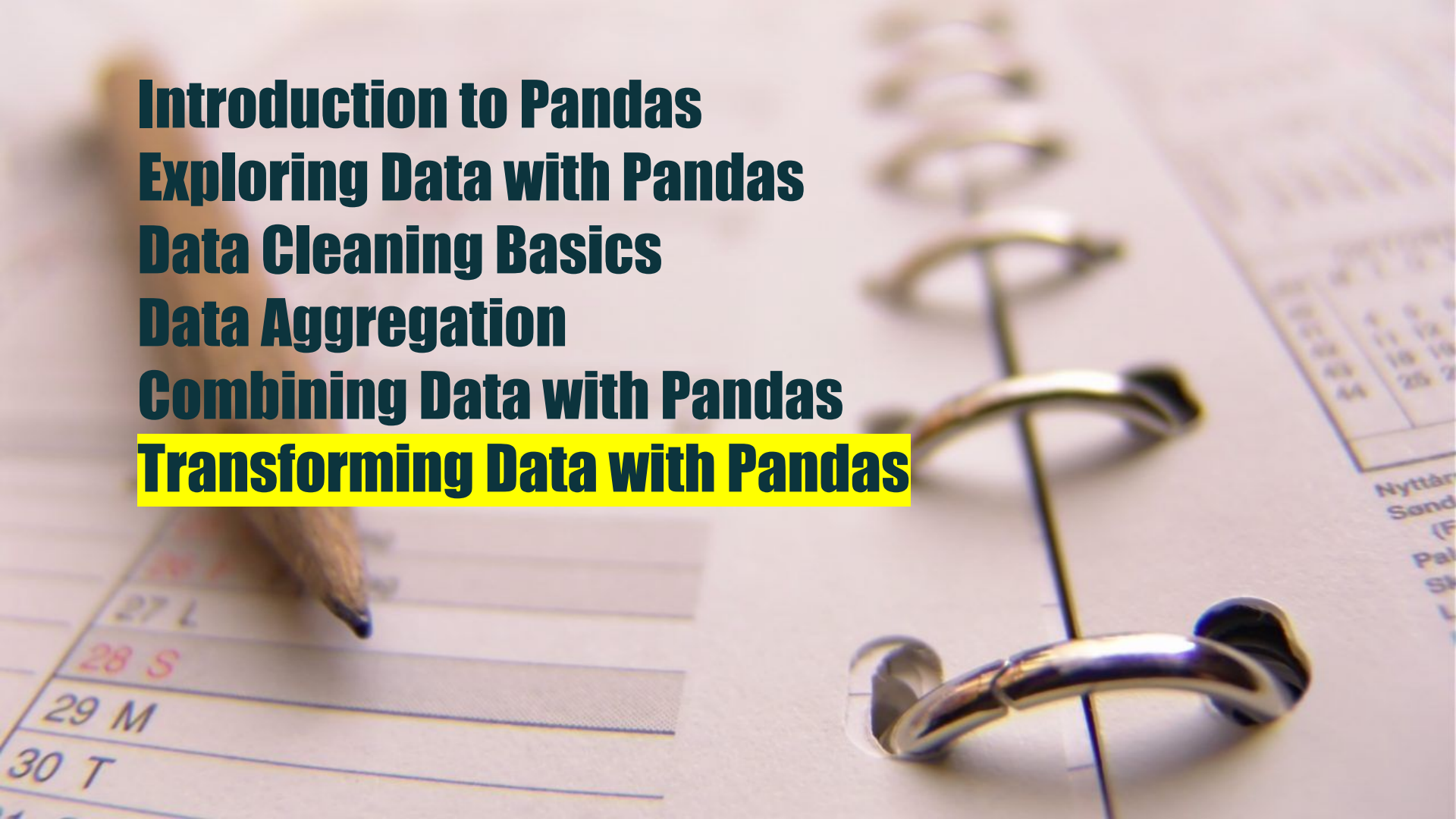
Lesson #03 - Part 02

Transforming Data with Pandas

September 2020


Introduction to Pandas
Exploring Data with Pandas
Data Cleaning Basics
Data Aggregation
Combining Data with Pandas
Transforming Data with Pandas
27 L
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- Transforming data with Pandas
  a. Map
  b. Apply
  c. Applymap
  d. Melt

Update from repository

```
git clone https://github.com/ivanovitchm/datascience2020.6
```

