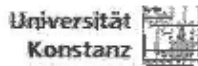


# Getting the information across to the user

**Daniel A. Keim**

Data Analysis and Information Visualization Group



May 4, 2010

## Data Analysis and Visualization Research Group

Daniel A. Keim

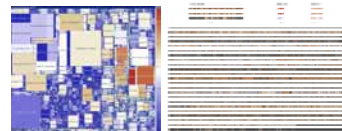
### Problem

- Information overload is major problem of the information age



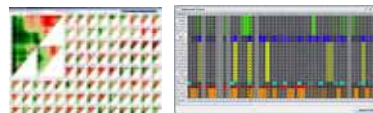
### Approach

- Integration of automated data analysis methods and interactive visualization techniques



### Research Areas

- Security Applications
- Document Analysis and Visualization
- Large-Scale Information Visualization
- Network Security and Financial Data Analysis
- Geo-Spatial Analysis
- Multimedia Analysis



### Research cooperations



## Challenges in Security Applications

- **Massive Amounts of Data**  
from heterogeneous, dynamic, ambiguous,  
and often conflicting sources
- **Complex Discovery, Monitoring and  
Communication Tasks**

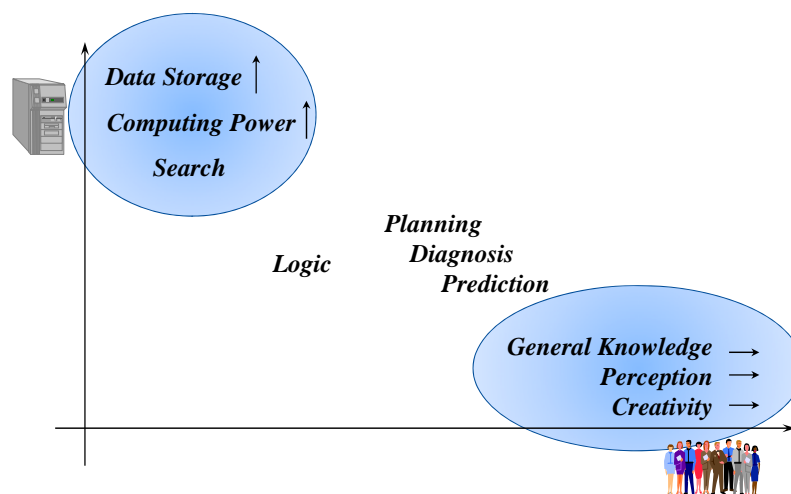
**“Discovery consists of seeing what everybody has  
seen and thinking what nobody has thought.”**

**Albert von Szent-Gyorgyi (1893 - 1986)**

→ **full automation not possible**

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## Abilities of Humans and Computers



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## Definition of Visual Analytics

### Definition:

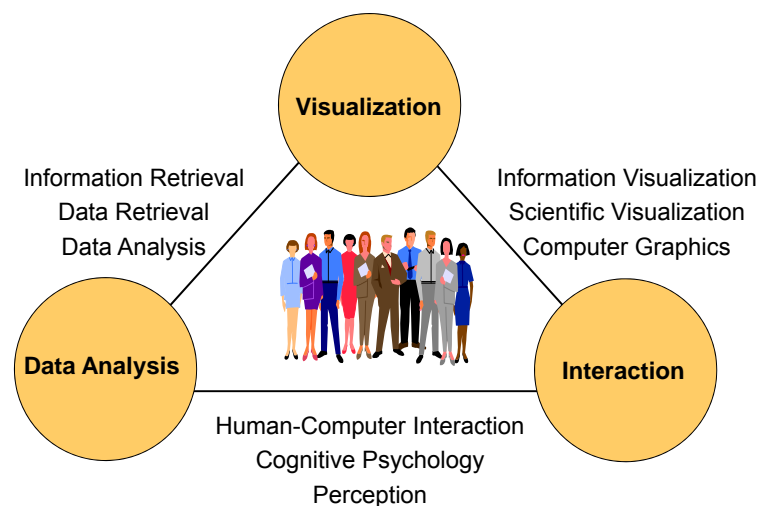
**Visual Analytics is the science of analytical reasoning facilitated by interactive visualizations.**

Visual analytics techniques are needed to

- integrate data from massive, dynamic, ambiguous, and often conflicting sources
- analyse the data to derive new insights
- make critical decisions (in real-time).

