### Analysis Via Levels and Methods

- Examples in this and graphs/trees lecture
- Note: only sometimes does this analysis occur in paper itself!
- You need to interpret
- (also something to do in your own project!)

### Multiscale Scatterplots

- Blur shows structure at multiple scales
- Convolute with Gaussian
- Slider to control scale parameter interactively
- Easily selectable regions in quantized image

**Figure 3**: A 2D scatterplot displaying how the strength and application metric interact. Any device having a regular geometrical shape (be it rectangular — as with the sliders, or round — a brush, etc.).

### Problem and Abstraction Levels

- Minimal problem context: paper is technique-driven not problem-driven
- Task abstraction: selection and filtering at different scales within scatterplots

### Encoding/Interaction Level

- Basic solution: visual encoding technique: scatterplots
  - Mark: points, channels, bars and text position
- Interaction technique: range sliders to filter max/min
- Limitations
  - Interesting areas might not be easy to select as rectangular regions, esp for complex derived attributes

**Figure 1**: Chiricota, Jourdan, and Melancon. Metric-Based Network Exploration and Multiscale Scatterplot. Proc. InfoVis 2004, p 135-142.

### Multiscale Scatterplot Selection Technique

- New encoding: derived space created from original scatterplot image
- Greyscale patches forming complex shapes
- Enclosure of darker patches within lighter patches
- New interaction:
  - Simple: sliders for filter size $s$ and number of levels $k$
  - Complex: single click to select all items $x \geq k$

**Figure 4**: Chiricota, Jourdan, and Melancon. Metric-Based Network Exploration and Multiscale Scatterplot. Proc. InfoVis 2004, p 135-142.

### Method: Linked Views

- Second linked view: 3D node-link network
- Patch selection in blurred scatterplot view shows corresponding components in network view
- Selection in one view filters what is shown in the other

**Figure 8**: Chiricota, Jourdan, and Melancon. Metric-Based Network Exploration and Multiscale Scatterplot. Proc. InfoVis 2004, p 135-142.

### Results: IMDB

- Original data: IMDB graph
- Metrics: network centrality, node degree
- 3 hubs selected in network view

**Figure 7**: Chiricota, Jourdan, and Melancon. Metric-Based Network Exploration and Multiscale Scatterplot. Proc. InfoVis 2004, p 135-142.

### Results: IMDB 2

- Single click in blurred scatterplot view selects entire clique

**Figure 6**: Chiricota, Jourdan, and Melancon. Metric-Based Network Exploration and Multiscale Scatterplot. Proc. InfoVis 2004, p 135-142.

### Critique

- Strengths
  - Successful construction and use of derived space
  - Appropriate validation
  - Qualitative discussion of result images to show new technique capabilities
  - Synergy between encoding and interaction choices
- Weaknesses
  - Somewhat tricky to follow thread of argument since intro/ framing focuses on network exploration, but fundamental technique contribution more about scatterplot encoding/interaction
Hierarchical Parallel Coordinates

- Technique-driven paper
- No problem characterization
- Scale up parallel coordinates to large datasets
- Limitation: overplotting/occlusion

Parallel Coordinates: Basics

- Scatterplot limitation: vis enc with orthogonal axes
- Only 2 attributes with spatial position channel in plane
- Instead, line up axes in parallel to show many attributes with position channel
- Items shown with line with k segments (not as point)

Par Coord Tasks: Showing Correlation

- Pos corr: straight lines; neg corr: all cross at single point

Par Coord Tasks: Aggregation

- Strong neg corr between two final axis pairs

Hier Par Coords: Abstraction

- Data abstraction
  - Original data: table of numbers
  - Derived data:
    - Hierarchical clustering of items in table
    - Cluster stats: points, mean, min, max, size, depth
    - Cluster density: points/size
    - Cluster proximity: linear ordering from tree traversal
- Task abstraction
  - Finding correlations
  - Finding trends, outliers at multiple scales

HPC: Magnification Interaction

- Dimensional zooming: use all available space
- Method: linked view to show true extent

Critique

- Par coords
  - Strengths
    - Can be useful additional view
    - Can be used completely standalone
    - Now popular, many follow-on technique refinements
  - Weaknesses
    - Major learning curve, difficult for novices
    - Hier par coords
      - Strengths
        - Success with major scalability improvement
        - Again, careful construction and use of derived space
      - Weaknesses
        - Interface complexity (structure-based brushing)

