EuroMatrixPlus
Evaluation, Localisation, Open Source

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Centre for Next Generation Localisation

Overview

- EuroMatrix (2006-2009)
- EuroMatrixPlus (2009 -2012)
- Evaluation
- Localisation
- Open Source

EuroMatrix 2006-2009

Goals

- MT between all EU languages
- Open Research Environment
- Open Source

EuroMatrix 2006-2009

Partners

- University of Saarbrücken
- University of Edinburgh
- Charles University Prague
- CLECT
- Group Technologies
- Morphologic

EuroMatrix 2006-2009

Existing MT systems for EU languages

[from Hutchins, 2005]

	Cze	Dan	Dut	Eng	Est	Fin	Fre	Ger	Gre	Hun	Ita	Lat	Lit	Mal	Pol	Por	Slo	Slo	Spa	Swe	
Czech	–	.	.	1	.	.	1	1	.	.	1	.	.	.	.	.	.	.	.	.	4
Danish	.	–	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	1
Dutch	.	.	–	6	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	9
English	2	.	6	–	.	.	42	48	3	3	29	1	.	.	7	30	2	.	48	1	222
Estonian	.	.	.	.	–	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0
Finnish	.	.	.	2	.	–	.	1	.	.	.	.	.	.	.	.	.	.	.	.	3
French	1	.	2	38	.	.	–	22	3	.	9	.	.	.	1	5	.	.	10	.	91
German	1	1	1	49	.	1	23	–	.	1	8	.	.	.	4	3	2	.	8	1	103
Greek	.	.	.	2	.	.	3	.	–	.	.	.	.	.	.	.	.	.	.	.	5
Hungarian	.	.	.	1	.	.	.	1	.	–	.	.	.	.	.	.	.	.	.	.	2
Italian	1	.	.	25	.	.	9	8	.	.	–	.	.	.	1	3	.	.	7	.	54
Latvian	.	.	.	1	.	.	.	.	.	.	.	–	.	.	.	.	.	.	.	.	1
Lithuanian	.	.	.	.	.	.	.	.	.	.	.	.	–	.	.	.	.	.	.	.	0
Maltese	.	.	.	.	.	.	.	.	.	.	.	.	.	–	.	.	.	.	.	.	0
Polish	.	.	.	6	.	.	1	3	.	.	1	.	.	.	–	2	.	.	1	.	14
Portuguese	.	.	.	25	.	.	4	4	.	.	3	.	.	.	1	–	.	.	6	.	43
Slovak	.	.	.	1	.	.	.	1	.	.	.	.	.	.	.	.	–	.	.	.	2
Slovene	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	–	.	.	0
Spanish	1	.	.	42	.	.	8	7	.	.	7	.	.	.	1	6	.	.	–	.	72
Swedish	.	.	.	2	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	–	3
	6	1	9	201	0	1	93	99	6	4	58	1	0	0	15	49	4	0	80	2	

