# The GUIDE system

An example of a context-aware interactive system: Here we focus on the implications for HCI

## What do we mean by Context-aware?

- The term has been defined as: "systems [that] adapt according to the location of user, the collection of nearby people, hosts, and accessible devices, as well as to changes to such things over time" [Dey and Abowd, 2000].

Dey A.K. and G.D. Abowd (2000) The Context Toolkit: Aiding the Development of Context-Enabled Applications. Workshop on Software Engineering for Wearable and Pervasive Computing, Limerick, Ireland.

## Intro…

- Cheesy video…

## Obtaining GUIDE Requirements…

- Requirements Capture (Lancaster TIC)
  - Observing information needs of visitors
  - Semi-structured one-to-one interviews
- What other methods could have been used?

## GUIDE Requirements…

- Four main requirements
  - Flexibility
    - e.g. Guidebook vs. tour guide vs. just wander…
  - Support for dynamic information
    - e.g. Castle opening times
  - Context-aware information
    - e.g. adaptive tours (cf castle opening times)
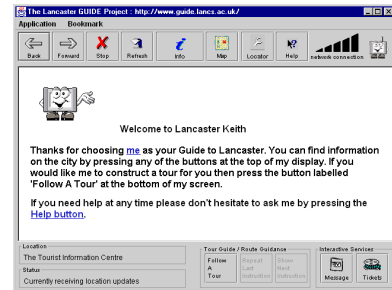  - Support for interactive services

## Initial Configuration…

## Issues ??

- What are some of the issues with associated with this stage??

## Welcome to GUIDE…



## First attempt at Context-aware behaviour…

Pressing the info button…
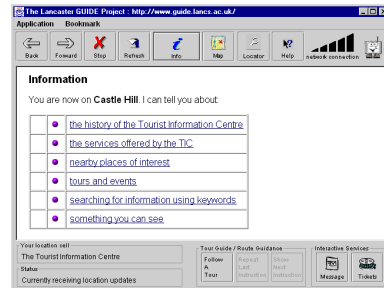
## General Information



## Issues??

## Issues??

- User may not want this information!!!

## Second attempt at Context-aware behaviour…

Give user more of a choice…

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## Interacting with GUIDE: The 'pull' based approach…



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## So what's the benefit?

- In this domain there is a considerable of information that the user would need to navigate trough…
- System automatically 'Indexes' (into the information database) based on the current location,
  - E.g. the fact that the user is located near to the Tourist Information Centre…
- Effectively tries to 'home in' on the more likely information requests to be made by the user

Cheverst, K. and G. Smith, Exploring The Notion Of Information Push And Pull With Respect To The User Intention And Disruption, *in Proc. of International workshop on Distributed and Disappearing User Interfaces in Ubiquitous Computing*, pp. 67-72. April 2001.

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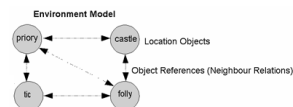## Interacting with GUIDE: The 'pull' based approach…



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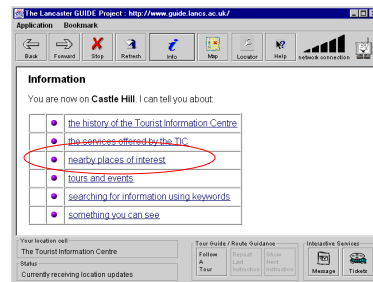
## Nearby places… Adaptive Hypermedia



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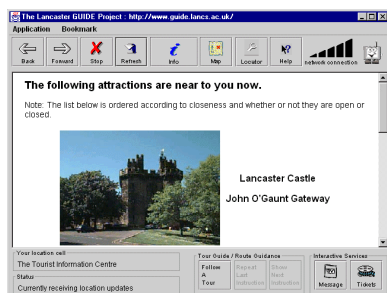
## So what's happening now…

- The system or 'agent' performs an 'intelligent' retrieval…
  - Interrogates the city information model
    - Includes geographic information/relationships and opening time of attractions
    - Context-used: Location + Time + User Model
      (More later)

## Problem – from HF perspective…

- System could over-constrain (filter) based on context, e.g. open/closed, previously visited etc.
  - "But I just would have still liked to have seen the priory building – open or closed doesn't matter"
  - System is trying to simplify for the user the task(s) that he/she needs to carry out in order to achieve (what the system thinks…) is the his/her current goal.
    - Mismatch between user's goals and system behaviour – more on this in Suchman (1987)

Suchman, L. Plans and Situated Actions: The Problem of Human-Machine Communication, Cambridge Univ. Press. (1987).
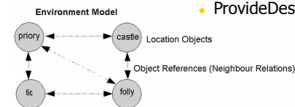
## Reducing complexity?

- "In effect, such systems migrate complexity away from the user to some form of intelligent agent" (Cheverst,2001)
- Adaptation to context can be used to simplify a user's understanding of, and interaction with, interactive systems – but when system attempts to pre-empt user's goal, this is where difficulties can arise.
- Benefits of information visualisation vs filtering

Cheverst, K. *et al*. "Using Context as a Crystal Ball: Rewards and Pitfalls", ACM *Personal Technologies*. 3(5), pp. 8-11, Springer-Verlag. 2001.

