

Goals

- Neural model that is able to produce DRSs
- Improve model by adding linguistic information

Discourse Representation Structures

I am not working for Tom

PMB release 2.2.0
pmb.let.rug.nl

e_1	x_1	t_1
time.n.08(t_1)		
$t_1 = \text{now}$		
work.v.02(t_1)		
Time(e_1, t_1)		
Co – Agent(e_1, x_1)		
Agent($e_1, \text{speaker}$)		
male.n.02(x_1)		
Name(x_1, tom)		

	Data	Docs	Tokens
	Train	4,597	29,195
	Dev	682	4,067
	Test	650	4,072
	Silver	67,965	583,835
	Bronze	120,662	919,247

Gold standard

b1 REF t1
b1 EQU t1 “now”
b1 time “n.08” t1
b2 Time e1 t1
b1 NOT b2
b2 REF e1
b2 Agent e1 “speaker”
b2 work “v.02” e1
b2 Co-Agent e1 x1
b3 REF x1
b3 Name x1 “tom”
b3 male “n.02” x1

System output

b2 REF x1
b2 EQU x1 “now”
b2 time “n.08” x1
b1 Time x2 x1
b2 NOT b1
b1 REF x2
b1 Agent x2 “speaker”
b1 work “v.01” x2
b1 REF x3
b1 Goal x2 x3
b1 Name x1 “tom”

Var matching

b1 → b2
t1 → x1
b2 → b1
e1 → x2

Scores

P: 5/8
R: 5/9
F: 58.8

Linguistic Information

I am not working for Tom

POS: PRP VBP RB VBG IN NNP
LEM: I be not work for Tom
SEM: PRO NOW NOT EXG REL PER
DEP: nsubj aux neg root case nmod
CCG: NP (S[dcl]\NP)/(S[ng]\NP) (S\NP)\
(S\NP) (S[ng]\NP)/PP PP/NP N

