Introduction

The ACL 2008 Workshop on Statistical Machine Translation (WMT-08) took place on Thursday, June 19 in Columbus, Ohio, United States, immediately following the annual meeting of the Association for Computational Linguistics, which was hosted by the Ohio State University.

This is the third time this workshop has been held. It has its root in the ACL 2005 Workshop on Building and Using Parallel Texts In the following years the Workshop on Statistical Machine Translation was held at HLT-NAACL 2006 in New York City, US, and at ACL 2007 in Prague, Czech Republic.

The focus of our workshop was to use parallel corpora for machine translation. Recent experimentation has shown that the performance of SMT systems varies greatly with the source language. In this workshop we encouraged researchers to investigate ways to improve the performance of SMT systems for diverse languages, including morphologically more complex languages and languages with partial free word order.

Prior to the workshop, in addition to soliciting relevant papers for review and possible presentation we conducted a shared task that brought together machine translation systems for an evaluation on previously unseen data. This year’s task resembled the shared tasks of previous years in many ways, but also included Hungarian-English and Spanish-German as new language pairs. In addition, we evaluated submitted systems against new test sets from the newswire domain.

The results of the shared task were announced at the workshop, and these proceedings also include an overview paper for the shared task that summarizes the results, as well as provides information about the data used and any procedures that were followed in conducting or scoring the task. In addition, there are short papers from each participating team that describe their underlying system in some detail.

Due to the large number of high quality submission for the full paper track, shared task submissions were presented as posters. The poster session was held in the afternoon and gave participants of the shared task the opportunity to present their approaches. The rest of the day was devoted to oral paper presentations and Daniel Marcu’s invited talk in the afternoon.

Like in previous years, we have received a far larger number of submission than we could accept for presentation. This year we have received 18 full paper submissions and 26 shared task submissions. In total WMT-08 featured 12 full paper oral presentations and 25 shared task poster presentations. The invited talk was given by Daniel Marcu of the Information Sciences Institute at the University of Southern California.

We would like to thank the members of the Program Committee for their timely reviews. We also would like to thank the participants of the shared task and all the other volunteers who helped with the manual evaluations. We also acknowledge the financial support of the shared task by the EuroMatrix project funded by the European Commission (6th Framework Programme).

Chris Callison-Burch, Philipp Koehn, Christof Monz, Josh Schroeder, and Cameron Shaw Fordyce
Co-Organizers
Organizers:

Chris Callison-Burch (Johns Hopkins University)
Philipp Koehn (University of Edinburgh)
Christof Monz (University of London)
Josh Schroeder (University of Edinburgh)
Cameron Shaw Fordyce

Program Committee:

Lars Ahrenberg (Linköping University)
Yaser Al-Onaizan (IBM Research)
Oliver Bender (RWTH Aachen)
Chris Brockett (Microsoft Research)
Bill Byrne (Cambridge University)
Francisco Casacuberta (University of Valencia)
Colin Cherry (Microsoft Research)
Stephen Clark (Oxford University)
Trevor Cohn (Edinburgh University)
Mona Diab (Columbia University)
Hal Daume (University of Utah)
Chris Dyer (University of Maryland)
Andreas Eisele (University Saarbrücken)
Marcello Federico (ITC-IRST)
George Foster (Canada National Research Council)
Alex Fraser (University of Stuttgart)
Ulrich Germann (University of Toronto)
Nizar Habash (Columbia University)
Jan Hajic (Charles University)
Keith Hall (Google)
John Henderson (MITRE)
Rebecca Hwa (University of Pittsburgh)
Doug Jones (Lincoln Labs MIT)
Damianos Karakos (Johns Hopkins University)
Kevin Knight (ISI/University of Southern California)
Shankar Kumar (Google)
Philippe Langlais (University of Montreal)
Alon Lavie (Carnegie Melon University)
Adam Lopez (Edinburgh University)
Daniel Marcu (ISI/University of Southern California)
Lambert Mathias (Johns Hopkins University)
Arul Menezes (Microsoft Research)
Bob Moore (Microsoft Research)
Miles Osborne (University of Edinburgh)
Kay Peterson (NIST)
Mark Przybocki (NIST)
Chris Quirk (Microsoft Research)
Philip Resnik (University of Maryland)
Michel Simard (National Research Council Canada)
Libin Shen (BBN Technologies)
Wade Shen (Lincoln Labs MIT)
Eiichiro Sumita (NICT/ATR)
David Talbot (Edinburgh University)
Jörg Tiedemann (University of Groningen)
Christoph Tillmann (IBM Research)
Kristina Toutanova (Microsoft Research)
Nicola Ueffing (National Research Council Canada)
Clare Voss (Army Research Labs)
Taro Watanabe (NTT)
Dekai Wu (HKUST)
Richard Zens (Google)

