

# INVITED TALK

## An Amorphous Object Must Be Cut By A Blunt Tool

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I wrote a paper on analogy-based machine translation in 1981, which was named "example-based machine translation" some years later I started the research work on machine translation from 60's, and constructed a fairly large practical system in the first half of 80's, where I had a bitter experience to write a grammar rules of Japanese and English. For example, when a new rule was added to analyze a new expression, this addition brought about sometimes bad effects to sentential analyses so far successful. Therefore it became almost impossible to check the consistency of all the grammar rules when the number of rules exceeded five hundred, for instance.

From this experience I realized that it was almost impossible to construct a complete set of grammar rules of a language, and was interested in the human ability of second language learning. We are taught many typical expressions with their translations as pairs, and translate new expressions analogously to the translations of similar expressions.

There are several excellent points in example-based machine translation. For example, this method can produce high quality translation expressions which the compositionality principle (rule-based method) cannot produce. And the system can be improved step by step by increasing translation pairs; that is, the system has a learning capability.

Tradition of European studies, particularly of natural science and engineering, is that they are to be based on their own theoretical framework: natural language must be explained by a grammar. We, Japanese, doubt however whether we can construct a complete theoretical system to such a vague object as a language, and can write a necessary and sufficient set of grammar rules to a language.

We know that an unfixed/amorphous object cannot be cut by a sharp knife but can be cut by a blunt tool more easily. This suggests that a vague object must be handled by a vague method. This is the reason why example-based machine translation which is not so theoretical is more successful than rule-based machine translation. This can be seen as a typical Japanese style approach.