



Extended Abstract

Basic Law of Information: Fundamental Theory of Generalized Bilingual Processing

Xiaohui ZOU¹, Shunpeng ZOU^{2,*}

¹ China University of Geosciences (Beijing) and UC Berkeley Searle Research Center

² China University of Geosciences (Beijing) / 29 Xueyuan Road, Beijing, 100083 P.R.China

E-Mails: 949309225@qq.com ; geneculture@icloud.com

* Tel.: +0086-82-322-302; Fax: +0086-82-321-665

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Introduction

This article aims to popularly introduce basic law of information - -fundamental theory of generalized bilingual processing.

Bilingual can be divided into three categories: narrow bilingual, such as Chinese and English; alternative bilingual, such as terms and sayings; generalized bilingual, such as mathematical language (arithmetic figures for example) and natural language (Chinese characters for example). They all belong to the generalized text in board sense. 1-2

Basic Law of information contains: A, existence of the real basic information as an axiom; B, law of human-computer interaction; and C, law of interpersonal communication.

The core problem is how to resolve ambiguity in translation and machine translation, which is the focus of this article. 3-5

Methods

Two types of formal strategy on generalized bilingual information processing:

Firstly, inheriting software engineering strategy as nature language understanding, knowledge representation, and pattern recognition; 6-8

Secondly, creating systematic engineering strategy as generalized bilingualism, knowledge ontology and bilingual programming.

The following highlights three operable basic steps and their three supporting models as well as theoretical basis, involving two types of instances penetrating macro and micro.

Step 1 and Model 1:

The butterfly model refined by the author is developed on the basis of the research results of Weaver and Vauquois 9-10:

The predecessors envisaged an intermediate language in statistical machine translation and rules-based machine translation, but actually it does not exist. It is more appropriate to assume that one pair of a series of bilingual pairs as "an intermediate language" and thus the key is the construction of bilingual pairs.

Step 2 and Model 2:

The knowledge and common sense ontology model refined by the author:

Through the combination of seven characters and a tetrahedron, it depicts a blueprint for top-level design of the entire human knowledge--the most basic conceptual framework and the most concise method system. In this way, it sets up a bridge of qualitative analysis between interdisciplinary, cross-field and cross-industry knowledge subdivision system.

Step 3 and Model 3:

The three types of bilingual information processing system (synergy model) constructed by the author:

It goes beyond Saussure's image of language system as Chess and Wittgenstein's figure of speech as language game and thus can be called super Chess (super cloud) and large-span language game (specific cloud).11-12

In this case, the rules of chess are the real basic information that control: the chess manual, chess idea as well as the chessboard and chess pieces equals to the language, the meaning and the physical images respectively, corresponding to "language, knowledge, software" known as the phenomenon of three types of information. The author's model taking chess as an analogy achieved the same result by different methods with Wittgenstein's language, thought, world; Husserl and Heidegger's inter-subjectivity, subjectivity, the former subjectivity; Popper's three worlds; and traditional philosophical methodology, epistemology, ontology.13-15

Results and Discussion

The combination of standardization and individuality, pluralism as well as diversity achieves the best human- computer interaction results.

Information Basic Law A: sequence-position relationship, the only conservation;

Information Basic Law B: Equivalent (According to same sequence-position), Parallel; Corresponding, Conversion.

Information Basic Law C: Synonymous (Agreed with each other), Parallel; Corresponding, Conversion.

Model 1 (to explain first and then translate) and model 2 (understand terms and familiar with sayings) follow the information basic law C, contributing to upgrading language ability and deep-processing knowledge issues.

Mode 3 (super cloud, specific cloud) follows information basic law B and information basic law A, contributing to machine translation quality issues.

The advantage of generalized bilingual information processing method lies in achieving reasonable division, complementary advantages, high collaboration and optimized interaction between three types of bilingualism.

Figure 1. Model 1 (to explain first and then translate) the key is the construction of bilingual pairs



Figure 2. model 2 knowledge and common sense ontology: the most basic conceptual framework

