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| **Course code and name:** | **F20DV – DATA VISUALIZATION AND ANALYTICS** |
| **Type of assessment:** | **Individual** |
| **Coursework Title:** | **Lab 4: Dataset Visualisation & Analytics** |
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Lab 4

F20DV – Data Visualization and Analytics

CW - 4

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Registration Number: H00331154

Program: Bsc. Computer Science (Year – 4)

Campus: Heriot-Watt University Dubai

Date: April 4, 2022

Code and results demonstrated to:

Introduction:

The image above is a dashboard designed to give users a detailed look at crime figures in the United States during the last 55 years (1965-2019).

Users are offered two options to choose from, i.e., the two major crime kinds – Property and Violent, and the users can select the one they want to investigate further. Each of the two major crime categories comprises of subcategories, which are displayed in the table below.

|  |  |
| --- | --- |
| **Property** | **Violent** |
| Burglary | Assault |
| Larceny | Murder |
| Motor | Rape |
| - | Robbery |

On choosing an option, users are provided with multiple graphs that show the correlation between the average population and the subcategories (eg: Burglary, Murder, etc.) for a particular year. In addition, the dashboard displays a ranking of states based on how high the rate of the chosen crime (Property or Violent) is in that state. A donut chart depicting the top crime subcategories for a particular year is also shown.

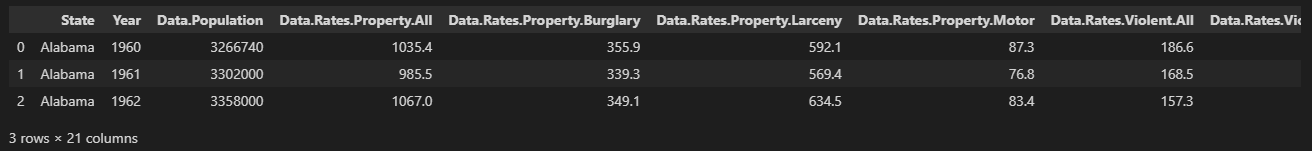
The dashboard is composed of the following layouts:

1. Choropleth Map of the United States
2. Donut chart – Shows the top crime subcategories for a particular year
3. Circular Bar chart – Displays the ranking of the states, ordered by the rate of the chosen crime category (Property or Violent)
4. Scatter plot – Shows the correlation between a crime subcategory and the overall population
5. Histogram – Displays the trend of a crime subcategory over the course of 55 years

Data:

For this dashboard, the main data has been taken from the following page (*The CORGIS Dataset Project*): <https://corgis-edu.github.io/corgis/csv/state_crime/>

The dataset is open source (Bart et al., 2017) and contains data on crime rates and totals for all 50 states and the federal district - Washington D.C. (District of Columbia). The dataset ranges from 1960 to 2019 and its dimensions are – 3116 rows and 21 columns.

The dataset was processed with Python and Pandas before being used for the dashboard, and the image below demonstrates how the original dataset looks when loaded into a DataFrame.

A screenshot of a computer

Description automatically generated with medium confidenceBecause certain datasets contain duplicate data, the Python program uses the duplicated() Pandas function to see if there are any duplicates in the DataFrame. Due to the truncation of the result, a for loop was constructed to print which rows contained duplicate data. The for loop did not return any rows, hence there were no duplicate values present in the dataset.

To increase readability and for easier access in the JavaScript programs, the column names of the DataFrame were modified using Pandas rename() function. The code snippet on the right demonstrates how and to what the columns were renamed.

Aside from 50 states and the federal district (Washington, D.C.), the dataset featured a few rows that displayed the overall data collected across the country. Since the dashboard only deals with data collected per state and district, the rows having the column “state” value as ‘United States” were dropped. Additionally, the state “New York” only has data from 1965 to 2019, hence the Python program only extracts the data collected from 1965 onwards. The resulting subset was stored in a DataFrame, which was then converted to a CSV file. This CSV file served as the primary dataset for the dashboard.

Graphical user interface, text, application, chat or text message

Description automatically generatedGraphical user interface, application

Description automatically generatedDashboard Header:

To show the crime rate scene in the US between 1965 to 2019, the dashboard makes use of HTML’s range slider

Layouts:

Map

Description automatically generatedMap

Description automatically generated**Layout 1: *Choropleth Map of the United States***

References:

1. Bart, A.C., Whitcomb, R., Kafura, D., Shaffer, C.A. and Tilevich, E. (2017). Computing with CORGIS. *ACM Inroads*, 8(2), pp.66–72.