Counting Missing Data

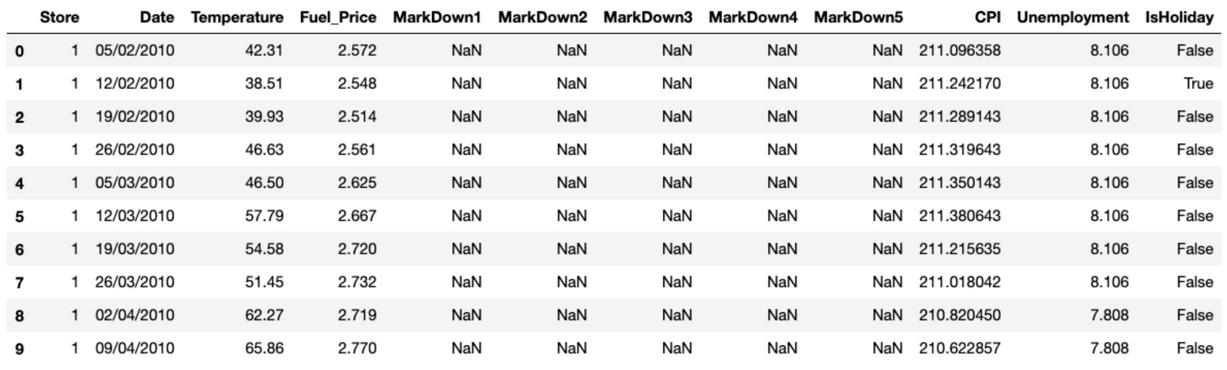
If you have a large dataframe, and it contains a few missing values (None or a numpy.NaN), then you can find the count of such missing value across the given label. For this purpose, you can use either of the following two analogous functions :

1. pandas.DataFrame.isna()
2. pandas.DataFrame.isnull()

The functions above are alias of each other and detect missing values by returning the same sized object as that of the calling dataframe, made up of boolean True/False.

Step 1. Load the dataset

```
import numpy as np

import pandas as pd

import matplotlib.pyplot as plt

import seaborn as sb

%matplotlib inline


# Read the data from a CSV file

# Original source of data: https://www.kaggle.com/manjeetsingh/retaildataset available under C0 1.0 Universal (CC0 1.0) Public Domain Dedication License

sales_data = pd.read_csv('sales_data.csv')

sales_data.head(10)
```



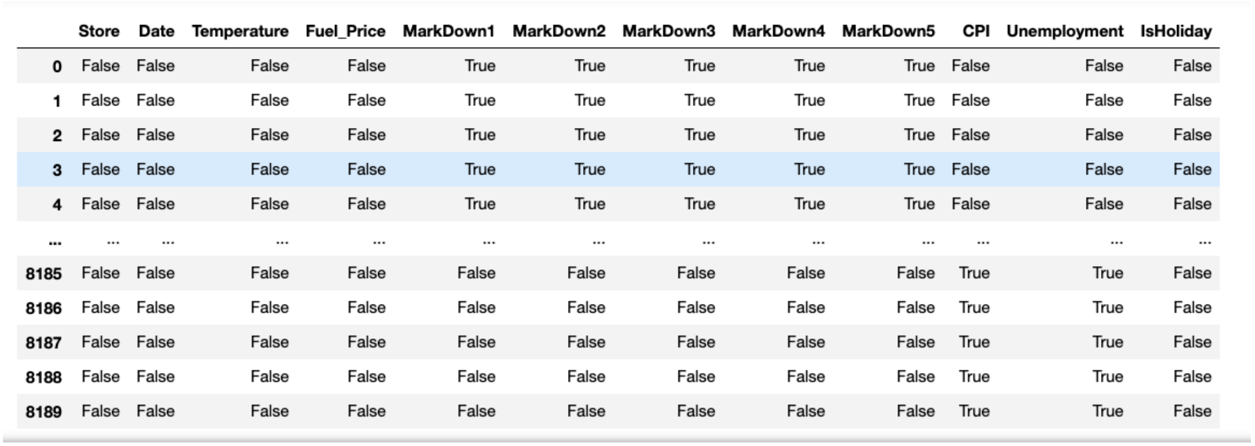
	Store	Date	Temperature	Fuel_Price	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5	CPI	Unemployment	IsHoliday
0	1	05/02/2010	42.31	2.572	NaN	NaN	NaN	NaN	NaN	211.096358	8.106	False
1	1	12/02/2010	38.51	2.548	NaN	NaN	NaN	NaN	NaN	211.242170	8.106	True
2	1	19/02/2010	39.93	2.514	NaN	NaN	NaN	NaN	NaN	211.289143	8.106	False
3	1	26/02/2010	46.63	2.561	NaN	NaN	NaN	NaN	NaN	211.319643	8.106	False
4	1	05/03/2010	46.50	2.625	NaN	NaN	NaN	NaN	NaN	211.350143	8.106	False
5	1	12/03/2010	57.79	2.667	NaN	NaN	NaN	NaN	NaN	211.380643	8.106	False
6	1	19/03/2010	54.58	2.720	NaN	NaN	NaN	NaN	NaN	211.215635	8.106	False
7	1	26/03/2010	51.45	2.732	NaN	NaN	NaN	NaN	NaN	211.018042	8.106	False
8	1	02/04/2010	62.27	2.719	NaN	NaN	NaN	NaN	NaN	210.820450	7.808	False
9	1	09/04/2010	65.86	2.770	NaN	NaN	NaN	NaN	NaN	210.622857	7.808	False

```
sales_data.shape
```

```
(8190, 12)
```

```
# Use either of the functions below
# sales_data.isna()
```

