# Story Telling
## for
# Visualization

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## Some Context

- **Visualization point of view**:
  - **starting point**: a **visualization task**
    (e.g., exploration, analysis, or presentation)
  - **question: can story telling help?**

- Alternatively (not now):
  - starting point: a story
  - question: can visualization help?

- **Previous work**:
  - **Story Telling** for **Presentation** in **Volume Visualization**,
    M. Wohlfart and H. Hauser, EuroVis 2007
  - **Advanced Storytelling** for **Volume Visualization**,
    A. E. Lie (Master student at UiB.no), 2009

## Wishes for Today

- **Learning more about story telling**
  (and related techniques)

- Focusing on **story telling for visualization**
  (not so much on visualization for story telling)

- Story telling for cases where **objectivity is 1$^{st}$ priority**
  (not where opinions / interpretations are central)

- Story telling for **exploration** / **analysis**?
  (as opposed to presentation)

## Previous Work (EuroVis 2007)

- **Visualization**
  - supporting exploration & analysis
  - supporting presentation & communication

    $\Rightarrow$ ***different goals!***

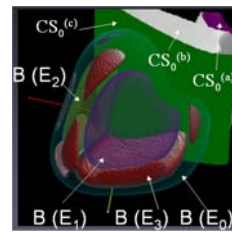- **Visualization for presentation**
  - getting your message across          (cf.: Chinese whispers!)
  - two main goals:
    - **minimize information loss**!
    - **maximize credibility**!

## Some State of the Art

- How to present?
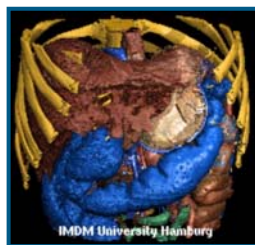  (esp. wrt. interactive visualization)
  - images (with labels!)
  - animations
  - semi-interactive graphics
  - interactive graphics



[VRVis (Mroz...)]



[VRVis (Mroz…)]          [Hamburg (Höhne…)]          [Magdeburg (Preim…)]

## The Basic Idea

- Improve **comprehensibility**
    - **challenge/problem**:
      loaded vis. results difficult to (fully) understand
    - **approach/solution**:
      preserve the creation of a visualization result
      (not only the final picture)

- Improve **credibility**
    - **challenge/problem**:
      „sink or swim" visualization
      („believe it or …")
    - **approach/solution**:
      enable the interactive reinvestigation on demand
      (diminuish disbelief)
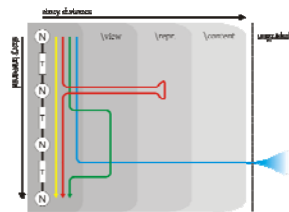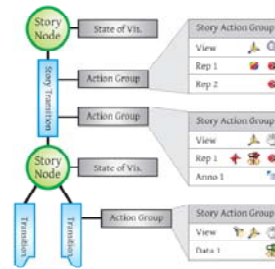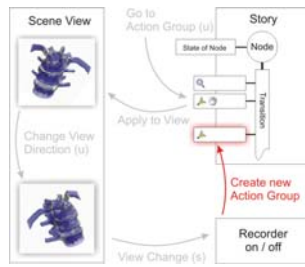
## Sample Story

- Analysis of a tripod fracture…
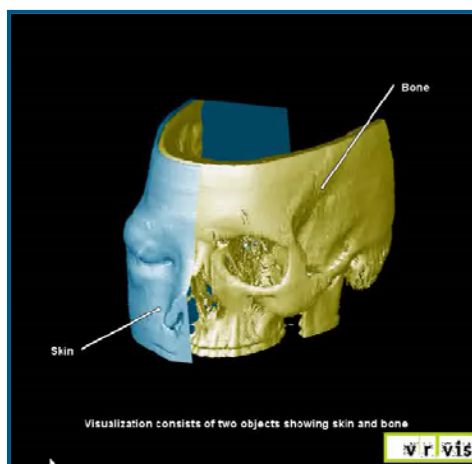
# Overview

