A-TOPSS: A Publish/Subscribe System Supporting Approximate Matching

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Different perceptions of cheap

Motivation

Location Based Service

Cheap 1-BR apartment close to downtown

Different degrees of match
Subscription & Publication Model

• **Subscription: (“apartment search”)**
  - $S_1$: (small size) and (cheap rent)
  - $S_2$: (nice inner-condition) or (nice atmosphere)}
  - $S_1$: (size, $\mu_{\text{small}}(x)) \land (\text{price}, \mu_{\text{cheap}}(y))$
  - $S_2$: (inner-condition, $\mu_{\text{nice}}(x)) \lor (\text{atmosphere}, \mu_{\text{nice}}(y))$
  - $S_1$:
    - $\min\{\mu_{\text{small}}(\text{size}), \mu_{\text{cheap}}(\text{rent})\}$ (alternative 1)
    - $\mu_{\text{small}}(\text{size}) \ast \mu_{\text{cheap}}(\text{rent})$ (alternative 2)
  - $S_2$:
    - $\max\{\mu_{\text{nice}}(\text{condition}), \mu_{\text{nice}}(\text{atmosphere})\}$ (alternative 1)
    - $\mu_{\text{nice}}(\text{condition}) + \mu_{\text{nice}}(\text{atmosphere})$ (alternative 2)

• **Publication: (“apartment info”)**
  - $e_i = \{(A_1,v_1), (A_2,v_2), \ldots, (A_m,v_m)\}$
  - $e = \{(\text{size, 80m}^2), (\text{rent, }$900)\}
Approximate Predicates

Attribute_value_table for the attribute size

p1: (size, $\mu_{Small}(x)$)

<table>
<thead>
<tr>
<th>idp 1</th>
<th>small</th>
<th>0, 0, 20, 40</th>
<th>$\rightarrow \mu_{small}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>idp 2</td>
<td>medium</td>
<td>30, 50, 50, 70</td>
<td>$\rightarrow \mu_{medium}$</td>
</tr>
<tr>
<td>idp 3</td>
<td>large</td>
<td>60, 90, 500, 500</td>
<td>$\rightarrow \mu_{large}$</td>
</tr>
</tbody>
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A-TopSS Demo Architecture
A-ToPSS Implementation

- User interacts with the Web server via HTTP.
- Web-publisher and Web-subscriber interact with the Web server.
- Workload generator provides matching processes.
- Subscription and publication buffers are used for data synchronization.
- Notification and matched subscriptions are handled by the system.
- Locks are used to manage access to shared data buffer.
A-ToPSS Web Server

Welcome to ToPSS

Existing ToPSS User
Enter your ID and Password to login
ToPSS ID: 
Password: 

Subscribe Now .......

log-in page

create a subscription type

Step 1: Choose a function
- Trapezoidal
- Analytical
- Probability

Step 2: Enter field names and number of fuzzy values
- Field names:
  - price: 3
  - quality: 4
- Number of fuzzy values:
  - type: 5

View my subscription
Add a subscription
Edit a subscription
delete a subscription
Create a subscription type
My publications
Main Menu
Logout