Context awareness for MOBIlearn: Creating an engaging learning experience in an art museum

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Context awareness for MOBIlearn

• We have developed:
  – An interactional model of context
  – A software implementation of that model
  – Web service interface for the software
  – Integrated prototype using sensor inputs
Context Awareness

• Purpose:
  – Context enables appropriate action - in this case learning

• Process:
  Context = a dynamic and historical process…
  …constructed from context states…
  … which are constructed through interaction between actors, situations, objects and activities... etc
Context Model

Context
What’s going on over time

Context State
Elements from the Learning and Setting at one particular point in time, space, or goal sequence

Context Substate
Elements from the Learner and Setting that are relevant to the current focus of learning and desired level of context awareness
Mapping this on to metadata

Metadata

Content

= Learning Objects
+ Resources
+ Services

Learner + Setting

Context awareness

= Context Substate
Basic Operation

1. Context features *acquired* or *input*
2. Context substate *constructed* from context features
3. Unsuitable content *excluded*
4. Remaining content *ranked* using current context state
5. Rankings *output* to delivery subsystems
Software implementation

- Painting
  - La Primavera
- Location sensors
  - Painting #41
- Level of interest
- Time on value
- Location data
- Painting #41
- +1: Painting
- La Primavera, low detail
- Birth of Venus, low detail
- +1: Painting
- La Primavera, high detail
- Birth of Venus, high detail

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Software implementation

![Diagram showing software implementation with nodes for Location sensors, Painting, Level of interest, and location data. The diagram illustrates the relationship between the location data of paintings such as "La Primavera" and "Birth of Venus" and the level of interest for each, with low detail or high detail options.]
Software implementation

- Painting
  - La Primavera
- Level of interest
  - high >10 seconds
- Time on value
- Location sensors
  - Location data
    - Painting #41
- Painting
  - Birth of Venus, low detail
  - Birth of Venus, high detail
  +1: Painting
  +1: Interest
- La Primavera, low detail
- La Primavera, high detail

Software implementation

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Software implementation

Painting

Location sensors

Location data

User profile: Level of Interest

Value

Salience: 1

Time on value

Salience: 1

Level of interest

Value

Salience: 2

+1: Painting

+1: Painting

+1: Interests

+1: Interests

La Primavera, low detail

Birth of Venus, low detail

La Primavera, high detail

Birth of Venus, high detail
Software implementation

- **Painting**: La Primavera
  - Value: Level of interest
  - Time on value: >10 seconds
  - Salience: 1

- **Level of interest**
  - Value: high

- **User profile**: Level of interest
  - Value: >10 seconds
  - Salience: 2

- **User input**: content selection
  - Birth of Venus

- **Location sensors**

- **Location data**

- **La Primavera**: low detail
  - +1: Painting
  - +1: Interest
  - +2: User

- **Birth of Venus**: high detail
  - +1: Painting
  - +1: Interest
  - +2: User

- **La Primavera**: high detail
- **Birth of Venus**: low detail
- **Birth of Venus**: high detail

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Basic Functionality

Perform comparison between:

**Context metadata (learner + environment)**

and...

**Learning Object metadata**

Comparison allows us to make recommendations about what is most relevant for the current context.
Test set-up

• Trials to be run at Nottingham Castle Museum in September

• Testing underway in mock-up art gallery

• Technology:
  – Ultrasound positioning sensors
  – Wireless PDAs
  – Content & metadata server
  – Other MOBIlearn system services
    • Collaborative services
    • Multimedia streaming

• Soon to be installed:
  – RFID tags & readers for iPaqs
Issues from stakeholders

• Lack of intro & follow-up
  – Museum visitors are un-prepared, and do not get to follow-up their visits afterwards

• Lack of collaboration
  – Wandering around the exhibits is often a lonely business, with visitors separated by group membership, and time

• No way to determine & provide appropriate amount of content
  – Each visitor comes to the museum with a unique set of interests. Crucially, these may change during their visit

• No focused attention
  – Visitors often enter at one of the gallery and move straight to the exit at the other end, without stopping to pay proper attention to what’s in-between
The challenge

How can we create an engaging experience?

- Track visitor locations, offer them content that is relevant
  - Track location and how long they’ve been there
- Track what they do over time, and recommend things according to their ‘path’
  - This path can also be compared to others’ paths
- Offer and encourage collaboration, through communication services, collaborative activities
  - A memorable, social experience will be a lot more engaging
- Focus their attention – point out items of interest – stop them walking straight through the gallery
  - Each painting has a story, beyond what it depicts, eg some buildings may be more prominent because of who has paid for the painting (and the building)...
- Support exploratory learning and curiosity
  - Even random pointers are likely to be better than no pointers at all
Next steps

• Roll-out in Nottingham Castle Museum
• Trials to compare:
  – Different representations of context
  – Automated vs. Manual input of contextual data
  – Different methods of initiating and maintaining collaborative activities
  – Ways of guiding them to ask questions, not find answers

How do we pique their curiosity, and keep them interested?