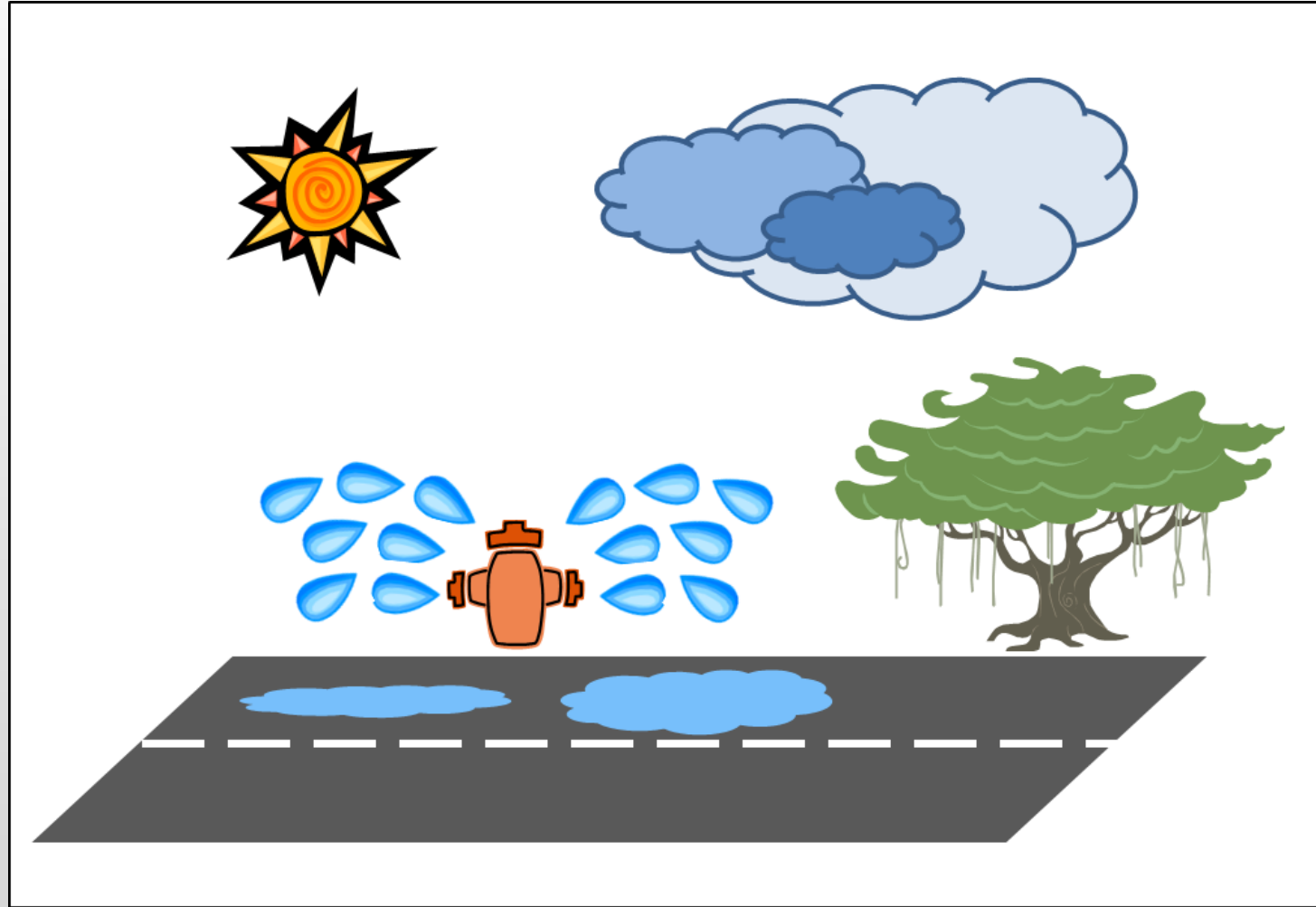


Introduction to the scientific fundament of Blickshift Analytics

Michael Raschke

Motivation



How difficult is it to read a visualization?

