

NTCIR-8 GeoTime at Osaka Kyoiku University - Hierarchical Index for Geographic Retrieval -

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ABSTRACT

We retrieved topics that contained the geographic and temporal information at NTCIR-8 GeoTime task. Employing morphological analysis, temporal and geographic information are extracted from GeoTime collection. The index that represents a geographic hierarchy is made from the geographic information. In the experiment, we confirmed that the effect of the geographic hierarchical index when topics included term of wide area region.

Categories and Subject Descriptors

H.3.3 [Information Systems]: Information Search and Retrieval – Information filtering, Query formulation, Search process.

General Terms

Experimentation, Performance, Measurement.

Keywords

Information Retrieval, Index, Geographic Hierarchy.

1. INTRODUCTION

We retrieved topics that contained the geographic and temporal information at NTCIR-8 GeoTime task. Employing morphological analysis, temporal and geographic information are extracted from GeoTime collection. The index that represents a geographic hierarchy is made from the geographic information.

As for retrieval, weight of terms is increased if they match the name of person. We expand the terms by using Weblio(the thesaurus dictionary site).

In the experiment, we confirmed that the effect of the geographic hierarchical index when topics included term of wide area district.

2. INDICES

Added to n -gram (long and varying length gram coded in fix bytes) based indices[1], which our group usually use for information retrieval, we made time and geographic indices using MeCab[2] morphological analysis system..

2.1 Temporal Index

We extract temporal information of the following form from morphological analysis.

(1)**年 (2)**年**月 (3)**年**月**日 (4)**月
(5)**月**日 (6)**日

However, the search noise occur when (1), (4), and (6) are used to represent the time width like "Ten years". Then, terms which are proceeded or followed by characters gave on Table 1 were excluded from the index.

Table 1. Filter of Temporal Information

Position	Character
Before (1),(4),(6)	約, 今後, 過去, 懲役, 震災
After (1),(4),(6)	間, 前, 後, 中, ほど, 程, 先, 以上, 以内, 未 満, 連続, ぶり, 代

2.2 Geographic Index

If MeCab analyses a sentence including geographic information "アメリカのニューヨークで...", its output becomes as shown in Figure 1. The region is analyzed as "国(country)" and "一般(general regions)". Using these analyses, a country index and a general region index were made.

```
%mecab
アメリカのニューヨークで・・・
アメリカ 名詞, 固有名詞, 地域, 国, *, *, アメリカ, アメリカ, アメリカ
の 助詞, 連体化, *, *, の, ノ, ノ
ニューヨーク 名詞, 固有名詞, 地域, 一般, *, *, ニューヨーク, ニューヨーク, ニューヨーク
で 助詞, 格助詞, 一般, *, *, で, デ, デ
```

Figure 1. Example of Morphological Analysis
of Geographic Information

2.3 Geographic Hierarchical Index

We also made an index which represents hierarchical structured of the geographic information. We used the Japanese geographic

increases weight by a factor of ten. The example of <TOPIC ID="GeoTime-0001"> is shown in Table 4.

3.3 Thesaurus Expansion

The terms have been enhanced by using the thesaurus of dictionary site Weblio[5]. Table 5 shows example of <TOPIC ID="GeoTime-0001">.

Table 4. Example of Term Weight Including Person's Name

Term	Weight
アストリッド・リンドバーグ	0.769230
都市	0.076923
児童書作家	0.076923
死亡	0.076923

Table 5. Example of Term Expansion

Term	Expanded Term
都市	とし 大都市 市街地 都会
死亡	しばう 亡 卒去 憤死 死 死去 死因 物故 病死 絶命 逝去

4. EXPERIMENTAL RESULTS

4.1 Indexing

We made each index of *n*-gram, temporal information, country name, regional name, and geographic hierarchy from the collection. Figure 5 shows our retrieval system. The indexing time is indicated in Table 6.

Table 6. Indexing Time

Index	Time(sec)
n-gram	114
Temporal and Geographic	809
Geographic Hierarchical	3,046

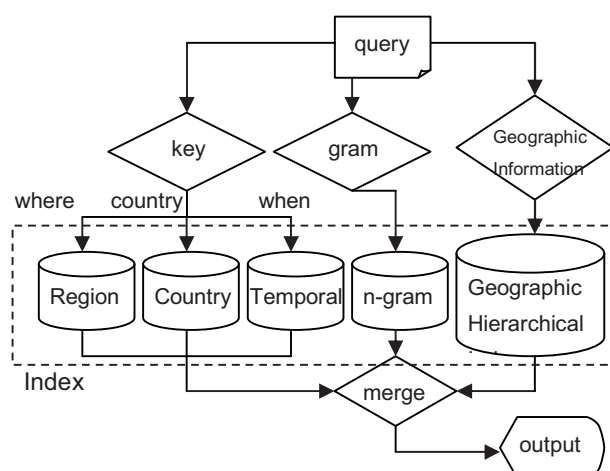


Figure 5. Retrieval System of OKSAT

4.2 Query Using Geographic Hierarchy

Because there was no query using a geographic hierarchy in GeoTime TOPICS, we prepared additional query "近畿地方の積雪について知りたい (I wanted to know the snowfall in the Kinki region)". Against a wide area of region Kinki, we confirmed that regions of lower hierarchy of Kinki were retrieved. For instance, <DOCNO>JA-020212127</DOCNO> includes name of prefectures in the Kinki province "Shiga Prefecture", "Hyogo Prefecture", and "Kyoto Prefecture" though this document doesn't contain the word of "Kinki" province. Effectiveness was confirmed by being retrieved it in 2nd place when using a geographic hierarchical index though it was 30th place when it was not used.

5. ANALYSIS OF RESULTS

We obtained good precision in the first half of topics whose relevant documents are few. However, precision is low even in comparatively easy topics when there are many relevant documents. Therefore, in addition to the retrieval of individual index such as *n*-gram, word, geographic, and temporal index, we should have merged their similarity more carefully. Although we increased the weight of proper nouns such as name of person or location in topics, we should have recognized them more precisely by using much more online dictionaries etc.

6. CONCLUSIONS

We retrieved topics that contained the geographic and temporal information at NTCIR-8 GeoTime task. Employing morphological analysis, temporal and geographic information are extracted from GeoTime collection. The index that represents a geographic hierarchy is made from the geographic information. In the experiment, we confirmed that the effect of the geographic hierarchical index when topics included term of wide area region.

7. REFERENCES

- [1] Sato, T., Fast full text retrieval using gram based tree structure, *Proc. ICCPOL '97*, Vol.2, pp.572-577 (1997).

[2] MeCab, <http://mecab.sourceforge.net/>

[3] JP, <http://www.post.japanpost.jp/>

[4] SPYSEE, <http://spysee.jp/>

[5] Weblio, <http://thesaurus.weblio.jp/>