Exploratory Data Visualization for Smart Systems

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People & Visual Thinking
Data Visualization

• Gain understanding
  – Different outcomes
  – Pattern matching
  – Fast, parallel
  – Extends memory
  – Relations & Interactions
Visualization Power

Every Direction = Different Point of View
Can Serve Clear Purpose
What if only one side is shown?
What if I read data to you?
Culture Effect

• “I see what you’re saying”
• “Seeing is believing”
• “A picture is worth a thousand words”
Visualization Power :: Wasted

• Clear question?
  – what you’re seeking is precisely known

• visualization not best approach
  What can data visualization serve
New purpose of Visualization

• Overall Picture
• Outside View
Religion / Income / Population
Data Visualization Improvement

Presentation

• Explanatory

Analysis

• Exploratory

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Data Visualization Improvement

Presentation: Explanatory
• Clarify
• Focus
• Highlight
• Simplify

Show exactly as needed
Influence & persuade

Analysis: Exploratory
• Explore data
• Assess situation
• Ask What?
• Decision Making?

Statistics
Database & information retrieval
Data mining
Machine learning

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Exploratory Data Visualization

• Don’t have clear questions!
• Don’t know what to find!
• From Data Exploration
  – Start Asking ??

• Most Useful Exploratory Visualization
  – Variables not clearly related
  – Motivate illogical interactions
Value of Exploratory Data Vis

• Time
  – Answer fast

• Discovery
  – Find more questions
    = more understanding

• Trust
  – True Reality

• Overall Pictures
  – Illogical relations
Too much data: Big Data

• No logical clear purpose
• Try different visual inter-relations
• New Representation & interactions
Building Exploratory Data Vis

Filter Independently → Data Tables → Gather Data

Data Mining → Represent Refine → Interact
Population / Capacity / Distribution
Exploratory Data Vis

• How to link data
• one common variable
  – Location
  – Time
  – Activity
  – ..... 
  – ..... 
  – Any variable can do!!
Time / Population / Capacity
Questions?

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