

Spoken dialogue translation technologies and speech translation

Hitoshi IIDA

ATR Interpreting Telecommunications Research Labs.
Hikari-dai, Seika-cho, Kyoto 619-02, JAPAN
e-mail: iida@itl.atr.co.jp

1. Introduction

Recent machine translation technology has achieved the level where several systems are in daily use. Conventional approaches to system enhancement are mostly aimed at handling written text such as technical documents, which mainly contain assertive sentences. However, dialogue utterances involve various kinds of intention expressions, and are often fragmentary, depending on the situation. To improve conventional systems so that they can translate these utterances, translation examples of both situation dependent expressions and idiomatic expressions for etiquette must be flexibly applied. Conventional technology is not completely satisfactory because conventional analytic methods cannot give a unique structure from which a target sentence can be easily generated in a systematic manner. The author addresses the problem of both dialogue translation technologies and speech translation.

2. Requirements for spoken dialogue translation

They often say that spoken language generally contains more ellipses and fragmental expressions than written language. But these expressions, such as ellipsis, inversion and topicalized phrasing, are not irregular but very natural by themselves in a spoken dialogue. They can not be seen until they are compared with a standard or school grammar. On the other hand, not all speakers use proper expressions, such as case role particles (or syntactic positions), appropriate polite expressions, topicalized phrases, and metonymical phrases. In addition to these phenomena, a case role particle cannot identify a case role with a head noun followed by the particle because case roles are continuously distributed between one case role and the other.

In summarizing the requirements for spoken dialogue translation, the following items must be handled:

- 1) a gradient of case role changing
- 2) topicalizing phrases
- 3) metonymical phrases
- 4) idiomatic expressions for etiquette
- 5) inconsistent expressions in one utterance

3. Example-based approach

The above requirements might be resolved using a huge knowledge of dialogue situations, domains and contexts, together with powerful inference with a tremendous calculation cost. But such knowledge-based approaches cannot easily handle continuous phenomena such as expression meanings which cannot be divided into discrete meaning components. On the contrary, a large number of translation example-pairs for each morphological language usage has been proving that a translation example that most closely matches the input expression to be translated can be found, and that the example can be used either as is or with some modification. This process is realized by a nearest-matching method through a process of finding the closest-matching translation example by measuring the intuitive semantic conceptual distance of the linguistic expression. At the same time, information on the occurrence frequencies of the examples is added into the calculations.

4. Speech translation

A speech translation system requires a high performance capability to handle fragmental and irregular expressions and to recover mis-recognized phrases. Such capability can be realized using a corpus-based approach supported by linguistic-based analysis rather than an analytic approach.