Or ....

```
git pull
```

CC0: Public Domain

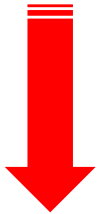
economics, social sciences, emotion

Data Sources

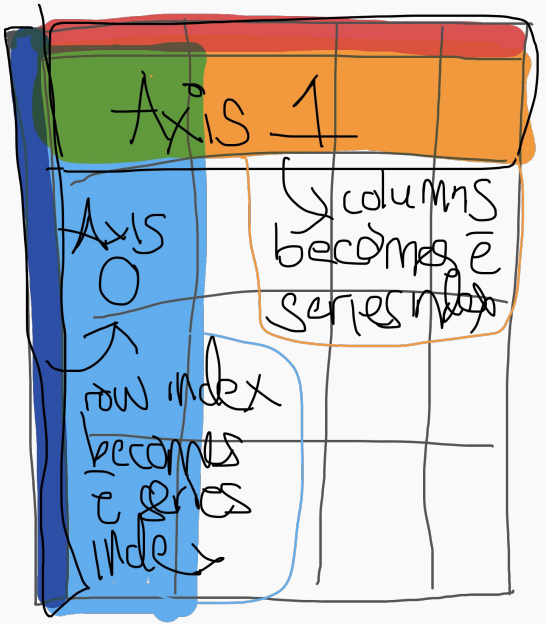
2015.csv	158 x 12
2016.csv	157 x 13
2017.csv	155 x 12

TARGET

Which of these factors contribute the most to the happiness score?

