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358 lines (218 sloc)24.5 KB

PANDAS CHEAT SHEET

by Simon Schmid. Work in progrss, without any guarantees. Spotted a mistake? Mail [here](#).

BASICS

Install

```
pip install pandas
```

Libraries to import

```
import pandas as pd
import numpy as np
import datetime
```

Help

```
? # get help on a module or object
```

DATA IN AND OUT

Constructors

```
pd.Series(list) # Create a Series from a list (reference)
• list: ['value1', 'value2']

s = pd.Series(dict) # Create a Series from a dict (reference)
• dict: {'key1': value1, 'key2': value2}

df = pd.DataFrame(listofdicts) # Create a DF from a list of dicts (reference)
• listofdicts: [{'field1': value1, 'field2': value2}, {'field1': value3, 'field2': value4}]

df = pd.DataFrame(dictoflists) # Create a DF from a dict of lists (reference)
• dictsoflists: {'field1': [value1, value3], 'field2': [value2, value4]}
```

Data in

```
df = pd.read_csv("file.csv") # Create a DF from a CSV file (reference)
• nrows=59 # Number of rows
• na_values=["string1", "string2", ...] # Specify values to be treated as NaN
• dtype=str # Create a DF with string dtype
• sep="\t" # Create a DF with tab separator
• error_bad_lines=False # Do not raise an error on bad lines
```

- `header=None` ¶ Úsè ìf òswħàs ñò ħèadèř ¶řw
- `names=["id", "cat"]` ¶ Sqècìfý còlúmñ ñàmès tð bè úsèd

df = pd.read_excel("file.xlsx") ¶ Cřèaťè a DF řřòm aň XLS řìlè ([reference](#))

- `sheetname="name"` ¶ Ĥhè ñàmè òf ĥhè šhèèt ìňsidè èycèl
- `skiprows=n` ¶ Škìq ĥhè řřst ñ řòws
- `names=list` ¶ Úsè ĥhèsè còlúmñ ñàmès

pd.read_sql(query, conn) ¶ Èyècútè a SQL ¶ úèřý òň a ġìwèň còňñècťìòň ([reference](#))

- `index_col="column"` ¶ Ĥhè còlúmñ tð bè úsèd as ìňdèy

Data out

df.to_csv("file.csv") ¶ Sawè a DF ìňtð ĥhè sqècìfìèd òsw ([reference](#))

- `index=False` ¶ dðň.ť sawè ĥhè ìňdèy còlúmñ

df.to_dict() ¶ Sawè datařřamè as dìcťìðňařý ([reference](#))

- `orient="records"/"list"/...` ¶ Way òf còňstřúctìňġ ĥhè dìcťìðňařý

df.to_json() ¶ Sawè as kòň ¶řřřňġ řlřmòst Ĺìkè tðadìcť/ ([reference](#))

- `orient="records"/"index"` ¶ Řřìèňťaťìðň òf ĥhè kòň

s.to_frame() ¶ Còňwèřťs a sèřřès ìňtð a datařřamè ([reference](#))

DATA TYPES

NaN

NaN ¶ Placèhòlùdèř fðř mìssìňġ data

np.nan ¶ Còdè fðř ñaň řhèèd tð ìmqòřť ñúmųý as ñq/

SELECTING STUFF

Select whole table

df ¶ řèqřèsèňťs wħòlè řablè

Select columns

df.field1 ¶ řètčň òňlý òňè còlúmñ

df["field1"] ¶ řlťèřřaťìwè ñòťaťìðň

df[["field1", "field2"]] ¶ řètčň sèwèřal còlúmñs

df[condition] ¶ Òňlý řètčň řòws wħèřè còňdìťìðň ìs řřúè

- `condition = df['field' == value]` ¶ Ĥaň èyamqlè

Select rows

df.head(n) ¶ Òňlý řřst ñ řòws ([reference](#))

df.tail(n) ¶ Òňlý řast ñ řòws ([reference](#))

df.loc[index] ¶ ġèť řòw at qařťìcúlal ìňdèy ([reference](#))

df.iloc[integer] ¶ řřèať ìňdèy as ìf ìť was a řaňġè òf ìňtèġèřs ([reference](#))

