# Master thesis

## Topic: Cognitive biases in Visual Analytics: discovering and reducing

Now days a huge volume of information can better and faster understanding only using visualizations. However, human cognition is susceptible to biases that can affect perception, interpretation, and ultimately decision-making. Systematic biases in human decision-making processes that have both a negative and positive impact on decision-making. For an intuitive quick decision, the bias system is the basis and main assistant, while with a deeper consideration of the factors influencing the decision, biases often have a negative impact by limiting and distorting the analytical process. When they intersect with data visualizations, they can mislead or oversimplify reality. A new research direction "visualization psychology" considers cognitive aspects in visualization decision-making models that provide significant assistance in the decision-making process and contribute reducing cognitive load. To improve visualization research in the context of decision-making, it is crucial to understand the impact of biases on visual attention and system thinking.

**The goal** of this master thesis is using the task-based taxonomy of cognitive biases, investigate the presence of each of the list in standard data visualizations most often used in dashboards and propose methods of debiasing or mitigation its impact.

**The focus** is on:

1. Critical analyzing and interpret data visualizations – which information people attend to in visualizations, which knowledge someone seeks to gain from a visualization, how people use visualizations.
2. Discovering cognitive biases in a visual analytics environment - using psychological empirical techniques to better understand the cognitive implications on decision making process and how people use visualizations to reduce the cognitive load.
3. Perspectives on human bias in visual analytics and debiasing - make new guidelines for precise and effective data communication that consider a myriad of factors when working with visualizations.

This work makes a practical contribution to build and refine theories of how people work with visual information and suggest new guidelines for effective debiasing that can help reducing the negative effects of misunderstanding visualizations.

It suggests a new approach and methodology of reducing cognitive load and mental cost due debiasing and increased quality and cognitive resource efficiency in task execution.

**Relevant topics:**

1. Influence cognitive biases on interpretation of data visualizations.
2. Critical analysis of existing methods for discovering cognitive biases in a visual analytics environment.
3. Debiasing the attentional repulsion effects in data visualizations.
4. Developing a methodology for debiasing in data visualizations

**List of literature and internet sources:**


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