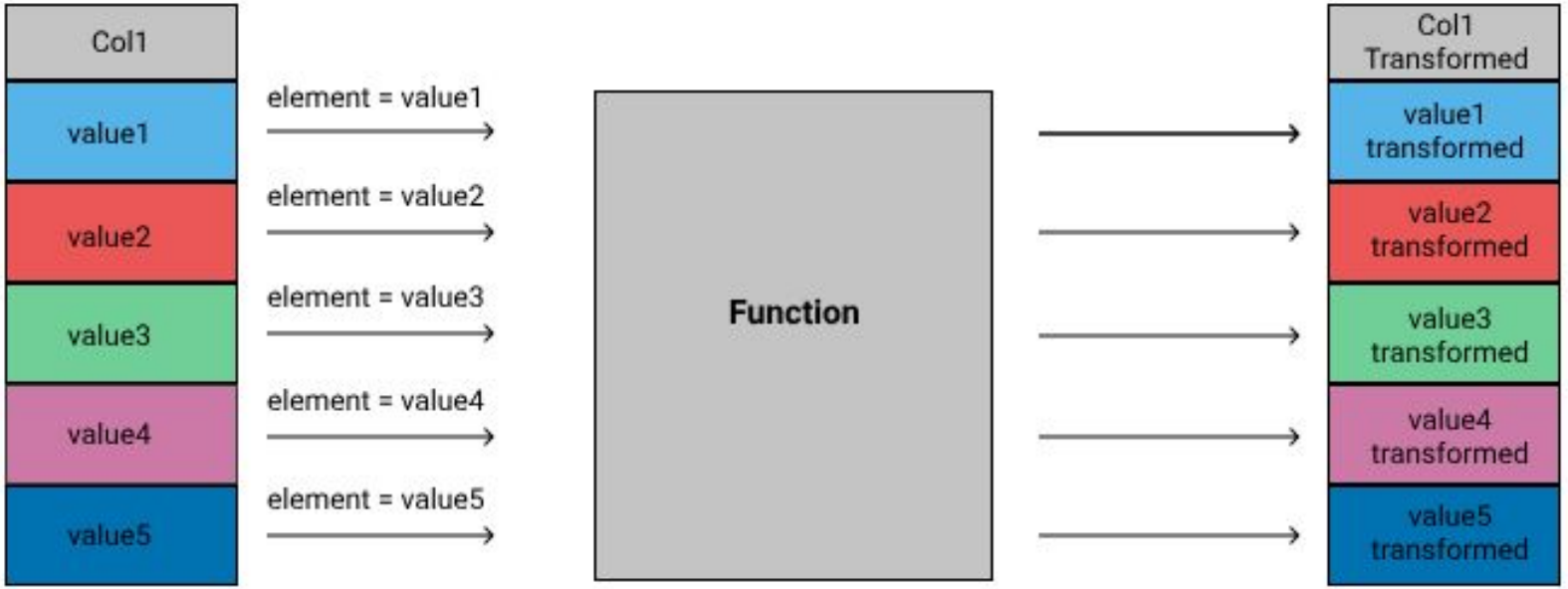


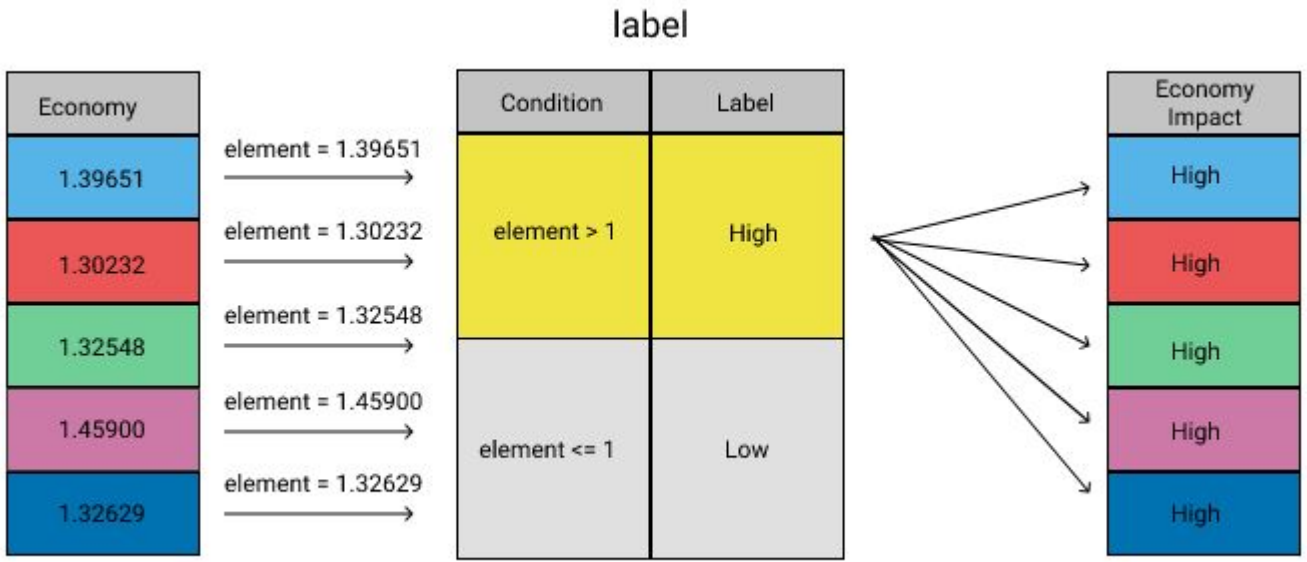
	Country	Region	Happiness Rank	Happiness Score	Standard Error	Economy	Family	Health	Freedom	Trust	Generosity
0	Switzerland	Western Europe	1	7.587	0.03411	1.39651	1.34951	0.94143	0.66557	0.41978	0.29678
1	Iceland	Western Europe	2	7.561	0.04884	1.30232	1.40223	0.94784	0.62877	0.14145	0.43630
2	Denmark	Western Europe	3	7.527	0.03328	1.32548	1.36058	0.87464	0.64938	0.48357	0.34139
3	Norway	Western Europe	4	7.522	0.03880	1.45900	1.33095	0.88521	0.66973	0.36503	0.34699
4	Canada	North America	5	7.427	0.03553	1.32629	1.32261	0.90563	0.63297	0.32957	0.45811



- Series.map()
- Series.apply()
- DataFrame.applymap()
- DataFrame.apply()
- Pandas.melt()

Apply a Function Element-wise: **map**, **apply**






```
1 def label(element):
2     if element > 1:
3         return 'High'
4     else:
5         return 'Low'
```

```
def label(element):
    if element > 1:
        return 'High'
    else:
        return 'Low'
happiness2015['Economy Impact'] = happiness2015['Economy'].map(label)
happiness2015['Economy Impact'] = happiness2015['Economy'].apply(label)
```

Series.map()
Series.apply()

	Economy	Economy Impact
0	1.39651	High
1	1.30232	High
2	1.32548	High
3	1.45900	High
4	1.32629	High

```
def label(element, x):
    if element > x:
        return 'High'
    else:
        return 'Low'
economy_map = happiness2015['Economy'].map(label, x = .8)
```

```
TypeError: map() got an unexpected keyword argument 'x'
```

```
def label(element,x):
    if element > x:
        return 'High'
    else:
        return 'Low'
economy_impact_apply = happiness2015['Economy'].apply(label,x=0.8)
```

