Cross-Device Consistency in Automatically Generated User Interfaces

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Problem Statement

How to automatically generate user interfaces for the same application or appliance for different devices

Motivation: to make new interfaces for old applications easier to learn when switching devices
Automatically Rendered Interfaces for a Classroom Controller
Automatically Rendered Interfaces for a Classroom Controller
Sorry for replying late, we may be starting a call center in a month so I am bit busy, but we have worked on your modifications and are sending these templates, please suggest us some colours if you don't like what we are using.

I will be available tomorrow evening our time by around 4–5.

Have a Great Weekend
Best Regards
Prasad
UI Rendering As Optimization

cost = cost of manipulating individual widgets + cost of navigating through the interface

For a multimodal approach, see “UI on the fly” by Reitter, Panttaja & Cummins
Manipulation-Navigation Tradeoff Example

cost = $\alpha_m \times$ cost of manipulating individual widgets
+ $\alpha_n \times$ cost of navigating through the interface
UI Rendering As Optimization

cost = \( \alpha_m \times \) cost of manipulating individual widgets
+ \( \alpha_n \times \) cost of navigating through the interface
+ \( \alpha_s \times \) dissimilarity to the previously used interfaces
The reference UI for a classroom controller rendered on a touch panel.

The “optimal” UI for the classroom controller for a keyboard and pointer device rendered in the absence of similarity information.

The “optimal” UI for the classroom controller for a keyboard and pointer device rendered taking into account the similarity information.
Open Questions

• What aspects of surface presentation make user interfaces appear “similar”

• Does surface presentation similarity matter?
Features

• Language (toggle, text, position, icon, color)
• Domain visibility (full, partial, current value)
• Orientation of data presentation
• Continuous Vs. discrete
• Variable domain
• Primary manipulation method (point, type, drag)
• Widget geometry
Summary

• Using optimization for user interface generation enables use of different quality metrics
• If we know the right features, we can find the right numbers
• **But:**
  • What features are most salient for determining if two interfaces are similar?
  • Does surface similarity matter?
• **We are designing a user study to answer these questions (with Roxane Neal)**
More Info

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