Overview

Data: 7 versions of a Wiki article
Task: explore document history

Timeline

Time curves: Folding Time to Visualize Patterns of Temporal Evolution in Data
Benjamin Bach, Conglei Shi, Nicolas Boudet, Tao Yu, Pedro Duarte
Microsoft Research-Inria Joint Centre, IBM Watson Research Centre
Revised: 14 October 2015

What: Data
Time series: Wikipedia histories, videos, and dynamic network

Why: Task
Overview and identify patterns

How: Method
Information encoding
Timeline
Curvilinear distance: cumulated changes
Spatial distance: effective changes

Validation

Live demo

http://www.aviz.fr/~bbach/timecurves/

Outline

What
Why
How
Validation

Outline

What
Why
How
Validation

Outline

What
Why
How
Validation

Outline

What
Why
How
Validation

Validation (algorithm)

Informal user feedback
Users: one neuroscientist over two months
Task: identify/compare patterns in fMRI data
Result: encouraging feedback regarding the usability

Validation (domain situation)

Informal user feedback
Users: one neuroscientist over two months
Task: identify/compare patterns in fMRI data
Result: encouraging feedback regarding the usability

Patterns and examples!
Geometric characteristics

- No effective progress
- Ineffective reversal
- Many small changes
- Chaotic processes

Curves between two remote time points

Patterns

- Cluster: minor revision
- Transition: big progression
- Cycle: back to previous point after a long progression
- Outlier: large sudden changes

Specific combination of geometric characteristics

Surveillance video

- Derived data
- Distance: normalized absolute pixel difference
- Patterns: Cluster: minor changes
- Outliers: moving people

Video summarization, anomaly detection

Cloud coverage and precipitation

- Patterns: Extremes: Jan & Aug
- Dec goes to Apr

Conclusion

- A general approach for visualizing patterns of evolution in temporal data
- Demonstrated by lots of examples (solid work)
- Gives developing history of time curve method

Useful in other domains such software engineering management, law making study...

Critiques

- No direct comparison with previous work
- Validation is insufficient

Video Interpretation from [37]

Image Spaces and Video Trajectories: Using Isomap to Explore Video Sequences

Animated movie example in the paper

Thanks!

Q&A