Additional Reviewers:
Mahmoud Ghoneim
Jeffrey Micher

Invited Speaker:
Daniel Marcu (ISI/University of Southern California)
Table of Contents

An Empirical Study in Source Word Deletion for Phrase-Based Statistical Machine Translation
Chi-Ho Li, Hailei Zhang, Dongdong Zhang, Mu Li and Ming Zhou .......................... 1

Rich Source-Side Context for Statistical Machine Translation
Kevin Gimpel and Noah A. Smith ................................................................. 9

Discriminative Word Alignment via Alignment Matrix Modeling
Jan Niehues and Stephan Vogel ................................................................. 18

Regularization and Search for Minimum Error Rate Training
Daniel Cer, Dan Jurafsky and Christopher D. Manning ............................... 26

Learning Performance of a Machine Translation System: a Statistical and Computational Analysis
Marco Turchi, Tijl De Bie and Nello Cristianini .............................................. 35

Using Syntax to Improve Word Alignment Precision for Syntax-Based Machine Translation
Victoria Fossum, Kevin Knight and Steven Abney ........................................ 44

Using Shallow Syntax Information to Improve Word Alignment and Reordering for SMT
Josep M. Crego and Nizar Habash ............................................................ 53

Improved Tree-to-String Transducer for Machine Translation
Ding Liu and Daniel Gildea ............................................................................. 62

Further Meta-Evaluation of Machine Translation
Chris Callison-Burch, Cameron Fordyce, Philipp Koehn, Christof Monz and Josh Schroeder . 70

Limsi’s Statistical Translation Systems for WMT’08
Daniel Déchelotte, Gilles Adda, Alexandre Allauzen, Hélène Bonneau-Maynard, Olivier Galibert, Jean-Luc Gauvain, Philippe Langlais and François Yvon .................................................. 107

The MetaMorpho Translation System
Attila Novák, László Tihanyi and Gábor Prószéky ........................................... 111

Meteor, M-BLEU and M-TER: Evaluation Metrics for High-Correlation with Human Rankings of Machine Translation Output
Abhaya Agarwal and Alon Lavie ................................................................. 115

First Steps towards a General Purpose French/English Statistical Machine Translation System
Holger Schwenk, Jean-Baptiste Fouet and Jean Senellart ................................. 119

The University of Washington Machine Translation System for ACL WMT 2008
Amittai Axelrod, Mei Yang, Kevin Duh and Katrin Kirchhoff ......................... 123
The TALP-UPC Ngram-Based Statistical Machine Translation System for ACL-WMT 2008
Maxim Khalilov, Adolfo Hernández H., Marta R. Costa-jussà, Josep M. Crego, Carlos A. Henríquez Q., Patrik Lambert, José A. R. Fonollosa, José B. Mariño and Rafael E. Banchs .......................... 127

European Language Translation with Weighted Finite State Transducers: The CUED MT System for the 2008 ACL Workshop on SMT
Graeme Blackwood, Adrià de Gispert, Jamie Brunning and William Byrne ................................. 131

Effects of Morphological Analysis in Translation between German and English
Sara Stymne, Maria Holmqvist and Lars Ahrenberg ................................................................. 135

Towards better Machine Translation Quality for the German-English Language Pairs
Philipp Koehn, Abhishek Arun and Hieu Hoang ................................................................. 139

Phrase-Based and Deep Syntactic English-to-Czech Statistical Machine Translation
Ondřej Bojar and Jan Hajič ................................................................. 143

Improving English-Spanish Statistical Machine Translation: Experiments in Domain Adaptation, Sentence Paraphrasing, Tokenization, and Recasing
Preslav Nakov ................................................................. 147

Improving Word Alignment with Language Model Based Confidence Scores
Nguyen Bach, Qin Gao and Stephan Vogel ................................................................. 151

Kernel Regression Framework for Machine Translation: UCL System Description for WMT 2008 Shared Translation Task
Zhuoran Wang and John Shawe-Taylor ................................................................. 155

Using Syntactic Coupling Features for Discriminating Phrase-Based Translations (WMT-08 Shared Translation Task)
Vassilina Nikoulina and Marc Dymetman ................................................................. 159

