



# Machine translation and its evaluation: a study

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## Abstract

Machine translation (namely MT) has been one of the most popular fields in computational linguistics and Artificial Intelligence (AI). As one of the most promising approaches, MT can potentially break the language barrier of people from all over the world. Despite a number of studies in MT, there are few studies in summarizing and comparing MT methods. To this end, in this paper, we principally focus on presenting the two mainstream MT schemes: statistical machine translation (SMT) and neural machine translation (NMT), including their basic rationales and developments. Meanwhile, the detailed translation models are also presented, such as the word-based model, syntax-based model, and phrase-based model in statistical machine translation. Similarly, approaches in NMT, such as the recurrent neural network-based, attention mechanism-based, and transformer-based models are presented. Last but not least, the evaluation approaches also play an important role in helping developers to improve their methods better in MT. The prevailing machine translation evaluation methodologies are also presented in this article.

**Keywords** Natural Language Processing · Computational linguistics · Statistical machine translation · Neural machine translation · Evaluation methods

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