As part of the group project for the lecture “Geospatial Data Analysis for Smart Communities” our group wanted to try two different ways of plotting geodata. One approach was with R and the second approach was with Tableau. This chapter describes the process, the data augmentation, the results as well as the learnings of plotting data with Tableau.

## The Process

Our group already collected some data sources and conducted some initial data processing steps. Namely, we collected the shape files for Switzerland on the country, canton, district, and municipality levels. Additionally, we also collected data about the political orientation of each canton as well as on the municipality level. As the last data source, all locations of private and public power plants as well as their power production were taken.

In the first step, all of these data sources were loaded into Tableau. With the help of Tableau, the files were either connected or certain joints across the data files were implemented. Unfortunately, the data was not as easy to map as first expected. The reason was, that the plant information data had X and Y coordinates for their geographical position, but Tableau build the map with the shape files. Hence, plotting specific data points on the map was difficult. However, it was possible to create a mapping with the address information of the power plant data. As a result, the power production was then aggregated on a canton and community level, which was then able to be mapped in Tableau in connection with the shape files.

## Data Augmentation

Python was used to process the existing data. First, the electricity data was aggregated on a cantonal level, as some cantons do not have a community level, but we still want to be able to plot some information on the canton level. Also, all the technical names of the plant categories were replaced. The complete code is provided in the file “CleanData.ipynb”.

Graphical user interface

Description automatically generated with medium confidence

Figure 1: Summarizing Total Power per Canton per Plant Category

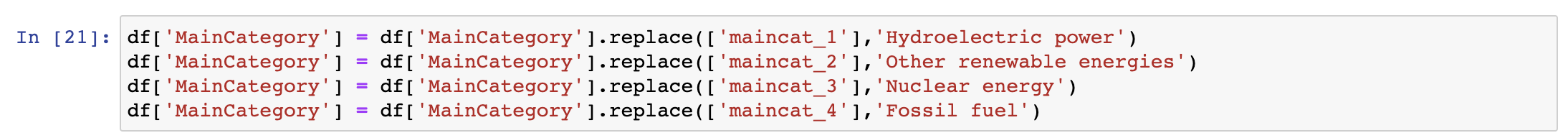


Figure 2: Replacing Technical Plant Names

Second, all the data on the municipality level was aggregated onto a community level, in order to connect it to a shape file and plot it in Tableau. The full code can be found in the “MappingOfData.ipynb” file.

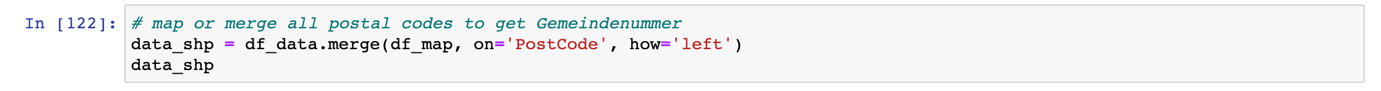


Figure 3: Merge of Municipality Number to Shape File

Graphical user interface

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Figure 4: Renaming of Column Name

Graphical user interface, text, application

Description automatically generated

Figure 5: Creating Mean of Policital Orientation on Community Level



Figure 6: Merge of Community Number to Shape File

After the mapping, the data could be plotted with more ease in Tableau than before.

## The Results

As mentioned before, as there are some cantons which do not have community areas, we had to create two layers of maps. First, a map on the canton level was created and colored according to its political orientation. So if the canton is colored in red, it is more oriented towards the right, when colored in blue more towards the left. Additionally, if you hover over the canton, you can see its average total power produced.

Second, a layer on the community level was created, also with the same information as on the cantonal level.

As a result, we can now visualize a complete map of Switzerland with its political orientation down do the community level where they exist.

Map

Description automatically generated

## Learnings

The process showed us, that mapping shape files in Tableau is simple and there are a lot of map functionalities in the software itself. However, if there are other geo data that are not shape files, for example, X and Y coordinates, it becomes much more complicated. It should be possible to create points on a map on our own, however, we did not manage to achieve this. Also, Tableau supports creating data mapping in their data Source section, but when creating a lot of joins or references across different data sources, the system becomes very slow. We would advise doing as much mapping outside of Tableau and only using their functionality if really necessary.