Personalization: Adaptive Approaches

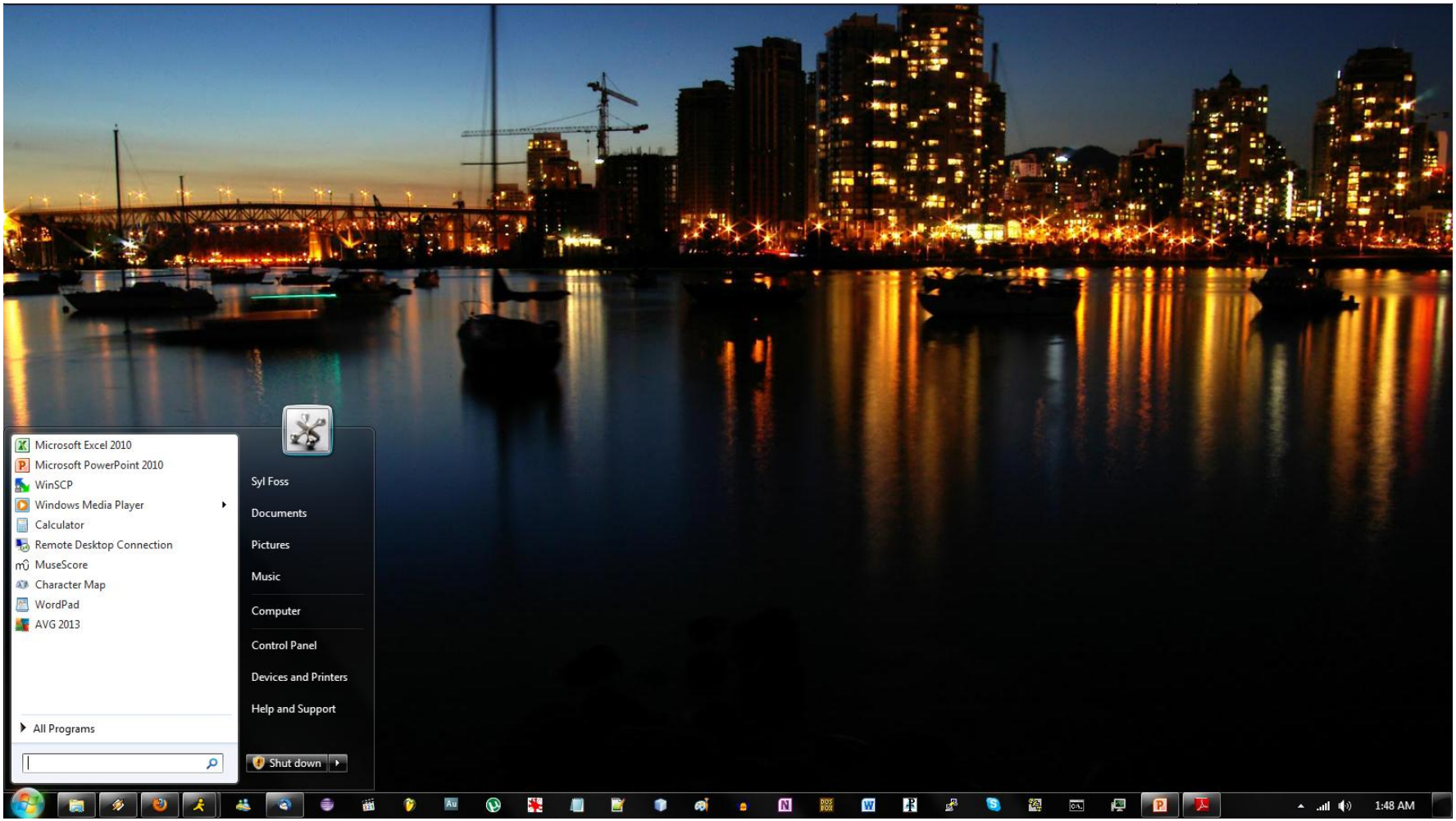
Sylvie Foss

Source: http://www.guidebookgallery.org/screenshots/winxppro

The magical world of Windows XP

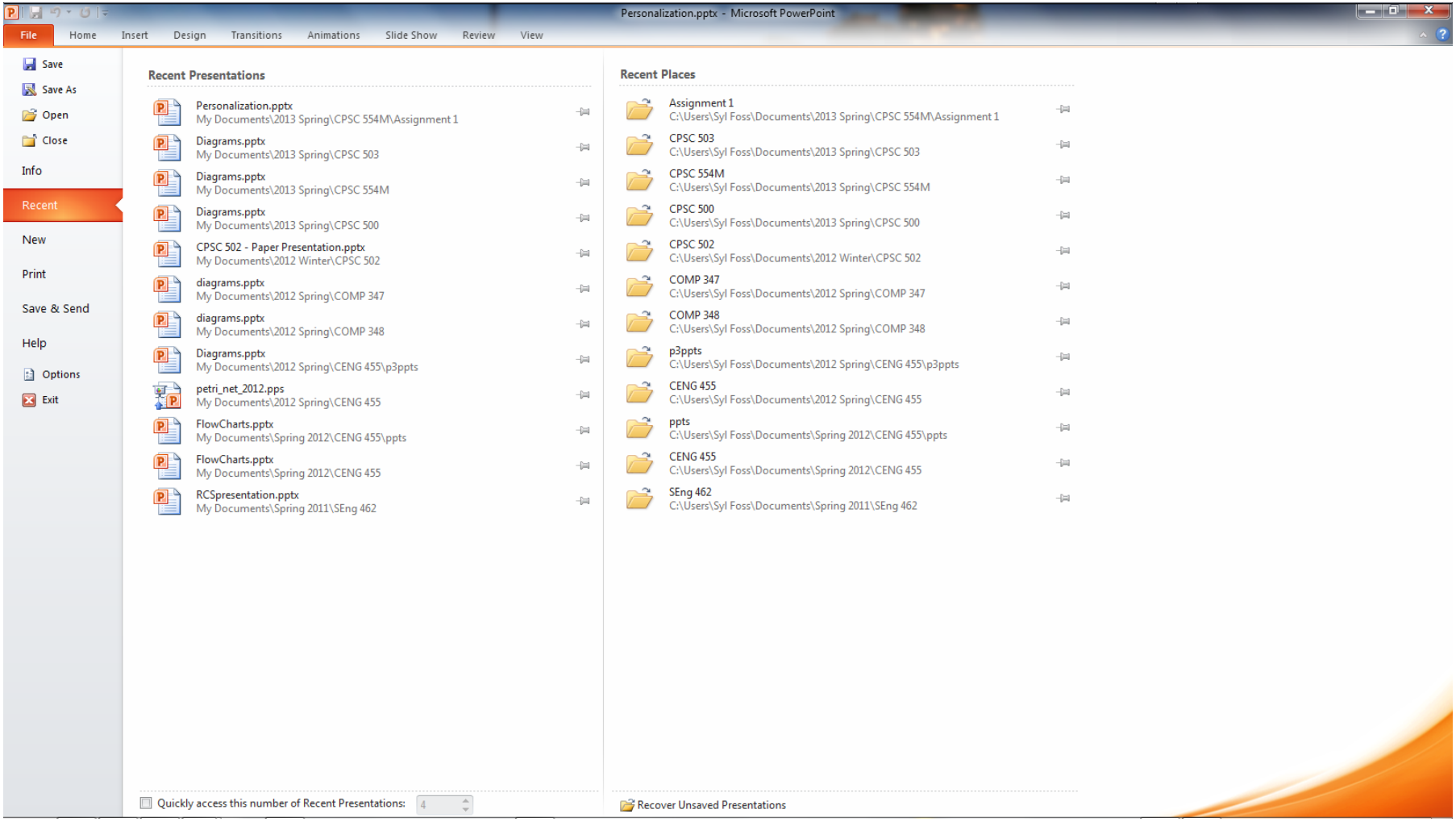
Source: my computer

It must have been a good idea



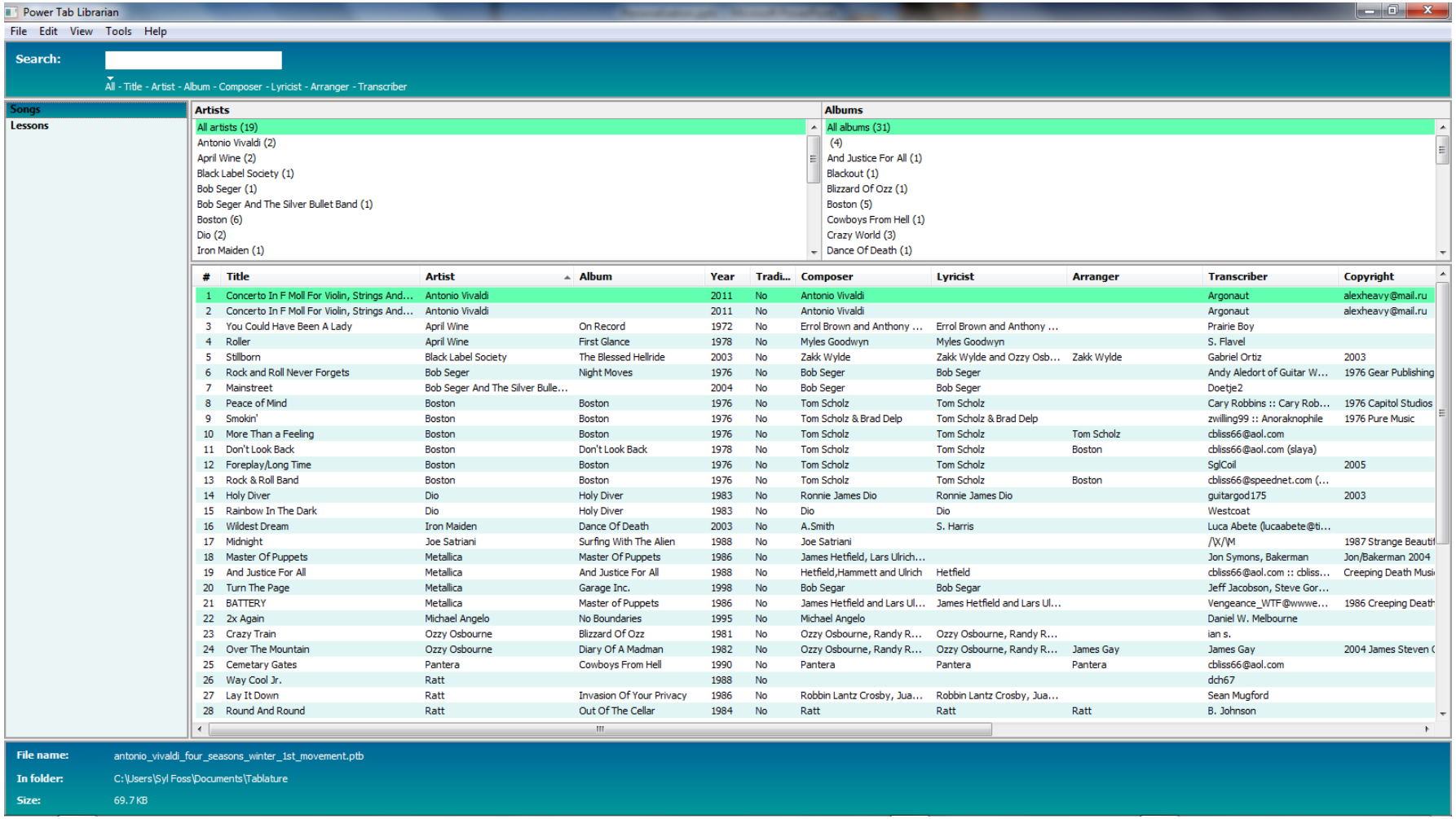
