From Visual Exploration to Storytelling and Back Again

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Guided visual exploration of genomic stratifications in cancer
Marc Streit, Alexander Lex, Samuel Gratzl, Christian Partl, Dieter Schmalstieg, Hanspeter Pfister, Peter J. Park, and Nils Gehlenborg,
*Nature Methods* 11, 9 (2014), 884–885
Guided Visual Exploration of Genomic Stratifications in Cancer

StratomeX Demonstration Video
The Cancer Genome Atlas
Clear Cell Renal Carcinoma Case Study
Authoring

Exploration

Presentation

finding

figure

video
Issues

• fraction/selection of the exploration
• tell just the „good“ parts
• no back link
“I have not failed. I've just found 10,000 ways that won’t work”

Thomas A. Edison
Issues

• fraction/selection of the exploration
• tell just the "good" parts
• no back link
How to reproduce the presented exploration?
How to go from visual exploration to storytelling and back again?
Capture Label Understand Explain
visualization driven explorations based on automated recorded provenance data.
Vistories

- visual data stories
- visual histories

stories consisting of authored subset of the provenance graph
Authoring

Exploration

Presentation
Authoring

Exploration

Presentation
Authoring

Exploration

Presentation
Shrinivasan and van Wijk, 2008
Supporting the Analytical Reasoning Process in Information Visualization

Wohlfahrt and Hauser, 2007
Story Telling for Presentation in Volume Visualization
**Presentation Authoring Exploration**

- Provenance Graph Recording
- Provenance Graph Visualization
- Story Editor Visualization

Samuel Gratzl
Presentation Authoring Exploration Presentation

- Provenance Graph Recording
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Story Editor Visualization
Provenance Graph Recording

- action-centered bi-partite graph
- a state is determined by the action sequence from the root
Provenance Graph View

degree-of-interest driven skewed node-link diagram
  node = state
  link = action

purpose
  exploration: orientation, navigation
  authoring: selection
Story Editor View

define one or multiple Vistories

- select provenance states
- annotations (text, frame, arrow)
- timing information

purpose

authoring: definition, annotation
presentation: orientation, navigation
Usage Scenarios

**Gapminder**

Between 1800 and 2015, we can see that, generally, as people became richer, they also started to live longer.

http://vistories.org/v/gapminder

**StratomeX**

Kaplan-Meier Plot showing survival of patients in connected block

http://vistories.org/v/stratomex
Implementation

wrapper library around Caleydo Web applications

requires: command design pattern

open source (BSD license)
http://github.com/Caleydo/caleydo_clue
what is tracked
• visual exploration actions

what not
• datasets
• data processing / wrangling
• application
• meta provenance
Capture
Label
Understand
Explain

a framework for reproducible, shareable, and communicable visual explorations
Provenance Graph Analysis

support user
- similar states
- possible next actions

insights
- usage patterns
- exploration strategies
• visual explorations tracked like source code
• provenance part of the supplementary material
• use case figures have a DOI linking to their Vistory
efficient
collaborative
sustainable
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