DATA ANALYTICS WITH COGNOS - GROUP 5

PROJECT: WATER QUALITY ANALYSIS

PHASE 4: DEVELOPMENT PART 2

SUBMITTED BY

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WATER QUALITY ANALYSIS

CONTINUE BUILDING THE ANALYSIS BY CREATING VISUALIZATIONS AND BUILDING A PREDICTIVE MODEL

Introduction:

Access to safe drinking-water is essential to health, a basic human right and a component of effective policy for health protection. This is important as a health and development issue at a national, regional and local level.

In some regions, it has been shown that investments in water supply and sanitation can yield a net economic benefit, since the reductions in adverse health effects and health care costs outweigh the costs of undertaking the interventions.

Some of the water quality parameters are,

- ❖ pH value
- ❖ Hardness
- ❖ Total Dissolved Solids
- ❖ Chloramines
- ❖ Sulfate
- ❖ Conductivity
- ❖ Organic carbon
- ❖ Trihalomethanes
- ❖ Turbidity
- ❖ Potability

1. **Data Preparation:**

- ➢ Import necessary libraries (e.g., pandas, numpy, matplotlib, scikit-learn).
- ➢ Load your dataset.
- ➢ Explore and preprocess your data. This includes handling missing values, encoding categorical variables, and scaling numerical features.

2.Exploratory Data Analysis (EDA):

- ➢ Create visualizations to better understand your data. Common libraries for this are Matplotlib and Seaborn.

- Examples of visualizations: histograms, scatter plots, box plots, etc., depending on your data type.

3.Feature Engineering:

- If needed, create new features or transform existing ones to improve the performance of your predictive model.

4.Splitting Data:

- Split your data into training and testing sets to evaluate your model.

5.Building a Predictive Model:

- Select an appropriate algorithm for your problem (e.g., linear regression, decision tree, random forest, or neural network).
- Train your model on the training data.
- Evaluate its performance using metrics like mean squared error (MSE), R-squared, etc.

6.Predictions:

- Make predictions on your test data.

7.Visualize Predictions:

- Create a bar chart or any other suitable visualization to display the predicted values alongside the actual values for comparison.

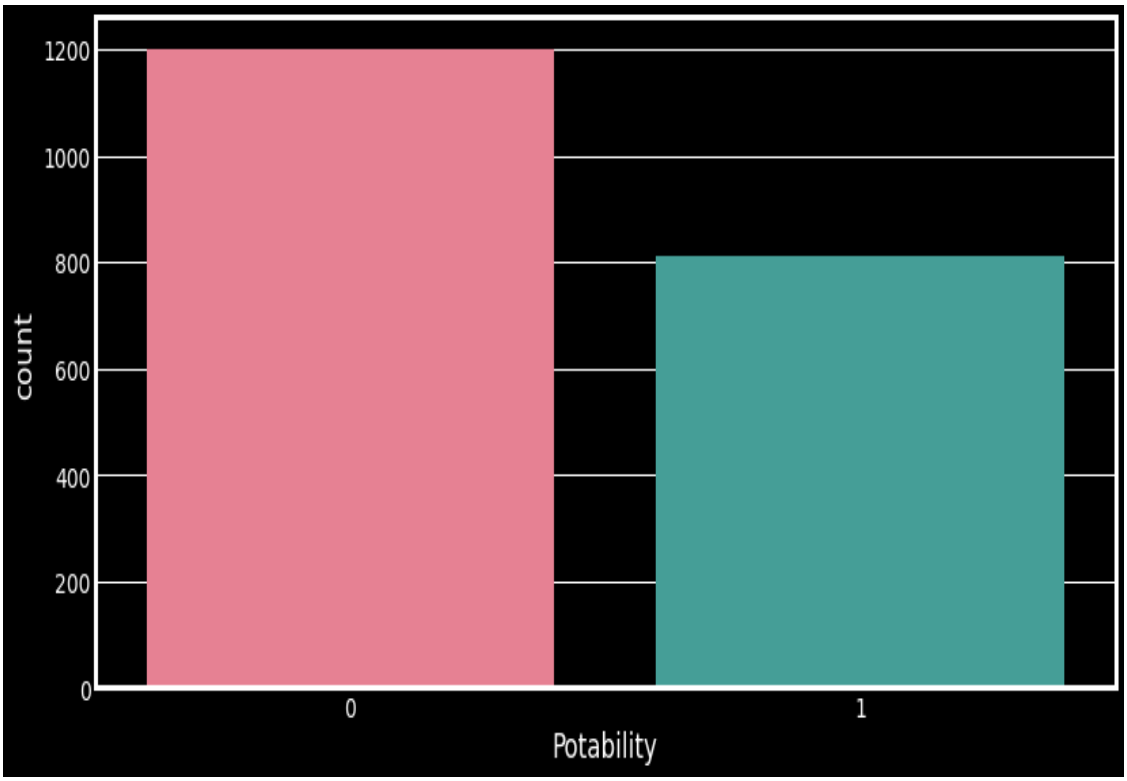
Dataset Link: https://www.kaggle.com/datasets/adityakadiwal/water-potability

