

MT Extravaganza

Ling 567

March 8, 2018

Overview

- Background
- Overview results
- Interactive exploration
- Course evals

Languages

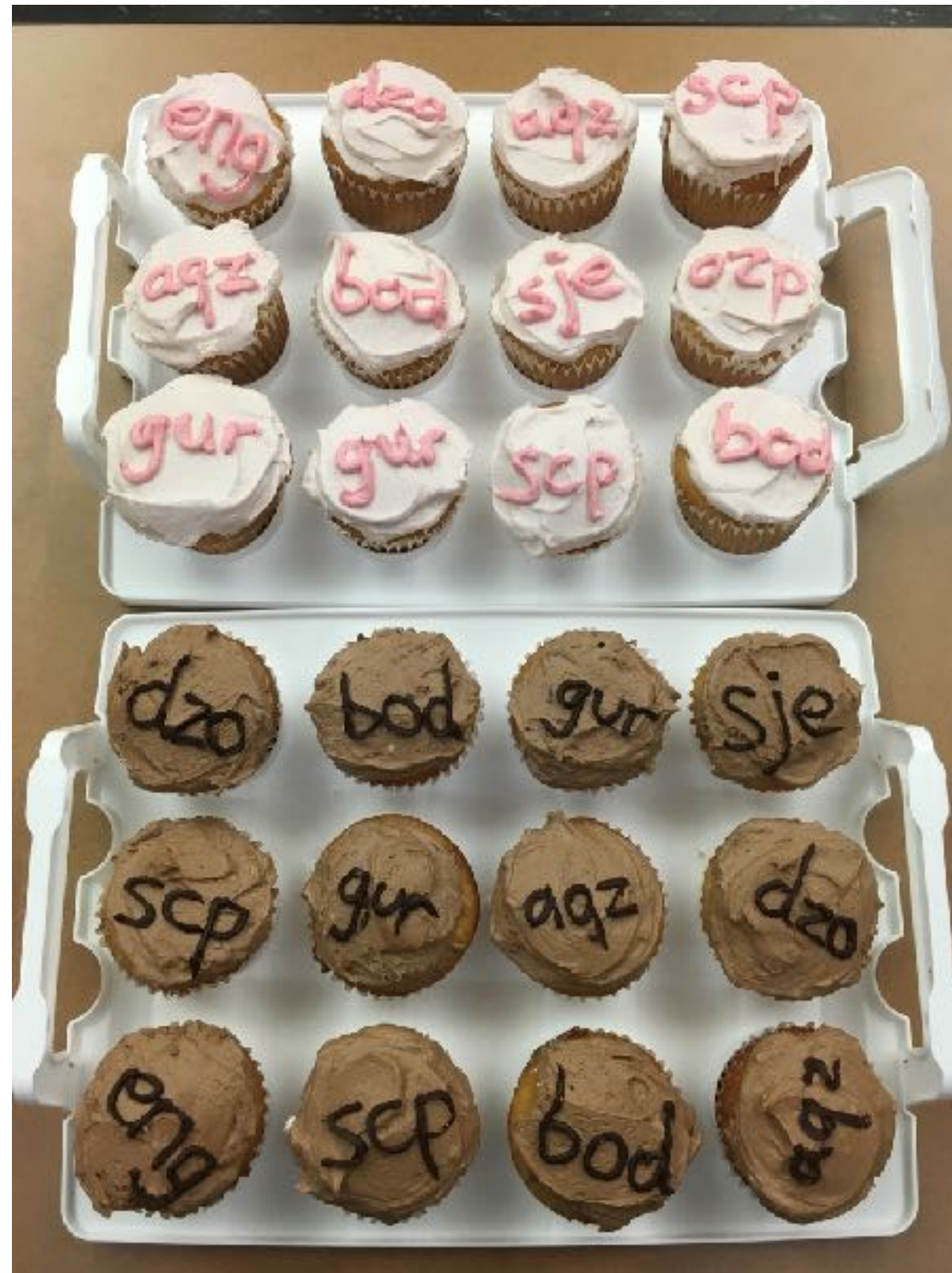
aqz	Akuntsu	Tupian	Edwards, Holmes
bod	Tibetan (Lhasa)	Tibeto-Burman	Cadigan, Ji
dzo	Dzongkha	Tibeto-Burman	Peck, Tian
eng	English	Indo-European	
gur	Dagaare	Niger-Congo	Owens, Still
scp	Yolmo	Tibeto-Burman	Lindberg, Ng
sje	Pite Saami	Uralic	Nielsen, Spivey