State of the Art: Eye-Tracking

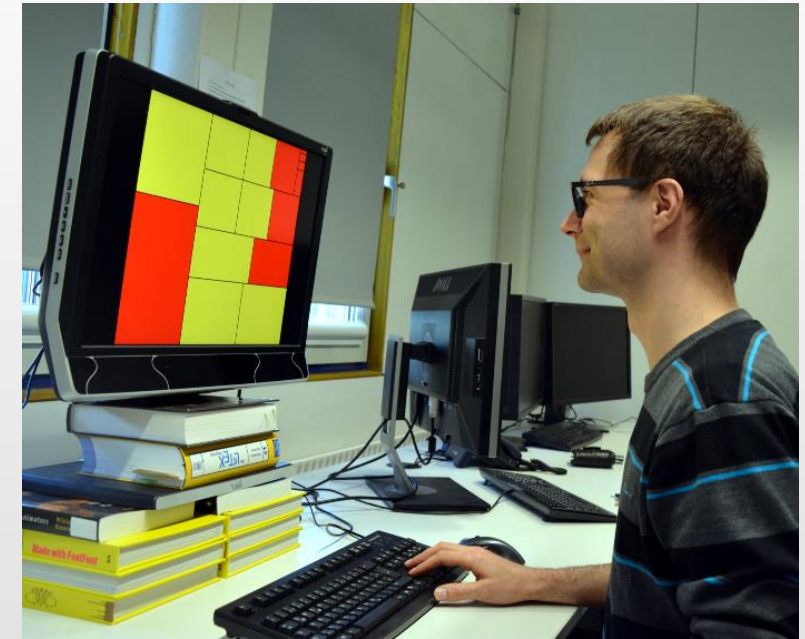
- Recording of eye movements:
Fixations, saccades, pupil diameter



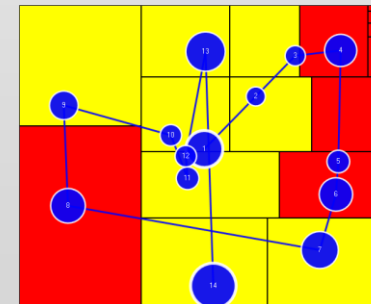
Analysis of cognitive processes

- In most cases, the analysis is done with statistical methods and simple visualizations