EuroMatrix 2006-2009

	Target Language																					
	en	bg	de	cs	da	el	es	et	fi	fr	hu	it	lt	lv	mt	nl	pl	pt	ro	sk	sl	sv
en	–	40.5	46.8	52.6	50.0	41.0	55.2	34.8	38.6	50.1	37.2	50.4	39.6	43.4	39.8	52.3	49.2	55.0	49.0	44.7	50.7	52.0
bg	61.3	–	38.7	39.4	39.6	34.5	46.9	25.5	26.7	42.4	22.0	43.5	29.3	29.1	25.9	44.9	35.1	45.9	36.8	34.1	34.1	39.9
de	53.6	26.3	–	35.4	43.1	32.8	47.1	26.7	29.5	39.4	27.6	42.7	27.6	30.3	19.8	50.2	30.2	44.1	30.7	29.4	31.4	41.2
cs	58.4	32.0	42.6	–	43.6	34.6	48.9	30.7	30.5	41.6	27.4	44.3	34.5	35.8	26.3	46.5	39.2	45.7	36.5	43.6	41.3	42.9
da	57.6	28.7	44.1	35.7	–	34.3	47.5	27.8	31.6	41.3	24.2	43.8	29.7	32.9	21.1	48.5	34.3	45.4	33.9	33.0	36.2	47.2
el	59.5	32.4	43.1	37.7	44.5	–	54.0	26.5	29.0	48.3	23.7	49.6	29.0	32.6	23.8	48.9	34.2	52.5	37.2	33.1	36.3	43.3
es	60.0	31.1	42.7	37.5	44.4	39.4	–	25.4	28.5	51.3	24.0	51.7	26.8	30.5	24.6	48.8	33.9	57.3	38.1	31.7	33.9	43.7
et	52.0	24.6	37.3	35.2	37.8	28.2	40.4	–	37.7	33.4	30.9	37.0	35.0	36.9	20.5	41.3	32.0	37.8	28.0	30.6	32.9	37.3
fi	49.3	23.2	36.0	32.0	37.9	27.2	39.7	34.9	–	29.5	27.2	36.6	30.5	32.5	19.4	40.6	28.8	37.5	26.5	27.3	28.2	37.6
fr	64.0	34.5	45.1	39.5	47.4	42.8	60.9	26.7	30.0	–	25.5	56.1	28.3	31.9	25.3	51.6	35.7	61.0	43.8	33.1	35.6	45.8
hu	48.0	24.7	34.3	30.0	33.0	25.5	34.1	29.6	29.4	30.7	–	33.5	29.6	31.9	18.1	36.1	29.8	34.2	25.7	25.6	28.2	30.5
it	61.0	32.1	44.3	38.9	45.8	40.6	26.9	25.0	29.7	52.7	24.2	–	29.4	32.6	24.6	50.5	35.2	56.5	39.3	32.5	34.7	44.3
lt	51.8	27.6	33.9	37.0	36.8	26.5	21.1	34.2	32.0	34.4	28.5	36.8	–	40.1	22.2	38.1	31.6	31.6	29.3	31.8	35.3	35.3
lv	54.0	29.1	35.0	37.8	38.5	29.7	8.0	34.2	32.4	35.6	29.3	38.9	38.4	–	23.3	41.5	34.4	39.6	31.0	33.3	37.1	38.0
mt	72.1	32.2	37.2	37.9	38.9	33.7	48.7	26.9	25.8	42.4	22.4	43.7	30.2	33.2	–	44.0	37.1	45.9	38.9	35.8	40.0	41.6
nl	56.9	29.3	46.9	37.0	45.4	35.3	49.7	27.5	29.8	43.4	25.3	44.5	28.6	31.7	22.0	–	32.0	47.7	33.0	30.1	34.6	43.6
pl	60.8	31.5	40.2	44.2	42.1	34.2	46.2	29.2	29.0	40.0	24.5	43.2	33.2	35.6	27.9	44.8	–	44.1	38.2	38.2	39.8	42.1
pt	60.7	31.4	42.9	38.4	42.8	40.2	60.7	26.4	29.2	53.2	23.8	52.8	28.0	31.5	24.8	49.3	34.5	–	39.4	32.1	34.4	43.9
ro	60.8	33.1	38.5	37.8	40.3	35.6	50.4	24.6	26.2	46.5	25.0	44.8	28.4	29.9	28.7	43.0	35.8	48.5	–	31.5	35.1	39.4
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sl	61.0	33.1	37.9	43.5	42.6	34.0	47.0	31.1	28.8	38.2	25.7	42.3	34.6	37.3	30.0	45.9	38.2	44.1	35.8	38.9	–	42.7
sv	58.5	26.9	41.0	35.6	46.6	33.3	46.6	27.4	30.9	38.9	22.7	42.0	28.2	31.0	23.7	45.6	32.2	44.2	32.7	31.3	33.5	–

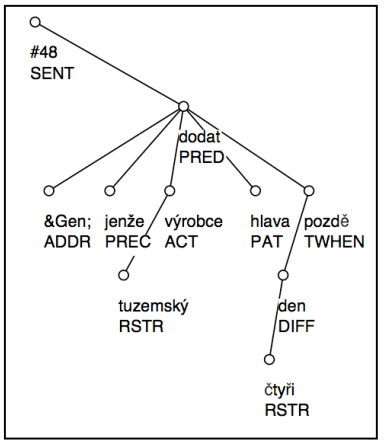
using the Acquis corpus)

[from Koehn et al., 2009]

EuroMatrix 2006-2009

Approaches

- Statistical Phrase-Based SMT (+ factors)
- Hybrid: RBMT and SMT
- Linguistically-Rich SMT (Prague Dependency-Bank)