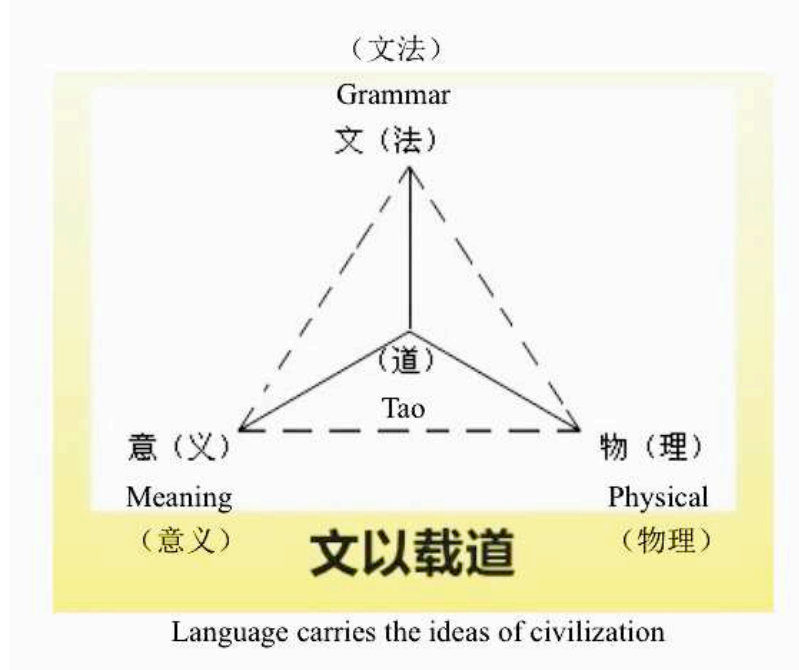


Figure 3. model 2 (understand terms and familiar with sayings)

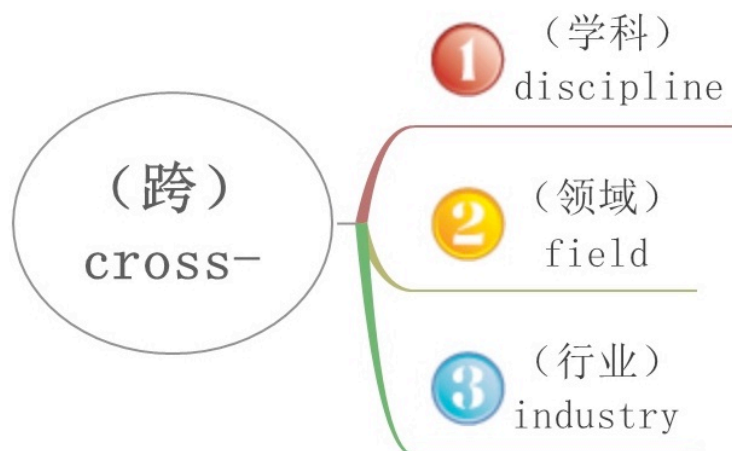
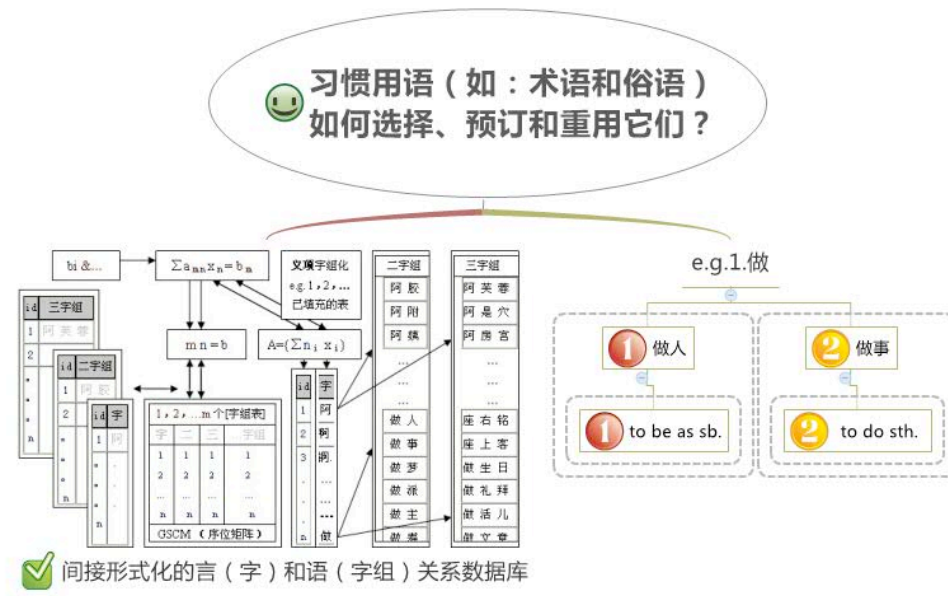


Table 1. Mode 3 (super cloud, specific cloud) follows information basic law A and B



Conclusions

Its significance is that Turing's "computability" theme and Searle's "Chinese room" theme can be considered as two special cases of Xiaohui's "bilingual chessboard" theme, thus highlighting the information basic law and its practical value.16-19

Its significance can be further described as follows:

Theoretically broaden the mind:

It is compatible with the convergence of formal information theory and the openness of semantic information theory 20-21.

The former is characterized by formal and computable; the latter is characterized by diversity and complexity.

Practically play a role:

Generalized bilingual information processing method can exceed and lead the two factions' points of views, namely strong AI and weak AI, solving natural language understanding problem and high-quality precision machine translation problem.

Three basic laws of information serve as the basis for collaborative translation of three types of bilingual; the realization of generalized bilingual information processing proves the existence of three types of bilingual collaborative translation mechanism since they are of mutual causal relationship.

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