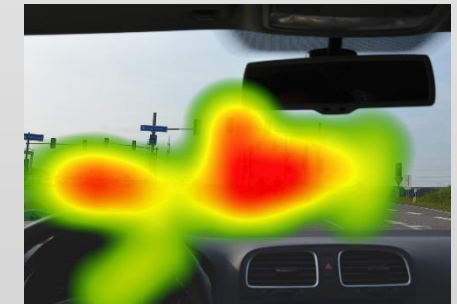
Visual Method is missing



Desktop-based system Tobii T60 XL

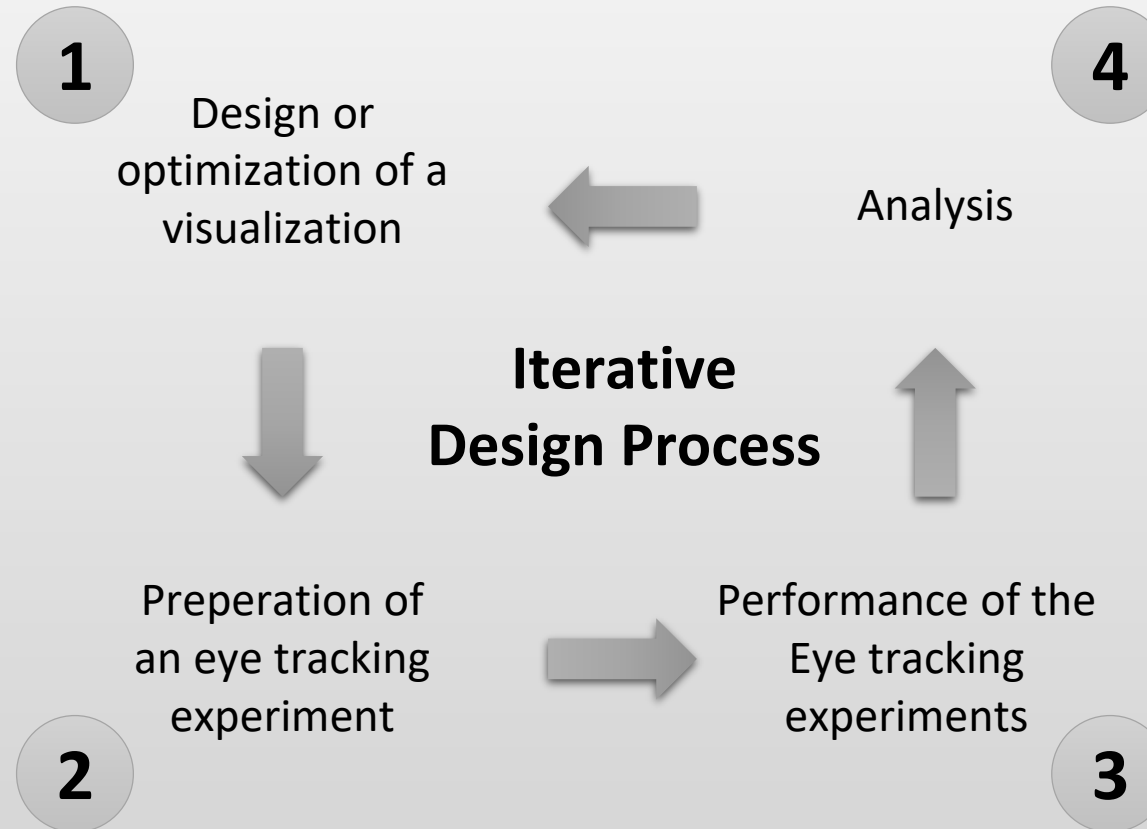


Scan Path
Visualization



Heat Map
Visualization

My personal motivation

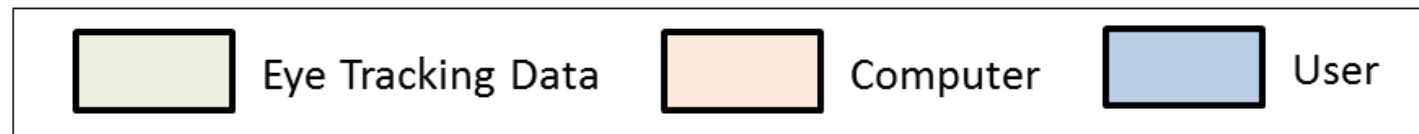
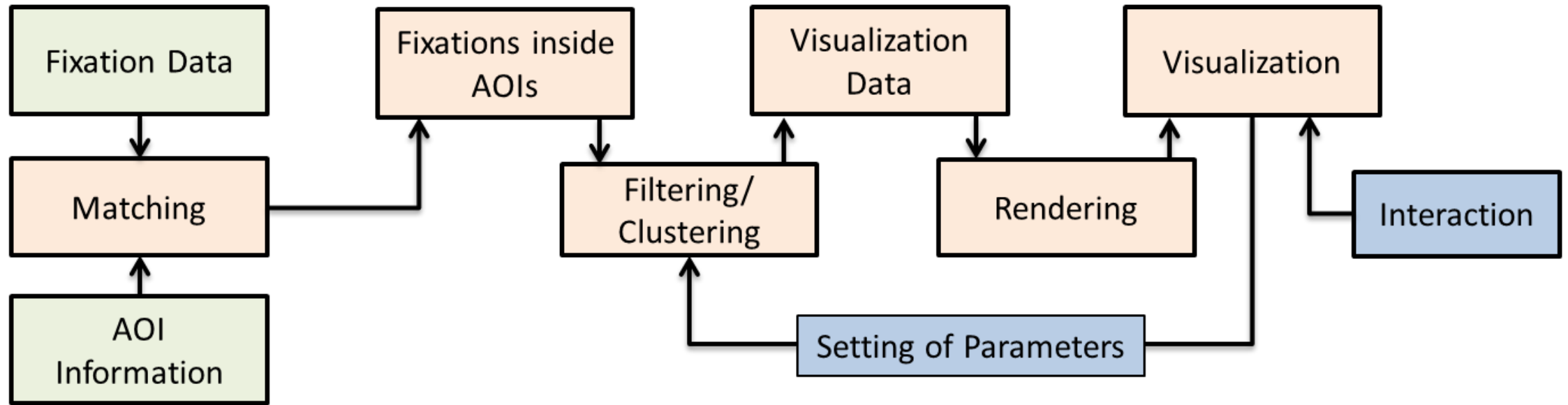


Parallel Scan Path Visualization (PSP)

- Are there general eye movement patterns?
- Can different user groups be distinguished?
- Visual search strategies
- Analysis of cognitive and perceptual processes

