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## References

- Akshar Bharati, Vineet Chaitanya, Amba P Kulkarni, and Rajeev Sangal. 1997. Anusaaraka: Machine translation in stages. *A Quarterly in Artificial Intelligence*, 10(3):22–25, July.
- Peter F. Brown, Stephen A. Della Pietra, Vincent J. Della Pietra, and Robert L. Mercer. 1993. The mathematics of statistical machine translation: Parameter estimation. *Computational Linguistics*, 19(2).
- Ralf D. Brown. 2000. Automated generalization of translation examples. In *Proceedings of the Eighteenth International Conference on Computational Linguistics (COLING-2000)*, pages 125–131, Saarbrücken, Germany.
- Shachi Dave, Jignashu Parikh, Bhattacharyya, and Pushpak Interlingua. 2002. Based english hindi machine translation and language divergence. *Journal of Machine Translation*, 17, September.
- Robert Frederking and Sergei Nirenburg. 1994. Three heads are better than one. In *Proceedings of the Fourth Conference on Applied Natural Language Processing, ANLP-94*, Stuttgart, Germany.
- Rashmi Gangadharaiah and N. Balakrishnan. 2006. Application of linguistic rules to generalized example based machine translation for indian languages. In *First National Symposium on Modeling and Shallow Parsing of Indian Languages, (MSPIL)*, India, Mumbai, April.
- N Gough. 2005. *Example-Based Machine Translation Using the Marker Hypothesis*. Ph.D. thesis, Dublin City University, Dublin, Ireland.
- D Groves and A Way. 2005. Hybrid example based smt: the best of both worlds? In *Proceedings of the ACL 2005 Workshop on Building and Using Parallel Texts: Data-Driven Machine Translation and Beyond*, pages pp. 183–190, Ann Arbor, MI.
- D. Groves and A. Way. 2006. Hybridity in mt: Experiments on the europarl corpus. In *Proceedings of the 11th Conference of the European Association for Machine Translation*, Oslo, Norway.
- Kenji Imamura, Hideo OKUMA, Taro Watanabe, and Eiichiro Sumita. 2004. Example-based machine translation based on syntactic transfer with statistical models. In *COLING 2004*, volume I, pages 99–105.
- Renu Jain, R.M.K. Sinha, and Ajai Jain. 2001. Anubharti: Using hybrid example based approach for machine translation. In *Symposium on Translation Support Systems, SYSTRANS*, Kanpur, India, February.
- Jae Dong Kim, Ralf D. Brown, Peter J. Jansen, and Jaime G. Carbonell. 2005. Symmetric probabilistic alignment for example-based translation. In *Proceedings of the Tenth Workshop of the European Association for Machine Translation (EAMT-05)*, pages 153–159, May.
- P Koehn. 2004. Pharaoh: A beam search decoder for phrase-based statistical machine translation models. In R. Frederking and K. Taylor, editors, *Machine Translation: From Real Users to Research; AMTA 2004, LNAI 3265*, pages 115–124, Berlin/Heidelberg, Germany. Springer Verlag.
- Makoto Nagao. 1984. A framework of a mechanical translation between japanese and english by analogy principle. *Artificial and Human Intelligence*, pages 173–180.
- Franz Josef Och and Hermann Ney. 2003. A systematic comparison of various statistical alignment models. *Computational Linguistics*, 29(1):19–51.
- K. Papineni, S. Roukos, T. Ward, and W. Zhu. 2002. Bleu: A method for automatic evaluation of machine translation. In *Proceedings of the 40th Annual Meeting of the Association for Computational Linguistics ACL '02*.
- Michael Paul, Eiichiro Sumita, and Seiichi Yamamoto. 2003. Example-based rescoring of statistical machine translation output. In *Machine Translation Summit IX*, pages 410–417, New Orleans, Louisiana.
- R.M.K. Sinha and A.Jain. 2003. Anglahindi: an english to hindi machine-aided translation system. In *MT Summit IX*, New Orleans, Louisiana, USA, September.
- S. Vogel and H. Ney. 2000. Construction of a hierarchical translation memory. In *Proceedings of the 18th International Conference on Computational Linguistics: COLING 2000*, pages 1131–1135, Saarbrücken, Germany.