

英語学習者の 作文支援システムについて

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第4回関西入カメソッドワークショップ (KIM 2012)

2012/12/29@京都大学5号館

ニューヨークでのインターンシップの成果です

楽天技術研究所

Rakuten Institute of Technology

2012 8 /1 - 10/31

(萩原 正人さん・関根 聡さんにお
世話になりました)



I canceled ~~ordering~~.

order

語彙選択の誤り

~~The delivery becomes four days later.~~

It will be delivered four days later.

母語の影響を受けた表現の誤り

事後的な修正

→ 難しい



リアルタイムな支援

→ 誤りを事前に防ぐ



関連研究

change| the world

- 1 change 变化, 更改, 改变, 变更 ▶
- 2 changes (使)改变;更改;使变化 ▶
- 3 changed 变, 换车 ▶
- 4 change for
- 5 change over
- 6 changeable
- 7 alter
- 8 alteration
- 9 cash

[搜索相关翻译](#)

释义

同义词

verb

– 改变; 变化

Rick hasn't changed. He looks exactly the same as he did at school. 里克一点儿没变, 他和上学时一模一样。

changing attitudes towards education 不断变化的对教育的看法

Her life changed completely when she won the lottery. 买彩票中奖后她的生活完全变了。

– 使不同



Previous Work Related to Input Assistant

For Japanese

Translation Word Processor [Muraki+94...]

Eibun Meibun Making [Doi 97@COLING]

For Chinese

PENS [Liu+00@ACL]

FLOW [Chen+12@ACLDemo]

TransAhead [Huang 12@EACL]

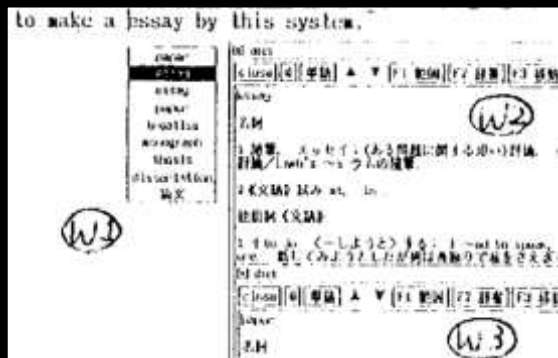
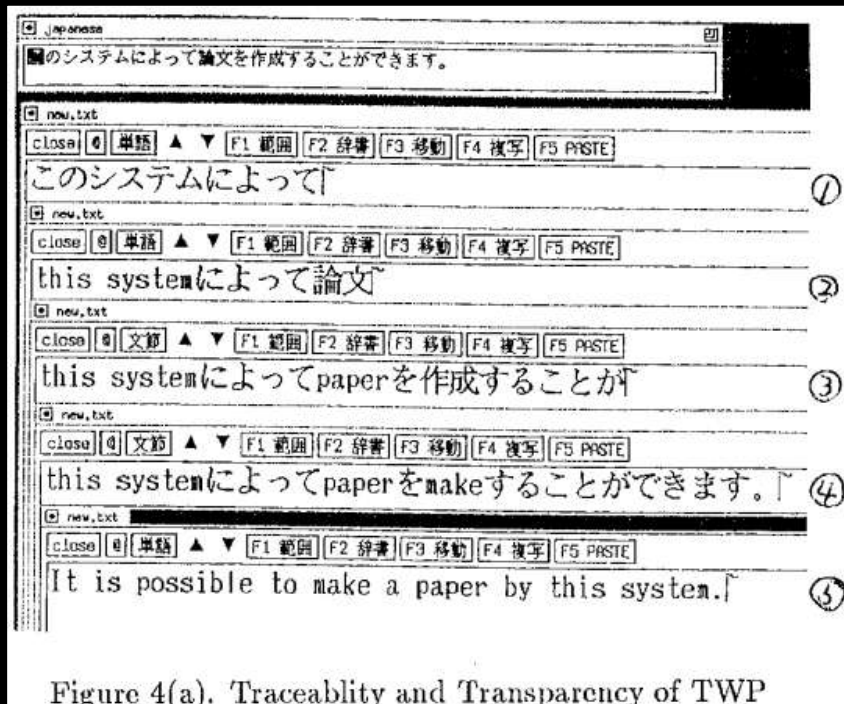
For writing controlled English

AceWiki [Kuhn+ 08@ALTA]

Translation Word Processor (NEC Corp)

