

**University of Stuttgart**  
Germany

# Discussion, Summary, and Future Challenges

Michael Burch

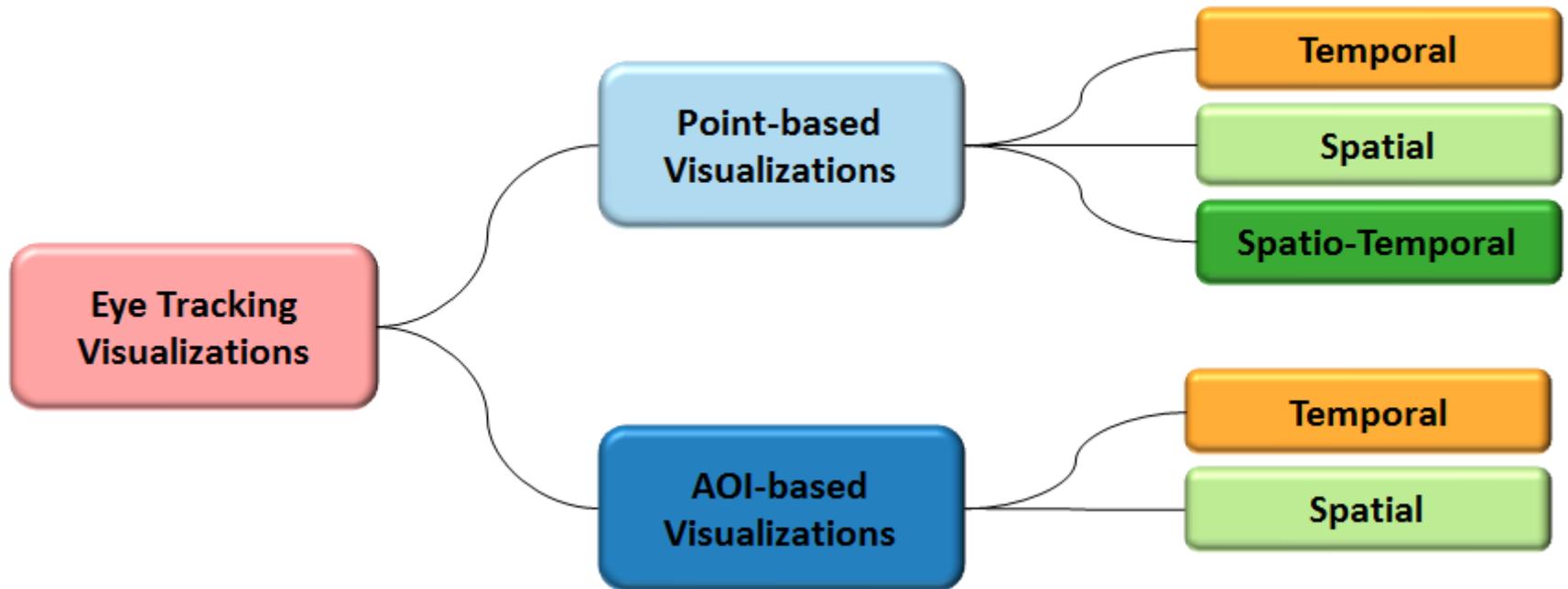
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Eurographics Tutorial: Eye Tracking Visualization | 05/04/2015 | Zürich, Schweiz



Visualization Research Center  
University of Stuttgart

# Taxonomy for Eye Movement Data Visualization

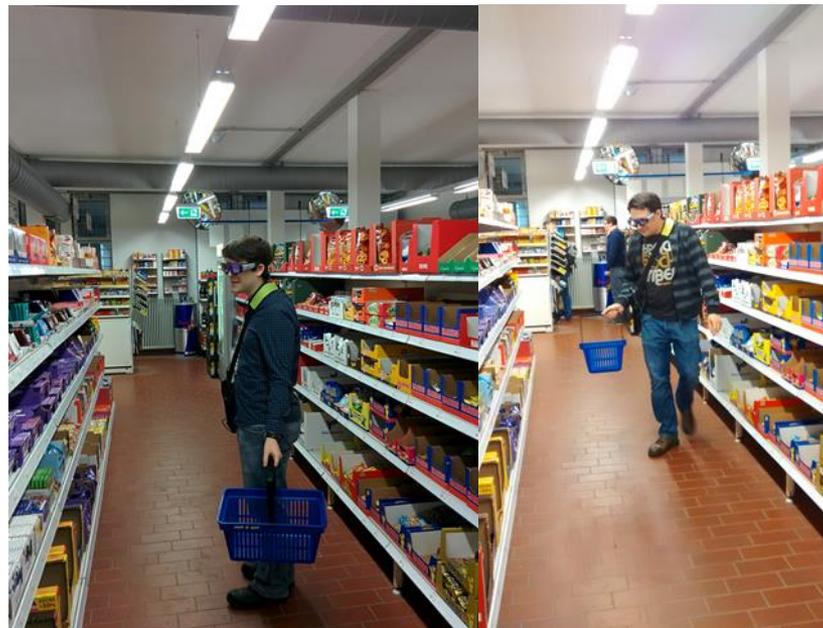


# Discussion of Future Research Directions

- Visualization techniques for
  - Point-based data
  - AOI-based data
- Few interactive techniques
- Few spatio-temporal techniques for AOI-based data

# Limitations of Point-Based Methods

- No semantic information
  - Patterns over time hard to interpret
- Comparison of participants with active stimulus content problematic



# Limitations of AOI-Based Methods

- Few in-context techniques
  - Loss of mental map
- Scalability
  - Representation of many AOIs



# Stimuli with Active Content

- Participants can influence the stimulus
  - Web pages
  - Interactive tools
- How to compare participants?

# Aggregation of Stimuli

- Typically more than one stimulus is shown.
- Eye movements are recorded for each stimulus separately.
- Can we generalize the visual task solution strategies?
- Can we find similar visual task solution strategies in different stimuli?
- Can we combine/aggregate all stimuli of similar characteristics?

# Statistical Evaluation of Eye Movement Data

- How can we build hypotheses about visual task solution strategies?
- How can we confirm or reject them based on numbers not on visually inspecting the visual attention?
- Can we do this automatically without annotating the eye movement data by using semantics of the stimulus?

# The Best Solution

- Visualization techniques depend on the analysis task
- Visual Analytics approaches that combine
  - Multiple Visualizations
  - Interaction
  - Statistics
  - Algorithms
  - The human user (or more of them)

# General Challenges

- Many more eye tracking studies needed
  - More data sets to experiment with
- Eye tracking devices are expensive
- Results of eye tracking studies in form of a publication cannot be expected before one year

# Future Challenges

