Report

TITLE
Subtitle

Visual Data Analysis IT740A

Group #

First names Family names

Year-month-day of submission

Contents

Abstract

A short description/summary of your assignment and your conclusions, where the reader gets an overview of the contents of the report. Think of the abstract as a way of making the reader interested and curious of what is to come. This part of the report is the last part that you write, and should be around 150 words.

1. Introduction

Write a short introduction to the assignment you have selected. Why did you choose this assignment, i.e., what are the analysis problems/questions/hypotheses, challenges, and the gain(s) of solving the problems from a visual data analysis perspective? Give the reader a short introduction and the necessary background information to the themes that you will concentrate on in your report. Make sure that concepts are explained/defined. Do not forget to refer to your sources – both in your written text and in a reference list. If you are unsure how to refer to your sources, please have a look here: https://www.his.se/en/library/write-and-cite/referencing/

1.1 Research questions/hypotheses

Based on the problem domain described above, list and describe your research questions/hypotheses to be answered in your report. These questions can also be used during your user evaluation, i.e. will the users be able to answer these questions with the help of your tool?

2. Background

How do you plan to address the problem and answer your hypotheses? Review and describe the related literature. It is encouraged to make use of the seminar papers already provided, if applicable. What are the previous researches' questions, results, and solutions and how do they relate to your problem? For example, if your project is about analysing and visualizing predictions of the effects of global warming, how have others addressed this problem? Which analysis techniques have they used and which major visualization techniques have they used for their particular data, and why? I.e. can the related research found help you in your work on your data, analysis, visualization and evaluation? Also, which more general visualization techniques do you think will be appropriate for your project, identified hypotheses/problems, end-users? Take a look at the course literature (especially Ware, C. (2010) and Munzner, T. (2014)) to describe and motivate for your design approach.

This section of the report will be part of the examination of the following course goals:

- *Critically reflect upon the importance of visualization in general and visual analytics in particular*
- *In detail account for the importance of visualization and interaction in data-intensive applications*
- *Describe and discuss central concepts regarding human perception and cognition*

3. Data

Briefly describe the dataset and the parameters that will be important for you in order to answer your questions/hypotheses. Indicate the source. If available online, providing a URL link helps the readers.

4. Approach

Describe the techniques that you will use for managing and analysing your data and the tool(s) that you will use for data management/data analysis/visualization and interaction/evaluation. Attaching initial screen captures and idea images/sketches helps for better understanding and nicely describes how you plan to visualize the results and enable interaction. Make sure to put emphasis on your own analysis and design motivations, for example, motivate why you have chosen a certain analysis technique and visualization strategy. Also, describe how you plan to evaluate your solution together with end users – explain the methods that you will use and motivate them (see the evaluation lecture and the book by Barnum, C.M. (2010) for more information). This section of the report will be used to grade your work in accordance with the following course goals:

- *Critically reflect upon the importance of visualization in general and visual analytics in particular*
- *In detail account for the importance of visualization and interaction in data-intensive applications*
- *Describe and discuss central concepts regarding human perception and cognition*

4.1 Data preparation

Describe what you did in order to use the data for analysis.

4.2 Data analysis

Describe which techniques you plan to use to analyse the data and motivate your choices in relation to your questions/hypotheses. For example, if you want to make a statement regarding a possible correlation, calculate the strength of the correlation in order to make a more informed statement. If your tool was to be used as a decision-support tool, which analyses need to be made in order to answer the hypotheses/questions?

4.3 Visualization and interaction

Outline your plan for visualization and interaction. Why these and not others? Attaching screen captures and images from visual data analysis tools helps for better understanding. How do they help to answer your questions/hypotheses? Relating to your established visualization strategy in your "Related work" section, how do you plan to implemented this in your design?

Figures can be descriptive, but do not use them excessively. All figures must have a figure number (i.e. Figure 1), an explaining text and a reference to the figure placed *below* the figure. You must also refer to you figure in your written text and elaborate why the figure is at a certain paragraph and what it shows to the reader (i.e., "Figure 1 describes ……"). See Figure 1 below for an example. The same goes for tables, however a table number and a table text is to be placed *above* the table.

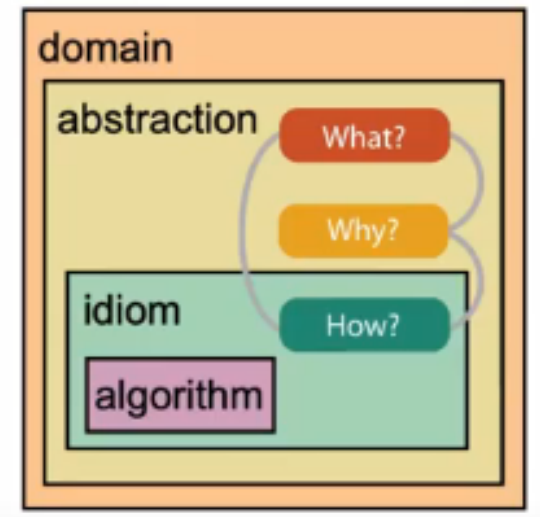

Figure 1 – The "what, why and how" of design studies (from Munzner, 2014).