Languages - mapped



lat/long data mostly from wals.info; map by batchgeo.com

Languages - cupcaked



Grammar coverage (shared)

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

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

MMT with ACE

- Faster system run times
- More coverage (fewer system timeouts)
- Compatible with Condor (yay!)
- Possibility of respecting ICONS representation of information structure

Input sentences

1. Dogs sleep
2. Dogs chase cars
3. I chase you
4. Dogs eat
5. The dogs chase cars
6. The dogs don't chase cars
7. I think that you know that dogs chase cars
8. I ask whether you know that dogs chase cars
9. Cats and dogs chase cars
10. Dogs chase cars and cats chase dogs
11. Cats chase dogs and sleep
12. Do cats chase dogs
13. Hungry dogs eat
14. Dogs eat quickly
15. Who sleeps
16. What do the dogs chase
17. What do you think the dogs chase
18. Who asked what the dogs chase
19. I asked what the dogs chased
20. The dog's car sleeps
21. My dogs sleep
22. The dog sleeps because the cat sleeps
23. The dog sleeps after the cat sleeps

Parse success

aqz	bod	dzo	eng	gur	scp	sje
14	15	20	23	19	19	19

	aqz	bod	dzo	eng	gur	scp	sje
Total parses	147	25	24	24	28	140	22
Avg parses	10.50	1.67	1.20	1.04	1.47	7.37	1.16

Items with end-to-end output (initial vpm fixes, no transfer rules)

	aqz	bod	dzo	eng	gur	scp	sje
aqz	12	12	11	12	12	13	12
bod	12	15	14	14	12	13	13
dzo	11	12	20	15	11	17	15
eng	14	16	20	23	16	18	21
gur	12	15	17	17	17	12	18
scp	9	12	14	14	9	19	17
sje	11	14	14	16	13	17	19

Items with end-to-end output
(added in transfer rules, as provided)

	aqz	bod	dzo	eng	gur	scp	sje
aqz	12	12	11	12	12	13	12
bod	12	15	14	14	12	13	13
dzo	11	12	20	15	11	17	15
eng	14	16	20	23	16	19	21
gur	12	15	17	17	17	13	18
scp	9	12	14	14	9	19	17
sje	11	14	14	16	13	17	19

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

	aqz	bod	dzo	eng	gur	scp	sje
aqz	12	12	11	12	12	13	12
bod	12	15	14	14	12	13	13
dzo	13	15	20	18	14	14	18
eng	14	16	20	23	16	14	21
gur	12	15	17	17	17	13	18
scp	9	12	14	14	9	19	17
sje	11	14	14	16	13	13	19

Transfer rule example

```
eat-ini-mtr := monotonic_mtr &
[ CONTEXT [ RELS < [ PRED "_eat_v_rel",
                    ARG2 #arg2 ] > ],
  FILTER [ RELS < [ ARG0 #arg2 ] > ],
  INPUT [ RELS < >,
         HCONS < > ],
  OUTPUT [ RELS < [ PRED "_food_n_rel",
                   LBL #larg,
                   ARG0 #arg2 & [ COG-ST type-id,
                                   NUM sg] ],
          [ PRED "exist_q_rel",
            ARG0 #arg2,
            RSTR #harg ] >,
         HCONS < [ HARG #harg,
                  LARG #larg ] > ],
  FLAGS [ EQUAL < #arg2 > ]].
```

Total number of outputs (no transfer rules)

	aqz	bod	dzo	eng	gur	scp	sje
aqz	1700	212	38	17340	1453205	1260168	5458
bod	44	120	19	415	350	4316	319
dzo	60	40	39	1389	3374	253520	4352
eng	74	81	28	103	62	230787	1015
gur	44	9837	24	51	558	4456	600
scp	64	103	17	333	196	1670864	1030
sje	46	64	19	114	242	133426	579

