

LIBRARIES IN AUSTRIA (2014)

DOCUMENTATION

IDEA & MOTIVATION

The reason why we want to visualize data from different libraries is because we want to find out if libraries are still used and how they are used after the rise of online media for research as well as leisure activities.

At the beginning of our project we wanted to use two separate visualizations. The first should be a map of Austria, which shows an overview about the number and the location of libraries per federal state. Later it should be possible to click on the federal states to get more details in another visualization which was planned as zoom-able sunburst with updating data.

After the intermediate presentation of the project with Mr. Alexander Rind, we decided just to concentrate on the sunburst visualization, as the data is more suitable for this kind of visualization.

DATA SET, ANALYSIS & STRUCTURING

Basically we used the data from Statistic Austria about Libraries in Austria (http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/bildung_und_kultur/kultur/bibliotheken/index.html).

This data seemed very useful and especially from the year 2014 there is a lot of concrete data available. Unfortunately there are just several *.xls files and *.pdf files offered and every file is structured differently.

As for the sunburst visualization a hierarchical JSON file was necessary we had to structure the data and convert it to this distinct form.

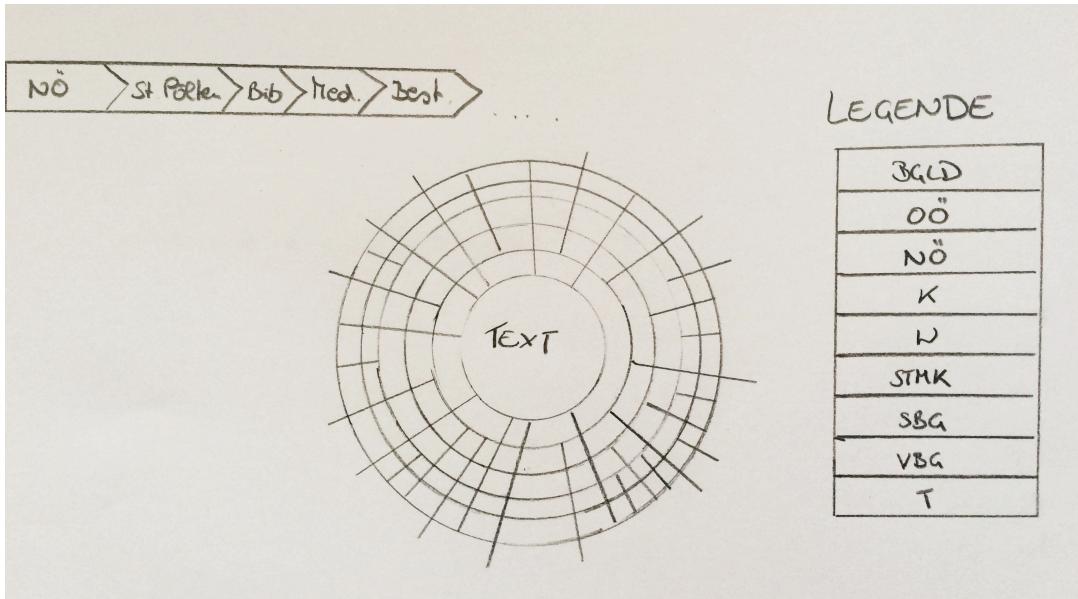
To simplify the implementation we decided to compose the whole data in one file and structure it hierarchically correct. The final structure of the JSON data looks like the following:

- Federal state
 - Town
 - Library
 - Media
 - Books, newspaper, magazines and collections
 - Digital media: single documents and databases
 - Ongoing newspapers and magazines
 - Printed
 - Digital
 - Usage
 - Registered users
 - Number of library visits
 - Number of used documents
 - Access to the library website
 - Search requests in the online library

- New media
 - Books, newspaper, magazines and collections
 - Digital media: single documents and databases
 - Costs for new media in € 1.000,-