Analysis pipeline

← Data Preparation → Interactive Visualization →

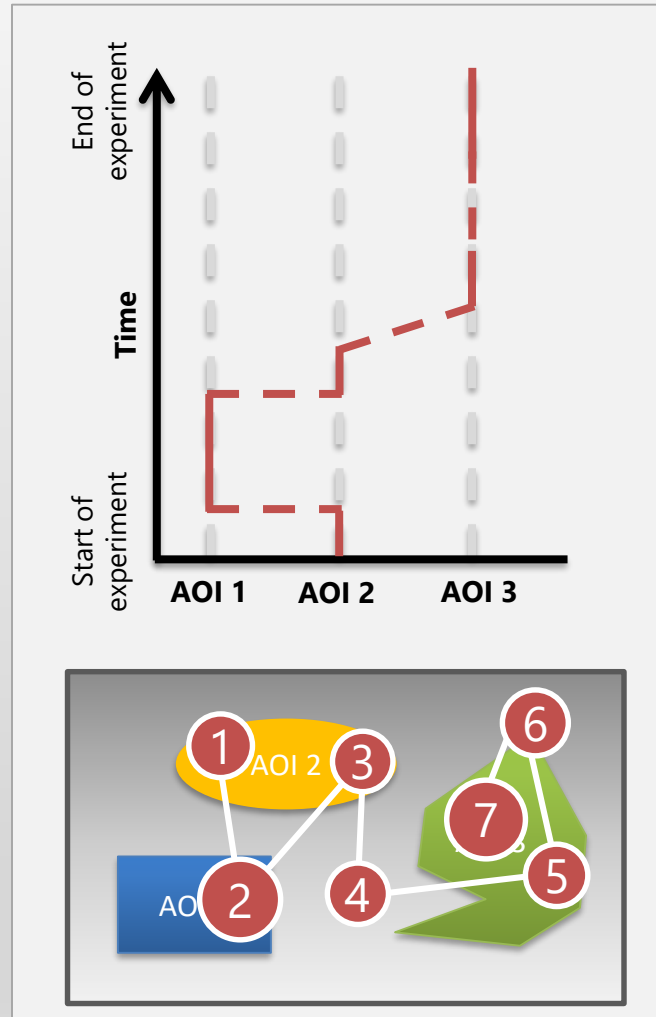


Parallel Scan Path Visualization (PSP)

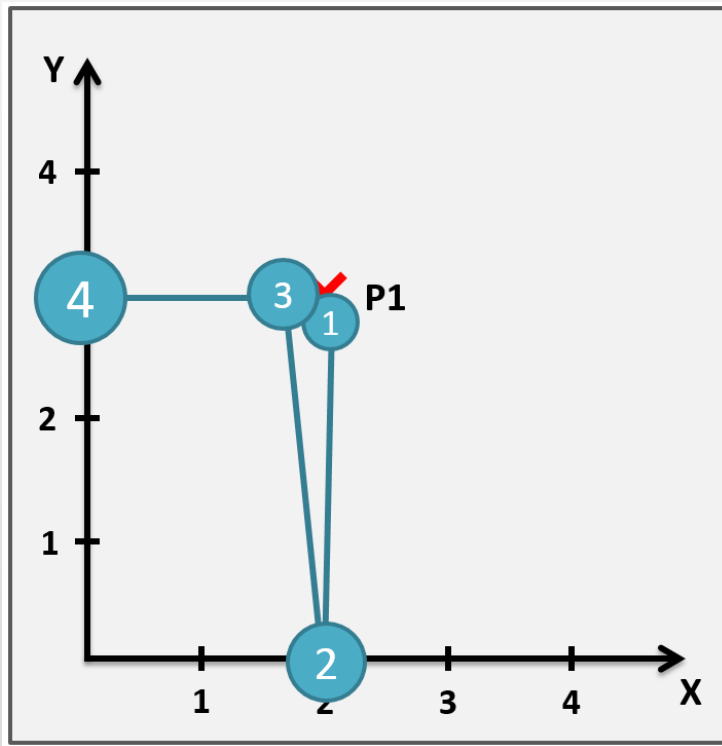
- AOI-based
- AOIs are shown with vertical lines

Eye Tracking Metrics

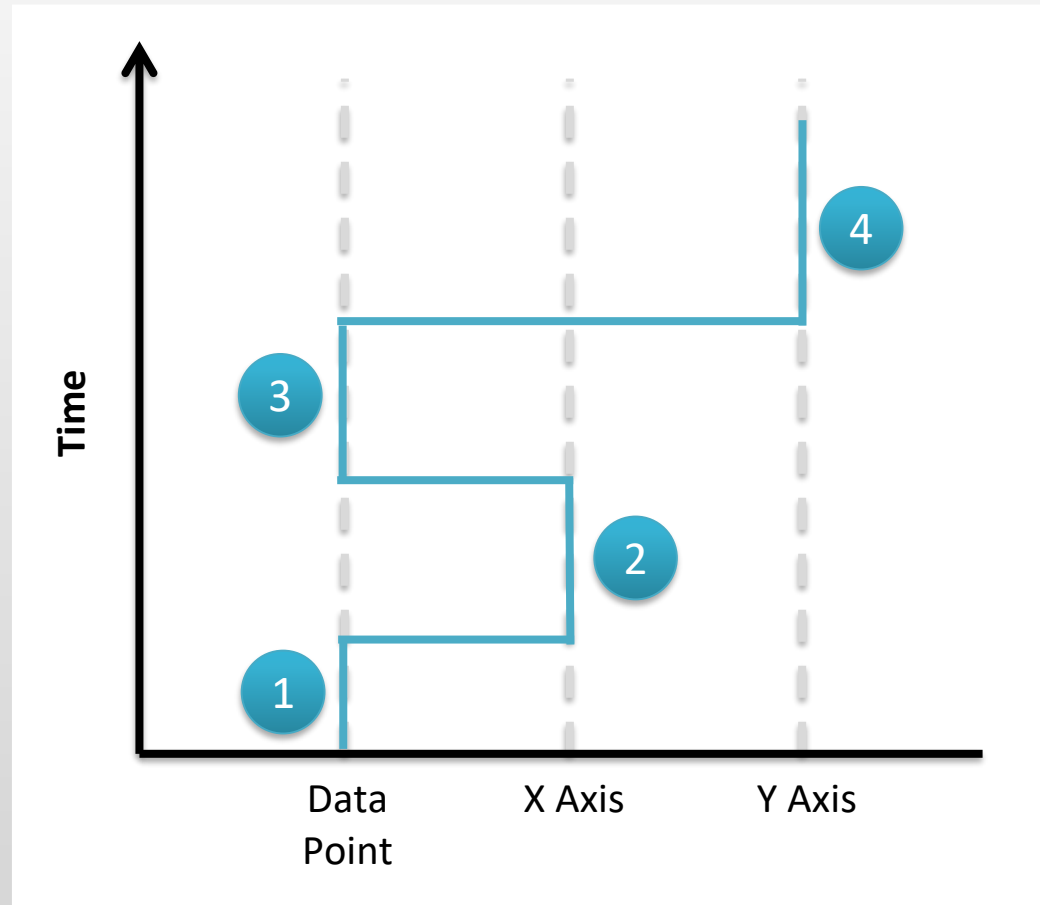
- Gaze duration
- Transitions (transition frequency)
- Fixations outside AOIs
- Single fixations
- Fixation frequency
- Time independent visualization



