Making Exploratory Data Analysis Sweeter with Sweetviz 2.0

BEGINNER DATA EXPLORATION LIBRARIES PYTHON STATISTICS STRUCTURED DATA SUPERVISED TECHNIQUE

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What is Exploratory Data Analysis?

The very first step in data science is exploratory data analysis, aka EDA. All types of data models do not fit all data types, so it is better to thoroughly analyze the data before proceeding further. For example, mathematical operations cannot be applied to categorical data, or the issue of missing values in the dataset must be addressed.
The accuracy of the data model directly depends on the quality of the data. However, in the real-world, data is collected from various sources and must be handled accordingly to reduce the repercussions.
EDA being the initial step of data mining, helps in getting insight into data without any assumptions. This helps in forming the hypotheses. The fundamental ingredients of EDA are data summarization, data description and inferences, and data visualization.
The traditional way of doing EDA in Python involves tools such as NumPy, Pandas, Scipy, and Matplotlib. However, a quick sneak peek into data can be done using Sweetviz.

Introduction to Sweetviz 2.0

Sweetviz 2.0 is an open-source pandas-based library to perform the primary EDA task without much hassle or with just two lines of code. It also generates a summarised report with great visualizations.

Installation using pip

The basic command to install a package using pip is:

```
pip install sweetviz
```

Alternatively, use the following command inside Notebook/Colab

```
!pip install sweetviz
```

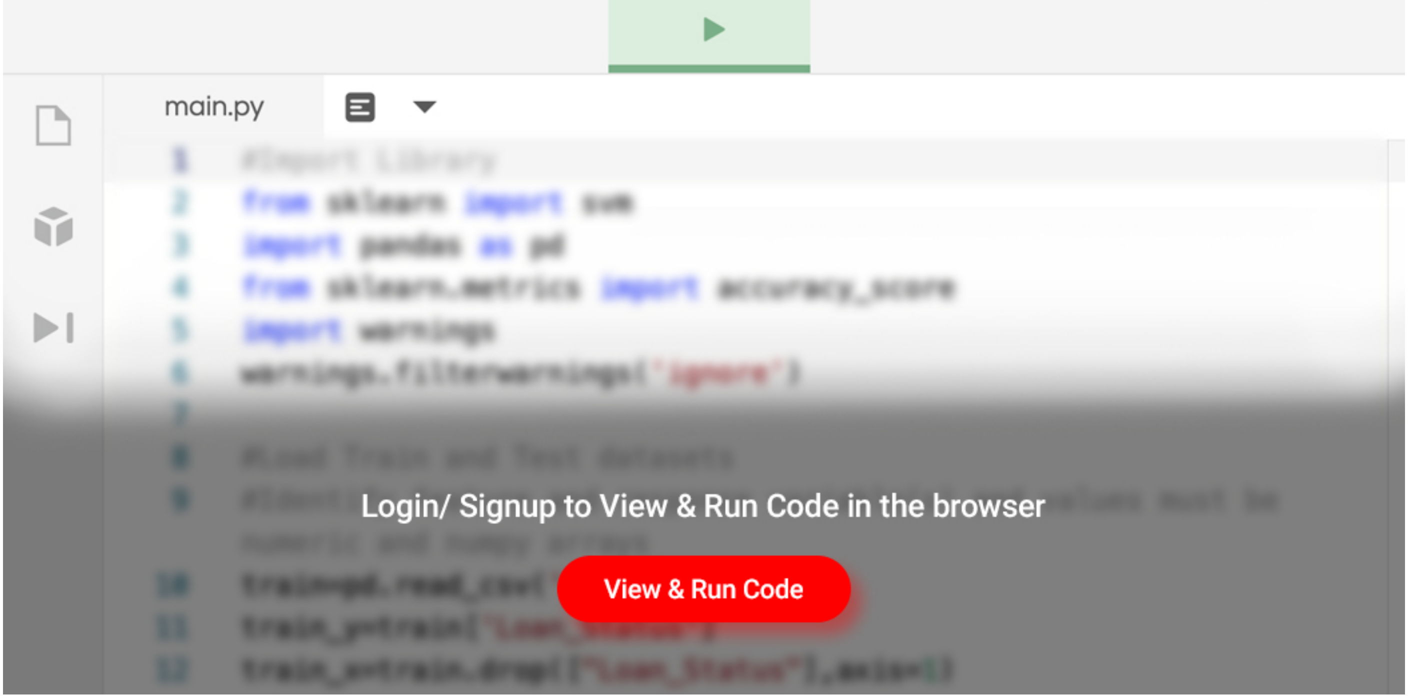
How to Use?

