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Understand main characteristics of Pandas

Manipulate date with Pandas

Use pandas in the context of data science problems

Pandas

https://pandas.pydata.org/

Open source library,

BSD License

High performance

Easy to use

Includes data structures and data analysis tools

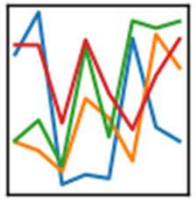
Data Structures

Series

DataFrame

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$



DataFrame

- Labelled data structure
- Columns with potentially different data types
- Similar to spreadsheet or SQL table
- Most used object by Pandas

	Country	Area_km2	Birth rate(births/1000 population)	Current account balance
0	Afghanistan	647500	47.02	NaN
1	Akrotiri	123	NaN	NaN
2	Albania	28748	15.08	-5.040000e+08
3	Algeria	2381740	17.13	1.190000e+10
4	American Samoa	199	23.13	NaN
5	Andorra	468	9.00	NaN
6	Angola	1246700	44.64	-3.788000e+07
7	Anguilla	102	14.26	NaN

Create DataFrame

Create dataframe from dictionary

```
import pandas as pd
d = {'col1': [1,2,1,3,1,2], 'col2':
[1,2,3,4,5,6]}
df = pd.DataFrame(data=d)
df.count()
df['col1'].value_counts()
df['col1'][1]=5
```

Copy DataFrames

Copy column

```
col1=df['col1’]
col1[2]=99
```

What is the result in col1 and df?

```
new_col1 = col1.copy()
new_col[2]=9999
```

Read and Save

Read and save into csv file

```
import pandas as pd
df = pd.read_csv('worlddata.csv')
…
df.to_csv('worlddata1.csv')
```

Read and Save

Read and save into csv file

```
url='https://raw.githubusercontent.com/masterfloss/data/main/worlddata.csv'
df = pd.read_csv(url, error_bad_lines=False,index_col=0,sep=",")
```

Read and Save

In collaboratoy:

```
from google.colab import files
files.upload()
```

At the end

```
files.download('file name')
```

Dataframe Information

Analyze information

- df.head()
- df.info()
- df.describe()
- df.columns

Access to Rows and Columns

DataFrame.at

Access a single value for a pair of row/column labels.

DataFrame. iloc

Purely integer-location based indexing for selection by position.

DataFrame.xs

Return cross-section from the Series/DataFrame.

This method takes a key argument to select data at a particular level of a MultiIndex..

DataFrame.loc

Access a group of rows and columns by label(s) or a Boolean array.

Access to Row and Columns

Cells:

```
df.iloc[195][0]
```

Rows:

```
df.iloc[[195][0]]
```

Columns:

```
df.loc[:,'GDPpercapita']
```

Convert Data to Numeric

Data types

df.dtypes

If the result is object, we need to convert a complete column with specific label to numeric

df.loc[:,'GDPpercapita']=pd.to_numeric(df['GDPpercapita'], errors='coerce’)

pd.to_numeric(args, errors)

Create New Columns

To create a column corresponding to the “internet per capita” it is necessary to do simply:

```
df['internetpercapita']=df['Internet users']/df['Population’]
```

New dataframe

Create a new dataframe

YX = df[['GDPpercapita', ‘MilitPercentGDP','Unemploy rate(%)’]]

And

YX.dtypes

All numerical of course...

Remove missing values

Delete missing values from the entire array

```
YX=YX.dropna()
```

Create X and Y:

```
Y = YX[['GDPpercapita']]
X = YX[['MilitPercentGDP','Unemploy rate(%)']]
```

Statistic Methods

Using the previous dataframe, the following met

X.mean()

X.median()

X.max()

X.min()

X.cov()

X.corr()

X.kurt()

X.kurtosis()

X.skew()

Conclusion

Data structures: dataframe, series

How to manipulate date

How to clean and access to data

Additional Bibliography

https://pandas.pydata.org/

https://pandas.pydata.org/pandas-docs/stable/getting_started/10min.html

https://scikit-learn.org/

https://scikit-learn.org/stable/index.html

https://www.statsmodels.org/stable/index.html