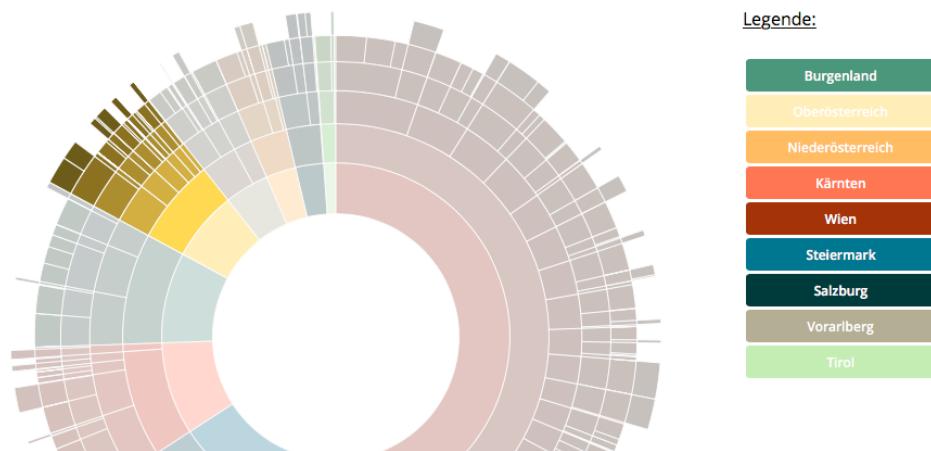
PROTOTYPING

We planned our visualization shown in the draft below. It is meant to be a “sequences sunburst”, according to the final structure, which represents the data in the middle. Additionally it's meant to be breadcrumbs to have a better overview and a legend, which shows the color of each federal state.



VISUALIZATION GOALS & DESIGN

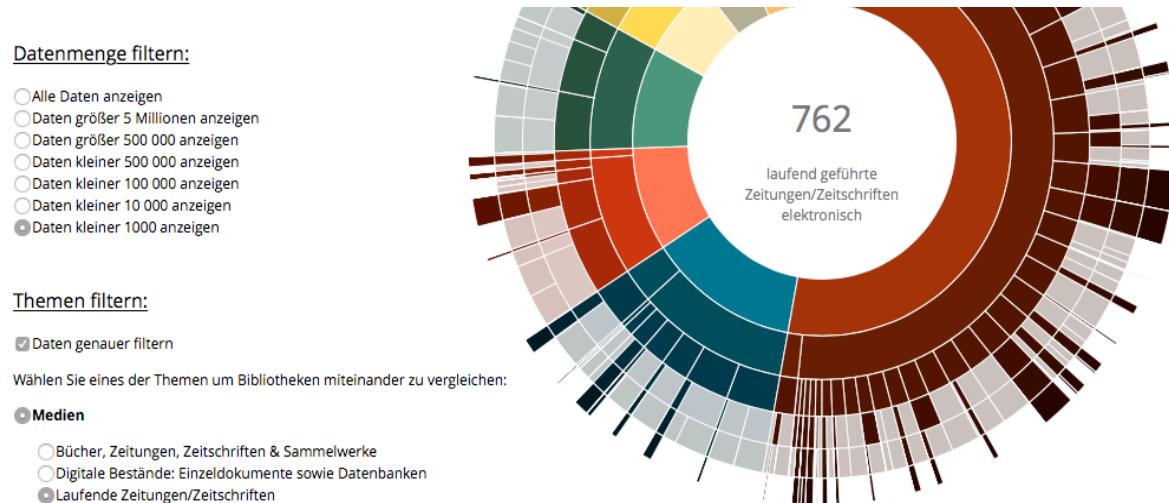
By hovering over the different federal states in the legend, the individual federal state is highlighted, in the case below a hover on “Oberösterreich” happened.



Further, two possibilities to filter the data have been added.

One is filtering according the amount of data. “Alle Daten anzeigen” and bigger data amounts provides just an overview. To show more details and further information from smaller quantities, there are the small data regions selectable.

The second filter is according the topic, to compare different libraries. The following screenshot highlights the sector “Laufende Zeitungen/Zeitschriften ” for each library.