HPC: Encoding Derived Data

- Vis enc: variable-width opacity bands
  - Show whole cluster, not just single item
  - Min/max: spatial position
  - Cluster density: transparency at mean point
    - Interpolate transparency between these

HPC: Interacting With Derived Data

- Vis enc: color based on cluster proximity derived attrib
  - Resolves ambiguity from crossings, clarifies structure

HPC: Encoding Derived Data

- Vis enc: color based on cluster proximity derived attrib
  - Resolves ambiguity from crossings, clarifies structure

Parallel Sets

- Technique-driven (problem char not main concern)
- Data abstraction
  - Table with categorical (not quant) attributes
    - Discrete
    - Small number of distinct values
    - Ordering between attributes not given
  - Cross-tabulation (multi-way frequency/contingency table)
- Task abstraction
  - Identify hotspots and major trends
  - Find relationships between dimensions and correlations between categories
  - Not outlier detection

Visual Encoding

- Like par coords but with boxes scaled by frequency values
- Color coded by values for current active dimension

Interaction: Reordering

- Boxes can expand to show histograms

Interaction: Aggregation

- Shows class distributions
- Crosses: class distribution
- Swarms: class distributions
## Presentations: Process Advice

**Bad idea:** make slides; give talk in class

**Good idea:** start early and refine iteratively

- make slides
- practice talk out loud with timer
- realize it’s too long
- realize it’s too short
- realize why order of explanation is backwards
- realize where you need more pictures/diagrams
- realize where you haven’t figured out what to say
- refine slides
- loop back up to practice; repeat until great!

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## Project Proposals I

- **Title (mandatory)**
- **Names/email for people on team**
- **Description of problem you’re targeting**
- **Description of proposed solution**
  - **Problem-driven:** design studies
  - **Technique-driven:** (new technique idea)
- **Analysis**
- **Survey**
- **Pre-proposal meetings:** deadline in two days
- **Many already done (I signed off)**
- **Not as complete as final, but you should have a start**
- **It gets better; practice makes it less scary**
- **Might have two people split one topic if it’s popular**
- **Vary your tone of voice**
- **Talk loud enough that we can hear**
- **Be specific not just generic (plan/code/writeup)**
- **Materials preparation:** 15%
- **Presentation style:** 15%
- **Content summary:** 50%
- **Talking to people who have not read your paper**

### Presentations: Process Advice

**Tips on practicing**

- always time it (whole thing; ideal slide by slide)
- best: give talk to somebody and get feedback
- at least once practice standing like giving real talk
- tips on slides
  - ensure smallest text readable from back of room
  - use color correctly (sufficient luminance contrast)
- tips on speaking
  - talk loud enough that we can hear
  - vary your tone of voice
  - get better; practice makes it less scary
- lots more useful tips

### Presentations: Process Advice 2

- tips on practicing
  - always time it (whole thing; ideal slide by slide)
  - best: give talk to somebody and get feedback
  - at least once practice standing like giving real talk
  - tips on slides
    - ensure smallest text readable from back of room
    - use color correctly (sufficient luminance contrast)
    - early drafts often text-oriented; add pictures as refine
  - tips on speaking
    - talk loud enough that we can hear
    - vary your tone of voice
    - it gets better; practice makes it less scary
    - lots more useful tips

### Topic Presentations: Signing Up

- **Title:** mandatory
- **Names/email for people on team**
- **Description of problem you’re targeting**
- **Description of proposed solution**
- **Materials preparation:** 15%
- **Presentation style:** 15%
- **Content summary:** 50%
- **Talking to people who have not read your paper**

### Presentations: Process Advice

**Tips on practicing**

- always time it (whole thing; ideal slide by slide)
- best: give talk to somebody and get feedback
- at least once practice standing like giving real talk
- tips on slides
  - ensure smallest text readable from back of room
  - use color correctly (sufficient luminance contrast)
- tips on speaking
  - talk loud enough that we can hear
  - vary your tone of voice
  - it gets better; practice makes it less scary
- lots more useful tips

### Reading For Next Time: NOTE CHANGE


### Project Proposals II

- **What user will do/see step by step in performing a task while using system**
- **Must include illustrations**
- **Previous work**
  - not as complete as final, but you should have a start
  - one per project due Oct 28 5pm as PDF by email
- **Subject header:** 533 submit proposal

### Reading For Next Time: NOTE CHANGE