4.4 Evaluation

Describe how you plan to perform the evaluation. Please refer to the lecture on evaluation for guidance as well as the book by Barnum, C.M. (2010). All students need to perform at least a user study with a small number of students. What this user study is to evaluate is up to you, but it must at least focus on how well your visualization tool helps the users to answer your hypothesis/problems identified for your project. However, the user study can also focus on usability issues. Additionally, students can also perform a heuristic evaluation of their tool **before** the user study so as to identify more general usability issues before the conduction of the user study. Such a heuristic evaluation can, for example, follow the guidelines provided by Nielsen, J. (1994). Wilson (2013) provides excellent guidance regarding how a heuristic evaluation should be performed. Make sure to write down how you plan to perform the evaluation – for example, if you plan to use an interview technique, please describe how you intend to perform this and together with whom. It is encouraged to ask the same research questions that you have set out to answer and validate whether the interviewee can find the same results as you have.

5. Results

Describe your data analysis results based on the final implementation in details. Elaborate on the significance of your findings/results and convey your thoughts. This section will be used to grade your work on the following course goals:

- *In detail account for the importance of visualization and interaction in data-intensive applications.*
- *Describe and discuss central concepts regarding human perception and cognition.*
- *Critically reflect upon the importance of visualization in general and visual analytics in particular*
- *Apply knowledge in visualization and interaction.*

5.1 Data preparation

Describe what you did in order to use the data for analysis.

5.2 Data analysis

Describe which techniques you used to analyse the data and motivate your choices in relation to your questions/hypotheses. For example, if you want to make a statement regarding a possible correlation, calculate the strength of the correlation in order to make a more informed statement. If your tool was to be used as a decision-support tool, which analyses need to be made in order to answer the hypotheses/questions?

5.3 Visualization and interaction

Attaching screen captures and images from visual data analysis tools helps for better understanding. Why did you choose the visualization and interaction techniques (and why not another one)? How do they help to answer your questions/hypotheses? Relating to your established visualization strategy in your "Related work" section, how have you implemented this in your design?

5.4 Evaluation

Describe the results from your evaluation. Use the appendix for providing the full set of questions etc. posed to the participants. Please refer to the lecture on evaluation for guidance as well as the book by Barnum, C.M. (2010). All students need to perform at least a user study with a small number of students. What this user study is to evaluate is up to you, but it must at least focus on how well your visualization tool helps the users to answer your hypothesis/problems identified for your project. However, the user study can also focus on usability issues. Additionally, students can also perform a heuristic evaluation of their tool before the user study so as to identify usability issues before the conduction of the user study. Such a heuristic evaluation can, for example, follow the guidelines provided by Nielsen, J. (1994). From the evaluation(s), what can you conclude and how will this affect your final tool? (I.e. based on the evaluation(s), how will the results be reflected in your tool, which changes need to be done to answer to usability guidelines/the user evaluation?)

6. Discussion

What do the results mean and how do they answer your research questions/hypotheses? From the evaluation and validation of the tool, what can you conclude? This section of the report will be used to grade your work on the following course goals:

- *In detail account for the importance of visualization and interaction in data-intensive applications.*
- *Critically reflect upon the importance of visualization in general and visual analytics in particular*

6.1. Limitation and Challenges

What could have been investigated if given more time? What have been difficult when solving the problem and getting answers for your research questions/hypotheses?

7. Conclusions

Write the conclusion. What did you gain from the project assignment? Briefly explain your questions/hypotheses, findings, and meaningful discussion points in relation to the data collection, data management, data analysis, visualization and interaction concepts, and evaluation of your tool. What additional investigations need to be performed (or what is the limitation) in order to say that your solution is a good one for the problem? Could your solution be applicable for other problems as well? In relation to the course goals, are there anything more that you would like to address in your report that you couldn't fit in the other previous sections?

References

Make sure to follow some reference style, such as Harvard or APA. See

https://www.his.se/en/library/write-and-cite/referencing/ for more information. Below is an example. Throughout your report, you need to carefully refer to your sources both in your written text and by using a reference list as the one below. If not, your report might be susceptible for plagiarism!

Barnum, C. M. (2011). Usability Testing Essentials: Ready, Set...Test. San Francisco: Morgan Kaufmann.

Munzner, T. (2014). Visualization Analysis and Design. CRC Press.

Nielsen, J. (1994). Enhancing the explanatory power or usability heuristics. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '94). Association for Computing Machinery, New York, NY, USA, 152–158.

Ware, C. (2010). Visual Thinking for Design. Morgan Kaufmann Series in Interactive Technologies, Elsevier Science.

Wilson, C. (2013). User interface inspection methods: A user-centred design method. Waltham, MA: Morgan Kaufmann.

Declaration of individual student efforts and time plan

Make sure to, in detail, describe what each student/group has performed throughout the project work. This will give an indication of the division of labour within the groups and will be used as input when determining the individual grades, together with each student's performance during the oral presentations.

Time plan

#	Activity/Milestone	Responsible	Week													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
A1	Activity 1															
A2	Activity 2															
A3	Activity 3															
A4	Activity 4															
M1	Milestone 1															
A5	Activity 5															
A6	Activity 6															
A7	Activity 7															
M2	Milstone 2															

Make a time plan, which can look like the one above. State which activities that have been made, when and by whom. This is for the teacher/fellow students to follow your work and give guidance what you need to focus on and when, but of course, this time plan is also for your own planning in the groups.