Let us get our hands dirty and start writing the code… (Feel free to use the source code here)

For this purpose, we will be using the Student Performance dataset (get it here). It is mixed data, that is, both numerical and categorical data are present. The dataset consists of 1000 students record with a total of eight features, viz.,

1. **gender: categorical**
2. **race/ethnicity: categorical**
3. **parental level of education: categorical**
4. **lunch: categorical**
5. **test preparation course: categorical**
6. **math score: numerical**
7. **reading score: numerical; and**
8. **writing score: numerical**

We will be using pandas for reading the csv (Comma Separated Values) file.



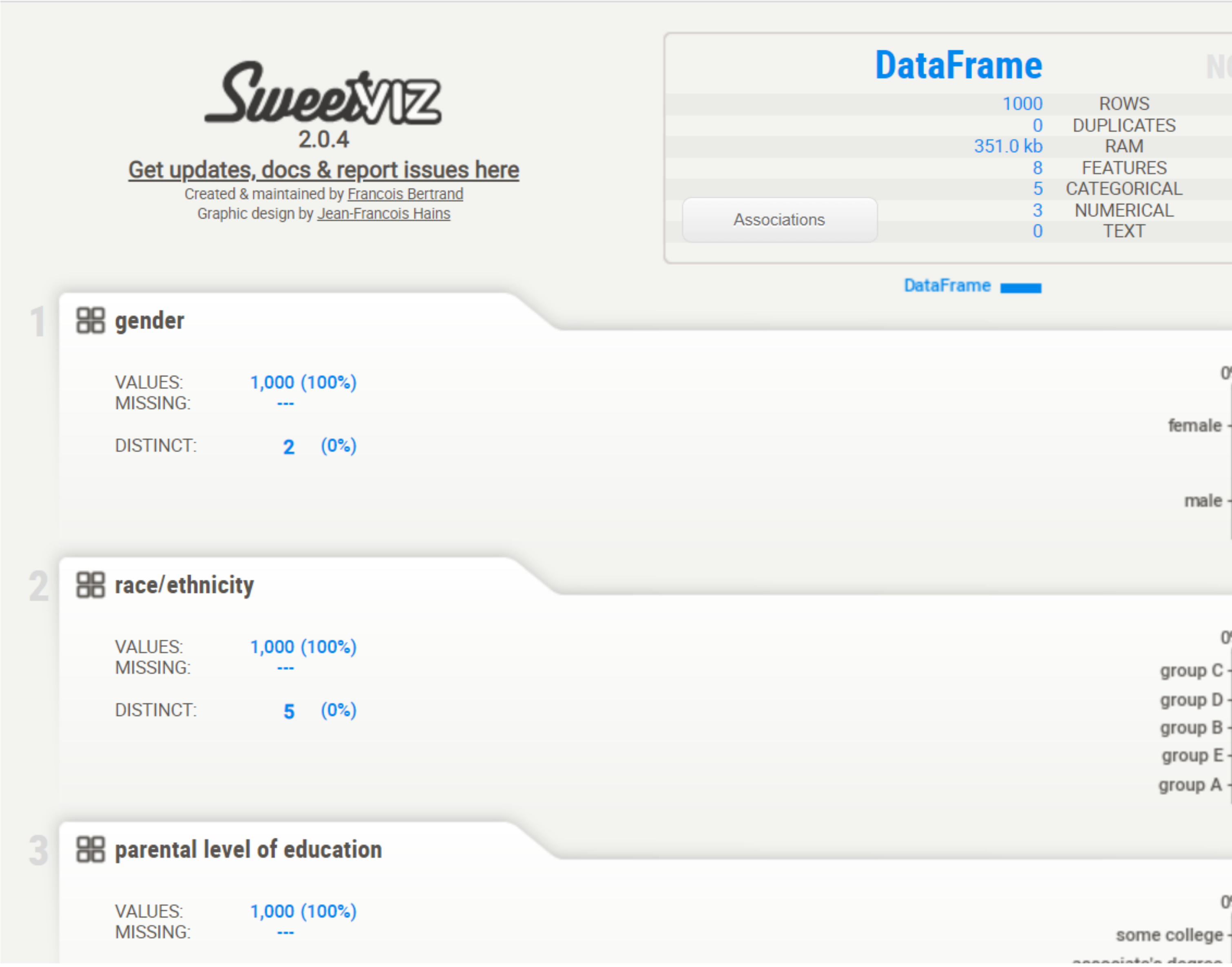
```
#Import Library
from sklearn import svm
import pandas as pd
from sklearn.metrics import accuracy_score
import warnings
warnings.filterwarnings('ignore')

#Load Train and Test datasets
#Identify feature and response variable(s) and values must be numeric and numpy arrays
train=pd.read_csv(
train_y=train['Loan_Status']
train_x=train.drop(["Loan_Status"],axis=1)
```

