

AZALEA: A KE-Free ICALL (intelligent computer assisted language learning) System for Japanese-English Translation

Naoyuki Tokuda, Liang Chen, Qing Zhong

R & D Center, Sunflare Co. Ltd.

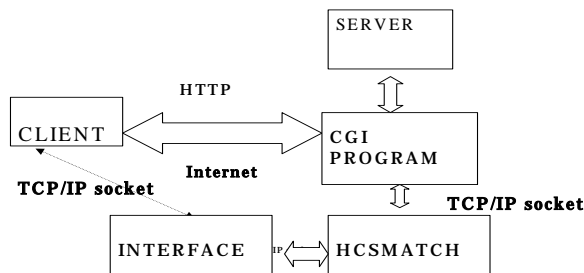
Shinjuku Hirose Bldg, Yotsuya 4-7, Shinjuku-ku, Tokyo 160-0004, JAPAN

{tokuda_n, chen_l, zhong_q}@sunflare.co.jp

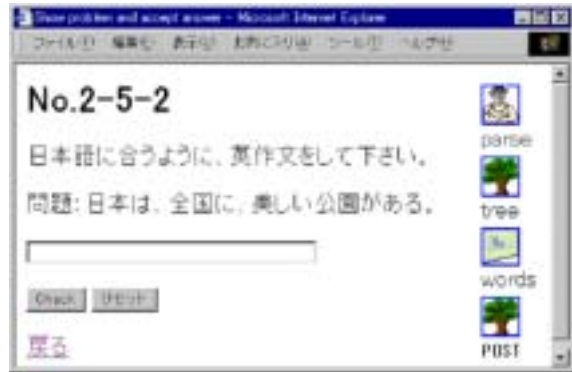
Abstract

An online intelligent tutoring system "Azalea" demonstrated here is the first attempt of its kind in simulating a human teacher firstly by diagnosing free-format-based students' English translations, and then returning error contingent feedback with suggested corrections. We have designed this KE (knowledge engineer)-free-ICALL by exploiting a FSA (finite state automaton)-based template-system as a knowledge base, the HCS (heaviest common sequence)-based global matching algorithm as a diagnostic engine, a POST(part-of-speech-tag) parser-based student model and the VTAT (visual template authoring tool) as an easy-to-use authoring tool, because the language teacher can build the knowledge system entirely by himself/herself without any help from KE's. The system has not only solved a so-called KE bottleneck problem in conventional expert-systems, but has opened a way of application to ICALL for other languages due to the language independence of automaton principle adopted.

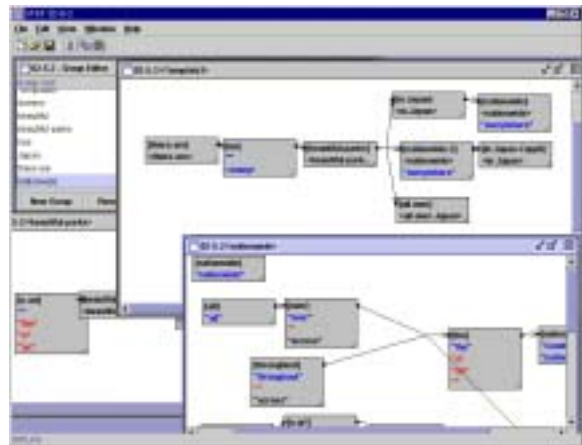
1 System Configuration



2 Main Interface



3 Visual Authoring Tools



4 Typical System Responses

1. Original sentence: We increased sales by taking advantage of our considerable experience. (in Japanese)

Keyed-in Sentence:

We have increased our amount of sales by making advantage of our wide experience.

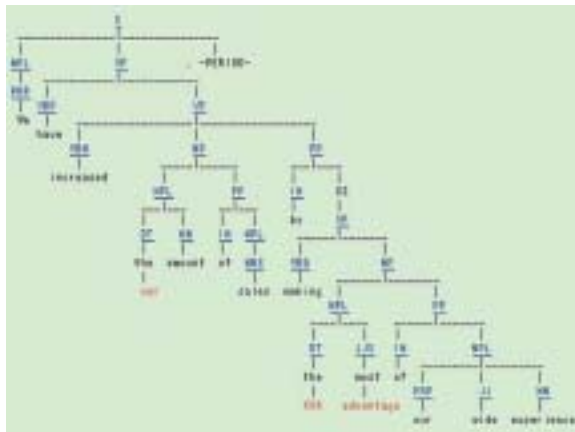
Check Result:

We have increased [our](1) amount of sales by [making advantage of](2) our wide experience.

(1) This part should be: "the "

(2) This part should be: "taking advantage of "

Parser Tree :



2. **Original sentence:** Japan has beautiful parks nationwide. (in Japanese)

Keyed-in Sentence:

In japan is dotted with lovely public gradens throughout the nation.

Check Result:

[In](3) [japan](1) is dotted with lovely public [gradens](2) throughout the nation.

- (1) Misuse of capital letters, should be "Japan"
- (2) Spelling error, should be "gardens"
- (3) This part is not necessary

Parser Tree :



3. **Original sentence:** The objective of automation is to reduce costs. (in Japanese)

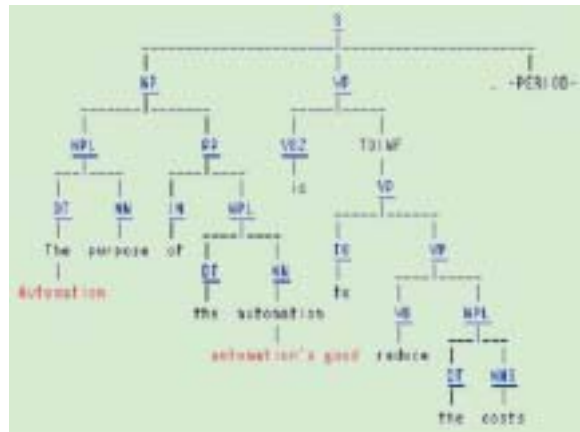
Keyed-in Sentence:

Automation purpose of the automation's good is to reduce the costs.

Check Result: [Automation](1) purpose of the [automation's good](2) is to reduce the costs.

- (1) This part should be: "The "
- (2) This part should be: "automation"

Parser Tree :



5 System Evaluation

Group 1: 200 professional translators or Trainees

No. Problem	Valid Responses	Correct Diagnosis	Wrong Diagnosis
02-2-3	161	159	2
02-3-3	163	163	0
02-4-3	159	154	5
Total	483	476	7
Percentage		98.6%	1.4%

Group 2: 100 freshmen at a Japanese university

No. Problem	Valid Responses	Correct Diaagnosis	Wrona Diaagnosis
02-2-3	88	87	1
02-3-3	96	95	1
02-4-3	80	75	5
Total	264	257	7
Percentage		97.3%	2.7%

References

Naoyuki Tokuda and Liang Chen. 2001. *An Online Tutoring System for Language Translation*. IEEE MultiMedia, 3(8): 46-55.

Liang Chen and Naoyuki Tokuda. 2002. .Bug Diagnosis By String Matching: Application to ILTS for Translation, To appear in J.CALICO, Volume 20, Issue No. 2, December Issue