Visual Analysis of Cognitive Processes

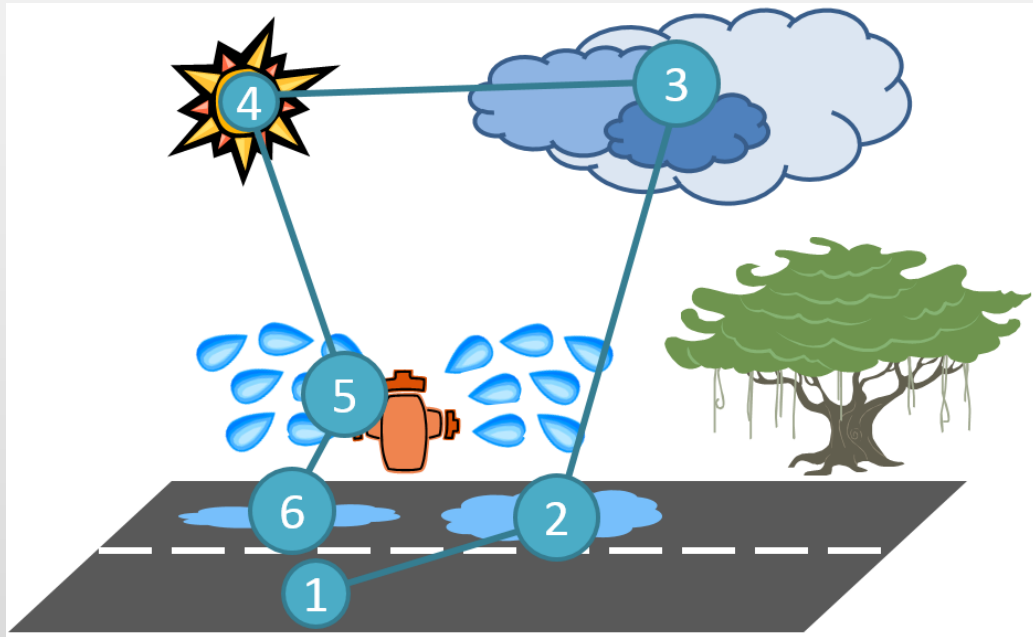


Please give the coordinates of point P1?