EuroMatrix 2006-2009

Achievements

- Moses PB-SMT
- Open source tools
- Training data
- Evaluation campaigns WMT
- MT Marathons
- …

EuroMatrix 2006-2009

	Target Language																					
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el	59.5	32.4	43.1	37.7	44.5	–	54.0	26.5	29.0	48.3	23.7	49.6	29.0	32.6	23.8	48.9	34.2	52.5	37.2	33.1	36.3	43.3
es	60.0	31.1	42.7	37.5	44.4	39.4	–	25.4	28.5	51.3	24.0	51.7	26.8	30.5	24.6	48.8	33.9	57.3	38.1	31.7	33.9	43.7
et	52.0	24.6	37.3	35.2	37.8	28.2	40.4	–	37.7	33.4	30.9	37.0	35.0	36.9	20.5	41.3	32.0	37.8	28.0	30.6	32.9	37.3
fi	49.3	23.2	36.0	32.0	37.9	27.2	39.7	34.9	–	29.5	27.2	36.6	30.5	32.5	19.4	40.6	28.8	37.5	26.5	27.3	28.2	37.6
fr	64.0	34.5	45.1	39.5	47.4	42.8	60.9	26.7	30.0	–	25.5	56.1	28.3	31.9	25.3	51.6	35.7	61.0	43.8	33.1	35.6	45.8
hu	48.0	24.7	34.3	30.0	33.0	25.5	34.1	29.6	29.4	30.7	–	33.5	29.6	31.9	18.1	36.1	29.8	34.2	25.7	25.6	28.2	30.5
it	61.0	32.1	44.3	38.9	45.8	40.6	26.9	25.0	29.7	52.7	24.2	–	29.4	32.6	24.6	50.5	35.2	56.5	39.3	32.5	34.7	44.3
lt	51.8	27.6	33.9	37.0	36.8	26.5	21.1	34.2	32.0	34.4	28.5	36.8	–	40.1	22.2	38.1	31.6	31.6	29.3	31.8	35.3	35.3
lv	54.0	29.1	35.0	37.8	38.5	29.7	8.0	34.2	32.4	35.6	29.3	38.9	38.4	–	23.3	41.5	34.4	39.6	31.0	33.3	37.1	38.0
mt	72.1	32.2	37.2	37.9	38.9	33.7	48.7	26.9	25.8	42.4	22.4	43.7	30.2	33.2	–	44.0	37.1	45.9	38.9	35.8	40.0	41.6
nl	56.9	29.3	46.9	37.0	45.4	35.3	49.7	27.5	29.8	43.4	25.3	44.5	28.6	31.7	22.0	–	32.0	47.7	33.0	30.1	34.6	43.6
pl	60.8	31.5	40.2	44.2	42.1	34.2	46.2	29.2	29.0	40.0	24.5	43.2	33.2	35.6	27.9	44.8	–	44.1	38.2	38.2	39.8	42.1
pt	60.7	31.4	42.9	38.4	42.8	40.2	60.7	26.4	29.2	53.2	23.8	52.8	28.0	31.5	24.8	49.3	34.5	–	39.4	32.1	34.4	43.9
ro	60.8	33.1	38.5	37.8	40.3	35.6	50.4	24.6	26.2	46.5	25.0	44.8	28.4	29.9	28.7	43.0	35.8	48.5	–	31.5	35.1	39.4
sk	60.8	32.6	39.4	48.1	41.0	33.3	46.2	29.8	28.4	39.4	27.4	41.8	33.8	36.7	28.5	44.4	39.0	43.3	35.3	–	42.6	41.8
sl	61.0	33.1	37.9	43.5	42.6	34.0	47.0	31.1	28.8	38.2	25.7	42.3	34.6	37.3	30.0	45.9	38.2	44.1	35.8	38.9	–	42.7
sv	58.5	26.9	41.0	35.6	46.6	33.3	46.6	27.4	30.9	38.9	22.7	42.0	28.2	31.0	23.7	45.6	32.2	44.2	32.7	31.3	33.5	–

using the Acquis corpus)

[from Koehn et al., 2009]