- Visualization stories
- Story telling and interaction
- Sample story
- Story authoring, implementation
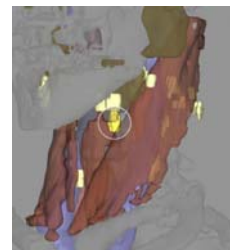
## Story Model

- From **story node**
  to **story node**
  (cf. keyframe anim.),
  - usually the story stops
    here for a moment
  - usually nodes are
    annotated

- via **story transitions**,

- which are composed
  of **action groups**,

- that join **actions**
  together which should be
  done in parallel
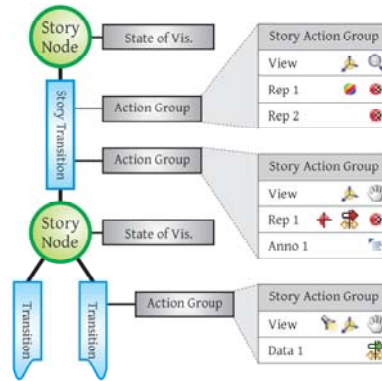


## Sample Story Templates

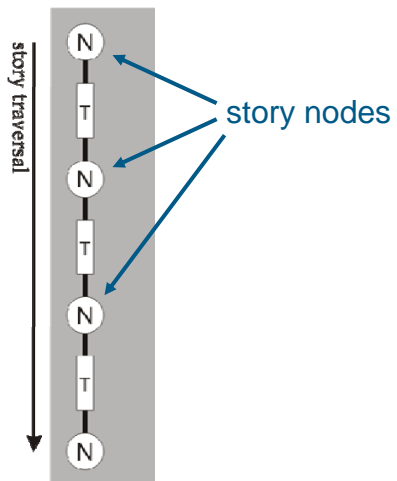- Information drill-down (á la Shneiderman et al.)
  - overview first
  - zoom & filter
  - details on demand

- Comparative visualization
  - e.g., left side vs. right side (symmetric datasets)
  - e.g., pre-operative vs. post-operative (multiple datasets)

- Iterative investigation
  - feature set traveral
    (FORALL features DO visualization)
  - cf. lymph nodes visualization
    [Krüger et al., EuroVis '05]

# Three Layers of Interaction in Visualization

view
params.

repr.
params.

content
params.

1. viewing/lighting

2. representation („how")

3. content („what")