Program:

```
import matplotlib.pyplot as plt
import matplotlib.pyplot as plt
plt.style.use('fivethirtyeight')
plt.style.use('dark_background')
import numpy as np
import pandas as pd
import seaborn as sns
from matplotlib.colors import ListedColormap
from scipy.stats import norm, boxcox
```

```
from sklearn.metrics import confusion_matrix, classification_report, accuracy_
score
from collections import Counter
from scipy import stats
from tqdm import tqdm_notebook

## Importing LuciferML
from luciferml.supervised.classification import Classification
from luciferml.preprocessing import Preprocess as prep

import warnings
warnings.simplefilter(action='ignore', category=Warning)
plt.figure(figsize=(12, 6))
sns.countplot(x="Potability", data=dataset, palette='husl');
```

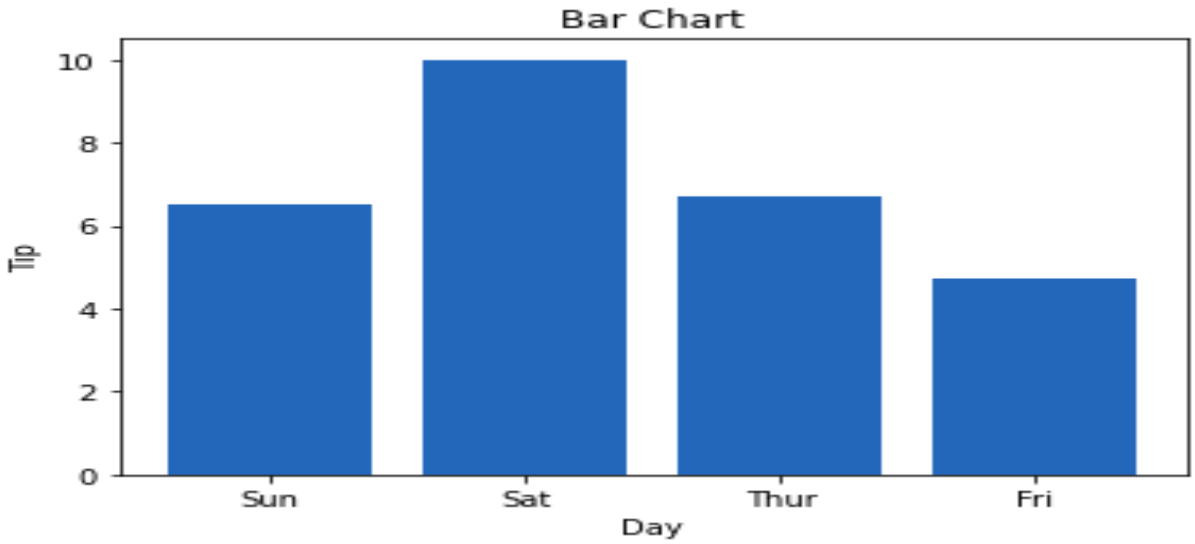
Output:



Program:

```
import pandas as pd
import pandas as pd

import matplotlib.pyplot as plt


# reading the database
data = pd.read_csv("tips.csv")

# Bar chart with day against tip
plt.bar(data['day'], data['tip'])

plt.title("Bar Chart")

# Setting the X and Y labels
plt.xlabel('Day')
plt.ylabel('Tip')

# Adding the legends
plt.show()
```

Output:



Conclusion:

Good data visualization should communicate a data set clearly and effectively by using graphics. The best visualizations make it easy to comprehend data at a glance.