

Functionality

Data Structure:

The primary data structure used is the tree data structure where the root node is the State (ten states have been selected for ease of processing) and child nodes are represented by the percentages of vaccinations and counties. Intermediate nodes consist of Metro status of counties and the Social Vulnerability Index (SVI) category. This tree is stored in a .json file for better clarity of levels of the tree. For user to visualize the tree's child nodes, a bar graph has been used to show counties' percentage of vaccination rate. This bar graph has been implemented using plotly in Flask and allows for enhanced user experience.

```
{
  "MI": {
    "Metro": {
      "A": [
        [
          95.2,
          "Barry County"
        ],
        [
          95.2,
          "Midland County"
        ],
        [
          95.2,
          "Livingston County"
        ],
        [
          95.2,
          "Clinton County"
        ],
        [
          95.2,
          "Ottawa County"
        ]
      ]
    }
  }
}
```

Figure 1: Tree Data Structure

User Interaction:

The user interacts with the program through the Visual Studio Code Terminal as well as the localhost server by accessing <http://127.0.0.1:5000/>. The python file is run in Visual Code Studio

and prompts the user for input. The user is to choose between Washington County and Michigan State to allow for processing the dataset in two different ways. In addition, the primary way the user interacts with the program is through the localhost server with the framework developed using Flask. In this interface, the user is asked multiple choice questions to choose the name of state, metro status of counties (Metro/Non-metro), and the Social Vulnerability Index category (SVI) from the options of A, B, C, or D category. The final page of the web application displays a bar graph which shows the percentage or proportion of vaccinations in counties.

Please Note: The bar graph tends to show same level of percentages as the percentages are varying across the states and not counties, therefore as the user has selected only one state, most counties have same percentages of vaccination rates. This results in same-heighted bars in the graph. In replacement of this, a different variable can be taken in the future such as the number of booster (booster_dose) doses administered in each county.

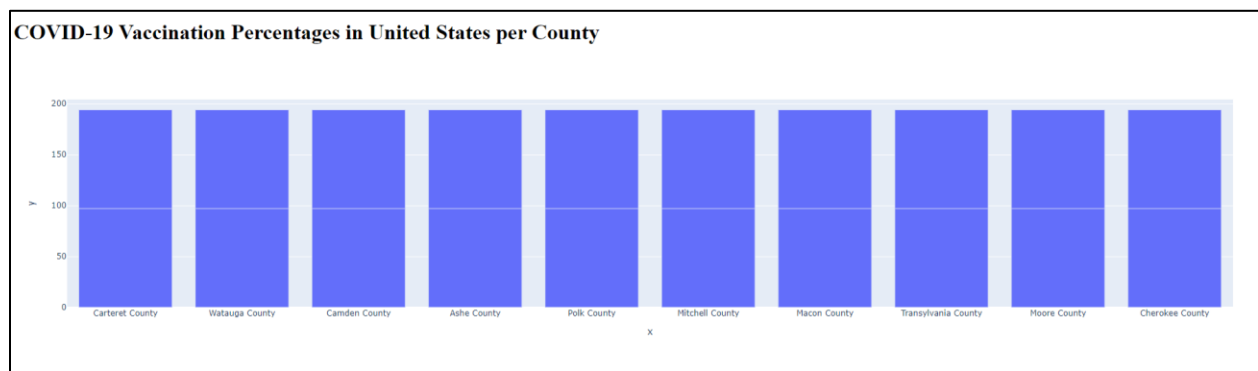


Figure 2: Bar Graph