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User Interface Façades Towards Fully Adaptable User Interfaces

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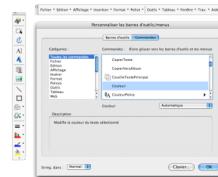
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Introduction

User Interfaces get more and more complex

- People only use small subset at a time
 - Desire to adapt UI
- Today, adaptation difficult



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UI Façades Basics

Seamlessly copy & paste screen regions



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Previous Work

(Self-)adapting or adaptive UIs

- E.g. for menus, toolbars

Skins, themes, better GUI builders

- [Chatty04, Fogarty02]

HTML cloning & computation [Fujima04]

Copy screen regions into separate windows

- [Hutchings03], WinCuts [Tan04]

Remove parts of windows, replicate content

- [Roussel03, Hutchings05]

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Criteria for Good Adaptable UIs

Fast, simple, just-in-time customization

Scope of customization: not only global customization, but also local

Deep customization [Bentley95], not just predefined options

Cross-application customization

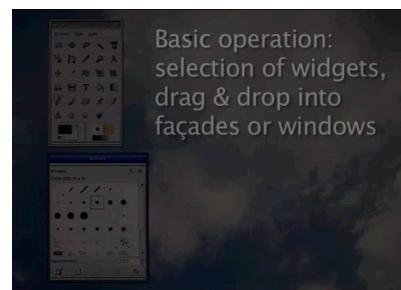
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UI Façades Basics

Fully interactive, duplicated screen regions

- Select, drag & drop

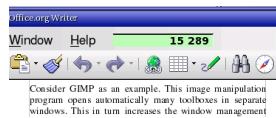


Basic operation:
selection of widgets,
drag & drop into
façades or windows

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UI Façades Basics

Holes via Cut



Façade Management

- Save & recall via window menu
- Automatic recall

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Façades Implementation

Based on Metisse [Chapuis05]

- Render off-screen, composite visible image
- Simple event redirection

Façades adds enhanced window manager

- Acts as I/O filter
- Seamless interaction composition

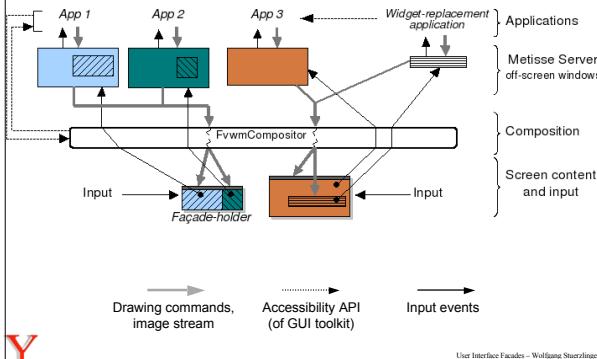
Without modifying original application (!)

Some functionality via Accessibility API

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Façades Overview



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UI Façades - Widgets

Widgets are “basic interactive units”

- Snapping to widgets important

Example:
Widget duplication

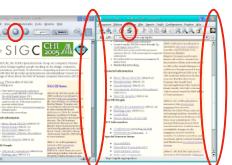
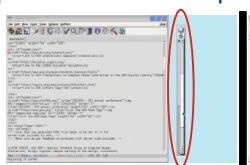


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Widget Duplication Examples



Duplication onto multiple monitors

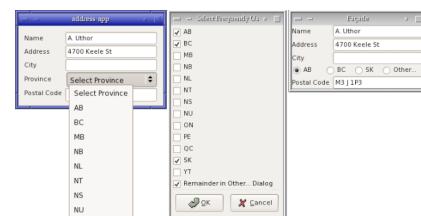


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Widget Replacement

Modify interaction



Enabled by actions in Accessibility API

- Replacement widgets a few lines of code (!)

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Widget Replacement



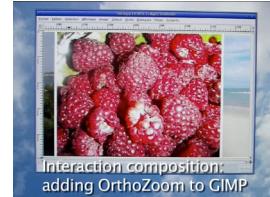
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Interaction Composition

Seamless integration of novel UI controls

- Ortho-zoom [Appert06]

- Toolglass



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Further possibilities

Use UI Façades to:

- Make static visualizations interactive
- Modify mouse actions, e.g. movement, button
- Quick, on-line, widget customization
- Full widget action redirection, e.g. one widget controls multiple "old" widgets
- Provide simple UI to adapt menu, toolbar, ...

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Conclusion

New system for adaptable UIs

- Flexible & seamless UI modification
 - Duplicate content to build new UIs
 - Simple-to-use
- Ad-hoc, opportunistic adaptation
 - Modify interaction (event & action level)
- Allows deep customization
- No programming by end-user

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Directions for future work

Non-rectangular regions

Integrate with UI description languages

- I/O Filter for XUL, XAML, ...

Macro recorder/programming for actions

User studies

First step towards vision of window system as a

"Fine-grained interactive graphical component
compositor"

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Acknowledgements

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- InSitu
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For more information:

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Questions?

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