# Story Layout
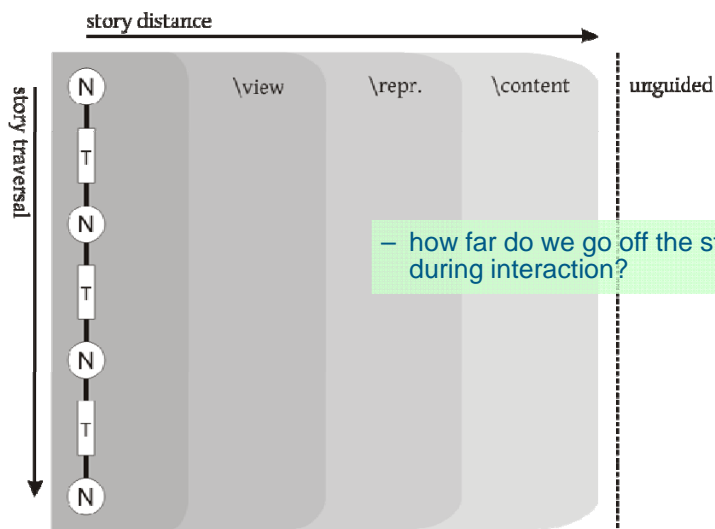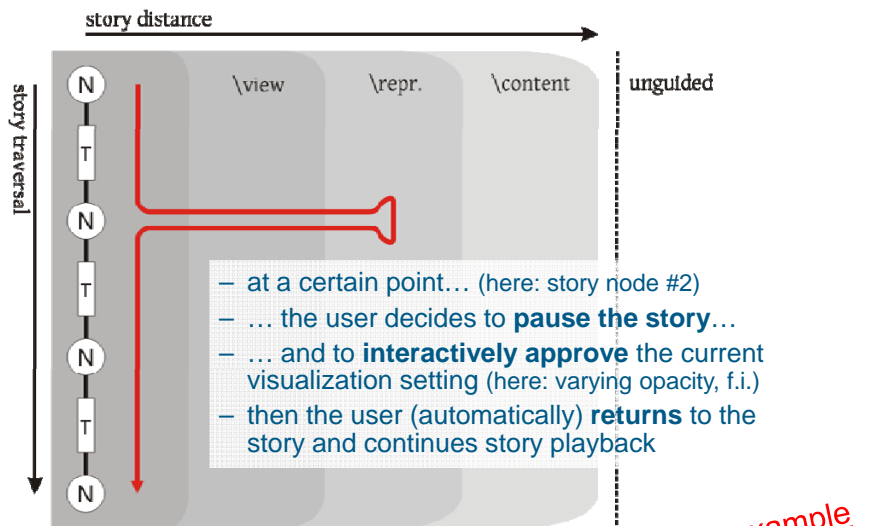
N

T

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T

N

T

N

story traversal

story nodes
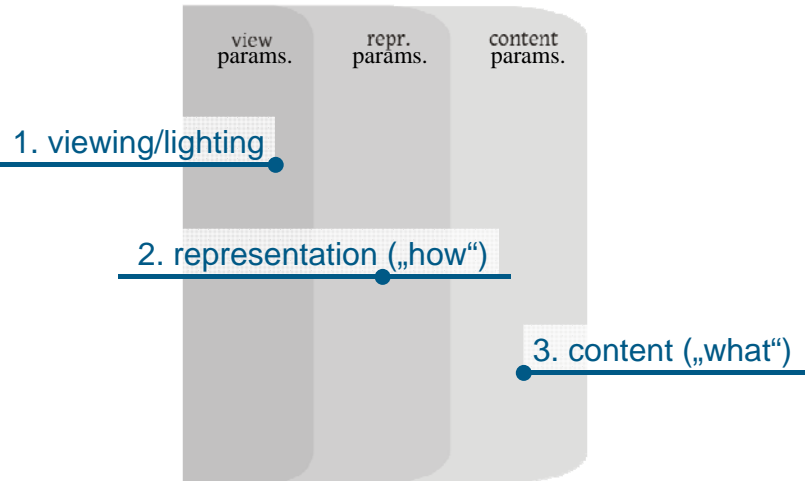
## Passive Story Consumption
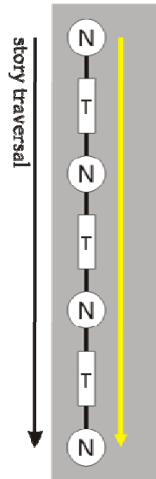
- default configuration, no interaction
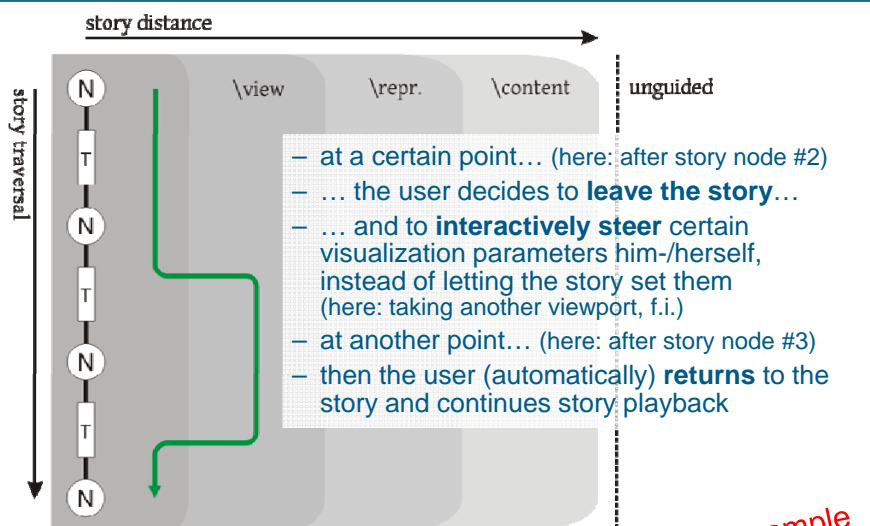- the story is consumed **like an animation**

## Story Telling and Interaction

- how far do we go off the story during interaction?

