universidade de aveiro

Evaluating Visualization techniques and tools: what are the main issues?

Beatriz Sousa Santos
DETI/IEETA , Universidade de Aveiro, Portugal

universidade de aveiro

Evaluation of Visualization techniques and tools

- The "**Human-in-the-loop**" nature of Visualization make this a particularly challenging problem

  but fundamental to be dealt with

- It is a multidimensional problem, involving:

  usability dimensions (effectiveness, efficiency, satisfaction)

  +

  less user-centric dimensions (accuracy, repeatability, robustness)

universidade de aveiro

Evaluation of Visualization techniques and tools

- **Essential concerns** when planning any evaluation:
  - Motivation
  - Evaluation methods
  - Test data
  - Collected data
  - Data analysis

universidade de aveiro

Evaluation of Visualization techniques and tools

- **Motivation** influences the choice of methods

  formative evaluation (e.g. observation)

  summative evaluation (e.g. controlled experiments)

- **Evaluation methods**

  could be adapted from other areas (e.g. HCI)

  several should be used (as they provide different information)

universidade de aveiro

Evaluation of Visualization techniques and tools

- **Test data** can (should) be

  synthetic (simpler, knowledge of ground truth)

  …

  real (more complex, realistic)

  common test data sets should be available

- **Collected data** can be

  qualitative or quantitative; discrete or continuous

  have a direct influence on the statistical methods

Evaluation of Visualization techniques and tools

- **Data analysis**

  - has an enormous impact on soundness/credibility

  - must be adequate to the type of data collected
    (e.g. sample size, distribution, nature, measuring scale)

  - often parametric statistical methods are not applicable

universidade de aveiro

Evaluation of Visualization techniques and tools

- **My best practices and beliefs:**

  - Use **several methods**:
    - More conventional (observation, controlled experiments)
    - Other: sessions with groups of potential users,
      evaluation by graphic designers

  - Get support from a **statistician** (since the onset) if statistics is going to be needed. Useful techniques have been:
    - Exploratory Data Analysis (EDA)
    - Non-parametric statistics

universidade de aveiro

Evaluation of Visualization techniques and tools

- Evaluation of Visualization is a complex issue

- It is fundamental to:

    - evaluate solutions to specific cases
    - develop new visualization methods
    - establish design guidelines

- i.e. to make Visualization more used and more useful

Thank you for your attention !