Source: my computer

It's actually really useful



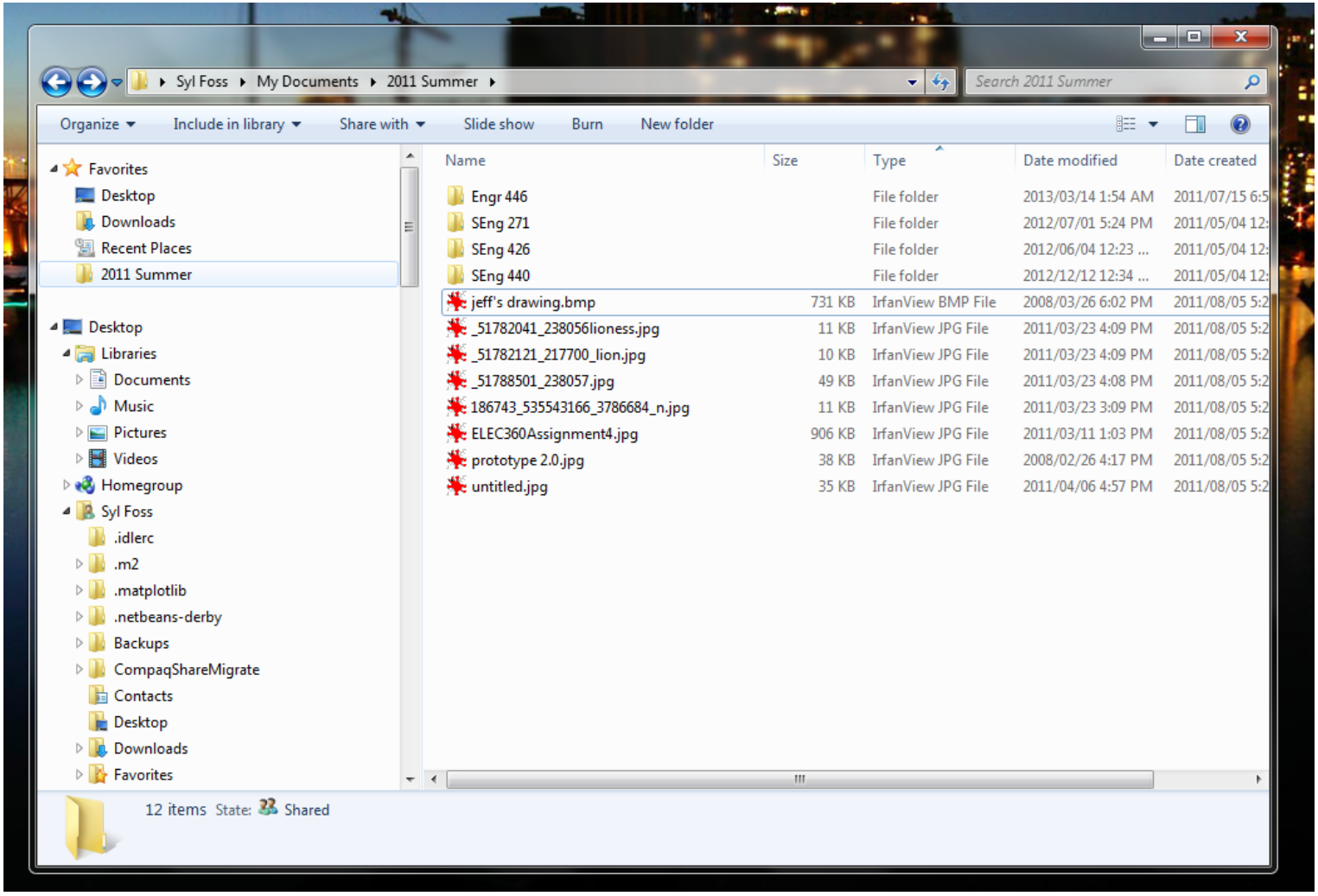
Source: Screenshot of Power Tab Librarian from my computer

More programs should have it



Source: my computer

Unlike this useless feature



Who needs adaptive interfaces?

- People have different abilities
  - Computer expertise
  - Drawing skill
  - Folks with fat fingers
- Background knowledge
  - Newcomers vs. experts
- Disabilities and accessibility issues

Source: FL Studio screenshot from my computer

Sometimes, help would be nice

Let’s learn how to use FL Studio

- I’ve just bought a new music creation program
- Can you help me get started?
  - I’ve heard good things about “Sytrus”

Who should adapt?

- Either the user learns
  - Tutorials
  - Inline help
  - Trial-and-error
- Or the system learns
  - Adjust UI to match user patterns
  - Help user as needed

Make the system adapt!

