

Program Structure: What Means What

This project consists of several key files and components that work together to analyze and visualize the distribution of electric charging stations in Berlin. Here is an overview of each part of the project and what it does:

1. `main.py`

- **Purpose:** This is the main file that orchestrates the execution of the project. It calls the necessary functions to read, process, and display the data.
- **What it does:**
 - Changes the working directory to the current file's directory to ensure the file paths are correct.
 - Loads the population data and electric charging station data.
 - Cleans the data using the functions defined in `core/methods.py`.
 - Converts the cleaned data into `GeoDataFrame` objects for geospatial visualization.
 - Calls the `make_streamlit_electric_Charging_resid` function to display the map visualization on Streamlit.

2. `core/methods.py`

- **Purpose:** Contains all the functions used for data processing and visualization.
- **What it does:**
 - **`preprop_resid`:** Cleans and prepares the population data (`plz_einwohner.csv`) for analysis. It ensures the data is in the correct format and removes unnecessary columns.
 - **`preprop_1stat`:** Cleans and prepares the electric charging station data (`Ladesaeulenregister.csv`). It extracts relevant information like the number of charging points and their geographical coordinates.
 - **`make_streamlit_electric_Charging_resid`:** Creates the map and visualization in Streamlit, showing the locations of charging stations and the population density of Berlin. It uses the cleaned data to generate the map.

3. `data` Folder

- **Purpose:** Contains the raw data files that the program uses for analysis.
- **What it contains:**
 - **`plz_einwohner.csv`:** A CSV file that contains population data for different postal codes in Berlin.
 - **`Ladesaeulenregister.csv`:** A CSV file that contains information about electric charging stations in Berlin, including their geographical coordinates and the number of charging points.

4. `config` Folder

- **Purpose:** Contains configuration files, such as the `pdict` dictionary, which holds mappings for column names in the data files.
- **What it contains:**
 - **pdict:** A Python dictionary that stores column name mappings and other configuration details used in the data processing functions. It helps ensure the correct column names are used in functions like `preprop_resid` and `preprop_lstat`.

5. geopandas & shapely Libraries

- **Purpose:** These libraries are used for working with geospatial data and performing geospatial operations.
 - **What they do:**
 - **geopandas:** Extends the functionality of Pandas to handle geospatial data. It allows us to work with data in the form of `GeoDataFrame`, which stores both geographic coordinates and attribute data.
 - **shapely:** Used to handle geometric operations and data. It helps us convert the coordinates into geometries that can be visualized on a map.
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