

MT Extravaganza

Ling 567

March 11, 2020

Overview

- Background
- Overview results
- Interactive exploration
- Course evals

Languages

abz	Abui	Alor-Pantar	Kim
mni	Meithei	Sino-Tibetan	Ahn
yaq	Hiaki	Uto-Aztecan	Conrad
sje	Pite Saami	Uralic	Nielsen, Spivey
eng	English	Indo-European	

Languages - mapped

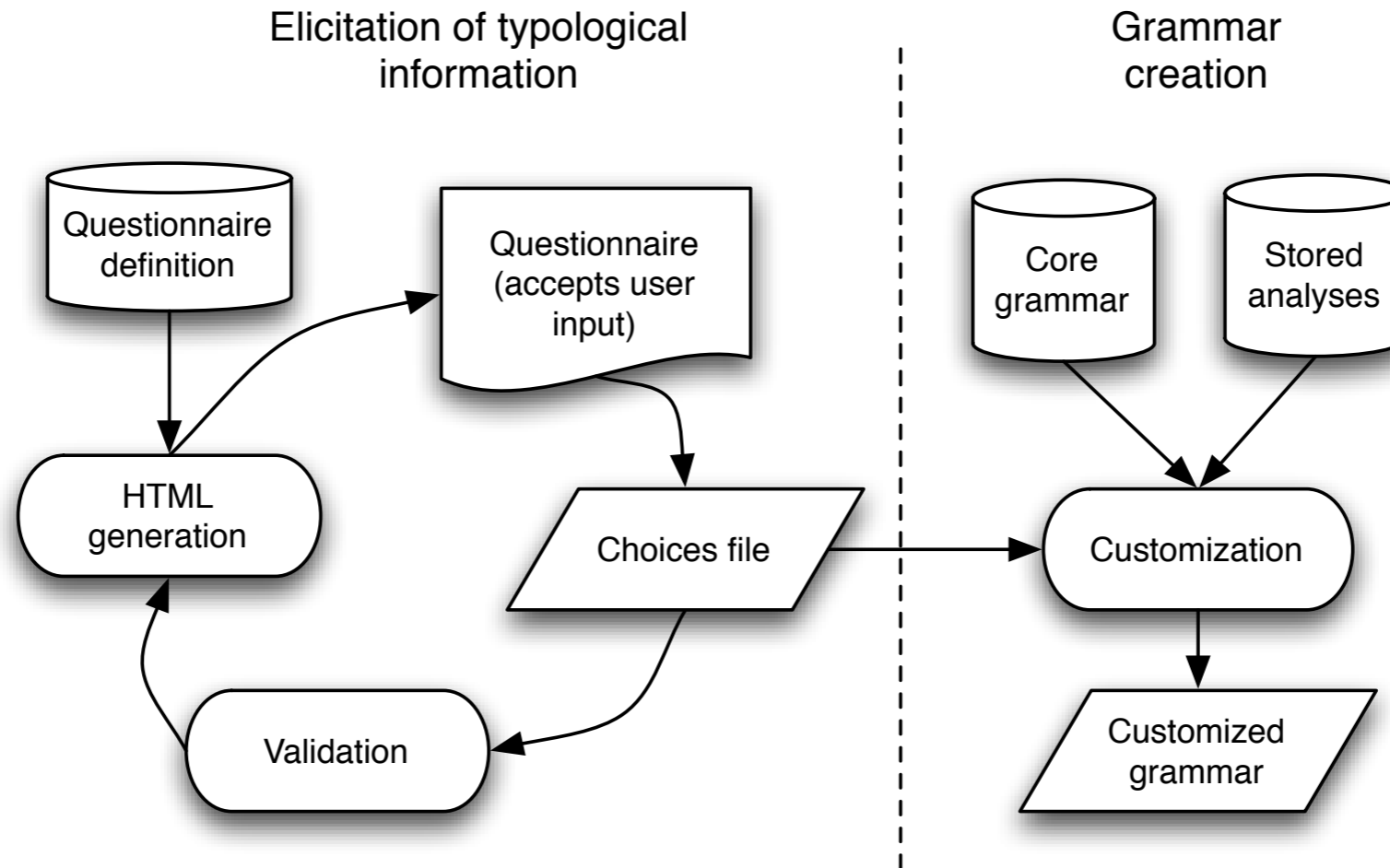


lat/long data from glottolog.org; map by batchgeo.com

Grammar coverage (mostly shared)

- Basic word order
- Case
- Agreement
- Personal pronouns
- Definiteness/demonstratives
- Tense/aspect
- Sentential negation
- Argument optionality
- Matrix yes-no questions
- Coordination
- Modification (adjective, adverb)
- Clausal complements
- Wh questions
- Possessives