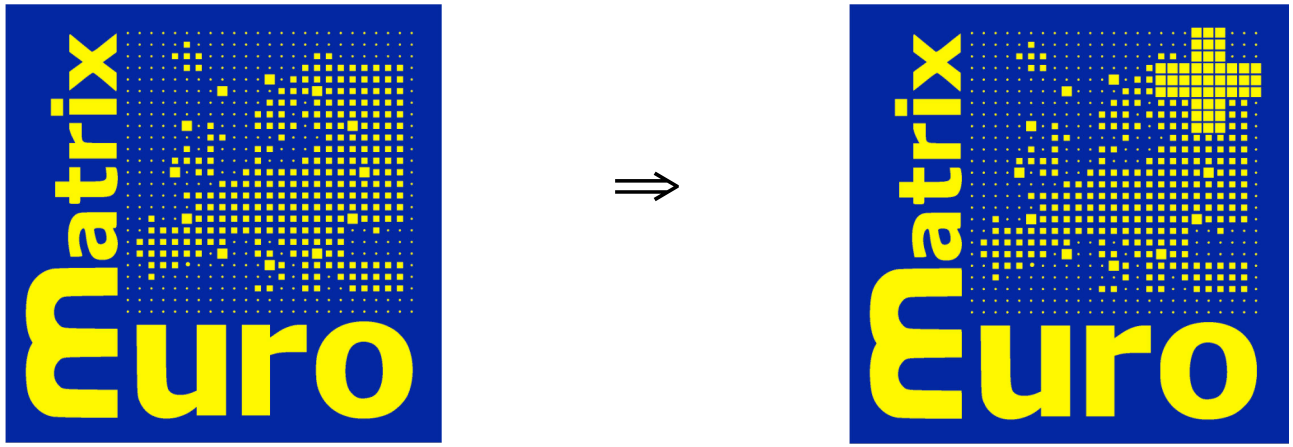
EuroMatrix 2006-2009

Lessons Learned:

- SMT struggles with
  - large divergence between languages (syntactic, word-order)
  - Rich morphology (target side)
- SMT performs well on in-domain data
- RBMT often better on out-of domain data

EuroMatrixPlus 2009-2012

Lessons Learned:



EuroMatrixPlus 2009-2012

Objectives:

- Improving MT Quality
  - Hybrid statistical/rule-based
  - Tree-based (hierarchical, syntactic, tecto-grammatic)
  - Improved learning methods
- Open Research/Community
  - Open source tools
  - Evaluation campaign
  - MT Marathon

EuroMatrixPlus 2009-2012

Objectives:

- Bringing Translation to the User
  - Professionals:
    - Localisation/Translation Industry
    - Individual translators
  - The Public:
    - Wiki translation

EuroMatrix 2006-2009

Partners

University of Saarbrücken	Germany
University of Edinburgh	UK
Charles University Prague	Czech Republic
Johns Hopkins University	USA
Fondazione Bruno Kessler	Italy
Universitè du Maine, Le Mans	France
Dublin City University	Ireland
Lucy Software and Service	Germany
Central and Eastern European Translation	Czech Republic

EuroMatrixPlus 2009-2012

Evaluation WMT 2010:

- ACL 2010 Joint Fifth Workshop on Statistical Machine Translation and Metrics MATR
- Uppsala, Sweden, July 15th and 16th 2010
- Three tasks:
  - Translation: English, German, Spanish, French, Czech (into English and from English)
  - System Combination
  - MT Automatic Evaluation (BLEU …)

Evaluation Results:

- Sneak Preview
- Not BLEU-scores
- Human Evaluation
- > 75,000 pair-wise comparisons (⇒ ranking)
- ⇒ 153 MT systems