- Who wants to learn new software anyhow?
  - Took me ages to learn FL Studio, and it was trial-and-error
- But it can be pretty annoying
  - Visual popout from today's paper
  - Moving instead of copying
  - Even research with my team
- So there are trade-offs

How to not be annoying

- People like to have a choice
  - Copying instead of moving
  - Toggle for my team's UI
- Stability
- Satisfaction over speed
  - Speed benefits only in unrealistic tasks

More on stability

- Gajos et al. (2008) thought in terms of predictability and accuracy
  - "Predictable if it follows a strategy users can easily model in their heads"
  - Accuracy is how long UI components stay in the adaptive area
- Simple and functional vs. more accurate but confusing learned approach
  - Users actually liked accuracy over predictability!

Incremental interfaces

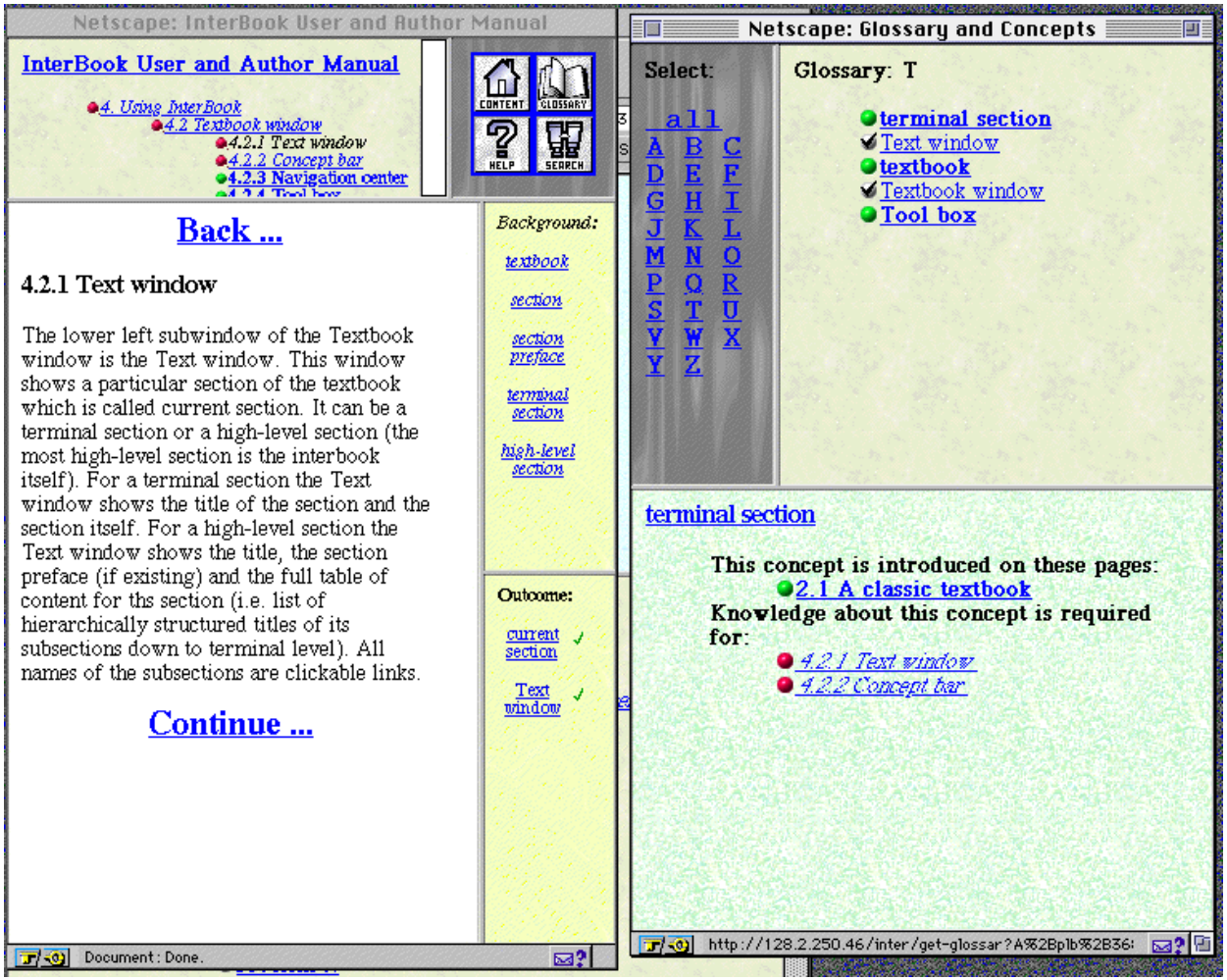
- Add functionality as you learn
- What and when?
  - *What* functionality to add
  - *When* to add it