Statistical Transfer Systems for French-English and German-English Machine Translation
Greg Hanneman, Edmund Huber, Abhaya Agarwal, Vamshi Ambati, Alok Parlikar, Erik Peterson and Alon Lavie ................................................................. 163

TectoMT: Highly Modular MT System with Tectogrammatics Used as Transfer Layer
Zdenek Zabokrtsky, Jan Ptacek and Petr Pajas ................................................................. 167

MaTrEx: The DCU MT System for WMT 2008
John Tinsley, Yanjun Ma, Sylwia Ozdowska and Andy Way ................................................................. 171

Can we Relearn an RBMT System?
Loïc Dugast, Jean Senellart and Philipp Koehn ................................................................. 175

Using Moses to Integrate Multiple Rule-Based Machine Translation Engines into a Hybrid System
Andreas Eisele, Christian Federmann, Hervé Saint-Amand, Michael Jellinghaus, Teresa Herrmann and Yu Chen ................................................................. 179
<table>
<thead>
<tr>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental Hypothesis Alignment for Building Confusion Networks with Application to Machine Translation System Combination</td>
<td>Antti-Veikko Rosti, Bing Zhang, Spyros Matsoukas and Richard Schwartz</td>
<td>183</td>
</tr>
<tr>
<td>The Role of Pseudo References in MT Evaluation</td>
<td>Joshua Albrecht and Rebecca Hwa</td>
<td>187</td>
</tr>
<tr>
<td>Ranking vs. Regression in Machine Translation Evaluation</td>
<td>Kevin Duh</td>
<td>191</td>
</tr>
<tr>
<td>A Smorgasbord of Features for Automatic MT Evaluation</td>
<td>Jesús Giménez and Lluís Márquez</td>
<td>195</td>
</tr>
<tr>
<td>Fast, Easy, and Cheap: Construction of Statistical Machine Translation Models with MapReduce</td>
<td>Chris Dyer, Aaron Cordova, Alex Mont and Jimmy Lin</td>
<td>199</td>
</tr>
<tr>
<td>Dynamic Model Interpolation for Statistical Machine Translation</td>
<td>Andrew Finch and Eiichiro Sumita</td>
<td>208</td>
</tr>
<tr>
<td>Improved Statistical Machine Translation by Multiple Chinese Word Segmentation</td>
<td>Ruiqiang Zhang, Keiji Yasuda and Eiichiro Sumita</td>
<td>216</td>
</tr>
<tr>
<td>Optimizing Chinese Word Segmentation for Machine Translation Performance</td>
<td>Pi-Chuan Chang, Michel Galley and Christopher D. Manning</td>
<td>224</td>
</tr>
</tbody>
</table>
Workshop Program

Thursday, June 19, 2008

8:40–8:50 Opening Remarks

Session 1: Full Papers

8:50–9:10 An Empirical Study in Source Word Deletion for Phrase-Based Statistical Machine Translation
Chi-Ho Li, Hailei Zhang, Dongdong Zhang, Mu Li and Ming Zhou

Kevin Gimpel and Noah A. Smith

9:30–9:50 Discriminative Word Alignment via Alignment Matrix Modeling
Jan Niehues and Stephan Vogel

9:50–10:10 Regularization and Search for Minimum Error Rate Training
Daniel Cer, Dan Jurafsky and Christopher D. Manning

10:10–10:30 Learning Performance of a Machine Translation System: a Statistical and Computational Analysis
Marco Turchi, Tijl De Bie and Nello Cristianini

10:30–11:00 Coffee Break

Session 2: Full Papers

11:00–11:20 Using Syntax to Improve Word Alignment Precision for Syntax-Based Machine Translation
Victoria Fossum, Kevin Knight and Steven Abney

11:20–11:40 Using Shallow Syntax Information to Improve Word Alignment and Reordering for SMT
Josep M. Crego and Nizar Habash

11:40–12:00 Improved Tree-to-String Transducer for Machine Translation
Ding Liu and Daniel Gildea

12:00-12:40 Invited Talk by Daniel Marcu
Thursday, June 19, 2008 (continued)

12:40-2:00  Lunch

Session 3: Shared Task

2:00-2:30  *Further Meta-Evaluation of Machine Translation*
Chris Callison-Burch, Cameron Fordyce, Philipp Koehn, Christof Monz and Josh Schroeder

2:30–2:40  *Limsi’s Statistical Translation Systems for WMT’08*
Daniel Déchelotte, Gilles Adda, Alexandre Allauzen, Hélène Bonneau-Maynard, Olivier Galibert, Jean-Luc Gauvain, Philippe Langlais and François Yvon

