

The Zoomable Bible: Getting the Big Picture

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Slides at <http://semanticbible.org/other/presentations/2008-zoomable/ZoomableBible.html>

*"Man cannot understand without images;
the image is a similitude of a corporeal thing,
but understanding is of universals which are to be abstracted from
particulars."*

- Thomas Aquinas

Outline

- History and Inspirations
- Information Visualization and Zoomable User Interfaces (ZUIs)
- Principles for a Bible ZUI
- Prototypes and Issues
- Conclusions

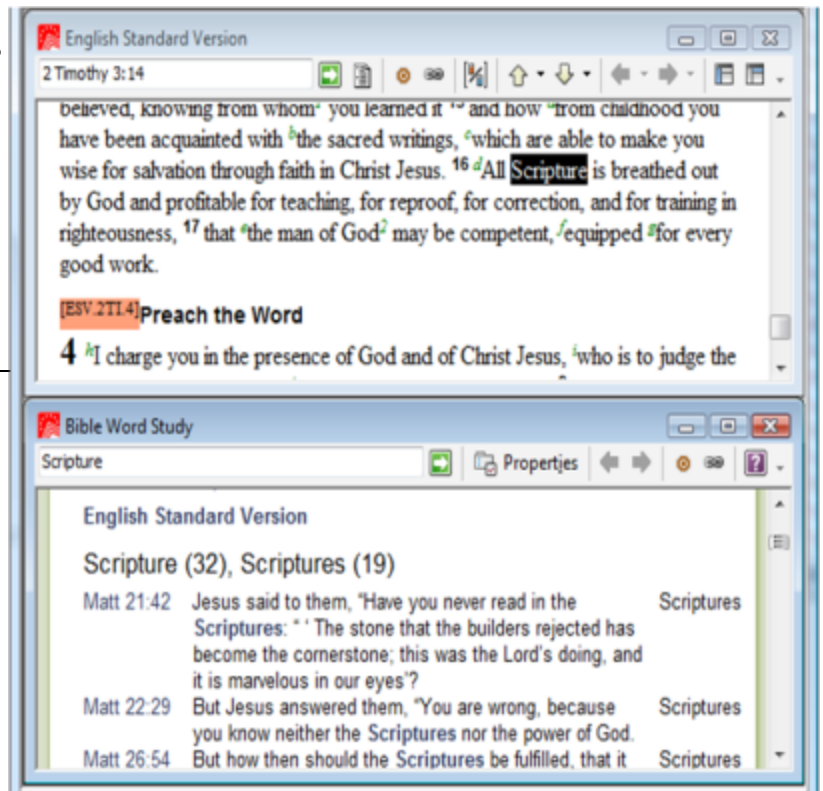
A Brief History of Bible Visualization

- The scroll
 - *Not very portable*
 - *Difficult to navigate ([Luke 4:17](#))*
 - *Fundamentally linear in presentation*
- The book:
 - *More portable (eventually)*
 - *No fundamental changes in navigation or visibility*



A Brief History, Part 2: Bible Software

- Storage, access, portability, search, integration are all vastly improved
- Visual context still limited by screen and font size
- Navigation devices:
 - *Direct reference*
 - *Scrolling*
 - *Search*
 - *Indexes and hyperlinks*
 - *But only limited use of visual navigation.*
- Search is now ubiquitous and powerful
 - *Search selection is contextual and immediate*
 - *But results are typically still a separate index.*
- Still hard to see the big picture



Inspirations I: Manuscript Study

- IVCF approach to inductive Bible study: getting a bigger picture by
 - *Directly annotating the text in a colorful and highly visual fashion*
 - *Never "turning the page"*
 - *Using a bigger desk*

You don't have to turn the page and lose the context

Inspirations 2: Treemaps

- Hierarchical, space-filling representations for quantifiable data

Direct, visual representation of hierarchy and quantity (size or other attributes)

See references slide for links



- Newsmap (Google News)
- Map of the market (stock performance by industry)
- My 2005 SBL talk on Visualizing the Gospels using Treemaps

Inspirations 3: Zoomable Interfaces

- Background: Eames' [Powers of Ten](#) movie (1977)
- [Google Earth](#): smooth, animated zooming and panning

Animated navigation helps provide context
- iPhone
- [Human-Computer Interaction Lab](#) at University of Maryland

Information Visualization 101

- Information visualization: the use of interactive visual representation of abstract, non-physically based data to amplify cognition
 - Tufte: *"we envision information in order to reason about, communicate, document, and preserve that knowledge"*
 - Shirkey: *"the overall pattern of data often exhibits patterns that emerge from the individual pieces of data, patterns that can be impossible to discern by merely re-sorting the data in spreadsheet format"*

