



Beyond Application-Led Research in Pervasive Display Systems

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Pervasive Display Systems

- Systems Research in Pervasive Displays
 - Objective
 - Create systems that are able to support display-centred applications
 - Challenges
 - What are display-centred applications?
 - What is a display service?

Pervasive Display Systems

- Several prototypes explore many potential applications.
- Research is focused on specific applications
 - Evaluation from an end-user perspective
 - No generic infra-structure support for pervasive display applications.
 - Even though many systems provide similar functionality and address common issues, they are hard to compare and evaluate.
- Approach
 - Identify the system's characteristics and basic assumptions
 - Study key applications to identify the requirements they may pose
 - Identify key design criteria to support comparisons between various display systems

Pervasive Display Systems

- Before saying what it is like, what about giving it a name?
 - How about Pervasive Display Systems?
 - Or maybe ...
 - Distributed Display Environments
 - Multi-Display Environments
 - Pervasive Display Landscapes
 - Pervasive Display Infrastructure
 - Pervasive Display Environments
 - Ubiquitous displays
 - Situated display networks

Pervasive Display Systems

- Characteristics and basic assumptions (1)
 - A PDS is made up of public displays, i.e. displays that are not under the control of a single user.
 - A PDS is multi-purpose, and thus is not tailored at the needs of any application in particular. It provides generic support to an open-ended set of applications that may require display services.
 - The main function of the PDS is to manage display requests and arbitrate display resources.

Pervasive Display Systems

- Pervasive Display Systems: Characteristics and basic assumptions (2)
 - A PDS is assumed to support coordination between multiple displays.
 - Displays are potentially dispersed across many sites spanning a vast geographical area and they are typically placed at such a distance from each other that a user is only able to interact with one display at each point in time
 - Pervasive Displays is not about desktops

Pervasive Display Systems

- Identify requirements from applications
 - how to identify the potential requirements that an open-ended set of applications may impose on those systems, given:
 - broad variety of scenarios in which pervasive displays systems have been used
 - all the new usage types that are yet to be identified
 - Incremental step is to identify at large what are the main usage models and their key requirements
 - clusters the multiple requirements posed by individual applications into larger requirements groups
 - Inform the design of pervasive display systems so that they can be targeted at their main usage (not necessarily to all usage models)
 - Helps guiding user expectations on display systems and their perceived affordances

Pervasive Display Systems

- A taxonomy of usage models
 - Experience oriented
 - Content oriented
 - Sign oriented
 - Ambient oriented
 - Personal oriented
- The contradiction between support for sophisticated control and generalisation is probably the key trade-off in the design of pervasive display systems

Pervasive Display Systems

- Situation Display System
 - Situated applications may be running to support activities associated with that physical space and use presentation services, either pre-programmed, pro-actively, or as a reaction to user input.
 - The presented items are mainly situated applications, and not just static content.
 - Situated applications are able to generate dynamic content and negotiate their current utility with the system.
 - The system intermediates user input, separating the process of sensing user input from the problem of reacting to that input.
 - Scheduling is context-aware and is based on the dynamic maximisation of the systems' utility.
 - context-aware scheduling model based on a long-term scheduling that defines the set of activities to be presented together with various context criteria for their presentation
 - short-term scheduling that builds on the current state of the system, environment and applications to select the most relevant application to be presented.
- Deployments

Pervasive Display Systems

- Key issue is the definition of an evolutionary path that promotes incremental research in this area.
 - common terminology
 - common abstractions and architectural approaches
 - promotion of benchmark tasks that facilitate the comparison between various systems
 - ultimately the move away from designs specialized for each particular environment to reusable building blocks that provide common infrastructure support for multi-purpose pervasive display systems.