# Mindex as a Source of Topic Map



#### outline

- ZHuman Information Processing
- ∠input,processing&discussion,output
- *≝*Concept Graph
  - ∠The meaning of documents is determined by the words in the documents. The meaning of words is determined by the documents that contain the words.
- ∠ Examples of Concept Graph Newspaper, Scientific Journals, Patents, Dictionary, Questionnaire
- ∠Mindex-Next Generation Search Engine









#### Concept Graph

- The meaning of documents is determined by the words in the documents. The meaning of words is determined by the documents that contain the words.

#### Characteristic Words

- A word has different meaning according to the context where the word is used. The semantical relationship of two words depends also on the context where they are used. We formalize the context simply as a set of documents and formalize hypernym/hyponym relation according to the document frequencies of words.
- Assume that U shows the set of whole documents. Given a query q, D(q) represent the set of documents that satisfy the query q. Given a word w, and a set of documents X, df(w;X) represents the number of documents in X that contains the word w. A word w is characteristic if df(w;D(q))=df(w;U) > 0.5. In other words, a word is characteristic to the search result D(q) when more than half documents that contains the word w belong to D(q). If we say more roughly, the word w is characteristic to the sate contain the word w satisfy the query q.

## Hypernym/Hyponym Relation

- We introduced a formulation of hypernym/hyponym relation of words according to the document frequencies. A word u is a hypernym of v with respect to D(q) when they satisfy the following two conditions. df(u; U) > df(v; U) df(u v;D(q))=df(v;D(q)) > 0.5
- Area (a, y, b(q)) = a((x, b(q)) > cost Area (a, b(q)) represents the number of documents in D(q) that contain both u and v. In other words, u is a hypernymof v, when u occurs more often in all documents than v and most documents that contain v contains u.

## Direct Upper Relation

∠Hypernym/hyponym relation determines an order structure among characteristic words and can be drawn as a directed acyclic graph. However, some words have too many hypernym and the graph may contain edges overlapped each other. To obtain more clear structure, we define "direct upper/lower" relation between words.

 ${\mathscr Z}$  Given a word v, the set UP(v) of upper words of v and the set DUP(v) of direct upper words of v are defined as follows.

A hypernym u of v is a direct upper hypernym when there are no other hypernym of v between u and v. Visualization of a concept graph can be obtained by placing words of high frequencies on the left sides and ones with lower frequencies on the right sides.



### English - Japanese Dictionary

document unit	description of a word
#documents	1,648,628
#words	986,410
#occurrences of words	8,644,997
total size(bytes)	112,624,437
average size of documents(byte)	68.3

