Information Visualization I 02

- The power of visualization
 - *Very high bandwidth for presenting information*
 - *Visual memory in navigation: the [memory palace](#)*
 - *Multi-variate presentation through spatial orientation, size, color, typography, and other visual attributes*
- Shneiderman's Mantra (Shneiderman 1996):
 - *Overview first*
 - *Zoom and filter*
 - *Then details on demand*

Bible Information

- The text itself, but also ...
- Structural relationships:
 - *Hierarchy: book > chapter, pericope > verse > word*
 - *Concordances, topical or thematic indices*
 - *Alternate organizations: chronological, authorship, etc.*
- The traditional reference scheme has no informational content
- Historically, biblical study has been "zoomed in" on words

Bible Visualization is Different

- Fundamentally textual rather than quantitative
 - *But there are quantitative aspects*
- Read-only: no text entry or editing
 - *But annotation for social collaboration can be useful: "tagging", rating, linking, textual annotations*
- Relationships between textual elements: concordances, topical indices, etc.

traditionally these are links (referential or hyperlinks): they don't have to be

Traditional Bible Navigation

- At the book level: either memorize the order, or use the table of contents
 - *Size relationships are inherent in page counts, but far from intuitive*
- Chapter+verse references are semantically opaque

Can you imagine using page numbers this way?

Hezekiah chapter 12: not everybody gets the joke
- Associations between references and content are learned over time

Okay for cogniscenti, but hard for novices
- Moving to a new text loses the context of the previous one
- Not easy to browse for information

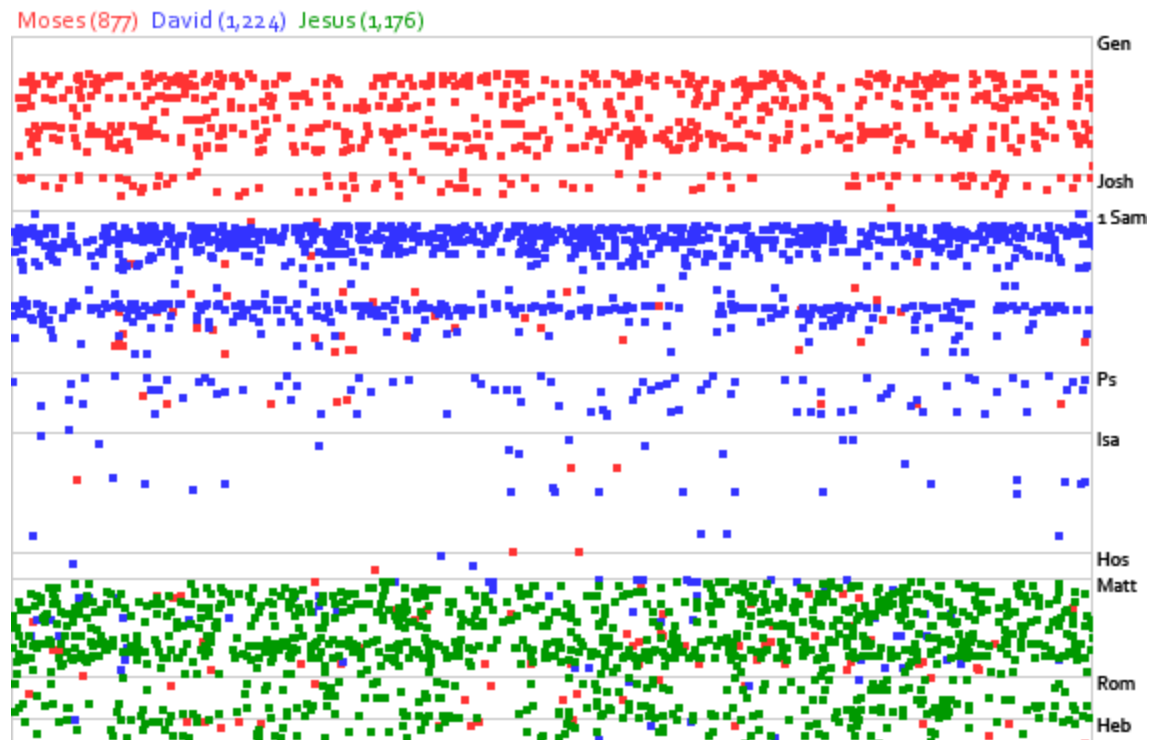
The Dimensionality of Bible Visualization

- **Nielsen:** optimize for 1024x768
 - *60% of all monitors, as of 2006*
 - *786432 pixels (0.75 megapixels) are available*
- ESV text has
 - *1189 chapters*
 - *2403 pericopes (headings)*
 - *31103 verses*
 - *0.75M words (about one pixel each)*
- So we're close to being able to show it all (especially on larger monitors).