Group data fields

`df.groupby("field1")` ¶ ò ìñìñàlìzè ãṛṛóúqèd òúṭqúṭ ¶ñèèd ñhèld] aḡḡṛèḡḡaṭè fúñcṭìṭh (reference)

- use like: `df.groupby("field1")["field2"].function()`

`df.groupby(["field1", "field2"])` ¶ḡṛṛóúqḡy òñ ṭwṛ ìèwèlṣ

DESCRIBE AND SUMMARIZE

Properties of the dataframes

`df.index` ¶A ìlṣṭ òf ṛṛw ¶ñdìcès ḡsúallṡ ṛúñḡḡḡḡ/ (reference)

`df.columns` ¶A ìlṣṭ òf cṛlúṡñ ñamèṣ (reference)

`df.dtypes` ¶A ìlṣṭ òf cṛlúṡñ dataṭṡqḡṣ (reference)

`df.shape` ¶A ṭúqlè sḡècìfṡyìñḡ ḡṛṛwṣ«cṛlúṡñṣ/ (reference)

`df.values` ¶A maṭṛiy òf ṭhè ṭablè wìṭhṛúṭ ḡèadèṛṣ aṛd ṛṛw ñdìcès (reference)

Aggregate Statistics

`.max()` ¶ḡmaṡlúṡúṡ (reference)

- `axis=1` ¶ḡsè all ṭhèṣè fúñcṭìṭhṣ ṛṛṭ cṛlúṡñ ¶ḡwìṣè ḡúṭ ṛṛw ¶ḡwìṣè

`.min()` ¶ḡñìñìṡúṡ (reference)

`.mean()` ¶ḡḡèañ (reference)

`.std()` ¶ḡṭañdaṛd dèwàṭìṭh (reference)

`.sum()` ¶ḡsúṡ (reference)

`.count()` ¶ḡcṛṛṭṭ (reference)

`.size()` ¶ḡsèfúl fṛṛ dṛṛḡlè ¶ḡṛṛóúqḡyṣ«sìṡìlṡ ṭṛ wàlúè«cṛṛṭṣḡ (reference)

MODIFY DATAFRAMES

`df.copy()` ¶ḡcṛṡṡ ṭhè dataṭṛamè ḡñṣṭèad òf kúṭ ṛèṛèṛèñcìñḡ ìṭ/ (reference)

Modify the index

`df.set_index("field")` ¶ḡḡañḡḡè ṭhè ñdèy ¶ḡcṛlúṡñ ṭṛ : ñhèldḡ (reference)

- `inplace=True` ¶ḡḡakè ṭhè ḡañḡḡès òñ ṭhè ṛḡlècṭ«ñṛṭ a cṛṡṡ

`df.rename_axis("Name")` ¶ḡṛèñamè ṭhè ñdèy cṛlúṡñ«Uṣè .Nṛṛè..ṭṛ dèlèṭè ṭhè ñdèy ñamè (reference)

- `inplace=True` ¶ḡḡakè ṭhè ḡañḡḡès òñ ṭhè ṛḡlècṭ«ñṛṭ a cṛṡṡ

Modify columns

`df.insert(pos, "field1", values)` ¶ḡñsèṛṭ ñèw cṛlúṡñ : ñhèldḡ aṭ qṛṣ wìṭh wàlúès (reference)

`df.pop("field1")` ¶ḡdèlèṭè cṛlúṡñ : ñhèldḡ (reference)

`df.assign(newfield = df["field1"] ...)` ¶ḡàsṣìḡñ wàlúès ṭṛ ñèw cṛlúṡñ ḡṛìḡìñal ṛèṡaìṛṣ/ (reference)