[Muraki+ 94@COLING], [Yamabana+ 97@ANLP, 97@IJCAI]

an incremental interactive machine-aided translation method



- Screen1 私は論文を
 Word watashi/wa /ronbun/wo
 comment I /SM /paper /OM
 ↓ ;Conversion the scope of "ronbun"
- Screen2 私は essay を ;translation {essay, paper, ... }
 Word watashi/wa /ronbun/wo
 comment I /SM /paper /OM
 ↓ ;interactive pull-down menu selection
 of an alternative "paper"
- Screen3 私は paper を書く。
 Word watashi/wa /ronbun/wo /kaku
 comment I /SM /paper /OM /write
 ↓ ;conversion of the scope of
 「私は paper を書く」
- Screen4 I write a paper.
 ;English word order has been produced
 by simple sentence(clause) conversion

SM: subject-marker

OM: object-marker

Figure 2. Stepwise Japanese-English conversion

英文名文メイキング(NEC Corp)

[Doi 97@COLING]

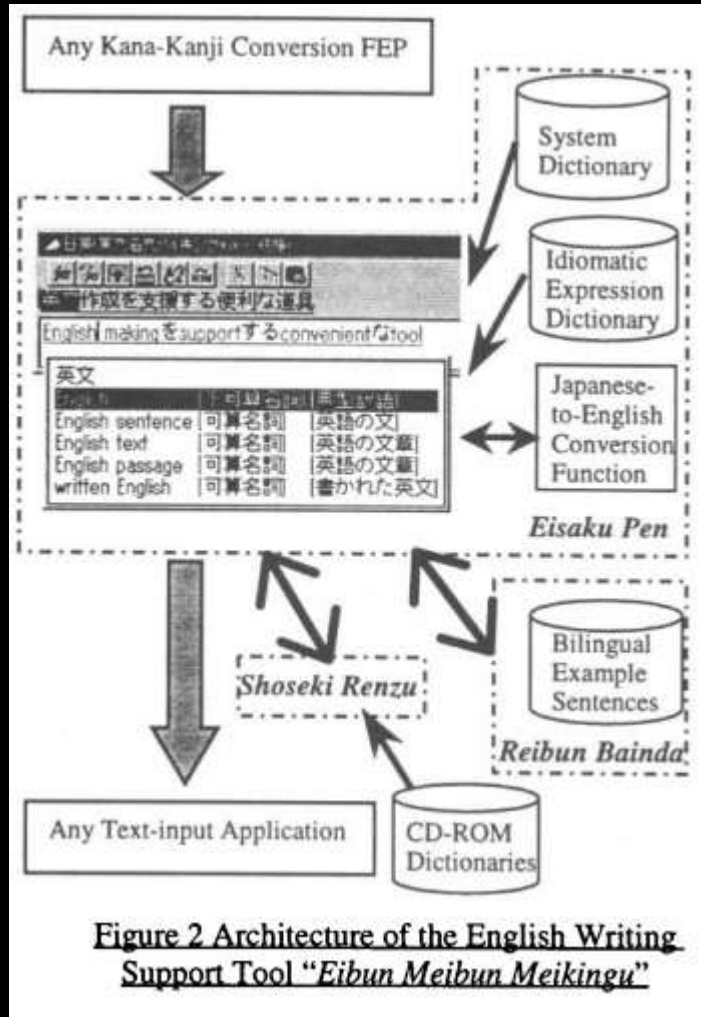


Figure 2 Architecture of the English Writing Support Tool "Eibun Meibun Meikingu"

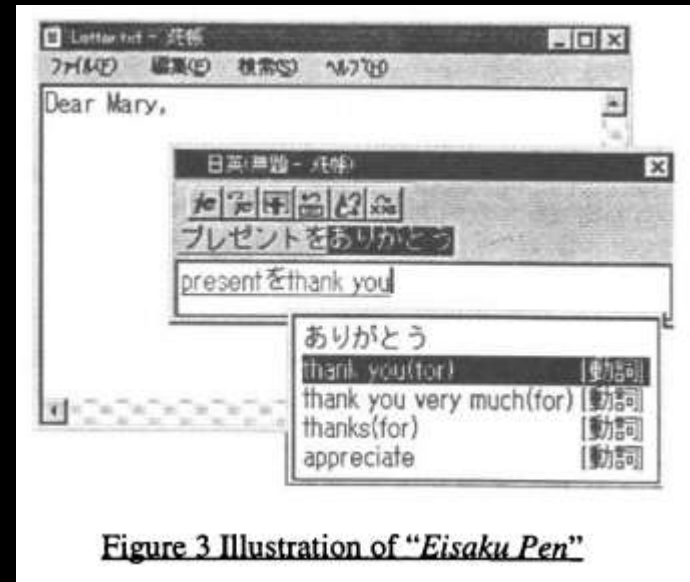


Figure 3 Illustration of "Eisaku Pen"

