

Prob parsing assignment calculations

Jean Mark Gawron *

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This is the recursion relation defining the Viterbi probability of an edge ($Vit(E)$):

$$\begin{aligned} Vit(E) &= \text{Max}_{\langle D_1, D_2 \rangle \in E} \text{PProb}(E, D_1, D_2) \\ \text{PProb}(E, D_1, D_2) &= Vit(D_1) * Vit(D_2) * P(E.cat \rightarrow D_1.cat \ D_2.cat) \end{aligned}$$

In the calculations below, in ambiguous edges, a ‘*’ occurs next to the daughter record that provides the maximum ‘PProb’. This is the daughter record used in the Viterbi parse, and the only daughter record that will survive in the backtrace table after parsing is complete.

*San Diego State University, Department of Linguistics and Oriental Languages, BAM 321, 5500 Campanile Drive, San Diego, CA 92182-7717, gawron@mail.sdsu.edu.

E	D ₁	D ₂	Vit(D ₁)	Vit(D ₂)	Rule	Vit(E)
s(0,10)	np(0,2)	vp(2,10)	.0025	2.3438e-09	1.0	5.8594e-12
np(0,2)	dt(0,1)	nbar(1,2)	.5	.01	.5	.0025
dt(0,1)	Lexical					.5
nbar(1,2)	Lexical					.01
vp(2,10)	vbz(2,3)	np(3,10)	1.0	1.8750e-09	.4	7.5000e-10
	* X1(2,4)	pp(4,10)	.01	4.6875e-07	.5	2.3438e-09
	X2(2,7)	pp(7,10)	1.2500e-05	.00125	.1	1.5625e-09
	X1(2,7)	pp(7,10)	2.5e-06	.00125	.5	1.5625e-09
			max			2.3438e-09
X2(2,7)	X1(2,4)	pp(4,7)	.01	.00125	1.0	1.25e-05
X1(2,7)	vbz(2,3)	np(3,7)	1.0	2.5e-06	1.0	2.5e-06
X1(2,4)	vbz(2,3)	np(3,4)	1.0	.01	1.0	.01

E	D ₁	D ₂	Vit(D ₁)	Vit(D ₂)	Rule	Vit(E)
vbz(2,3)	Lexical					1.0
np(3,10)	* nbar(3,4)	pp(4,10)	.01	4.6875e-07	.2	4.6875e-09
	nbar(3,7)	pp(7,10)	3.7500e-06	.00125	.2	9.3750e-10
			max			4.6875e-09
np(3,7)	nbar(3,4)	pp(4,7)	.01	.00125	.2	2.5e-06
nbar(3,7)	nbar(3,4)	pp(4,7)	.01	.00125	.3	3.7500e-06
np(3,4)	Lexical					.01
pp(4,10)	p(4,5)	np(5,10)	.5	9.375e-07	1.0	4.6875e-07
pp(4,7)	p(4,5)	np(5,7)	.5	.0025	1.0	.00125
p(4,5)	Lexical					.5
np(5,10)	dt(5,6)	nbar(6,10)	.5	3.7500e-06	.5	9.375e-07
np(5,7)	dt(5,6)	nbar(6,7)	.5	.01	.5	.0025
dt(5,6)	Lexical					.5
nbar(6,10)	nbar(6,7)	pp(7,10)	.01	.00125	.3	3.75e-06
nbar(6,7)	Lexical					.01
pp(7,10)	p(7,8)	np(8,10)	.5	.0025	1.0	.00125
p(7,8)	Lexical					.5
np(8,10)	dt(8,9)	nbar(9,10)	.5	.01	.5	.0025
dt(8,9)	Lexical					.5
nbar(9,10)	Lexical					.01