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Example-Based Machine Translation using Associative Processors

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This paper proposes an Example-Based Approach (EBA) using Associative Processors (APs) for machine translation, especially speech-to-speech translation, that requires (1) high accuracy and (2) a quick response. EBAs translate by mimicking the best-match translation examples (hereafter, "examples"), which are derived from corpora. These approaches are known to perform structural disambiguation, target word selection, and whole translation accurately. Therefore, EBAs fulfill the first requirement. The second requirement is also fulfilled by an EBA using APs as follows. The central mechanism of EBAs, Example-Retrieval (ER), retrieves the examples most similar to the input expression from an example database. ER becomes the dominant component as the size of the example database increases. We have parallelized ER by using APs consisting of an Associative Memory and a Transputer. Experimental results show that ER can be drastically accelerated by our method. Moreover, a study of communication among APs and an extrapolation from the sustained performance of 10 APs demonstrate the scalability of our method against the size of the example database. Consequently, the EBA using APs meets the critical requirements of machine translation.

KeyWords: *machine translation, example-based approach, parallel processing, associative memory, speech-to-speech translation*

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