InterBook

- Web-based interface by Brusilovsky et al. (1996)
- System for reading and writing textbooks
- Interface is way too complicated
  - Separate windows for navigation, support, etc.
  - Some features go ignored

Source: www.contrib.andrew.cmu.edu

A pretty (complicated) UI



User-as-student metaphor

- Adaptive electronic textbooks act as tutors
  - Keep track of student knowledge
  - Suggest more as they fill the prerequisites
- Think of the user as a student learning how to use the interface
  - Now we can solve our problem with adaptive tutoring
  - UI features are concepts to learn

Adapting for accessibility

- Accessible touch screens
  - Users with reduced motor control
  - Eyesight considerations
- How to adapt for these people?
  - Depends on environment
  - User-specific capabilities
- Certain needs at certain times

The Shared User Model

- PhD work of Kyle Montague (2012)
- Log user and environment data
  - Capture user interactions
  - Sensors to observe light, noise, etc.
- Adjust the UI accordingly
  - Adjust required touch duration, thresholds for movement, target sizes, brightness, etc.

MyUI project

- García et al. (2012) also developed a system for special needs adaptation
  - Gathers data on usage
  - Combines modular interaction components to form suitable UI
- "Adaptation engine" determines what to do
  - For vision problems, make the font bigger
  - For very poor vision, read the text aloud

Looking toward the future

- Further evaluation in realistic scenarios
  - Existing systems sound promising, long-term
- Much work still required
  - Still difficult to find balance between helpful and irritating
  - Machine learning
- Adapt to adaptation; it is worth it
  - Enormous design overhead

Discussion

- What would happen if your house adapted to your needs?
  - Ruin aesthetics if the front door moves closer to the car?
  - Could you keep track of your belongings?

Discussion

- What are some adaptive interfaces you've used?
  - Which UIs do you wish *were* adaptive?

Discussion

- What obstacles are preventing the adaptation of adaptation?
  - Which obstacle is the biggest?

Discussion

- Is there value in subsets of interfaces?
  - eg: Different UI for students, children, elderly, etc. and each is also adaptive

References

1. Andreyev, S. (2012). Fixed interfaces, adaptive interfaces… What is next? Total movability – a new paradigm for the user interface. Cornell University Library.
2. Brusilovsky, P. and E. Schwarz (1997). User as student: Towards an adaptive interface for advanced Web-based applications. See *Jameson* (1999), pp. 177-188.
3. Findlater, L., and Gajos, K. Z. 2009. Design Space and Evaluation Challenges of Adaptive Graphical User Interfaces. *AI Magazine* 30(4).
4. Gajos, K. Z., Czerwinski, M., Tan, D. S., and Weld, D. S. 2006. Exploring the design space for adaptive graphical user interfaces. In *Proceedings of the Working Conference on Advanced Visual interfaces* (Venezia, Italy, May 23 - 26, 2006). AVI '06. ACM, New York, NY, 201-208.
5. Gajos, K. Z.; Everitt, K.; Tan, D.S.; Czerwinski, M.; and Weld, D.S. 2008. Predictability and Accuracy in Adaptive User Interfaces. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI'08), 1271–1274. New York: Association for Computing Machinery.
6. García, A., Sánchez, J., Sánchez, V., and Hernández, J. A. (2012). Integration of a Regular Application into a User Interface Adaptation Engine in the MyUI Project. In *ICCHP'12 Proceedings of the 13th International Conference of Computers Helping People with Special Needs*, pp. 311-314.
7. Montague, K (2012). Interactions speak louder than words: shared user models and adaptive interfaces. In *UIST Adjunct Proceedings* '12, pp. 39-42.