

# Interaction Techniques for Ambiguity Resolution in Recognition-based Interfaces

Jennifer Mankoff

CoC & GVU Center  
Georgia Tech

## Definitions

- Mediation
  - dialogue between user and computer
  - used for resolving ambiguity
- Recognizer
  - interprets user input
  - creates ambiguity
- Error
  - mistake from user's perspective
  - represented with ambiguity

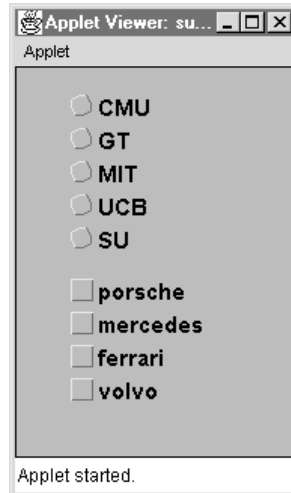
## Recognition

- Recognition is becoming ubiquitous
- Recognition is difficult to use
- A range of interface problems result
- OOPS toolkit helps solve them

## Outline

- Definitions
- Illustration
- Broad Solution: OOPS
- Context Applications
- Discussion

## Clicking



## OOPS Toolkit (CHI'00)

- Toolkit-level support for handling ambiguity in recognition
  - Library of mediators
  - Architectural support
- 1<sup>st</sup> version: GUI
- 2<sup>nd</sup> version: Based on Context Toolkit

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## Library of mediators

- Based on literature survey
- Generic and re-usable
- Three major classes
  - Repetition
  - Choice
  - Automatic

## Library of mediators

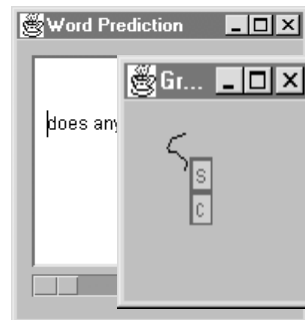
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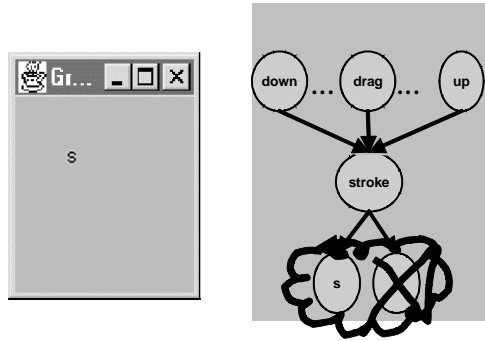
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## Architectural Support

- INDEPENDENT of any specific toolkit
- Separation of mediators, recognizers, context widgets, and application
- Communication by a common internal model (ambiguous hierarchical events)
- Maintains ambiguity indefinitely

# Ambiguous Hierarchical Events



# Context Applications

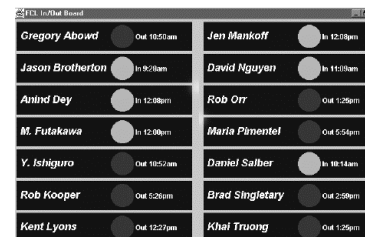
- In/Out Board
- Messaging

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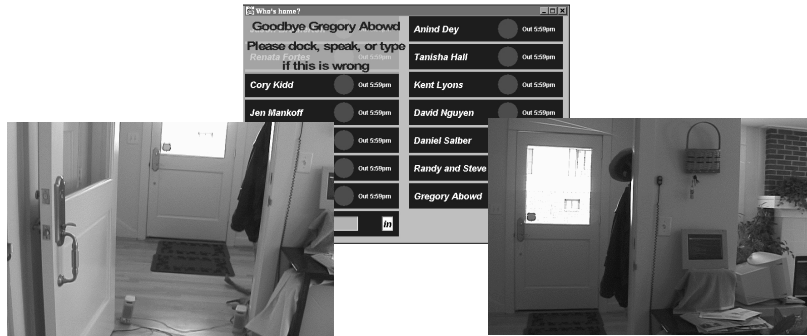
# In/Out Board

- What's ambiguous?
  - Direction
  - People Forget



## In/Out Board: Mediation

- Visual, Audio feedback of guess
- Many choices for how to mediate



## Messaging/Communication

- How do you reach someone?
  - Many possible devices (Cell phone, email, find them, etc)
  - Many possible situations (meeting, meal, sleep, etc)
  - Many possible locations

## In/Out Board: Mediation

- Distributed over space and time
- Implicit -> Explicit input



## Messaging/Communication

- What's ambiguous?
  - Is it OK to call someone (interrupt)?
  - Where is the person being called?
  - With what device should we try to reach them?
  - Is it OK to give extra info to the caller? What information?

## Messaging: Mediation

- Give callee choice to answer call
  - Non-speech audio (e.g. ringing phone)
  - Other, less intrusive alternatives?
  - Inform them about caller
- Give caller choice to send call
  - *n*-best list of ways to reach someone
  - Information about what they're doing
  - Information about where they are

## Conclusions

- Resolution of ambiguity through mediation
- General toolkit architecture
- Lots of difficult design work left

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## Future Work

- Testing
- Implicit input
- Arbitrary input devices
- Ambiguity

## **Acknowledgements**

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## **Further Information**

<http://www.cc.gatech.edu/fce/errata/>

[jmankoff@cc.gatech.edu](mailto:jmankoff@cc.gatech.edu)