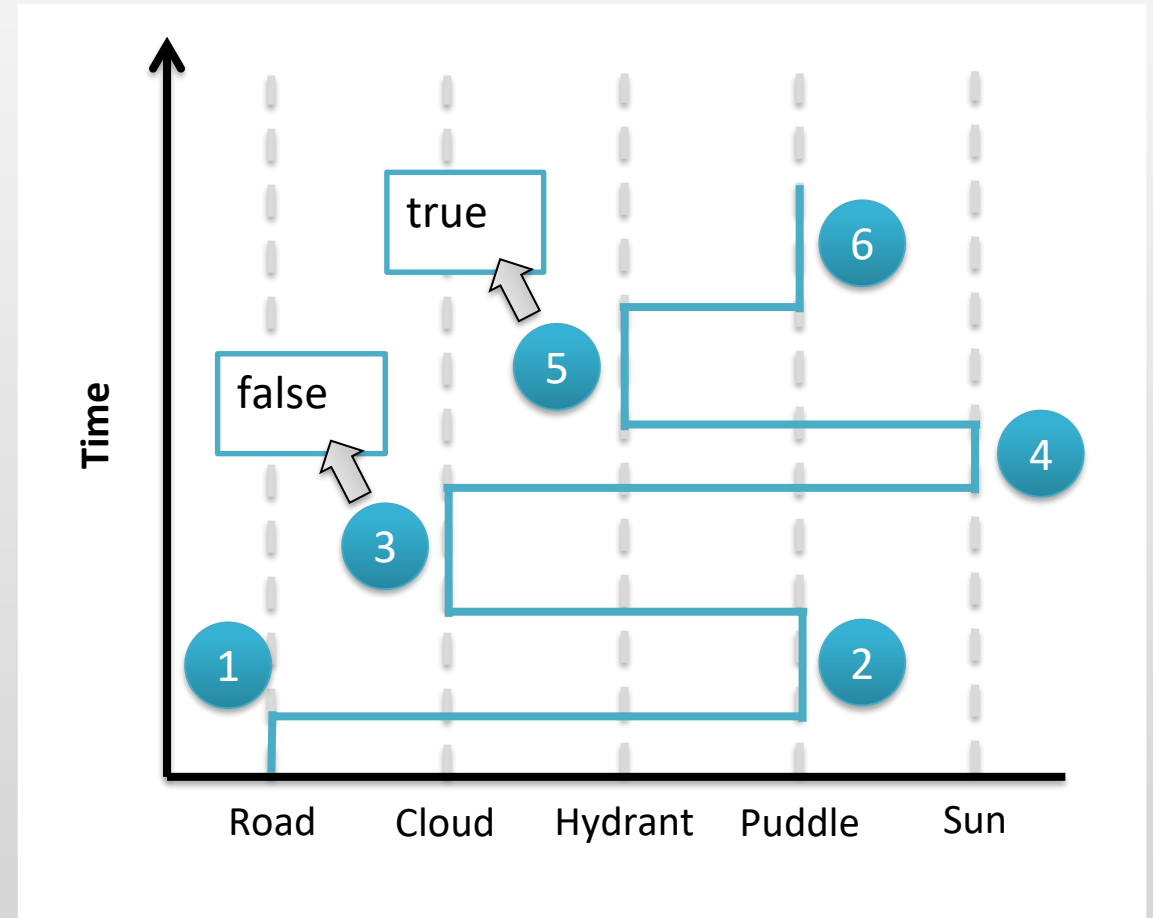


Reading Information

Visual Analysis of Cognitive Processes

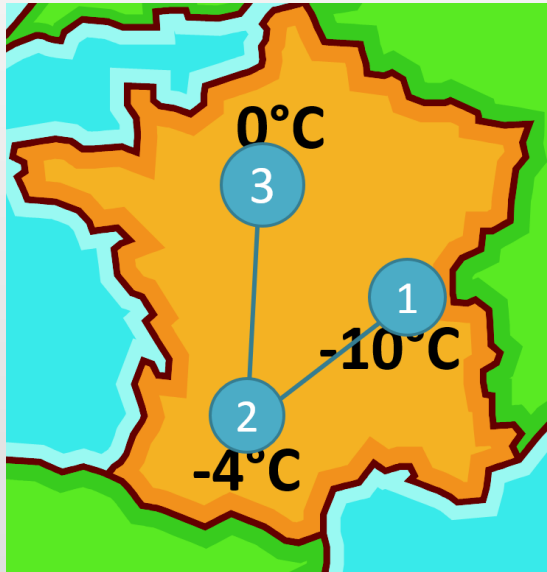


Why is the road wet?