## The Adaptive Hypermedia Bit…

## How does this AH bit work?

- Incorporation of GUIDE tags
  - Enables pages to query Information Model
  - Processed by GUIDE filter component
  - Example (nearby places)
    - <GUIDETAG INSERT NEIGHBOURS>
    - Filter calls methods…
      - ReturnNeighbours()
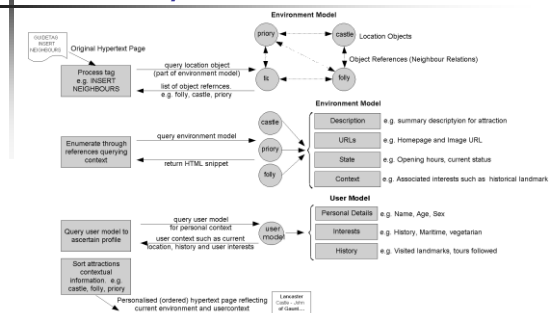      - ProvideDescription() and ProvideImage()



## Generating the AH (2)



## Summary of mechanism…

# More on the User Model…

## The User Model…

- Visitor profile, including:
  - name
  - group name (if applicable)
  - age
  - dietary preferences, e.g. vegetarian food
  - specific interests, e.g. maritime history
- current (or virtual) location
- list of attractions already visited
  - "Welcome back…"

## Updating the User Model (1)

- Pages can be tagged in order to enable the 'Interests' part of the User Model to be updated…
- For example, if user requests information from pages with a high history content then 'History' rating could be increased.
- Issues??

```
<GUIDETAG INTEREST (HISTORY GREATER 0)>
     -- Additional History Text --
  </GUIDETAG>
```

## Updating the User Model (2)



## With Low History Interest…



## With High History Interest…

## Issues ??

- Predictability??

## The tour GUIDE part…

## Picking a Tour…



```
Guide Tour Wizard                                                    X
To Create a tour repeat steps (1) and (2) for each location you wish to visit.

(1).. Click on a location once to see a short description of that location.
(2).. Click a second time to add or remove this to the tour.
(3).. Click the Finished button once you are ready for me to calculate your tour.

Popular Attractions
    The Butterfly House
    ⊠ The City Museum
    ⊠ Lancaster Castle - Shire Hall Entrance
Food and Drink
Historic Sites and Buildings
    Lancaster Castle - John O'Gaunt Gateway
    ⊠ The Lancaster Priory

Lancaster Priory in dates from the 11th century though there has been a church o
this site from 630 A.D. and maybe in Roman times.

            Finished         Cancel
```

## Following a Tour…



## Issues ??

## Issues…

- Virtual vs Real…
  - Allows me to virtually navigate but at what cost?
- Stepping back
  - What sort of 'interaction paradigm' does this reflect?
  - What are alternatives?

## Metaphors used in the GUIDE UI

- GUIDE uses metaphors to leverage from anticipated familiarity/understanding of users
- Browser Metaphor
  - Benefits?
  - Drawbacks?
- Bars of Connectivity
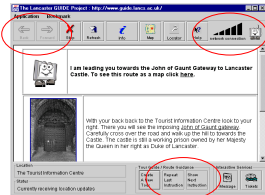


## Implications of disconnection from the network…

- GUIDE units can loose network connectivity
- Certain functionality becomes unavailable
  - Reception of dynamic information, Bookings, etc.
  - Concern to reduce apparent anomalies in behaviour
    - Unpredictability could affect a visitor's trust of the system
  - Encourage an appropriate mental model for understanding the role of connectivity
  - Leverage from common understanding of the mobile phone
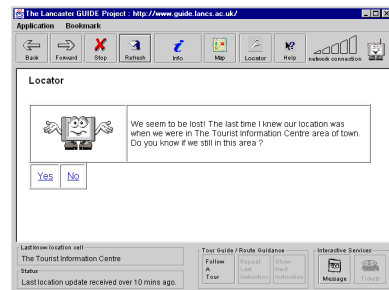    - Bars of connectivity metaphor
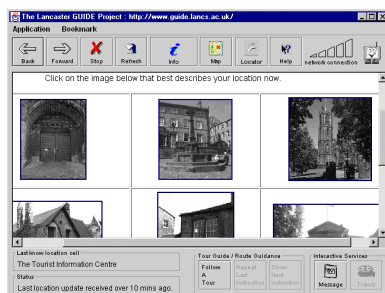


## Conveying Uncertainty…

- Again linked to notion of helping user to appreciate that the system does not know 'exactly' where the user is.
- Why?
  - Implications for predictability/perceived reliability.
- What if time passes with no locations updates
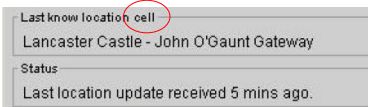


## Solving Location Problems: A GUIDE and Visitor Partnership



## Selecting from Thumbnails…



## Found Again…