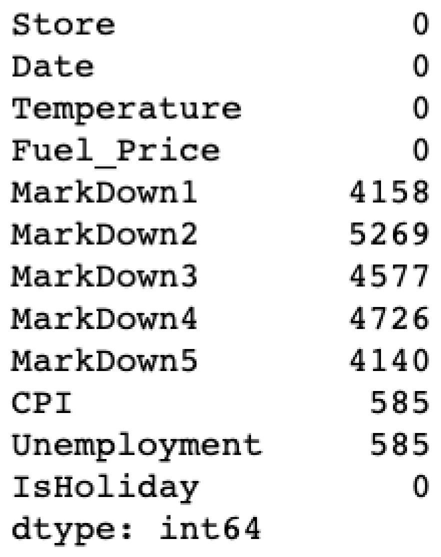
```
sales_data.isnull()
```



	Store	Date	Temperature	Fuel_Price	MarkDown1	MarkDown2	MarkDown3	MarkDown4	MarkDown5	CPI	Unemployment	IsHoliday
0	False	False	False	False	True	True	True	True	True	False	False	False
1	False	False	False	False	True	True	True	True	True	False	False	False
2	False	False	False	False	True	True	True	True	True	False	False	False
3	False	False	False	False	True	True	True	True	True	False	False	False
4	False	False	False	False	True	True	True	True	True	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...
8185	False	False	False	False	False	False	False	False	False	True	True	False
8186	False	False	False	False	False	False	False	False	False	True	True	False
8187	False	False	False	False	False	False	False	False	False	True	True	False
8188	False	False	False	False	False	False	False	False	False	True	True	False
8189	False	False	False	False	False	False	False	False	False	True	True	False

We can use pandas functions to create a table with the number of missing values in each column. Once, you have the label-wise count of missing values, you try plotting the tabular data in the form of a bar chart.

```
sales_data.isna().sum()
```

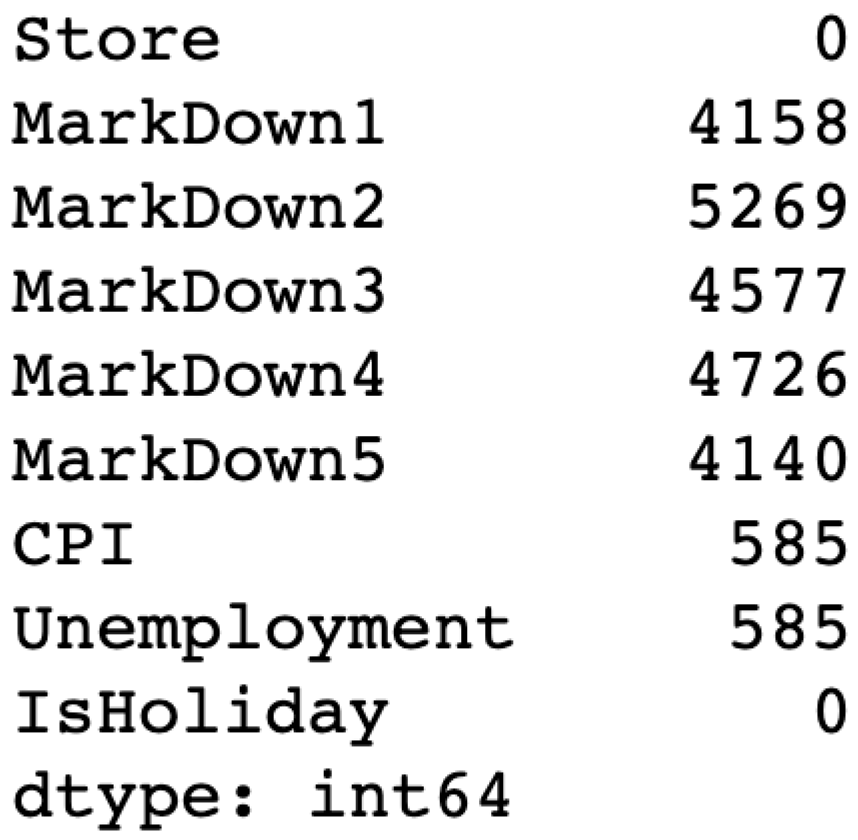


```
Store              0
Date               0
Temperature        0
Fuel_Price         0
MarkDown1       4158
MarkDown2       5269
MarkDown3       4577
MarkDown4       4726
MarkDown5       4140
CPI              585
Unemployment     585
IsHoliday          0
dtype: int64
```