Sweetviz has a powerful function called ***analyze()*** that helps in analyzing the data at a glance.

```
# Analyzing data report=sv.analyze(data) # Generating report report.show_html('eda_report.html')
```

Bang! Our report is ready in a split second.

The function ***show_html()*** *generates a detailed report consisting of the following details:*



2.0.4

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Created & maintained by Francois Bertrand

Graphic design by Jean-Francois Hains

DataFrame

1000	ROWS
0	DUPLICATES
351.0 kb	RAM
8	FEATURES
5	CATEGORICAL
3	NUMERICAL
0	TEXT

1 gender

VALUES: 1,000 (100%)
MISSING: ---

DISTINCT: 2 (0%)

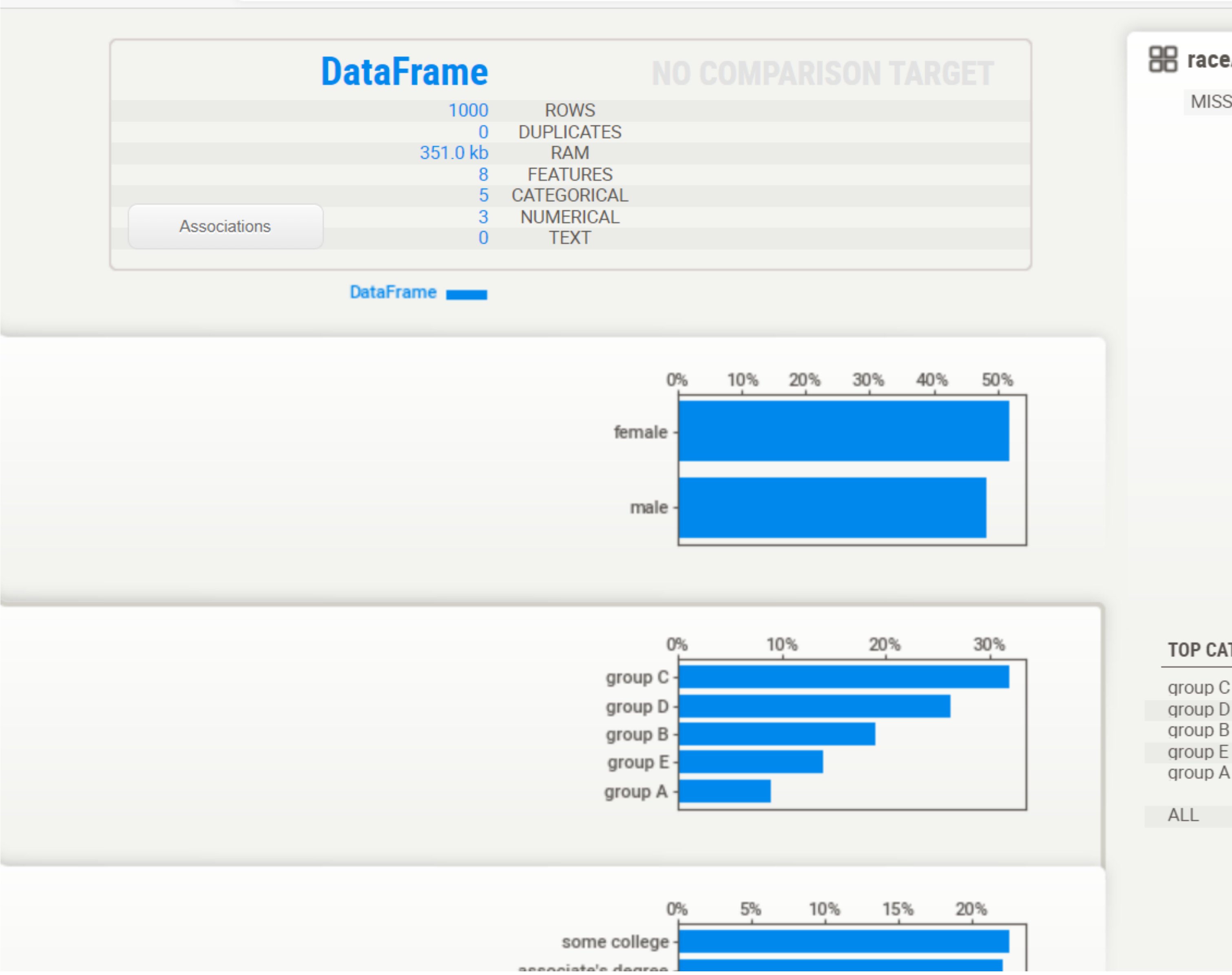
2 race/ethnicity

VALUES: 1,000 (100%)
MISSING: ---

DISTINCT: 5 (0%)

3 parental level of education

VALUES: 1,000 (100%)
MISSING: ---



DataFrame NO COMPARISON TARGET

1000 ROWS
0 DUPLICATES
351.0 kb RAM
8 FEATURES
5 CATEGORICAL
3 NUMERICAL
0 TEXT

If show_html() function is not supplied with any parameter, by default, it generates a file named **‘SWEETVIZ_REPORT.html’.**

Apart from this, we can compare two datasets side-by-side. To have a glance at this, we would split the dataset into two halves.

```
# Spliting the data into two datasets data1=data[0:400] data2=data[400:]
```

Now, let us compare both of them side-by-side using

```
report_comp=sv.compare([data1,'DATA1'],[data2,'DATA2'])  report_comp.show_html('Compare_Results.html')
```

If the function ***compare()*** is left with default parameters, refer to the two datasets by Dataframe and Compared, respectively.

We can also perform target analysis, but currently, it only supports numerical or binary targets, rather than categorical targets. Let’s consider math scores as a target:

```
report_comp=sv.compare(data1,data2,'math score') report_comp.show_html('Compare_Results.html')
```

Version 1.0 vs 2.0

Although working with Sweetviz makes EDA hassle-free, it does introduce some difficulties as well.