EuroMatrixPlus 2009-2012

From English

- EN-CS 17
  - EM+: 1, 7, 8
- EN-DE 18
  - EM+: 3, 4, 9, …
- EN-FR 19
  - EM+: 3, 7, …
- EN-ES 16
  - EM+: 5, 6, …

Into English

- ES-EN 14
  - EM+:2
- FR-EN 24
  - EM+: 3
- CS-EN 12
  - EM+: 6, 7, 9
- DE-EN 25
  - EM+: 6, 8, 9, …

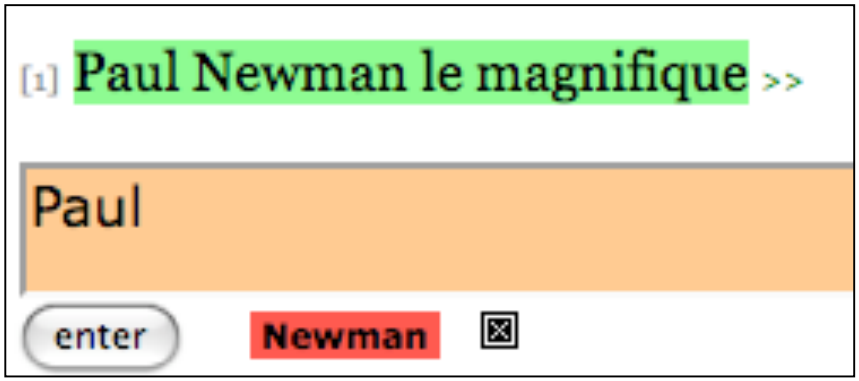
EuroMatrixPlus 2009-2012

MT in the Localisation/Translation Industry:

- Integration of MT into Localisation Workflows
- MT/TM
- MT confidence scores ≈ TM fuzzy match scores
- MT and mark-up
- Pricing MT
- Post-editing MT/TM output
- …

Post-editing MT/TM output (I):

- Interactive/predictive MT



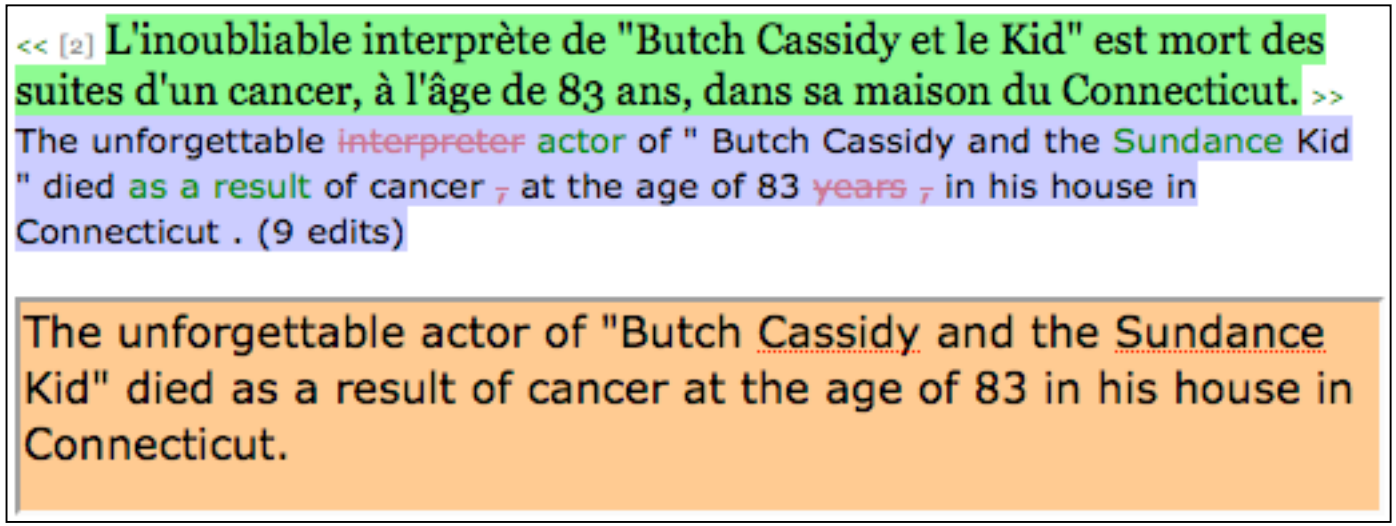
Post-editing MT/TM output (II):