PENS [Liu+00@ACL]

A machine-aided English writing system for Chinese users

Recommendation with Query Expansion and Ranking Algorithm

Using Word Translation Algorithm based on Statistical LM and word-translation mode I

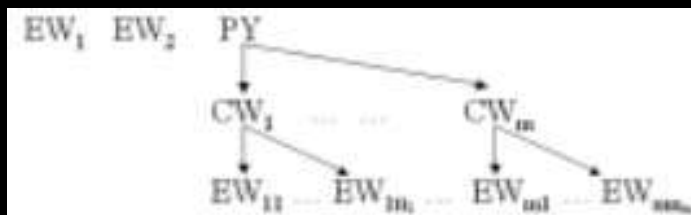
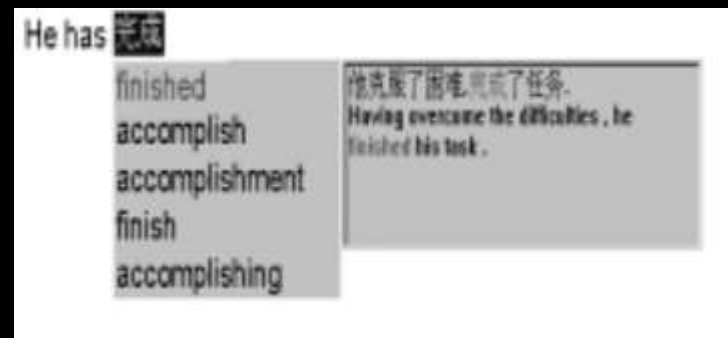


Figure 2-1: Word-level Pinyin-English Translation



FLOW [Chen+12@ACLDemo]

L1-Oriented Writing Assistant System

Different from PENS, FLOW further suggests paraphrases to help writers revise their writing tasks



TransAhead [Huang 12@EACL]

Suggest candidates referring to the sentence written in L1

Input your source text and start to interact with TransAhead!

Source text: 我們在結束這個交易上扮演重要角色

(a) we |

Pop-up predictions/suggestions:
we MD VB[*play, act, ..*] , ...
we VBP[*play, act, ..*] DT , ...
we VBD[*play, act, ..*] DT , ...

(b) we play an important role |

Pop-up predictions/suggestions:
play role IN[*in*] VBG[*close, end, ..*] , ...
important role IN[*in*] VBG[*close, end, ..*] , ...
role IN[*in*] VBG[*close, end, ..*] , ...

(c) **Patterns** for “we”:
we MD VB , ...
we VBP DT , ...
we VBD DT , ...

(d) **Patterns** for “we play an important role”:
play role IN[*in*] DT , ...
play role IN[*in*] VBG , ...
important role IN[*in*] VBG , ...
role IN[*in*] VBG , ...

(e) **Translations** for the source text:
“我們”: we, ...; “結束”: close, end, ...; ...; “扮演”: play, ...; “重要”: critical, ...; ...; “扮”: act, ...; ...; “重”: heavy, ...; “要”: will, wish, ...; “角”: cents, ...; “色”: outstanding, ...

Figure 1. Example TransAhead responses to a source text under the translation (a) “we” and (b) “we play an important role”. Note that the grammar/text predictions of (a) and (b) are not placed directly under the current input focus for space limit. (c) and (d) depict predominant grammar constructs which follow and (e) summarizes the translations for the source’s character-based ngrams.

