

# KitAi-VAL: Textual Entailment Recognition System

## for NTCIR-11 RITE-VAL

Poster ID - RITE08

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### Task and basic idea

SV task: Methods based on an extended system of RITE2 for some linguistic phenomena

FV task: One search log method and Two summarization method using our RITE2 system

### KitAi on RITE2

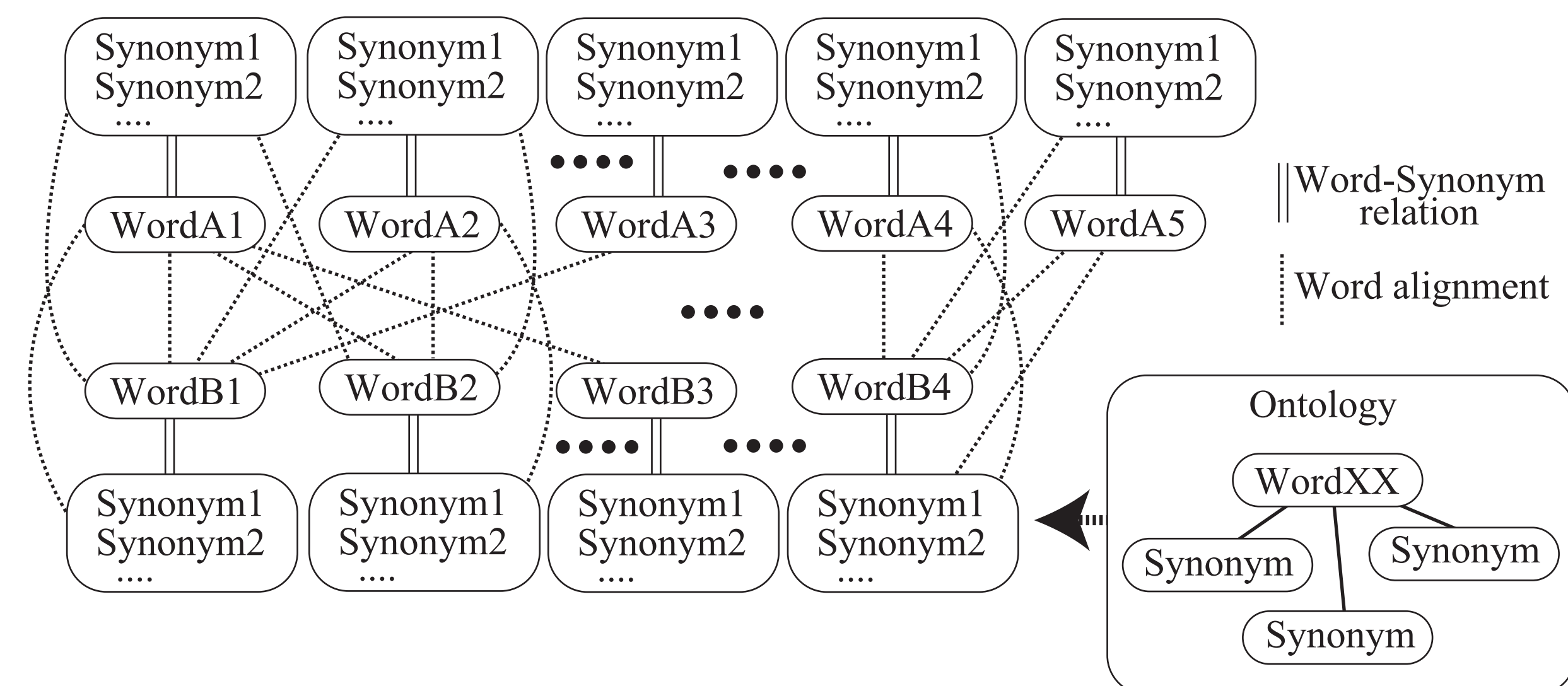
#### Correspondence features

- Word overlap and edit distance between t1 and t2
- Expansion with ontologies; Japanese WordNet and Nihongo-Goi-Taikei

Machine Learning: SVMs, C4.5, etc.

Voting method for the final answer

$$\text{Score} = \frac{\alpha \times \text{SVM} + \beta \times \text{Logistic} + \gamma \times \text{C4.5}}{3}$$



### SV task: Classifier for some linguistic phenomena

#### Add features

- 5 pattern-based features (binary)
  - \* e.g., The pattern "X1 to yobu" exists in a sentence t1 or t2 and the pattern "X1 toha ... koto wo iu" or "X1 toha ... de aru" exists in the other sentence. (X1と呼ぶ vs. X1とは...である)
- 5 linguistic phenomenon features (binary)
  - \* e.g., Case-ga of t1 (or t2) matches Case-wo t2 (or t1)

#### Add classifiers

- Focusing on 9 majority categories in the unit-test task
  - \* (1) case\_alternation, (2) scrambling, (3) synonymy phrase, (4) modifier, (5) entailment phrase, (6) coreference, (7) clause, (8) relative\_clause and (9) implicit\_relation.
- Classifiers are generate for each category, and they are combined with weights

Experimental result for RITE-2 data

| Method      | Accuracy |
|-------------|----------|
| KitAi-RITE2 | 35.67    |
| KitAi-VAL   | 38.01    |

The combined method outperformed the non-combined method.

### FV task: Search log and summarization methods

#### Two strategies

- **Search log method (MethodFV1)**
  - \* Only search log information; 47 features for SVM
    - # of documents in each search result, # of documents retrieved with n-queries, the size of query words from t2, tfidf value in the retrieved documents, and so on.
- Summarization methods: Classification with KitAi by using an estimated t1
  - \* **One sentence extraction (MethodFV2)**
    - A weighting method about each sentence and the previous and next sentences for personal name, location name, sahen(サ変)-noun, general noun, compound noun
    - The method extracts one sentence containing the highest value in the textbook
  - \* **Sentence combination (MethodFV3)**
    - Step 1. 1st phrase extraction with weights: a phrase with many query words in a short range
    - Step 2. 2nd phrase extraction: the most non-similar phrase in the search result against the phrase in Step 1
    - Step 3. Combine them

| Method    | Macro-F1 | Accuracy | CorrectAR |
|-----------|----------|----------|-----------|
| MethodFV1 | 50.95    | 58.37    | 30.27     |
| MethodFV2 | 56.37    | 57.59    | 19.02     |
| MethodFV3 | 54.65    | 57.00    | 28.23     |

MethodFV1: the best Accuracy and CorrectAR

MethodFV2: the best F1 and poor CorrectAR

MethodFV3: better on average.