TECHNICAL IMPLEMENTATION

Basically we used the template for the “sequences sunburst” from D3.js (<http://bl.ocks.org/kerryrodden/7090426>).

As our titles for the breadcrumbs were to long for an horizontal display, we changed it to a vertical design. One point was that the basic visualization from D3.js shows the data as percentage. We changed it to relative numbers and added an additional text.

The diverse filter options as well as the hover-highlight on the legend were not included in the template. These are additionally implemented from us.

```

364
365  function highlightSection(string){
366      var allNodes = d3.selectAll("path");
367      allNodes.style("opacity", 0.3);
368      var node = [];
369      node = partition.nodes(Json)
370          .filter(function(d) {
371              return (d.name == string);
372          });
373
374      var sequenceArray =[];
375      sequenceArray = getChildren(node[0],sequenceArray);
376
377      allNodes.filter(function (node) {
378          return (sequenceArray.indexOf(node) >= 0);
379      })
380          .style("opacity", 1);
381  }

```

```

411 function compare(element,init){
412     var allNodes = d3.selectAll("path");
413     var id = "";
414     var value = "";
415     if(element != ""){
416         id = element.id;
417         value= element.value;
418     }
419     if (d3.select('#filtermode').property('checked') != true) {
420         allNodes.style("opacity", 1);
421     }else{
422         allNodes.style("opacity", 0.3);
423         var nodes = [];
424
425         //find nodes with ticked value
426         nodes = partition.nodes(Json)
427             .filter(function(d) {
428                 if(d.parent != undefined && d.parent.parent != undefined){
429                     return (d.name == value||d.parent.name == value|| d.parent.parent.name == value);
430                 }
431             });
432
433         if(value == "Medien" || value == "Benützung" || value == "Neuzugänge"){
434             if(init != "init"){
435                 resetSubRadios();
436             }
437             enableSubRadios(value);
438         }
439
440         //find all parents to highlight them as well
441         var sequenceArray =[];
442         for(var i = 0; i < nodes.length; i++){
443             var ancestors = getAncestors(nodes[i]);
444             for(var j = 0; j<ancestors.length; j++){
445                 sequenceArray.push(ancestors[j]);
446             }
447         }
448         //make it the array unique to avoid double highlighting
449         sequenceArray = sequenceArray.filter(function(item, i, ar){ return ar.indexOf(item) === i; });
450
451         //highlight selected nodes
452         allNodes.filter(function (node) {
453             return (sequenceArray.indexOf(node) >= 0);
454         })
455             .style("opacity", 1);
456
457     }
458 }
459 }
```

THEORETICAL ANALYSIS

As it is possible to interact in our sunburst visualization and as there is a lot of different data from libraries visualized it is an Exploration.

The federal states are visualized in different colors. The related data is colored in the corresponding shade. Darker hues are used for hierarchical super-categories, lighter hues for sub-categories. Due to this fact, the gestalt laws similarity and connectedness are given. Proximity is fulfilled because of the closeness of the individual sectors and elements. Although the whole visualization is not a full circle a continuous flow of a circle can be seen because of the gestalt law continuation.

The sunburst has the users' intents select & focus and abstract/elaborate as it is possible to select single sectors and show more details.

Because of the two additional filter options and the possibility to hover over the legend also the users' intent filter is concerned. By selecting an option or hover over a federal state in the legend, just the relevant sectors are highlighted.

LESSONS LEARNED

We learned that good data is really important for a good visualization. It would be perfect if it is well structured at the beginning and every data-set or table (if there are more than one) has the same structure in general.

As well, the type of visualization should be well chosen. We have been thinking a lot about our visualization type but because of the hierarchical data we decided to use the sunburst.

First we wanted to use the “zoom-able sunburst with updating data” but because of the complexity of our data this was too confusing. So we decided to use the “sequences sunburst”. This sunburst also includes breadcrumbs to have a better overview and shows the data in the middle.

MEMBER DISTRIBUTION

Basically we worked out every point together. The main responsibility from Barbara was the technical implementation of the sunburst and the filtering. Eva was responsible for data processing and the documentation.