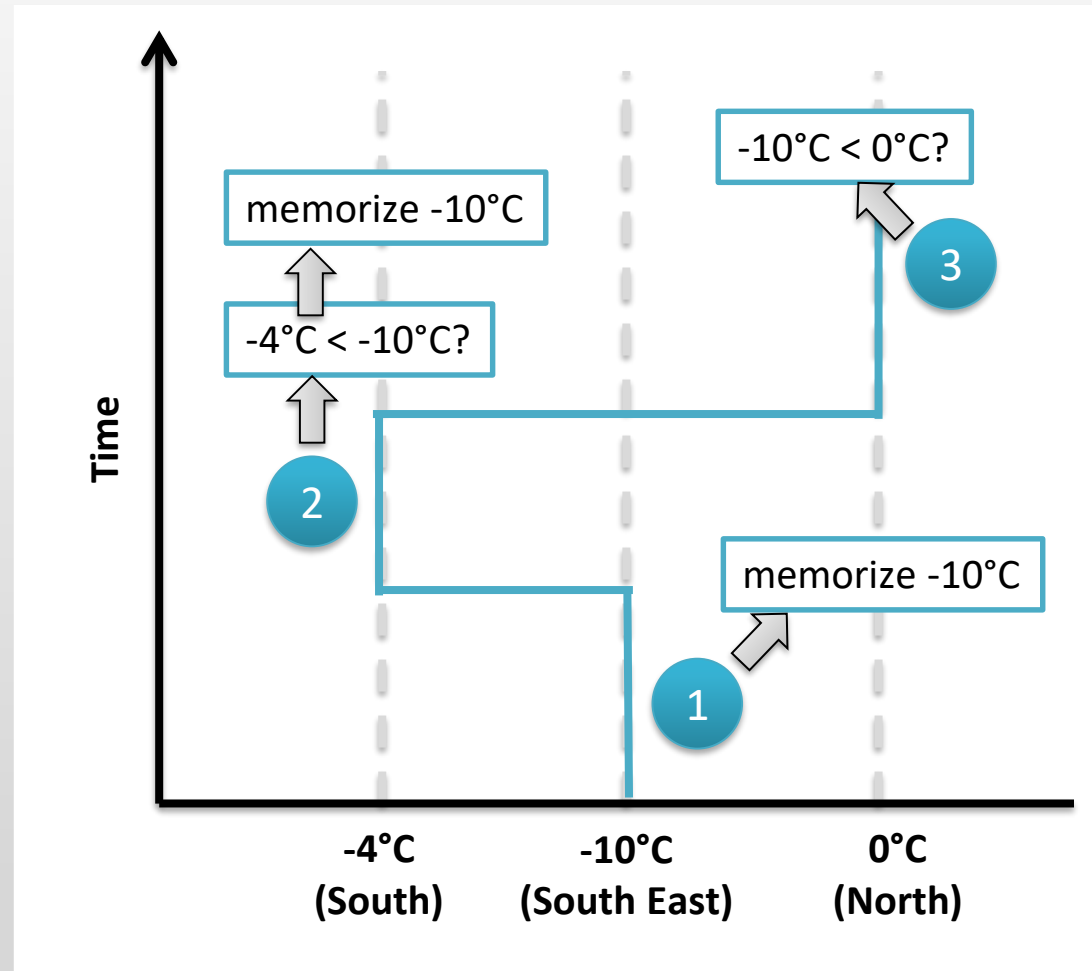


Drawing Conclusions

Visual Analysis of Cognitive Processes

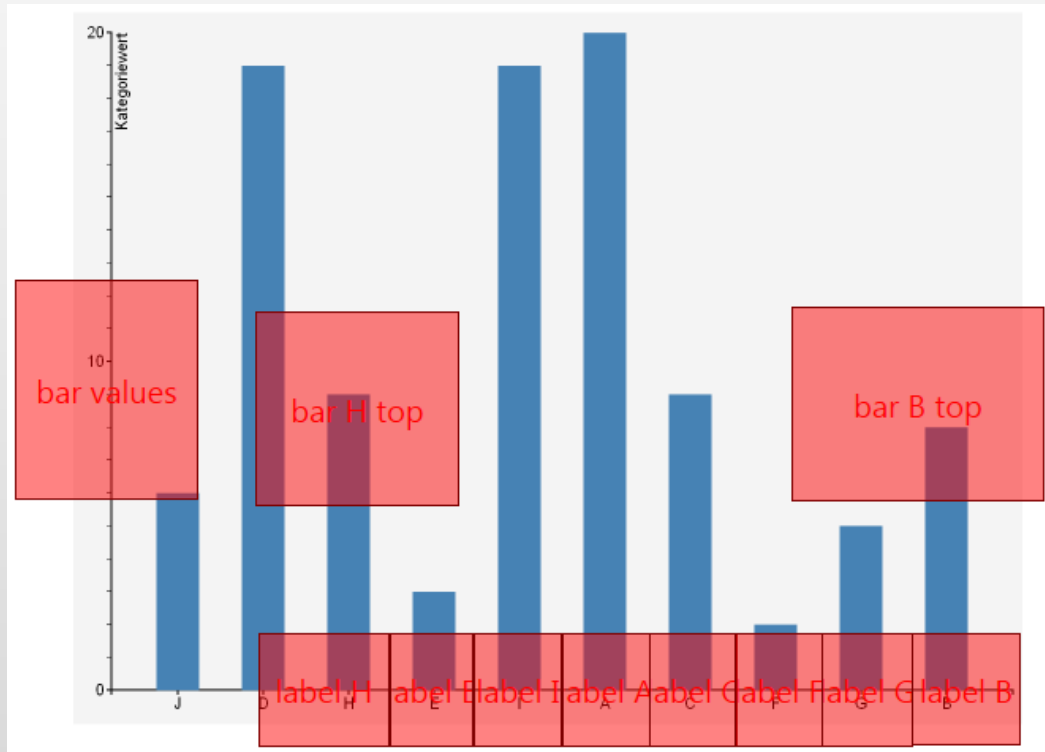


Is the lowest temperature in southern France lower than in the north?