What if we want to visualize these missing value counts?
One interesting way we can apply bar charts is through the visualization of missing data. We could treat the variable names as levels of a categorical variable, and create a resulting bar plot. However, since the data is not in its tidy, unsummarized form, we need to make use of a different plotting function. Seaborn's barplot function is built to depict a summary of one quantitative variable against levels of a second, qualitative variable, but can be used here.

Step 2 - Prepare a NaN tabular data

```
# Let's drop the column that do not have any NaN/None values
na_counts = sales_data.drop(['Date', 'Temperature', 'Fuel_Price'], axis=1).isna().sum()
print(na_counts)
```



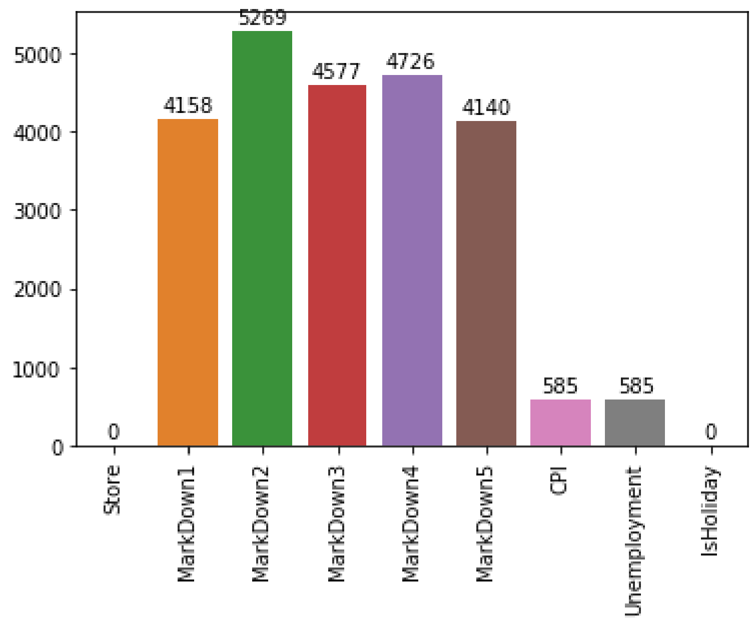
```
Store              0
MarkDown1       4158
MarkDown2       5269
MarkDown3       4577
MarkDown4       4726
MarkDown5       4140
CPI              585
Unemployment     585
IsHoliday          0
dtype: int64
```

Use seaborn.barplot()

Step 3 - Plot the bar chart from the NaN tabular data, and also print values on each bar

```
# The first argument to the function below contains the x-values (column names), the second argument the y-values (our counts).
# Refer to the syntax and more example here - https://seaborn.pydata.org/generated/seaborn.barplot.html
sb.barplot(na_counts.index.values, na_counts)


# get the current tick locations and labels
plt.xticks(rotation=90)
```

```
# Logic to print value on each bar
for i in range (na_counts.shape[0]):
    count = na_counts[i]

    # Refer here for details of the text() - https://matplotlib.org/3.1.1/api/_as_gen/matplotlib.pyplot.text.html
    plt.text(i, count+300, count, ha = 'center', va='top')
```



Note - The seaborn.barplot() is a useful function to keep in mind if your data is summarized and you still want to build a bar chart. If your data is not yet summarized, however, just use the countplot function so that you don't need to do extra summarization work. In addition, you'll see what barplot's main purpose is in the next lesson when we discuss adaptations of univariate plots for plotting bivariate data.

Supporting Materials

- sales_data.csv