Slide 1

Query generation mechanism for the information retrieval reflecting users' circumstance

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Slide 2

Background

+ flooding plain text information in WWW
  + Full text search : in heavy usage
    + to retrieve articles
    + to solve computer setting trouble
  + Many information are hard to input in plain text
    + Time (Current time, Time frame)
    + Position (Longitude, Latitude)
    + Occasion (Budget, Transportation)

Slide 3

Trends of the research

+ Service specific search engine
  + Web database (Semantic Web)
    + Setting up database for each purpose
    + Set metadata to all contents
      + User Profile
      + Contents' metadata
  + Information Filtering
    + Filtering the results of full-text search
    + No need to set contents' metadata

Slide 4

Considering about the trend

+ Web database
  + Parameter of a query $\propto$ Users' labor
+ Information filtering
  + A quality of matching is lower than Web db's
    + First step : Full text search

Consisting with   Quality of matching
and
Less users' labor

Slide 5

In the Ubiquitous World...

+ User requires behavioral supports

GPS, Clock, Schedule, Budget → profile

Scheduled time, Scheduled position → Whether (metadata)

Current time, Current position, Budget, Genre → Gourmet (metadata)

Scheduled time, Scheduled position, Budget → Transit (metadata)

Slide 6

Purpose of this research

+ Reflecting a user's circumstantial information
+ Supporting a user to input keywords which are hard to find in plain text

Search Engine

Time: 11:00
Position: N43.11, E135.22
Occasion: lunch

I recommend this query to send S.E.

A platform of information retrieval

✦ M3 search engine (Arai, 2004)

User
- Set the metadata
- Send query

User's metadata

M3 Search engine
- Match the query with contents' metadata
- Sort results of matching
- Send results of scoring

matching functions

contents' metadata

scoring functions

A focus

✦ Query generation mechanism
  ✦ Choosing suitable metadata for a user

Which metadata should I choose to search prefer restaurant??

?
?

User's metadata

Related Work

✦ Context-Aware system
  ✦ CONSORTS (Sashima at el., CARC, AIST)
    ✦ aim at only location information
  ✦ CoBrA (Chen at el., Maryland university)
    ✦ adapting to semantic web technology (SOAP, RDF)
    ✦ aim at devices (treating only sensor's context)

✦ A user sometime reutilizes his circumstantial information
✦ A new platform should be able to adopt to each web services

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Requirements

✦ A framework to share user's metadata for some portal search engine.
  ✦ converting metadata
    ✦ rule based
    ✦ (making a use of data mining techniques)

User's metadata

Query generation mechanism

User

Search engine

Search engine

A sequence of the proposal

1. A user receives query requirements of a search engine
2. A user send the requirements to query generation mechanism
3. A user confirm the query and send it to the search engine
4. A user gets the results from search engine

User's metadata

(2)

Query generation mechanism

User

(1), (4)

(3)

Search engine A

Search engine B

A syntax of user's metadata

✦ Written in RDF (Resource Description Format)
  ✦ Current time
    ✦ from a clock
  ✦ Scheduled time
    ✦ from iCalender
  ✦ Current location
    ✦ from a GPS sensor
  ✦ Credit card
    ✦ manual input
  ✦ Budget
    ✦ manual input
    ✦ (Edy card)
  ✦ etc…

```xml
<?xml version="1.0"?>
<rdf:RDF
 xmlns:rdf=http://www.w3.org/1999/02/22-rdf-syntax-ns#
 xmlns:ut=http://hoge.naist.jp/classes/>
<rdf:Description
  rdf:about=user@is.naist.jp>
  <ut:Time>
    <rdf:Description>
      <ut:now>15:25</ut:now>
    </rdf:Description>
  </ut:Time>
</rdf:Description>
</rdf:RDF>
```

```xml
...
<ut:Position>
  <rdf:Description>
    <ut:latitude>35.57</ut:latitude>
    <ut:longitude>135.57</ut:longitude>
  </rdf:Description>
</ut:Position>
...
```

Query generation mechanism

```
POST /QueryQGM HTTP/1.1
....
  <SOAP-ENV:Body>
    <m:QueryUserMetadata xmlns:m=...>
      <m:Time>Now</m:Time>
      <m:Position>Latitude</m:Position>
      <m:Position>Longitude</m:Position>
...
```

Search engine

SOAP Request
SOAP Reply

SOAP Request

User

Query generation mechanism

SOAP Reply

Choosing metadata according to SOAP request

```
HTTP/1.1 200 OK
....
  <SOAP-ENV:Body>
    <m:QueryUserMetadataResponse ...>
      <m:Now>15:25</m:Now>
      <m:Latitude>45.13</m:Latitude>
      <m:Longitude>135.68</m:Longitude>
...
```

User's metadata

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A sample of action

+ Gourmet search

There are…
•current time
•current longitude
•current latitude
•budget

A search engine requests
•current time
•current longitude
•current latitude
•budget
•genre

Search engine

SOAP Request
SOAP Reply

SOAP Request

User

Query generation mechanism

SOAP Reply

Choosing metadata according to SOAP request

Results
•current time
•current longitude
•current latitude
•budget

User's metadata

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Future Works

+ Evaluation
  + Count of Process
    + How about process improvement?
    + Desire to decrease the count of process
  + The rate of correct answer
    + How about the quality of matching?
    + Desire to increase the rate
  + Support for non-existing user's metadata

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Summary

+ To realize information retrieval reflecting user's circumstantial information...
  + Supporting a user to input keywords
  + Proposing a framework for recycle user's metadata
  + Designing a Query generation mechanism

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