Firstly, the reports generated using the base OS module; hence it is incompatible with custom environments such as Google Colab. Secondly, the reports are in HTML format; therefore, the graphs cannot be plotted inline.

However, in version 2.0, these issues have been taken care of by a new feature ***show_notebook()*** which embeds the visualizations in the notebooks using an iframe. Also, you'll be able to save a report in HTML format that could be accessed later.

Playing with Reports

The additional yet optional parameters make this task easy.

Version 2.0 allows the user to manipulate the appearance of the report with some parameters as –

```
report_comp.show_html(filepath='report.html', open_browser=True, layout='vertical', scale=0.7)
```

Another feature introduced in version 2.0 called **show_notebook()** displays the report within the notebook environment rather than any browser-based external environment using an IFRAME HTML element. Typical usage of this feature is demonstrated by the following lines of code –

```
report_comp.show_notebook(w=None, h=None, scale=None, layout='vertical', filepath='E:/sweetviz_report.html')
```

where,

w and h: signifies the width and height of the window. It can be defined in absolute pixels (e.g. 400) or relatively (e.g. 70%).

filepath: saves the file in the directory with the name specified which can be accessed later

layout: there are two layout modes available, viz., widescreen and vertical

scale: this defines the scale of the report within the window. It is a fractional number ranging from 0 to 1.

Conclusion

In this short article, I outlined how to load data using pandas and have quick insights on the data using Sweetviz 2.0 in just a couple of lines of code.

References

1. https://pypi.org/project/sweetviz/ [accessed: Jan-05-2021]

2. https://www.kaggle.com/spscientist/students-performance-in–exams?select=StudentsPerformance.csv [accessed Jan-05-2021]

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Kopal Rastogi