Total number of outputs (added in transfer rules, as provided)

	aqz	bod	dzo	eng	gur	scp	sje
aqz	1700	212	38	17340	1447379	1260216	5458
bod	44	120	19	415	350	4316	319
dzo	60	40	39	1389	3374	253521	4352
eng	74	81	28	103	62	230787	1015
gur	44	9837	24	51	558	4464	600
scp	64	103	17	333	196	1670799	1030
sje	46	64	19	114	242	133426	579

Total number of outputs

(added in transfer rules, provided default aspect)

	aqz	bod	dzo	eng	gur	scp	sje
aqz	1700	212	38	17340	1453205	315624	5458
bod	44	120	19	415	350	940	319
dzo	60	40	39	1389	3374	10672	4352
eng	74	81	28	103	62	4628	1015
gur	44	9837	24	51	558	4464	600
scp	64	103	17	333	196	615760	1030
sje	46	64	19	114	242	5164	579

Total number of outputs (transfer rule propagation)

	aqz	bod	dzo	eng	gur	scp	sje
aqz	1700	212	38	17340	1453205	315624	5458
bod	44	120	19	415	350	940	319
dzo	68	60	39	1413	3406	10624	4364
eng	74	81	28	103	62	4628	1015
gur	44	9837	24	51	558	4464	600
scp	64	103	17	333	196	615760	1030
sje	46	64	19	114	242	5164	579

Maximum number of outputs (Final)

	aqz	bod	dzo	eng	gur	scp	sje
aqz	1112	84	20	15913	1390909	308224	4544
bod	8	40	3	192	128	512	168
dzo	32	14	5	544	3072	10240	1728
eng	16	16	2	32	8	4096	432
gur	8	4536	2	12	280	4096	432
scp	16	31	2	192	128	248832	432
sje	16	20	2	32	128	4096	432

Items with exact match output (Final)

	aqz	bod	dzo	eng	gur	scp	sje
aqz	12	9	3	11	9	0	11
bod	12	14	3	14	12	1	12
dzo	13	12	6	18	13	1	16
eng	14	14	6	23	14	1	19
gur	12	12	6	17	17	1	15
scp	9	9	1	12	7	2	14
sje	11	11	1	15	10	1	19

Item 16: ambiguity in aqz

The car chases and cats and dogs chase dogs
The cars chase and cats and dogs chase dogs
The car chases and the cats and dog chase dogs
The cars chase dogs and cats and dogs chase
The car chases and cats and dogs chase the dogs
The car chases and the cats and dogs chase dogs
Cars chase and cats and dogs chase dogs
The car chases dogs and cats and dogs chase
The car chases dogs and the cats and dog chase
Cars chase and cats and dogs chase the dogs
A car chases and the cats and dog chase dogs
The car chases and the cat and dogs chase a dog
Cars chase and cats and dogs chase a dog
The car chases and cats and dogs chase a dog
The car chases dogs and the cats and dogs chase
Cars chase and cats and dogs chase the dog
The car chases and cats and dogs chase the dog
The car chases dogs and the cat and dog chase
The car chases the dogs and the cats and dog chase
The car chases dogs and the cat and dogs chase
The car chases a dog and the cats and dog chase
The car chases the dogs and the cats and dogs chase
The car chases the dog and the cats and dog chase

The car chases a dog and the cats and dogs chase
The car chases the dogs and the cat and dog chase
The car chases the dog and the cats and dogs chase
The car chases a dog and the cat and dog chase
A car chases and cats and dogs chase dogs
Cars chase and the cats and dog chase dogs
Cars chase dogs and the cats and dog chase
A car chases and the cats and dogs chase dogs
A car chases and cats and dogs chase the dogs
The cars chase and cats and dogs chase the dogs
Cars chase the dogs and the cats and dog chase
A car chases and the cat and dogs chase a dog
The cars chase dogs and the cats and dog chase
The car chases and the cat and dog chase the dog
Cars chase the dog and the cats and dog chase
Cars chase and the cats and dogs chase dogs
The car chases and the cats and dog chase the dog
A car chases dogs and the cats and dog chase
A car chases and cats and dogs chase a dog
A car chases and the cat and dog chase the dog
A car chases the dogs and the cats and dog chase
Cars chase dogs and the cats and dogs chase
A car chases and the cats and dog chase the dog

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