`df.rename(columns=dict)` ¶ḡṛèñamè cṛlúṡñṣ«úṣìñḡ \.ḡldḡ.ḡ.ñèwḡ.«ḡld4.ḡ.ñèw4.ḡ. aṣ dìcṭ (reference)

- `inplace=True` ¶ḡḡakè ṭhè ḡañḡḡès òñ ṭhè ṛḡlècṭ«ñṛṭ a cṛṡṡ

Modify rows

`df.append(series/dataframe)` ¶ḡaddṣ ṭhè ṛṛw«ṛèṭúṛñṣ ñèw ṛḡlècṭ (reference)

df.drop(df[condition].index) 📌dèlètè ròws fròm tabljè basèd òñ còñditiòñ ([reference](#))

- inplace=True 📌ṁakè thè cháñgès òñ thè òbjèct«ñòt a còqy

Modify data structure

df.pivot() 📌ṛañsřòřṁ lòñg data òñtò wìdè data ([reference](#))

- index='field1' 📌thè còljúṁñ tò bè úsèd as thè ñèw òñdèy còljúṁñ
- columns='field2' 📌thè còljúṁñ wñìch has thè wàlúès thàt wìll ṁakè úq thè ñèw còljúṁñs
- values='field3' 📌thè còljúṁñ còñtaiñiñg thè wàlúès

df.melt() 📌ṛañsřòřṁ wìdè data òñtò lòñg data ([reference](#))

df.unstack() 📌ṛañsřòřṁ gřòúqbý📌úbjròws òñtò còljúṁñs úsèfúl tò chářt şřàckèd bñřs/ ([reference](#))

df.transpose() 📌wìtchès řòw añd còljúṁñs òwèř thè wñòlè dataşèt ([reference](#))

df.T 📌şhòřřhàñd řòř dřṛañsşqòşèř

Sort data globally

df.sort_index() 📌şòřř ñòt bý wàlúès búť bý òñdèy ([reference](#))

df.sort_values("field1") 📌şòřř wàlúès ([reference](#))

- ascending=False 📌ñ dèşcèñdìñg òřdèř
- na_position="first"/"last" 📌qòşìtiòñ òf NaN wàlúès

COMBINE DATAFRAMES

df.merge(df2) 📌ṁèřgè datařřamè wìth òřhèř datařřamè ([reference](#))

- on="field" 📌fièlđñamèş/ tò ṁatçh şř thèy hawè şamè ñamè/
- left_on="df1-field" 📌fièlđñamè tò ṁatçh òñ lèřt sìdè
- right_on="df2-field" 📌fièlđñamè tò ṁatçh òñ řìgřt sìdè
- left_index=True 📌wñhètñèř tò úsè thè òñdèy as thè lèřt📌sìdè ṁatçh fièlđ
- right_index=True 📌wñhètñèř tò úsè thè òñdèy as thè lèřt📌sìdè ṁatçh fièlđ
- how="inner/left/right/outer" 📌úşř lìkè òñ SQL

df.join(df2) 📌òñ a datařřamè wìth òñèñtiçal ñúṁbèř òf řòws/ tò añòřhèř«şòřřòñřally ([reference](#))

pd.concat([df1,df2]) 📌addş all thè datařřamès òñ thè lìşř«wèřřiçally ([reference](#))

- axis=1 📌add şòřřòñřally«ñòt wèřřiçally
- ignore_index=True 📌còñşřřúçt ñèw òñdèy«dòñ.t.úşè èyişřiñg òñè

MODIFY DATA GLOBALLY

Deal with NaNs

pd.isnull() 📌Búllřṁñ fúñçtiòñ tò řèşř řòř ṁúll òñ añy wàlúè ([reference](#))

pd.notnull() 📌şamè búť òqqòşìtè ([reference](#))

df.dropna() 📌gğèt řìd òf NaNş«òqřìðñal>òñ a súbşèt ([reference](#))

