CS5044: Practical 2

Creating Interactive Visualisations Using Tableau Desktop

For this practical you will come up with a concept and design for an information visualisation of a given dataset and implement it in Tableau Desktop. As part of this practical, you will

- consider possible questions that could be explored based on the given data using visualisation,
- based on the above, develop design ideas for an interactive visualisation through the process of sketching – on-paper and via digital sketches in Tableau,
- design interactive features for the visualisation as part of your ideation process,
- implement the final design concept in Tableau Desktop, and, finally
- reflect on your design choices, in particular, the visual encodings of data attributes, and what types of insights your visualisation might provide.

WEIGHTING AND MARK DESCRIPTORS

This practical is weighted at **20% of the overall grade**. The general mark descriptors apply and can be reviewed here:

https://info.cs.st-andrews.ac.uk/student-handbook/learning-teaching/feedback.html#Mark_Descriptors

The practical should be submitted to MMS no later than **March 7, 2019; 21:00**.

PRACTICAL DESCRIPTION

In this practical you will use Tableau Desktop to create an interactive visualisation of a given dataset which is available on Studres **CS5044/Practicals/Practical_2/data**. Details on the dataset are provided further below.

The requirements for your visualisation are as follows:

PROMOTE INSIGHT THROUGH EXPLORATION

Your visualisation facilitate the exploration of the data and, in this way, help answering/exploring at least **one open-ended questions** that one may ask about the dataset. Your questions should target at least four distinct data attributes and be open-ended enough to require an interactive visualisation.

When building your visualisation, you may use any inspiration from the web, including images of visualisations, Tableau tutorials, or existing visualisation techniques. However, you must reference all external resources that you have used for this practical as part of your report. You should also correctly name the visualisation techniques you apply.

Be sure to critically consider Tableau's build-in visualisation techniques (e.g., from the Show-me panel) and modify them carefully for your particular data context and purpose.

CONSIDER DATA ATTRIBUTES TO SHOW, DEPENDING ON YOUR QUESTION

Your visualisation should include the data attributes that are of interest given the question you try to shed light on. Note that one aspect of the data can be included in several attributes. For example, the dataset may include several attributes describing location data, at different levels: individual latitude and longitude, by country, by region, by continent, etc... It is up to you to decide what attributes to show in your visualisation and how. Depending on your question, it may make sense to show higher-level attributes (e.g., country or continent) or more fine-grained details (e.g., individual location data based on latitude and longitude).

PROVIDE MULTIPLE PERSPECTIVES ON THE DATA

It is difficult, if not impossible to show all aspects of a complex dataset in one single view. You will have to make decisions on the types of visual representations and "views" required to highlight particular data aspects in a meaningful way. As a rule of thumb, your visualisation should include **at least two different views**, that is, two different visual representations (e.g., a map and a timeline). Different views should be assembled into a **Tableau Dashboard** and interactively linked where appropriate.

INTERACTIVE ELEMENTS
Your visualisation should include basic interactive elements beyond the tooltips and legends that Tableau provides by default. Interactive elements may include, for example, filters or sliders to select certain attribute levels or interactive links between the different views to enable a coordinated exploration of the data from multiple perspectives.

REPORT

Your report should start with the question you have chosen to focus on, followed by three sections:

DESCRIPTION OF THE VISUALISATION
Describe your visualisation and all views it includes.

- Describe the visual mapping, that is, which visual variables you used to encode the different data attributes (you can use a table here, as in Practical 1). **Clearly justify your choice of visual encoding** based on the expressiveness and effectiveness principles.
- Describe how one can interact with the visualisation. How do the interactive elements of your visualisation work and what effect do they have on the views themselves?
- Illustrate your descriptions with screenshots of the visualisation and/or your sketches where necessary.

INSIGHTS FROM THE VISUALISATION
Describe the insights people can gather from your visualisation. Again, your visualisation should address one question that you clearly state at the beginning of your report. Make sure to not only discuss the insights that can be gathered, but also provide visual evidence.

CRITICAL DISCUSSION
Critically reflect on the strengths and limitations of your visualisation. Are there other questions that the visualisation (or your general work with the data) has brought up that you would like to explore in the future?

Your report should not exceed 1000 words, excluding references. Include visualisation screenshots, sketches or other visual material to illustrate your argument.

VISUALISATION PROCESS

The dataset is large and complex, and, most likely, unfamiliar to you. Your first step should therefore be to familiarize yourself with the data [1]. This process can be guided by the following set of questions:

- What attributes are included in the data? How do these attributes relate to each other? Do some of them deal with the same aspect of the data?

- What are the types of attributes included in the dataset?

- What questions does the data trigger in you? Write these questions down.