A Different Approach to Bible Visualization

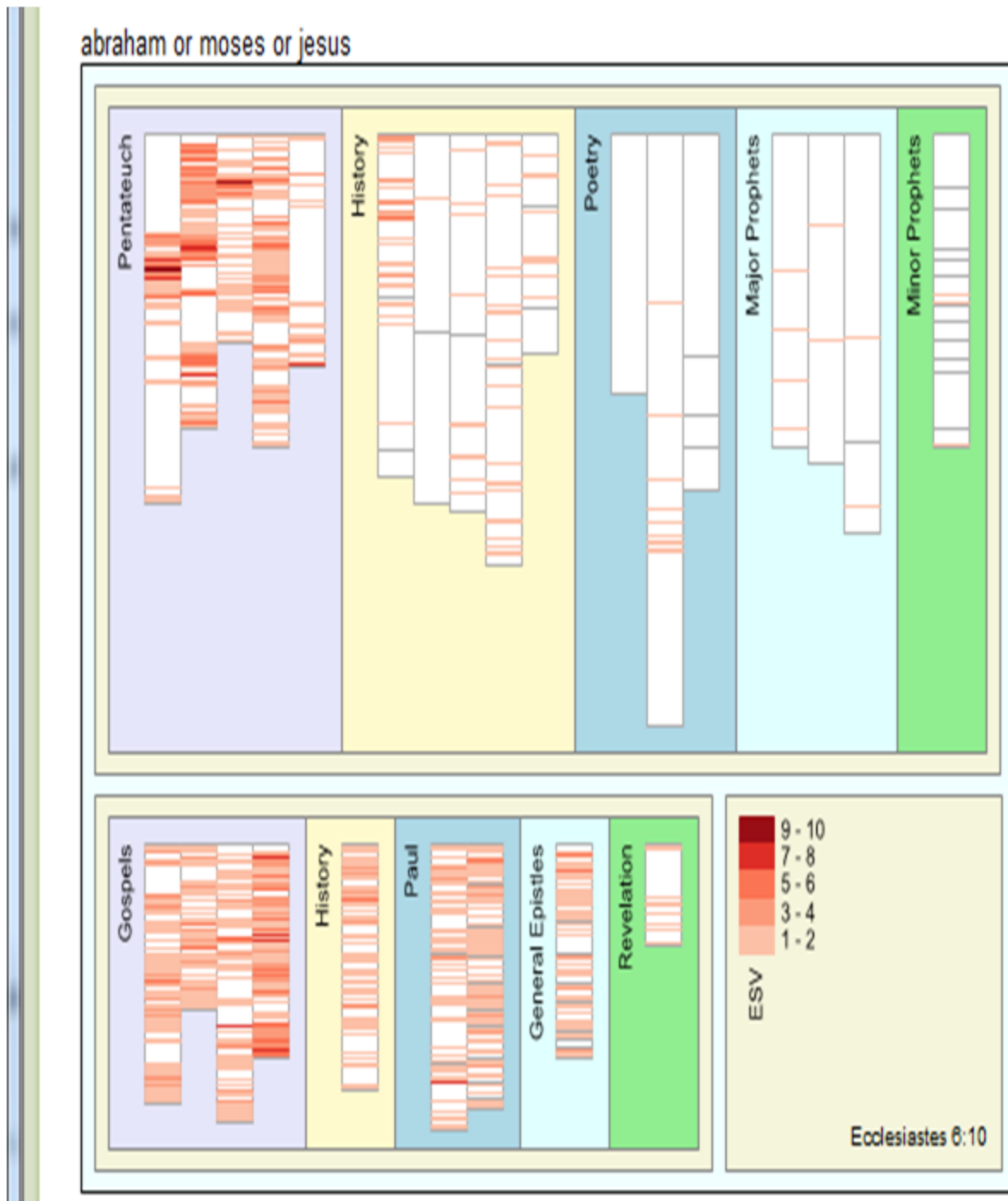
- Visually represent the entire text
- Direct navigation through selection, zooming, and panning
- Visualize search results directly on the text
- Represent the full text hierarchy, without impeding navigation
- Support alternative higher-level organizations

Related Applications



- OpenBible.info's [Bible Word Locator](#)
 - *Visual display of word distribution*
 - *Shows Bible and Book context*
 - *Not navigable*

Related Applications (2)