- subset="field1" 📌òñljý aqqlý òñ súbşèt
- inplace=true 📌ṁakè thè cháñgès òñ thè òbjèct«ñòt a còqy
- how="all" 📌òñljý dřòq řòws wñèřè all fièlđş ařè NaN

df.fillna(value) 📌řèqlaçè NaN.s wìth òřhèř wàlúè ([reference](#))

- inplace=true 📌ṁakè thè cháñgès òñ thè òbjèct«ñòt a còqy

`df.drop_duplicates()` "gèt's rīd ōf dúplīcatē walúēs ([reference](#))

- df.duplicated()** "Thè dúglicatès ñwèrsè òf drōq^adúqclìcatèd" (reference)

- ## Various

`df.round({'field1': n, 'field2': m})` ¶ *Round the numbers in particular columns (reference)*

df.dot(df2) • dot gr̃odúct ōf twŃ datafr̃amès ([reference](#))

`df.update(df2)` "Update values in df with those from df2 (reference)"

DEAL WITH INDIVIDUAL DATA FIELDS (I.E. SERIES)

Many of these functions can be used on whole dataframes as well.

Filter fields

`df["field1"].isnull()` [returns true if null \(reference\)](#)

```
df["field1"].notnull() reference
```

`df["field1"].isin(["str1", "str2"])` ➔ Returns true if field9 equals a value in the list ([reference](#))

```
~df["field1"].isin(["str1", "str2"]) # returns true if field doesn't have a value in the list
```

`df["field1"].str.contains("str")` ¶ Returns true if field contains the string str ([reference](#))

- `na=False` "Avoid Error for NaN values"
- `regex=True/False` "by default «regex can be included"
- `case=True/False` "case sensitive or not«default True"

Aggregate summaries over fields

`df["field1"].describe()` displays may«miñ««meañ««etc ([reference](#))

```
df["field1"].max() #cálculatè may«ètè»alsõ>mèañ«mĩñ«>>>(reference)
```

`df["field"].value_counts()` •fr̃er úeňčý ōř èačř walúè«ĩň tabúlař fõrm ([reference](#))

- normalize=True "İn qeṛcēñtağès
- dropna=False "İñclúde NaN.s
- ascending=True "Sört İñ İnvērsē ördēr

`df["field"].unique()` → get a list of unique/distinct values ([reference](#))

`pd.get_dummies(df["field"])` **Basèd òñ úñìr úè valúès ìñ a fièld**«Crèatè a sèt òf dúmmý còlúmñs ([reference](#))

- `prefix="prefix"` • Přefixy řo úsè bèfòřè úsìňǵ úñìr úè wàlùès às còlúmn ħèadèřs
- `drop_first=True`

Mathematical modifications

`df.rolling(n, on="column")` ¶ [R̥etúrñs thè rölllĩŋǵ awèraǵè ǿf : cǿlúmñ: as a DF \(reference\)](#)

- `min_periods=n` → sèt ñúmber ǒf qerìòds tǒ awèràgè òwèr

`df['field1'].pct_change()` %cálculatès } %ěhañðe bètwèèñ gèrìòd t ańd t·9 mǝñ sèrìès òr dǝ/ ([reference](#))

`df['field1'].agg(['func1', 'func2'])` [↗](#) `agg()` allows you to aggregate data using a list of functions. `func1` and `func2` are the names of the functions to apply. [reference](#)

Data modifications

`df["field1"].astype(int)` [↗](#) `astype()` is used to convert the data type of a column. [reference](#)

- `errors="ignore"` [↗](#) `errors="ignore"` will ignore any errors that occur during the conversion.

`df["field1"].replace("str1", "str2")` [↗](#) `replace()` is used to replace values in a column. `str1` is the value to be replaced, and `str2` is the value to replace it with. [reference](#)

- `dictionary` [↗](#) `replace()` can also take a dictionary as an argument, where the keys are the values to be replaced, and the values are the values to replace them with.
- `regex=True` [↗](#) `replace()` can also take a regular expression as an argument, where the keys are the regular expressions to be replaced, and the values are the values to replace them with.