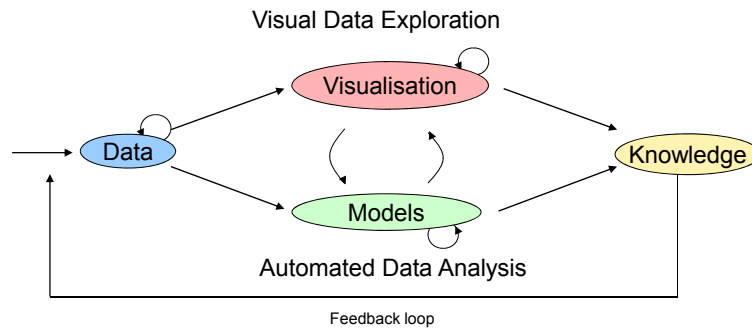
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## Visual Analytics



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## Visual Analytics Process



### Research Challenges:

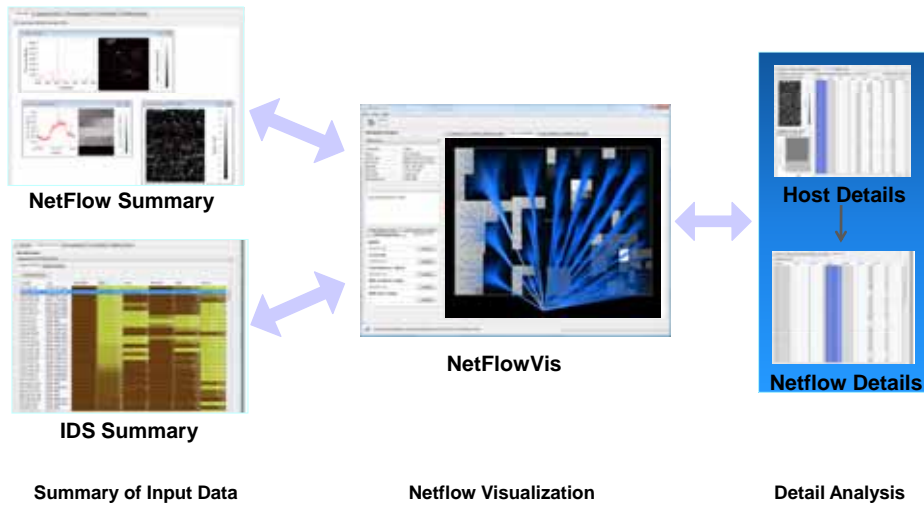
- Integration of automatic techniques and information visualization into a human guided knowledge discovery process
- How to best combine interactive visualizations with automated analysis?

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## Visual Network Security Analysis

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## Network Analysis with the NetFlowVis System



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## Visual Network Analysis

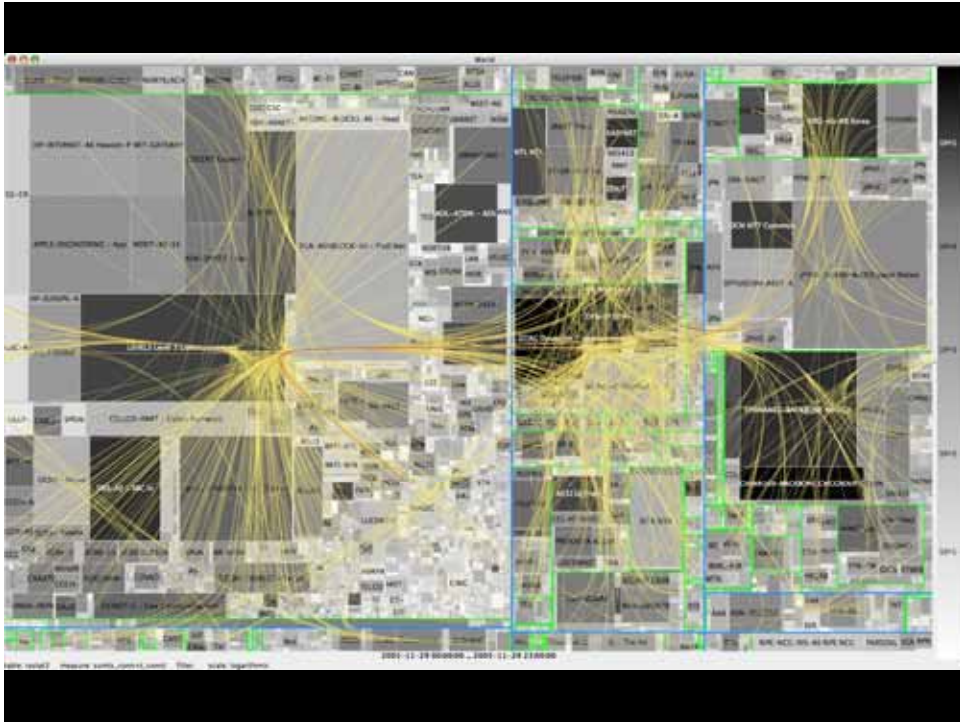


### Hierarchy:

- **Continents**
- **Countries**
- **Autonomous Systems**
- **Networks**

data: rzstat3    date: 29 Nov 2005    measure: outgoing connections

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## Conclusion

**“All truths are easy to understand once they are discovered; the point is to discover them.”**

**Galileo Galilei (1564-1642)**

**Questions?**

***infovis.uni-konstanz.de***