary NP Coordination

$\texttt{Car} \sqcap \exists \textbf{equippedWith}.\texttt{ManualGearTransmission}$

$\sqcap \exists \textbf{equippedWith}.\texttt{AlarmSystem} \sqcap \exists \textbf{equippedWith}.\texttt{NavigationSystem}$

$\sqcap \exists \textbf{equippedWith}.\texttt{AirBagSystem}$

I am looking for a car equipped with (a manual gear transmission system, an alarm system, a navigation system and an air bag system)$_{NP}$.

Summary

Ambiguous Grammar = High Expressivity, Large Search Space

Hypertagging = Making Choices

Thanks!