2:40–2:50  *The MetaMorpho Translation System*
Attila Novák, László Tihanyi and Gábor Prószéký

2:50–3:00  *Meteor, M-BLEU and M-TER: Evaluation Metrics for High-Correlation with Human Rankings of Machine Translation Output*
Abhaya Agarwal and Alon Lavie

3:00-3:30  Booster Session: Shared Task

Shared Translation Task

*First Steps towards a General Purpose French/English Statistical Machine Translation System*
Holger Schwenk, Jean-Baptiste Fouet and Jean Senellart

*The University of Washington Machine Translation System for ACL WMT 2008*
Amitai Axelrod, Mei Yang, Kevin Duh and Katrin Kirchhoff

*The TALP-UPC Ngram-Based Statistical Machine Translation System for ACL-WMT 2008*
Maxim Khalilov, Adolfo Hernández H., Marta R. Costa-jussà, Josep M. Crego, Carlos A. Henríquez Q., Patrik Lambert, José A. R. Fonollosa, Jose B. Mariño and Rafael E. Banchs

*European Language Translation with Weighted Finite State Transducers: The CUED MT System for the 2008 ACL Workshop on SMT*
Graeme Blackwood, Adrià de Gispert, Jamie Brunning and William Byrne

*Effects of Morphological Analysis in Translation between German and English*
Sara Stymne, Maria Holmqvist and Lars Ahrenberg

*Towards better Machine Translation Quality for the German-English Language Pairs*
Philipp Koehn, Abhishek Arun and Hieu Hoang
Phrase-Based and Deep Syntactic English-to-Czech Statistical Machine Translation
Ondřej Bojar and Jan Hajič

Improving English-Spanish Statistical Machine Translation: Experiments in Domain Adaptation, Sentence Paraphrasing, Tokenization, and Recasing
Preslav Nakov

Improving Word Alignment with Language Model Based Confidence Scores
Nguyen Bach, Qin Gao and Stephan Vogel

Kernel Regression Framework for Machine Translation: UCL System Description for WMT 2008 Shared Translation Task
Zhuoran Wang and John Shawe-Taylor

Using Syntactic Coupling Features for Discriminating Phrase-Based Translations (WMT-08 Shared Translation Task)
Vassilina Nikoulina and Marc Dymetman

Statistical Transfer Systems for French-English and German-English Machine Translation
Greg Hanneman, Edmund Huber, Abhaya Agarwal, Vamshi Ambati, Alok Parlikar, Erik Peterson and Alon Lavie

TectoMT: Highly Modular MT System with Tectogrammatics Used as Transfer Layer
Zdenek Zabokrtsky, Jan Ptacek and Petr Pajas

MaTrEx: The DCU MT System for WMT 2008
John Tinsley, Yanjun Ma, Sylwia Ozdowska and Andy Way

Can we Relearn an RBMT System?
Loïc Dugast, Jean Senellart and Philipp Koehn

Using Moses to Integrate Multiple Rule-Based Machine Translation Engines into a Hybrid System
Andreas Eisele, Christian Federmann, Hervé Saint-Amand, Michael Jellinghaus, Teresa Herrmann and Yu Chen

Incremental Hypothesis Alignment for Building Confusion Networks with Application to Machine Translation System Combination
Antti-Veikko Rosti, Bing Zhang, Spyros Matsoukas and Richard Schwartz
Thursday, June 19, 2008 (continued)

Shared Evaluation Task

*The Role of Pseudo References in MT Evaluation*
Joshua Albrecht and Rebecca Hwa

*Ranking vs. Regression in Machine Translation Evaluation*
Kevin Duh

*A Smorgasbord of Features for Automatic MT Evaluation*
Jesús Giménez and Lluís Márquez

3:30-4:40 Coffee Break and Poster Session

Session 4: Full Papers

4:40–5:00 *Fast, Easy, and Cheap: Construction of Statistical Machine Translation Models with MapReduce*
Chris Dyer, Aaron Cordova, Alex Mont and Jimmy Lin

5:00–5:20 *Dynamic Model Interpolation for Statistical Machine Translation*
Andrew Finch and Eiichiro Sumita

5:20–5:40 *Improved Statistical Machine Translation by Multiple Chinese Word Segmentation*
Ruiqiang Zhang, Keiji Yasuda and Eiichiro Sumita

5:40–6:00 *Optimizing Chinese Word Segmentation for Machine Translation Performance*
Pi-Chuan Chang, Michel Galley and Christopher D. Manning