- Does it make sense to sort or group certain data attributes? How does this affect other attributes?

To start exploring visual encodings of the data, pick a small sample of the data (<20 data points). Start your ideation process on paper and/or via Tableau Desktop itself. If you sketch on paper, consider applying the Five Design Sheet Method [2]. If you are using Tableau Desktop, make sure to produce a new sheet for each new sketch. In any case, create several sketches. Try different types of visual representations on the same data sample. Push yourself to create at least three different visual representations of the same data sample and attributes. Then try the same visual representation on different data samples.

Critically think about your choice of visual encoding – no visual representation is perfect. You will probably have to make compromises. Create many sketches to begin with without judging your ideas. Then start to narrow down your ideas and try to select the ones that show the most promise.

As discussed in the lecture, sketching does not necessarily have to involve pen and paper. You can use any analogue or digital tools you are comfortable with. It is important however, that these tools enable you to do lots of quick explorations, without much time commitment or effort. Remember, sketches do not have to look pretty. They don't have to be decipherable to others. They are just for you to familiarize yourself with the data, to find interesting aspects in the dataset, and to help you to develop ideas on how to visualize them.

Select the sketches that best represent your design/ideation process – they are part of the deliverable of this practical. Digitize your sketches (if on paper you can use the printers in the School, they all have a scanner built-in), annotate them if necessary, and submit them as **a single multipage pdf file**. You can use PowerPoint to assemble them in different slides and save these slides as a pdf.

THE DATA

COMMITTEE TO PROTECT JOURNALISTS: JOURNALISTS MISSING, IMPRISONED, KILLED [3]

The Committee to Protect Journalists maintains data of journalists who have gone missing, been imprisoned or killed for reasons related to their work. The database goes back to 1992 and contains more than 2,500 entries, with details such as the journalists background and nationality, organisations they have worked for, or circumstances of their deaths. The data can be found on StudRes. Information can be found on the Committee to Protect Journalists' website [3].

DELIVERABLES

The deliverables of this practical include
- Your visualisation as a Tableau Workbook file (.twbx). **Make sure to use the .twbx format as it groups your visualisation worksheets together with the underlying data**. This is in particular important if you made any changes to the data or used additional data.
- Your report as a pdf.
- Your sketches as a pdf.

POSSIBLE <mark>EXTENSIONS</mark>

– Linking additional data resources to show additional aspects of the provided dataset.

– Provide a video of your visualisation in-use that clearly explains how the visualisation works. Videos should not exceed 3 min. in length.

– …

ASSESSMENT

The assessment of your practical will focus by the quality of your visualisation design and your report.

- Your visualisation should show multiple aspects of the data in an expressive and effective way and enable interactive exploration.

- Your report should include a concise yet clear description of your visualisation and its features as well as a good justification of your design decisions. Furthermore, it should include a critical discussion of the insights the your visualisation can provide as well as its limitations.

- You have to provide evidence of an ideation and design process in form of paper and/or digital sketches.

An adequate practical will include a basic interactive visualisation in Tableau that includes at least two linked views that complement each other, some evidence of an ideation process, and a concise report that describes the visualisation, provides design justifications and insights and some critical reflection.

A good practical will include a well-designed visualisation consisting of at least two interactive views that are carefully designed and adequately customized (e.g., regarding labels, tooltips, and filters, etc...). It will include a well- written and structured concise report that describes the visualisation and its interactive features, justifies of design decisions, and insights that can be gathered (see above). The illustration of the ideation process will show that multiple design ideas have been considered.

An excellent practical will include all of the above plus one or multiple extensions.

RULES

You are expected to work on the practical on your own and to follow the Good Academic Practice policy: https://www.st-andrews.ac.uk/students/rules/academicpractice/. Lateness penalties follow the default School policy (Scheme B, 1 mark per 8-hour period or part thereof). You can review the policy on lateness penalties here:
https://www.st-andrews.ac.uk/media/teaching-and-learning/policies/penalties.pdf.
The University views plagiarism very seriously. Ensure that any images you choose to use as material in your report are correctly attributed to their proper sources. Ensure that all text that you include in your report, that is not your own, is correctly cited as a quotation and carries an accompanying reference (including page numbers) to the original source. If your visualisation sketches are based on existing work, acknowledge their source and authors in the footnotes and/or references of your report. If you are using standard visualisation techniques such as bar charts or line graphs, it is enough to just name them properly in the report.

RESOURCES

[1] M. Stefaner on the visualisation process. Useful techniques on how to approach visualizing unfamiliar datasets. https://vimeo.com/28443920.

[2] Five Design Sheet Method. http://fds.design/

[3] Committee to Protect Journalists. https://cpj.org/data/methodology/