

# Corpus-based Speech Monologue Parsing

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## Background

Applications of spoken monologue processing such as:

- Simultaneous machine interpretation [Ryu et al. 2004]
- Automatic real-time captions generation [Mikami et al. 1999]

Incremental language parsing is strongly required

## Motivation

There exist several researches about incremental parsing [Kato et al. 2005; Nivre 2004; Collins 2004].

What kind of language unit is defined as a parsing unit becomes a point.

## Purpose

Propose a technique for incremental dependency parsing of spoken Japanese monologue on a clause-by-clause basis

## Incremental dependency parsing based on clause boundaries

### Parsing unit of Japanese monologues

We adopt a *clause* (not a sentence) as a parsing unit. A *clause* basically contains one verb phrase.

- Since a clause is shorter than a sentence,

We can output the dependency structure of a clause faster.

- Since a clause is a syntactically sufficient and semantically meaningful language unit,

The following applications can utilize the output dependency structure.

### Relation between clause boundary and dependency structure



It is said that the problem is in the point that the surrender cannot be claimed even if the contract term passed as long as there is no right reason

- : Dependency relation of which dependent bunsetsu is not the last bunsetsu of a clause
- - : Dependency relation of which dependent bunsetsu is the last bunsetsu of a clause
- : Clause    □ : Bunsetsu    | : Clause boundary



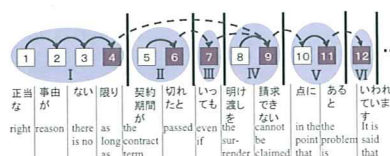
### Clause Boundary Analysis

by using CBAP [Maruyama et al. 2004]

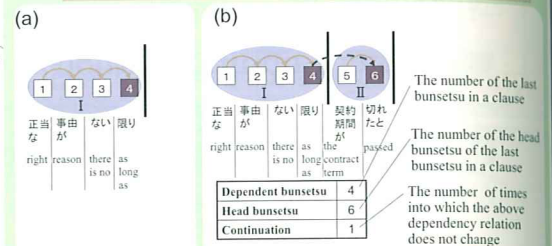
### Clause-Level Dependency Parsing



### Monologue-Level Dependency Parsing



## Example of Monologue-Level dependency Parsing

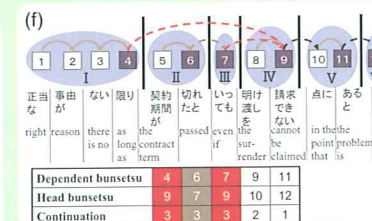
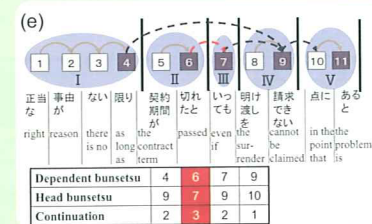
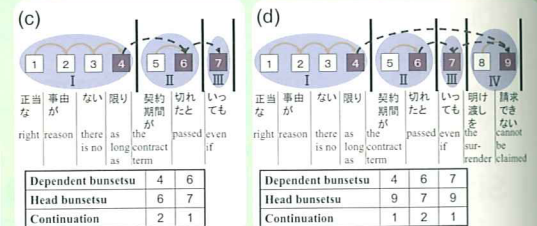


### Continuation:

Our method decides and outputs the dependency relation of which the *continuation* reaches to some value (= *fixed value*).

- We adopt the *continuation* as the likelihood of the dependency relation.

In this example, we assume that the *fixed value* is 3.



## Parsing Experiment

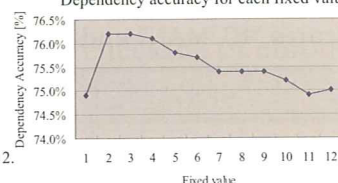
- We used the monologue corpus "Asu-Wo-Yomu"  
⇒ A collection of transcriptions of a TV commentary program of the Japan Broadcasting Corporation (NHK).

- We performed the parsing experiment 12 times, by changing the *fixed value* from 1 to 12.

### Size of the experimental data (Asu-Wo-Yomu)

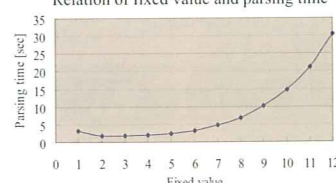
	Test data	Learning data
Program	7	95
Sentence	470	5,532
Clause	2,140	26,318
Bunsetsu	5,054	65,762
Morpheme	12,753	165,173

### Dependency accuracy for each fixed value



Accuracy of our past non-incremental sentence-by-sentence dependency parsing based on clause boundary [Ohno et al. 2004]: 79.0%.

### Relation of fixed value and parsing time



Parsing time of our past dependency parsing [Ohno et al. 2004]: 2.1 [sec/program]

We can confirm that our technique can parse *incrementally* with almost the same performance as our past sentence-by-sentence dependency parsing method.

## Conclusions

We have proposed a technique for incremental dependency parsing of Japanese spoken monologue on a clause-by-clause basis.

- Our technique can identify dependency relations incrementally for a monologue which is not divided into sentences.

### Future work:

Improve the accuracy by using prosody information such as pauses effectively.