Application1: pattern search

- Interface for multi-variable view

Application1: pattern search—Critiques

- Strength: successful to improve the flexibility of pattern search
- Weakness: not able to deal with complex operation among data streams

Application1: pattern search algorithm

- Algorithm: 
  \[ f(Q, C) = \min_{Q} \sum (C - Q)^2 \]
- Too naive?
- Options for constrains: offset, translation, magnitude scaling, linear trend removal, noise reduction

Application1: 3 steps for pattern search

- Reduce the scope of query
- Search and highlight
- Filtering by

User-centered analysis via events

- Event specify
- Event detect
- Event representation

Summary for "Method" paper

- Critiques:
  - Strength: clear structure for designer to start
  - Unmentioned: how to process the raw data? Which method to choose?

Paper: Time-oriented

- Time-oriented vs. time-series
  - Why do that?
  - Ubiquitous in many application domains
  - Basic temporal abstraction
  - Too naive?

Temporal data abstraction

- Challenges
  - Large amount of data
  - High frequency time-series
  - Too many attributes to concern

- Methods
  - Temporal data abstraction
  - Principal Component-based Analysis (PCA)

Analyzing methods

- Challenges
  - Large amount of data
  - High frequency time-series
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- Methods
  - Temporal data abstraction
  - PCA—Principal Component-based Analysis

Application1: pattern search


Application2: ChronoLenses


Time-Series Data

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Types to visualize

- Linear vs. cyclic
- Points vs. intervals

Analyzing methods

- Challenges
  - Large amount of data
  - High frequency time-series
  - Too many attributes to concern

- Methods
  - Temporal data abstraction
  - PCA—Principal Component-based Analysis

Entry points to start with

- Visualization
- Analysis
- User side

Referred Papers

- Exploratory Analysis of Time-series with ChronoLenses (Jian Zhao, Fanny Chevalier. IEEE TVCG 17(12):2422-2431 2011 (Proc. InfoVis 2011)).
2 main tasks
- (T1) Single-data stream transformation (e.g., Fourier Trans, remove mean)
- (T2) Cross-data stream analysis (e.g., Subtraction, inner product)

Lens & parameters
- $f_{T1}(x)$: Hide some streams according to the parameter
- $f_{T2}(y)$: Scale some streams according to the parameter
- $f_{T1}/y$: Similar to (T1)
- $f_{T2}/x$: Similar to (T2)

Strength
- Flexible interface
- Strong process ability for complex tasks
- Immediate response when moving the lens
- Domain independent

Weakness
- Layering and Tree-view limitation
- Large jump might occur when lens highly integrated
  Similar to microscope

Critiques
- Flexibility interface
- Strong process ability for complex tasks
- Immediate response when moving the lens
- Domain independent

Q&A

Thank You!