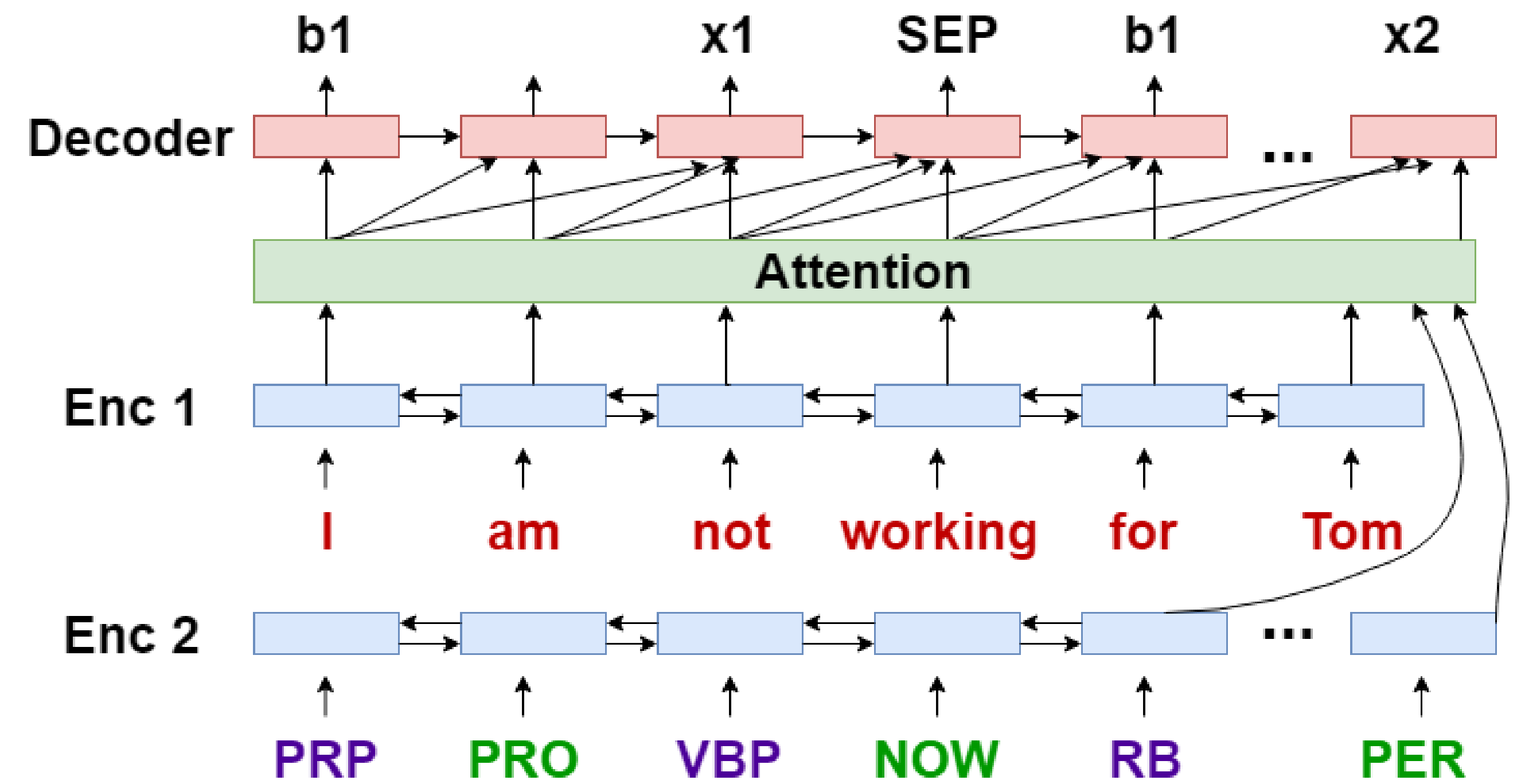
One encoder POS + SEM

Enc 1: I PRP PRO + a m VBP NOW + not RB NOT +
working VBG EXG + for IN REL + Tom NNP PER

Two encoders POS + SEM

Enc 1: I + a m + not + working + for + Tom
Enc 2: PRO PRO VBP NOW RB NOT VBG EXG IN REL NNP PER

Neural Architecture



Character-level input for words, but keep:

- DRS operators: NOT, REF, EQU
- DRS roles : Agent, Time, Theme
- Linguistic tags : PRP, PRO, aux

Train two types of models:

- Gold-only
- Gold + silver



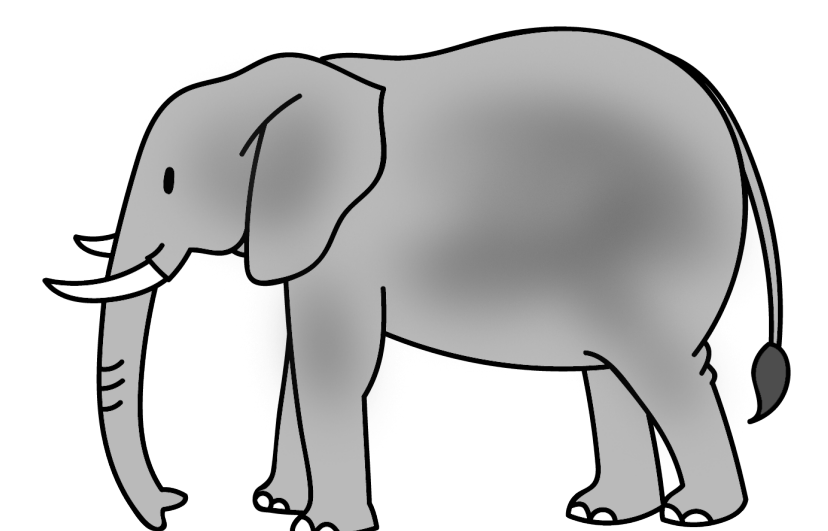
Results

Model	1 enc	2 enc
Baseline	78.6	
+ LEM	78.6	79.9
+ SEM	79.4	80.5
+ POS	79.4	80.8
+ CCG	79.4	81.0
+ DEP	78.8	81.3

Model	1 enc	2 enc
Baseline	84.5	
+ LEM	84.0	85.6
+ POS	84.3	85.5
+ CCG	84.5	85.6
+ DEP	84.5	85.4
+ SEM	83.7	85.1

Comparison

Model	Dev	Test
SPAR	40.0	40.8
SIM-SPAR	53.3	57.7
Boxer	72.2	72.2
Neural Boxer	80.9	83.2
Gold-only	78.6	81.5
Gold-only + ling	81.3	83.4
Gold + silver	84.5	86.7
Gold + silver + LEM	85.6	87.0



Only lemmas for best model
Sentences are very short

References

- Boxer** : Open Domain Semantic Parsing with Boxer, Bos, Nodalida, 2015
- Parallel Meaning Bank** : Towards a multilingual corpus of translations annotated with compositional meaning representations, Abzianidze et al, EACL, 2017
- Matching procedure** : Evaluating Scoped Meaning Representations, Van Noord et al., LREC, 2018
- Neural Boxer** : Exploring Neural Methods for Parsing Discourse Representation Structures, Van Noord et al., TACL, 2018
- Shared Task** : The First Shared Task on Discourse Representation Structure Parsing, Abzianidze et al., IWCS, 2019