- Ranking word/phrase translations

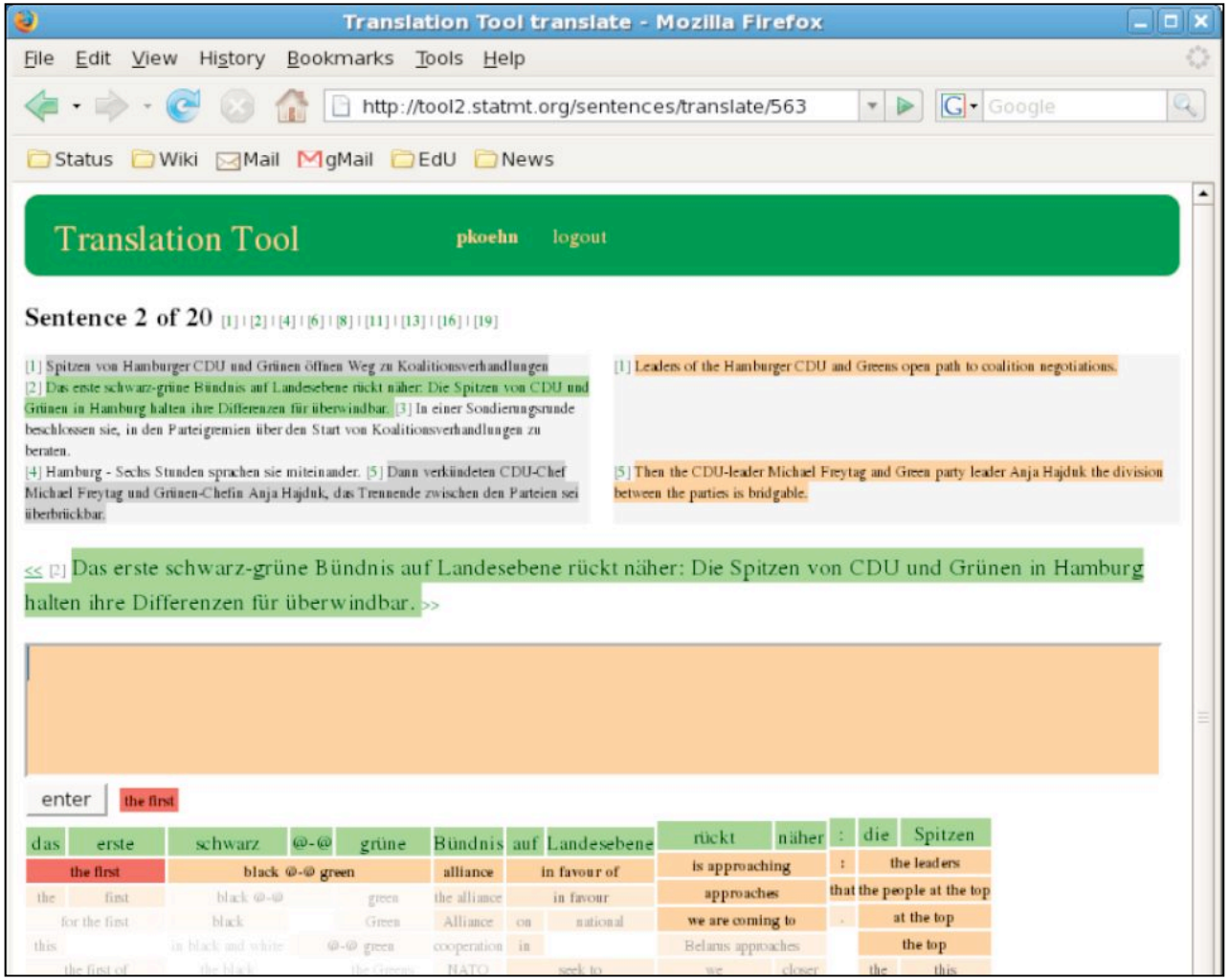
Paul	Newman	le	magnifique
Paul	**Newman**	**the**	**wonderful**
Mr	Newman ,	**the magnificent**	
Mr Paul	Newman here	the wonderful	
as Paul	Committee		beautiful
another	Newman , who speaks		magnificent
with Paul		the splendid	
, Paul		the excellent	
of Paul		the beautiful	
work of Paul			it
the words of Paul			great

Post-editing MT/TM output (III):

- Tracking MT post-edits



EuroMatrixPlus 2009-2012



EuroMatrix 2006-2009

Open Source

- Moses
  http://www.statmt.org/moses/
- Joshua
  http://joshua.sourceforge.net/Joshua/Welcome.html
- IRSTLM Language Modeling
  http://sourceforge.net/projects/irstlm/
- Europarl
  http://www.statmt.org/europarl/
- …

EuroMatrixPlus 2009-2012

EM: http://www.euromatrix.net/

EM+: http://www.euromatrixplus.net/

EM++: http://???

Questions?