Context Modeling for Device- and Location-Aware Mobile Web Applications

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Structure

- Motivation / Introduction
- Context modeling components
  - Device Modeling
  - Location Modeling
  - Users Preference Modeling
- Integration into a context aware system architecture
- Conclusion and Future Work
Motivation / Introduction

- **Trends**
  - Personalization of information
  - Variety of mobile devices

- Developing personalized applications for the ubiquitous Web

- Providing personalized user interfaces addressing heterogeneous capabilities of device classes

- Existing approaches restricted to
  - one adaptation scenario (device independence, personalization, LBS)
  - only the modeling of context information, not on the usage

- Requirements: gathering, processing and sophisticated representing of context information, so that it can be used for adapting Web applications
Overview

Context Data
- User Properties
- Usage Data
- Device Properties
- Location

Context Modeling

Context Model
- IdentificationProf.
- PreferenceProfile
- DeviceProfile
- EnvironmentProf.

Adaptation

Adaptation Effect
- Personalization
- Device Independence
- Location Awareness
Device Modeling

Acquiring Device Capabilities

UserAgent

UAProf enabled device

client side code

Client/Server Communication

Device Modeling

Device Repository

device profile request

device profile response

Device Profile

updated device capabilities (UAProf)

Update Device Context

DELI framework

Context Model

Client/Server Communication
Location Modeling

Acquire Position or Mobile Identification

JSR 179
Mobile Identification (MSID ...)
Location Requester

Client/Server Communication

Location Modeling

mobile identification
Location Requester

Location Context Update

updated client location (MLP)

Context Model

Environment Profile

Location Server
(locating / authentication / authorization)

Location request (MLP)
location response (MLP)

Landmark Server
extended location response
Preference Rules

\[
\begin{align*}
&((\text{medium} \neq \text{picture}) \land (\text{medium} \neq \text{text}) \rightarrow \text{nolInterest}), \\
&((\text{category} \neq \text{action}) \rightarrow \text{nolInterest}), \\
&\text{(default} \rightarrow \text{interest})
\end{align*}
\]
Integration into a Web system

Pipeline-based Document Generation

Input Doc. contains all variants and adaptation options
Transform adaptation to context model properties
Transform adaptation according to user preferences
Rendering XHTML.full, XHTML.basic, XHTML.MP, WML

Context Modeling

Device Modeling
Location Modeling
User Modeling

Context Model

Device Profile
Location Profile
User Profile

Device Properties / UAPref
User Interactions

Component Repository
Conclusion / Future Work

- Different context modeling components for different adaptation scenarios
- Personalization, device independence, LBS
- Integration into a context aware system architecture

- Generic support for integrating arbitrary context modeling components
- Performance aspects of the overall system architecture
- Modular framework
  - for design and development of adaptive Web applications in different stages of an authoring process
Prototyp
Users Preference Modeling

- Acquire User Interactions
  - Client/Server Communication
- User Modeling
  - Evaluation Resolver
  - Is instance example for existing rules?
  - Rule Calculation
- Context Model
  - updated user preference rules
  - Device Profile

Client side code (e.g. JavaScript, JAVA, JScript)