Grammar Development: Customization + Extension



Added chaos: Started with automatically inferred grammar specifications

Set up

- Transfer-based MT: Grammars parse and generate, mapping surface strings to semantic representations in MRS
- Grammars developed on the basis of the Grammar Matrix, facilitating harmonized semantic representations
- Quasi-lexical interlingua (English lemmatas as PRED values)
- ‘semi’ (Semantic Interface) maps variable properties (PNG, TAM, COG-ST) from grammar internal space to interlingual space. Lossy mapping, provides defaults
- One ‘accommodation’ transfer grammar per language, instantiating shared transfer rules

Input sentences

- 1.Dogs sleep
- 2.Dogs chase cars
- 3.I chase you
- 4.Dogs eat
- 5.The dogs dont chase cars
- 6.I think that you know that dogs chase cars
- 7.I ask whether you know that dogs chase cars
- 8.Cats and dogs chase cars
- 9.Dogs chase cars and cats chase dogs
- 10.Cats chase dogs and sleep
- 11.Do cats chase dogs
- 12.Hungry dogs eat
- 13.Dogs in the park eat
- 14.Dogs eat in the park
- 15.The dogs are hungry
- 16.The dogs are in the park
- 17.The dogs are the cats
- 18.I asked what the dogs chased
- 19.The dog s car sleeps
- 20.My dogs sleep
- 21.Who sleeps
- 22.What do the dogs chase
- 23.What do you think the dogs chase
- 24.Who asked what the dogs chase
- 25.I can eat glass
- 26.It doesnt hurt me

Parse success

abz	eng	mni	sje	yaq
16	26	15	18	15

Items with end-to-end output (grammar & transfer rules as provided)

	abz	eng	mni	sje	yaq
abz	12	11	9	9	9
eng	13	26	14	21	14
mni	7	12	15	9	7
sje	11	16	10	18	11
yaq	11	14	10	13	15

Items with end-to-end success
(original transfer rules, some grammar mods)

	abz	eng	mni	sje	yaq
abz	12	11	9	9	9
eng	13	26	13	21	14
mni	7	12	13	8	7
sje	11	16	9	18	11
yaq	11	14	10	13	15

Items with end-to-end output: Final (transfer rule propagation)

	abz	eng	mni	sje	yaq
abz	12	12	9	10	10
eng	13	26	13	21	14
mni	7	13	13	8	8
sje	10	16	9	18	11
yaq	11	15	11	13	15

Transfer rule example

```
be_in-feel-think-mtr := monotonic_mtr &
[ INPUT [ RELS < [ PRED "_be.in_v_rel",
  LBL #lbl,
  ARG0 #lindex,
  ARG1 #arg1,
  ARG2 #harg1 ],
  [ PRED "_and_coord_rel",
  C-ARG #carg,
  L-HNDL #lbl,
  L-INDEX #lindex,
  R-INDEX #rindex ],
  [ PRED "_feel_v_rel",
  ARG0 #rindex,
  ARG1 #arg1,
  ARG2 #harg2 ] > ,
HCONS < qeq &
  [ HARG #harg1,
  LARG #larg ],
qeq &
  [ HARG #harg2,
  LARG #larg ] > ],
```

```
OUTPUT [ RELS < [ PRED "_think_v_rel",
  ARG0 #carg,
  ARG1 #arg1,
  ARG2 #larg ] >,
HCONS < > ]].
```

Total number of outputs (grammars & transfer rules as provided)

	abz	eng	mni	sje	yaq
abz	8287	223	1491	92	90
eng	648	93	1022	1019	26
mni	46624	763	402361	140	122
sje	3176	111	3537	577	28
yaq	539	53	957	56	46

Total number of outputs (some grammar mods)

	abz	eng	mni	sje	yaq
abz	5372	223	734	92	90
eng	409	93	486	1019	26
mni	15420	320	13718	64	42
sje	1943	111	791	577	28
yaq	334	53	487	56	46

Total number of outputs (transfer rule propagation)

	abz	eng	mni	sje	yaq
abz	5306	225	734	98	92
eng	379	93	486	1019	26
mni	15420	322	4884	64	43
sje	1693	111	791	577	28
yaq	286	65	553	56	46

Maximum number of outputs (Final)

	abz	eng	mni	sje	yaq
abz	2592	96	448	48	20
eng	144	32	120	432	4
mni	14112	96	2644	24	16
sje	688	32	448	432	4
yaq	72	12	168	8	8

Items with exact match output (Final)

	abz	eng	mni	sje	yaq
abz	11	10	0	9	9
eng	9	26	1	18	14
mni	6	9	1	7	6
sje	8	15	0	18	10
yaq	8	15	1	11	15

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