## Story Playback with Interactive Approval

story distance

story traversal

\view    \repr.    \content    unguided

- at a certain point… (here: story node #2)
- … the user decides to **pause the story**…
- … and to **interactively approve** the current visualization setting (here: varying opacity, f.i.)
- then the user (automatically) **returns** to the story and continues story playback

example



## Semi-Interactive Story Playback

story distance

story traversal

\view    \repr.    \content    unguided

- at a certain point… (here: after story node #2)
- … the user decides to **leave the story**…
- … and to **interactively steer** certain visualization parameters him-/herself, instead of letting the story set them (here: taking another viewport, f.i.)
- at another point… (here: after story node #3)
- then the user (automatically) **returns** to the story and continues story playback

example

**Total Separation from the Story**

story distance

story traversal

N
T
N
T
N
T
N

\view    \repr.    \content    unguided

– at a certain point… (here: after story node #3)
– … the user decides to **leave the story**…
– … and to change to **interactive visualization** (no return to the story)
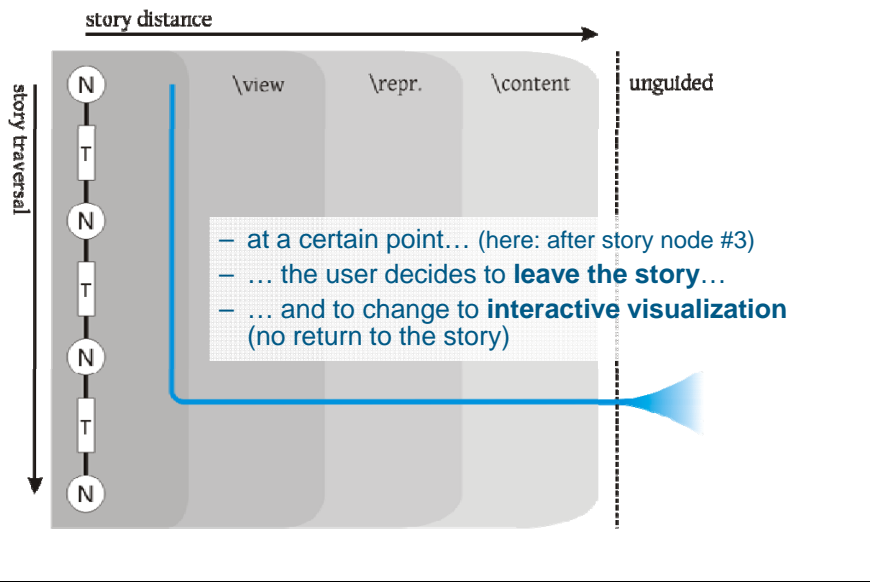


