| | | |
|---|---|---|
| CENTRE FOR MATHEMATICAL SCIENCES | **SUBJECT: BSD2333 DATA WRANGLING**<br>**TOPIC:** Chapter 4<br>**LAB REPORT 3** **DATE:** 16 MAY 2022 | **MARKS**: 15(3%) |

| CLO | Description | PLO mapping | Percentage | Marks |
|---|---|---|---|---|
| CLO1 | Acquire data wrangling fundamental concepts and knowledge. | PLO1: Knowledge and Understanding<br>C3: Application | 1% | 5 |
| CLO2 | Apply data wrangling techniques to handle heterogeneous and distributed data. | PLO2: Cognitive Skills and Functional work skills with focus on Numeracy skills<br>C3: Application | 1% | 5 |
| CLO3 | Manipulate data to required format and location for data-driven applications. | PLO3: Functional work skills with focus on Practical, and Digital skills<br>P4: Mechanism | 1% | 5 |

The objectives of this Laboratory report are to help you to:

1. Understand the terminologies used in data wrangling.
2. apply data wrangling techniques using Python to solve a data wrangling problem.

## Question 1: Interactive Data Visualization

Visual aids are an important part of any presentation for a reason - we process visual inputs a lot faster than written text. It's more effective and less time-consuming to digest a report that contains relevant and charming visuals for what is written.

1. What is Interactive Data Visualization?
2. What is used for interactive visualization?
3. What are the benefits of interactive data visualizations compare to traditional data visualization?

**[5 MARKS]**
**[CO1/PLO1]**

**Question 2: Creating a Choropleth Map to Represent Total Renewable Energy Production and Consumption across the World**

In this activity, we will be working with the Renewable Energy Consumption and Production datasets from Our World in Data https://ourworldindata.org/renewable-energy). These datasets are made available on the book's GitHub repository as share-ofelectricity-production-from-renewable-sources.csv (the production dataset) and renewable-energy-consumption-by-country.csv (the consumption dataset). Your task is to create choropleth maps for the total renewable energy production and consumption across different countries in the world animated based on the production/consumption years between (excluding) 2007 and 2017.

These are the steps that will help you solve this activity:

1. Load the renewable energy production dataset.
2. Sort the production DataFrame based on the Year feature.
3. Generate a choropleth map for renewable energy production using the plotly express module animated based on Year.
4. Update the layout to include a suitable projection style and title text, then display the figure.
5. Load the renewable energy consumption dataset.
6. Convert the consumption DataFrame to a suitable format for visualization.
7. Sort the consumption DataFrame based on the Year feature.
8. Generate a choropleth map for renewable energy consumption using the plotly express module animated based on Year.
9. Update the layout to include a suitable projection style and title text, then display the figure.

**[10 MARKS]**
**[CO2/PLO2 & CO3/PLO3]**

| | | |
|---|---|---|
| CENTRE FOR MATHEMATICAL SCIENCES | **SUBJECT: BSD2333 DATA WRANGLING**<br>**TOPIC:** Chapter 4<br>**LAB REPORT 3** **DATE:** 16 MAY 2022 | **MARKS**: 15(3%) |

## QUESTION 1

| **CO1: Acquire data wrangling fundamental concepts and knowledge.** | | | | | | |
|---|---|---|---|---|---|---|
| **Item Assessed (Cognitive)** | **Poor 1** | **Fair 2** | **Good 3** | **Very Good 4** | **Excellent 5** | **Score** |
| Understand and explain the concept of data wrangling process | Able to identify some of the keywords but fail to give the explanations. | Able to identify some of the keywords but fail to give the explanations. | Able to identify all the keywords but manage to give some of the explanations. | Able to identify all the keywords but manage to give most of the explanations. | Able to identify all the keywords and successfully give the explanations . | |
| | | | | | **Total Score** | **/5** |

## QUESTION 2

| **CO2: Apply data wrangling techniques to handle heterogeneous and distributed data.** | | | | | | |
|---|---|---|---|---|---|---|
| **Item Assessed (Cognitive)** | **Poor 1** | **Fair 2** | **Good 3** | **Very Good 4** | **Excellent 5** | **Score** |
| Using analytical, logical or problem solving appropriate to the discipline. | The work has not demonstrated analytical, logical or problem solving understanding appropriate to the discipline. | The work has demonstrated some analytical, logical or problem solving understanding appropriate to the discipline. | The work has demonstrated analytical, logical or problem solving understanding appropriate to the discipline. | The work has demonstrated a thorough analytical, logical or problem solving understanding appropriate to the discipline. | The work has demonstrated a thorough and sophisticated analytical, logical or problem solving understanding appropriate to the discipline. | |
| | | | | | **Total Score** | **/5** |

| CO3: Manipulate data to required format and location for data-driven applications. | | | | | | |
|---|---|---|---|---|---|---|
| **Item Assessed (Psychomotor )** | **Poor 1** | **Fair 2** | **Good 3** | **Very Good 4** | **Excellent 5** | **Score** |
| Code execution | Code does not work. | Code work but has major flaws. | Code mostly works, and has only minor flaws. | Code works in a way the student intended. | Code is functional and refined with extra features that exceed the requirements. | |
| | | | | | **Total Score** | **/5** |