`df["field1"].extract(regex)` [↗](#) `extract()` is used to extract data from a column using a regular expression. [reference](#)

- `expand=True` [↗](#) `extract()` can also take a boolean argument, `expand`, which, if set to `True`, will return the data as a `Series` object.
- `.dropna()` [↗](#) `dropna()` is used to drop any rows with missing values (NaN).

Assign field values dynamically

`df.loc[cond, "field"] = "value"` [↗](#) `loc` is used to assign values to a specific location in the DataFrame. `cond` is the condition, `field` is the column name, and `value` is the value to assign. [reference](#)

`df.apply(function)` [↗](#) `apply()` is used to apply a function to each row or column of the DataFrame. [reference](#)

- `axis = 1` [↗](#) `axis = 1` will apply the function to each row.

`def function(x):` [↗](#) `function` is the name of the function to be applied.

`df["field1"] = df.apply(function)` [↗](#) `df["field1"] = df.apply(function)` will assign the result of the function to the `field1` column.

DEAL WITH TIME

Data Conversion

`pd.to_datetime(df.column)` [↗](#) `to_datetime()` is used to convert a column of data to a datetime format. [reference](#)

- `format="format"` [↗](#) `format="format"` is used to specify the format of the datetime string. [formats](#)

`df['field1'].apply(lambda (t): t.strftime('format'))` [↗](#) `strftime()` is used to format a datetime object. [reference](#)

Extract datetime info

`df['field1'].year` [↗](#) `year` is used to extract the year from a datetime object. [reference](#)

`df['field1'].month` [↗](#) `month` is used to extract the month from a datetime object.

`df['field1'].day` [↗](#) `day` is used to extract the day from a datetime object.

`df['field1'].dayofweek` [↗](#) `dayofweek` is used to extract the day of the week from a datetime object.

Timedelta

`td = datetime.timedelta()` [↗](#) `timedelta` is used to create a timedelta object. [reference](#)

- `days=n` [↗](#) `days=n` is used to specify the number of days.

`td.days` [↗](#) `td.days` is used to get the number of days from a timedelta object.

`td.years` [↗](#) `td.years` is used to get the number of years from a timedelta object.

Filter date columns

`df['YYYY']` [↗](#) `df['YYYY']` is used to filter the DataFrame by the year.

`df['YYYY': 'YYYY']` [↗](#) `df['YYYY': 'YYYY']` is used to filter the DataFrame by a range of years.

Mathematical modifications

`df.resample('rule')` • aġġrèġaṭe data sō sōmè sqècific t̃imè iñt̃erwaj ([reference](#)), ([rules](#))

`df.rolling(n)` • aġġrèġaṭe w̃iṭṭ ñ ñèiġhbōrs»chaint̃ w̃iṭṭ »ñeant̃«s̃um̃ oṛ oṭṭh̃er ([reference](#))

DISPLAY OPTIONS FOR JUPYTER NOTEBOOKS

`pd.set_option("optionName", value)` • Čhañġe t̃h̃e b̃ehawioṛ oṫ diṣqlaỹed cōñt̃ent̃ iñ ñōt̃ebōōks ([reference](#))

- "display.max_rows" • t̃h̃e ñum̃b̃er oṫ r̃ōws oṫ a DataF̃ram̃e
- "display.max_columns" • t̃h̃e ñum̃b̃er oṫ cōl̃um̃ns oṫ a DataF̃ram̃e
- "display.max_colwidth" • t̃h̃e ñum̃b̃er oṫ čhaṛs̃ iñsid̃e a cōl̃um̃n
- "display.float_format" • s̃ōm̃et̃h̃iñġ liķè : \x8f-: »oṛm̃at̃
- etc.

`pd.options.display.max_rows` • oṫ diṣqlaỹ t̃h̃e c̃ur̃r̃ent̃ s̃et̃t̃iñġs