**All Four Interaction Patterns**

story distance

story traversal

N
T
N
T
N
T
N

\view    \repr.    \content    unguided

passive story playback

st. telling with interactive approval

semi-interactive story playback

total separation from story
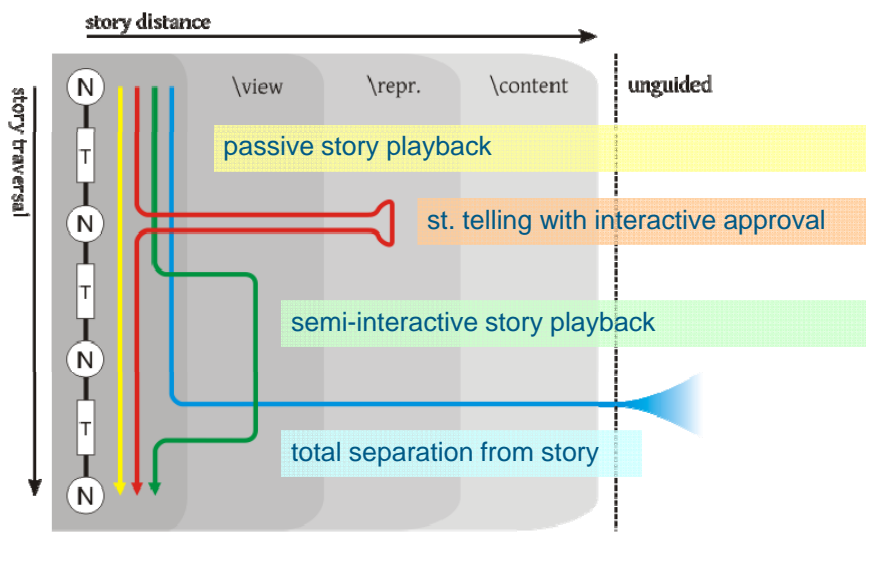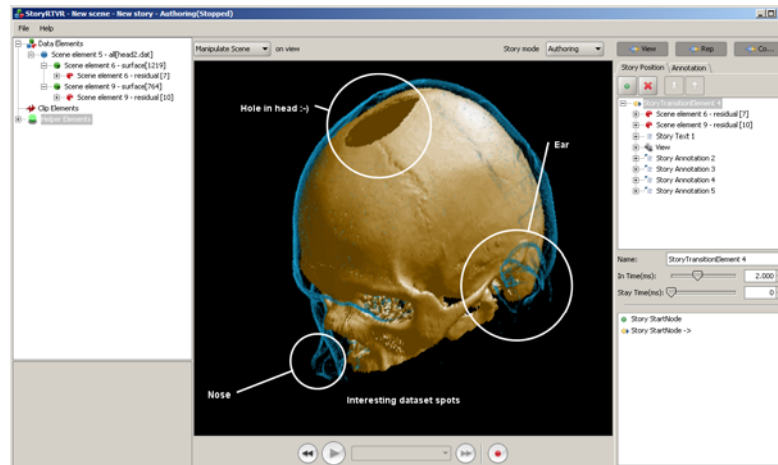
# Story Authoring

- **Story generation**, then **story editing**
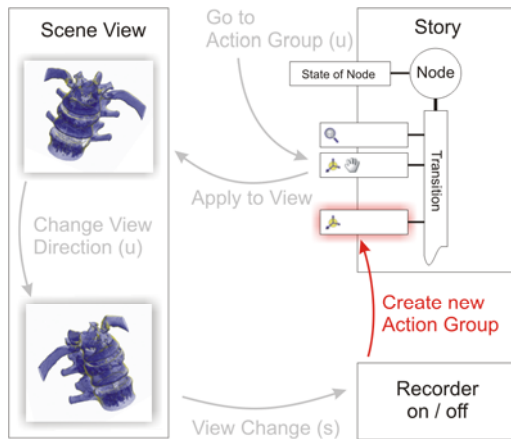


# Implementation

- Based on RTVR (Java)

## Story Telling for Presentation

- New approach to improve
  - comprehensibility
  - credibility
- Presentation relevant (often costly)
- Semi-interactive visualization
  - guided interaction (if interaction at all)
  - adapts to user preferences
- Future opportunities
  - automatic export of reports
  - delayed / remote cooperation (joint analysis)
  - documentation

## Acknowledgements

- **Michael Wohlfart** (did his Master on all this)
- **Lukas Mroz** – RTVR, support, much more!  ;–)
- The **Meister**!
- **Ivan Viola**, **Stefan Bruckner** – very valuable input!
- **Bernhard Preim**, **Knut Hartmann** – great exchange!

- *You!*  for your attention!

- **K*plus*.at** for funding – very important!  ;–)

## Workshop Questions / Considerations

- **What techniques/approaches to use in visualization** (and which not)?

- **Story telling in objective visualization** (no intended interpretation)?

- **Story telling outside the presentation context** (in exploration/analysis)?