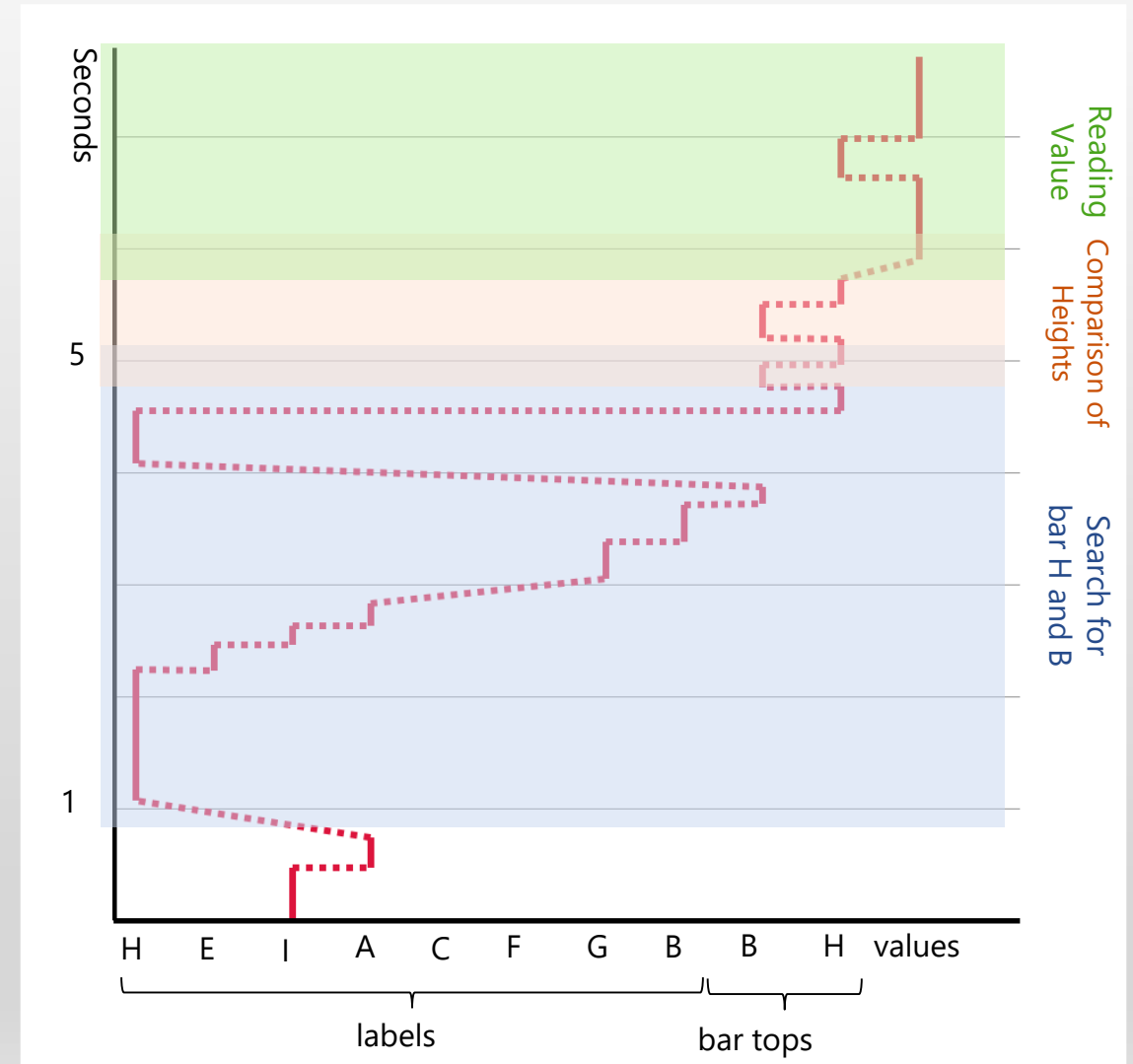


**Combination of Reading and Drawing
Conclusions**

Visual Analysis of Cognitive Processes



Give the higher value of the two bars with the labels "H" and "B".



Scientific Outlook

- Further algorithms for scan path comparison
- Test with complex visualizations
- Additional information channels
- „Big Eye Tracking Data Analysis“
- Iterative design process
- New possibilities for the analysis of memory processes

Blickshift GmbH
Schelmenwasenstraße 34
70567 Stuttgart
Deutschland



Dr. Michael Raschke
+49 711 184 245 26
michael.raschke@blickshift.de

www.blickshift.com



<http://twitter.com/Blickshift>



<https://www.youtube.com/channel/UC4SaxIfONsaQjhsRBq9cIA>