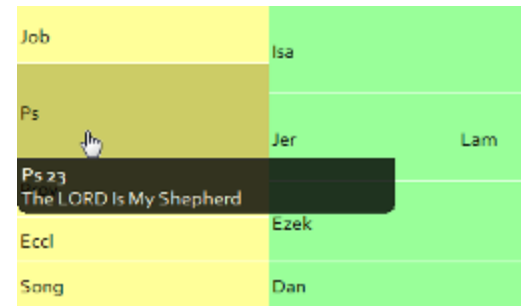
- Logos' Graph Bible Search (demo)
 - *Thematic grouping of books*
 - *Interactive display supports navigation*
 - *Hyperlinked to text*

- Difficult to position the mouse at this scale
- No details to aid navigation
- Following a hyperlink leaves the visualization behind

The mantra: provides overview, no zoom or filter, details on demand but only on a separate canvas

Related Applications (3)

- OpenBible.info's [Bible Book Browser](#) (demo)
 - *Thematic grouping of books*
 - *Spatial orientation shows both Bible and book context*
 - *Chapter+heading navigation supports browsing*
 - *Hyperlinked to text*
- Spatial representation is not to scale
 - *Jude is the same size as Revelation*
 - *Mouse sensitivity is therefore highly variable*
- Chapter and heading displays are transient, and only chapters can be selected
- Following a hyperlink leaves the visualization behind



The mantra: provides overview, though no zoom or filter, and details on demand

Zoomable Bible: Key Concepts

- Spatially-oriented view of the entire text
 - *Supports visual navigation and memory*
 - *Has spatial and structural fidelity*
 - *Provides a canvas for visualizing search results, annotation, and other meta-data*
- Use zooming and panning for navigation
- Provide as much context as scale allows
 - *Macro view: high-level structure and relevant meta-data*
 - *Micro view: lower-level structure and text*

Zoomable Bible Layout

- Using the Piccolo 2D toolkit from UMd HCIL
- Strip treemaps: hierarchical, spatially-oriented, ordered, with decent aspect ratio
- Groups and books have horizontal layout
- Pericopes have vertical layout for readability
- All the text is there, though not always visible

(demo)

Further Development

- Need better scaling of fonts, margins, etc. to match zoom level
- Search should highlight hits so you can zoom in on them
 - *Highlight the verse or pericope if the text is too small*
- Better text layout and wrapping
 - *Word count is a poor approximation for pericope size*
 - *Vertical orientation of pericopes tends to truncate pericope headings*
- Zoom out to different higher-level organization
- Encode chapter divisions with shading?

Alternate Layouts

- Overview on one side, text (and other) details on the other side
 - *Pro:*
 - Easier, more familiar reading format, including cleaner text layout
 - Still provides the big picture
 - *Con:*
 - Less integrated view

Further Thoughts

- Is text magnitude really a critical attribute for browsing the Bible?
- Higher-level organization is critical for navigation and understanding
- Visualizing search results: dealing with small scale
- Is dynamic layout important? (probably)
- ZUIs and accessibility

Conclusions

- Our print traditions have limited our view of how we can represent and navigate the Biblical text
- Visual approaches can give us a different view, and help us get the big picture

Resources and References

- [Human-Computer Interaction Lab](#) at University of Maryland:
 - [Treemap home page](#): includes software, numerous technical reports, and [Java implementations of several treemap algorithms](#).
 - Bederson, B.B., Shneiderman, B., and Wattenberg, M. (2002) [Ordered and Quantum Treemaps: Making Effective Use of 2D Space to Display Hierarchies](#). *ACM Transactions on Graphics (TOG)*, 21, (4), October 2002, 833-854.
 - Shneiderman, B. (1996). [The eyes have it: A task by data type taxonomy for information visualizations](#). Technical Report UMCP-CSD CS-TR-3665, College Park, Maryland 20742, U.S.A.
 - [Piccolo 2D Graphics Toolkit](#)
- Eick, S. (1994). [Graphically displaying text](#). *Journal of Computational and Graphical Statistics*, 3(2):127-142.
 - Describes the SeeSoft™ tool for high-resolution text display, and applies it to illustrate word distribution in a scaled visualization the New Testament.
- [Info Viz Wiki](#)

Resources and References (2)

- [Gospel Spectrum](#)
 - Flash-based visualization of the NIV Harmony of the Gospels
 - Includes navigation by time periods, spatial representation (number of verses), coordination across the Gospel sources, and text terminals.
- [The Exegesis project](#) searches the web for KJV quotations and visualizes the accumulated matches.
- [Biblediagrams.com](#) shows static, info-graphic type representations of some Biblical timelines and related information.
- Chris Harrison's [visualizations of Bible cross-references, people, and places](#)

Resources and References (3)

- The ESV blog has visualizations of [cross-references \(static\)](#) and [social networks \(with zooming and panning\)](#).
- The [Bible & World History Timeline](#) is a radial wall chart illustrating people and places from the Bible in their historical context. Not digital, but an interesting information visualization approach.