Method Choosing Decision Model for Eye Tracking

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Eye Tracking: Why, When, and How | Dresden | 24.08.2013
Motivation

New visualization

New visualization useful for task / goal?

Eye tracking experiment design

Analysis of data

Time consuming / knowledge gap

Eye tracking experiment conduction

300 – 400 scanpaths

30 participants
Motivation

Research question

Results of experiment
Method Choosing Decision Model

Experimental Design

Analysis Model

Experimental Conduction

Decision Model

User Interaction

Results of Experiment

Matching Model

Analysis Process
Experimental Design

- Visualization Technique
- Variables
- Research Question
- Tasks
- Stimuli
- Experimental Categorization
- Experimental Design Method
- Data Collection Method
- Experimental Conduction
- Analysis Model
- Matching Model
- Results

Structured and machine readable format
Experimental Conduction

Collected Experimental Data

- Eye Tracking Data
- Interaction Data
- Other Data
- Participant Data
- Performance Data

Automatic collection, machine readable format
Matching Model

Eye Tracking

Analysis Tasks

Visual Analysis Methods

Visual Analytics

Visualizations

Experimental Design

Matching Model

Analysis Model

Results

Andrienko et al. (2013)
Analysis Model

- Rules / Guidelines
- Decision Model
- Analysis Concept
- Feedback
- User Interaction
- Method Selection
- Analysis Process
- Experimental Design
- Matching Model
- Results
Application Example

- **Basis: Experimental Design**
  - Compare “Time Line Trees” with “Time Radar Trees”
  - Research Question: Why can TLTs better answer questions than Time Radar Trees?

![Time Radar Tree](image1)

![Time Line Tree](image2)

**Burch et al. (2008)**
Application Example

1. DM: Suggest multiple analysis tasks
   1. Overall spatial pattern of eye movements
   2. Examine trajectories of participants
Application Example

1. DM: Suggest multiple analysis tasks
2. AP: Choose one analysis task
   1. Examine trajectories of participants
Application Example

1. DM: Suggest multiple analysis tasks
2. AP: Choose one analysis task
3. DM: Suggest multiple visual analysis methods
   1. Scan path
   2. Space time cube
Application Example

1. DM: Suggest multiple analysis tasks
2. AP: Choose one analysis task
3. DM: Suggest multiple visual analysis methods
4. AP: Choose on analysis method
   1. Scan path
Application Example

1. DM: Suggest multiple analysis tasks
2. AP: Choose one analysis task
3. DM: Suggest multiple visual analysis methods
4. AP: Choose one analysis method
5. DM: Create visual analysis method
   1. Scan path is created from input data
Application Example

1. DM: Suggest multiple analysis tasks
2. AP: Choose one analysis task
3. DM: Suggest multiple visual analysis methods
4. AP: Choose one analysis method
5. DM: Create visual analysis method
6. AP: Use visual analysis method
7. AP: go back to step 1 or 3
Conclusion and Future Work

- Method Choosing Decision Model for Eye Tracking Data
  - Experimental Design
  - Experimental Conduction
  - Matching Model
  - Analysis Model: Decision Model + Analysis Process

- Future Work:
  - Define appropriate analysis tasks
  - Define and create visual analysis methods
  - Define the matching model
  - Define rules and guidelines for the decision model
  - Conduct case studies to test the model