Supporting Consumers in Providing Meaningful Multi-Criteria Judgments

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I'm looking for a black mobile phone either from Nokia or Sony Ericsson.
Semantic Web Service Retrieval
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Hybrid Solution

semantic matchmaking

predict judgment
Semantic Web Service Retrieval

![Diagram of semantic web service retrieval]

- :ServiceProfile
  - effect
  - Owned
    - product
  - Product
    - price
    - productType
  - Price
    - currency
    - Double
      - amount
      - Battery
      - MobilePhoneStyle
        - in {bar, slider}
      - MobilePhoneType
        - phoneType
        - color
      - Color
        - in {silver, black}
    - MobilePhone
      - 0.3 * (battery mul style mul color) +
        0.7 * (phoneType mul battery mul color)
      - Company
        - in [nokia[1.0], sonyEricsson[0.8]]
      - Model
Feedback Elicitation

```
:ServiceProfile
  effect
  Owned
    product
    Product

Price
  price
  productType

Currency
  currency
  ==usd

Double
  amount
  <=50

Battery
  battery

MobilePhoneStyle
  style
  in {bar, slider}

MobilePhoneType
  phoneType

Color
  color
  in {silver, black}

MobilePhone
  0.3 * (battery mul style mul color) +
  0.7 * (phoneType mul battery mul color)

Company
  in {nokia[1.0], sonyEricsson[0.8]}

Model
```
Recommending What To Judge

recommend

adjust & judge

recommend

Friederike Klan, PRSAT, Barcelona, Spain, September 30, 2010
Recommendation Algorithm

- request
- determine
- potential feedback structures
- rank
- recommended feedback structure
- past judgments
- $\alpha, \beta$
Recommendation Algorithm

\[ s(fs, r) = \alpha \cdot s_{\text{attributes}}(fs, r) + \beta \cdot s_{\text{number}}(fs, r) \]
Recommendation Algorithm

$$s(fs, r) = \alpha \cdot s_{\text{attributes}}(fs, r) + \beta \cdot s_{\text{number}}(fs, r)$$

$$s_{\text{attributes}}(f,s, r) = \frac{\sum_{i \in A_f} w_i(r)}{\sum_{j \in A_r} w_j(r)}$$

$$w_{\alpha}(r) = \sum_{r' \in R_\alpha} \text{sim}(r', r)$$
Recommendation Algorithm

\[ s(fs, r) = \alpha \cdot s_{\text{attributes}}(fs, r) + \beta \cdot s_{\text{number}}(fs, r) \]

\[ s_{\text{number}}(fs, r) = \overline{\text{sim}}(R_k, r) \]

\[ \overline{\text{sim}}(R_k, r) \]

\[ |A_{fs}| \]

\[ k \]

\[ \text{past judgments} \]

\[ \alpha, \beta \]
Recommendation Algorithm

request

determine & rank

recommended feedback structure

\[
\begin{align*}
\{[1,0.3], [2,0.4], [5,0.4],[6,0.4],[3,0.3], [7,0.3]\} \\
\{[1,0.3], [2,0.4], [5,0.4],[6,0.4],[3,0.3], [6,0.3], [7,0.3]\} \\
\{[1,0.2], [4,0.2], [5,0.2]\} \\
\{[1,0.05], [2,0.0]\} \\
\{[1,0.05], [2,0.0]\} \\
\{[1,0.05], [2,0.0]\}
\end{align*}
\]
Recommendation Algorithm

- request
- determine & rank
- recommended feedback structure

past judgments

α, β

adjust

s(fs, r) ≤ s(fs', r)

judged feedback structure
Preliminary Evaluation

- **48 service requests** covering typical requirements of consumers looking for computer items (desktop PCs, PDAs, ...)

- **Test series A**
  - homogeneous requests (from one category)

- **Test series B**
  - heterogeneous requests (from different categories)

- **Test runs**
  - **A/B1** – judged **certain number** of aspects
  - **A/B2** – judged **certain set** of attributes
  - **A/B3** – judged **certain number and set** of attributes
Preliminary Evaluation

A2

B2

B1

B3

Desktop PC (11)

PDA(1)

Desktop PC (2)

PDA(1)
Conclusion & Outlook

- proposed a hybrid SWS-CF-approach to SWS retrieval
- demonstrated
  - how detailed consumer feedback, that is meaningful and appropriate can be elicited
  - how users can be supported in that process
- future work
  - consider other aspects that might influence judgement preferences
  - extensive evaluation
Thank you for your attention!

Questions?
Comments?
Suggestions?

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