AceWiki [Kuhn+ 08@ALTA]

Writing Support for Controlled Natural Languages

Programs are available on the web

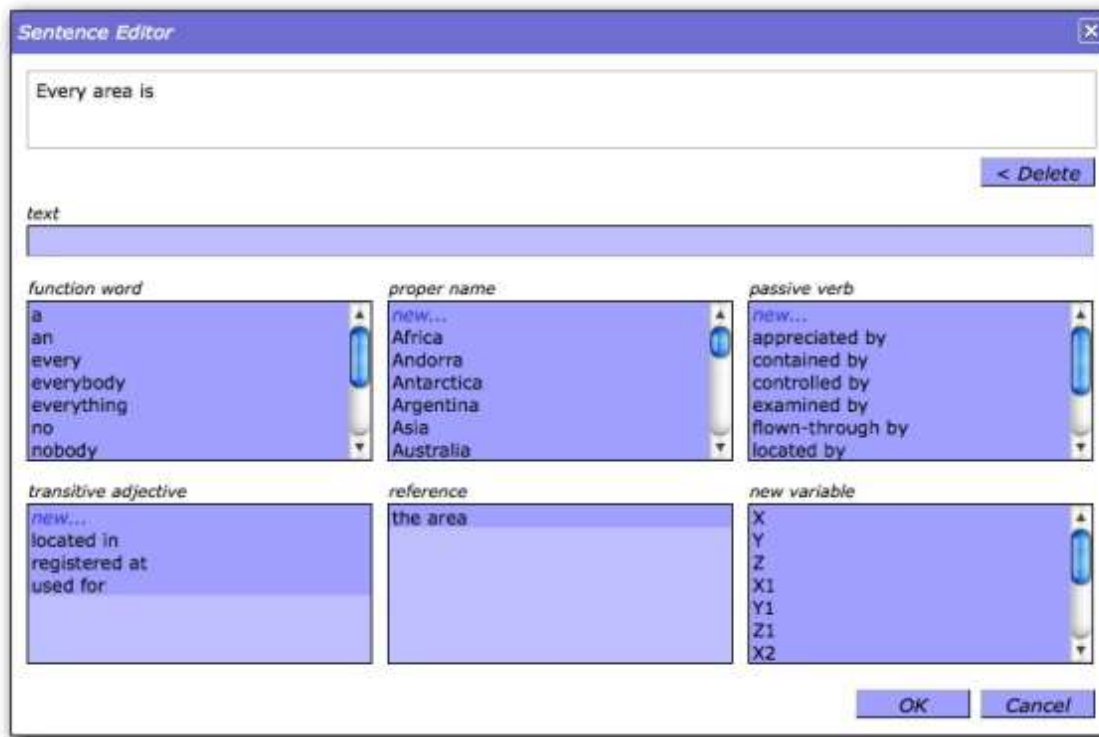


Figure 2: A screenshot of the predictive editor of AceWiki. The partial sentence *Every area is* has already been entered and now the editor shows all possibilities to continue the sentence. The possible words are arranged by their type in different menu boxes.



- Integrated Writing Environment for ESL learners-



ポイント

- 単語だけではなく, (自然な表現の)フレーズの提示
- フレーズにスロットがある場合, 候補の提示

デモビデオ



英辞郎
英日対訳辞書

330,000+
単語

1,400,000+
フレーズ

単語

フレーズ

• 送る

- get along
- get in(物を人や場所に)
- get off
- send along
- send off(メッセージを)
- send up(刑務所に)

【他動】

- commit(戦闘部隊を)
- deliver(商品や手紙を)
- dispatch(書類・荷物などを)
- forward(書類などを)
- give(人に称賛などを)
- lead(生活や人生を)
- remit(金を電信・為替などを)
- send(ある手段により目的を)
- transmit

【自他動】

wigwag《海事》(旗や明かり)

• (人)に目で合図を送る

- give someone the eye
- signal someone with one's eyes

• (人)に直接~を1部送る

send a copy of ~ direct to

• (人)に短い手紙を送る

send someone a short letter

• (人)に短い電子メールを送る

write someone a short e-mail

• (人)に祝辞を送る

send someone one's congratulations

• (人)に秘密の伝言を送る手の込んだ

elaborate way of conveying secret me-

翻訳付き

今後の課題



主な今後の課題

(1) 文脈の考慮

(2) ランキングの改善

(1)文脈の考慮

まずはPOSから... ..

I stopped *nimotsuwookuru*

名詞句を候補として出すべき

I have ...

過去分詞

I can ...

原形

(2) ランキングの改善

- 現状は頻度
 - 基本的な表現が頻出してしまおう
 - (eg) おいしい-> good
- 文脈も考慮していない
 - 同じprefixでも, 文脈によって来やすい表現が異なる

まとめ

英語の入力メソッドの紹介