Apply a Function Element-wise to Multiple Columns Using Applymap Method

```
def label(element):
    if element > 1:
        return 'High'
    else:
        return 'Low'
```

```
happiness2015['Economy Impact'] = happiness2015['Economy'].apply(label)
happiness2015['Health Impact'] = happiness2015['Health'].apply(label)
happiness2015['Family Impact'] = happiness2015['Family'].apply(label)
```

Dataframe.applymap()

```
factors = ['Economy', 'Family', 'Health', 'Freedom', 'Trust', 'Generosity']
factors_impact = happiness2015[factors].applymap(label)
```

	Economy	Family	Health	Freedom	Trust	Generosity
0	High	High	Low	Low	Low	Low
1	High	High	Low	Low	Low	Low
2	High	High	Low	Low	Low	Low
3	High	High	Low	Low	Low	Low
4	High	High	Low	Low	Low	Low

```
def label(element):
    if element > 1:
        return 'High'
    else:
        return 'Low'
factors = ['Economy', 'Family', 'Health', 'Freedom', 'Trust', 'Generosity']
factors_impact = happiness2015[factors].apply(label)
```

Dataframe.apply()

```
ValueError: ('The truth value of a Series is ambiguous.
```

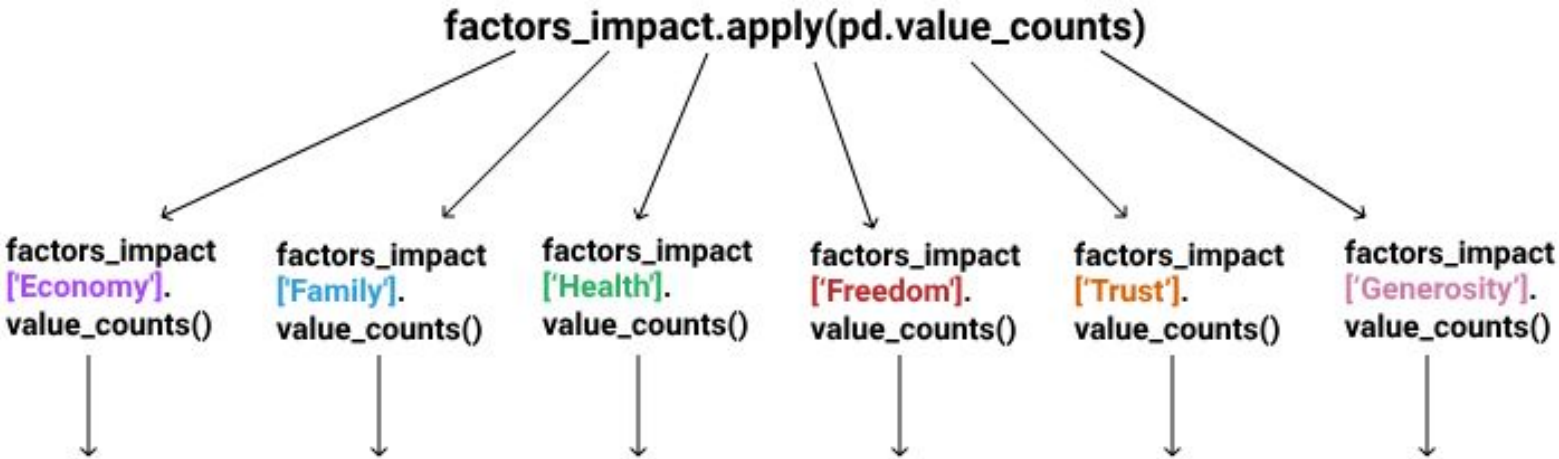
```
factors_impact
```

	Economy	Family	Health	Freedom	Trust	Generosity
0	High	High	Low	Low	Low	Low
1	High	High	Low	Low	Low	Low
2	High	High	Low	Low	Low	Low
3	High	High	Low	Low	Low	Low
4	High	High	Low	Low	Low	Low

Apply Functions along an Axis using the Apply Method

```
factors_impact.apply(pd.value_counts)
```

	Economy	Family	Health	Freedom	Trust	Generosity
High	66	89	2	NaN	NaN	NaN
Low	92	69	156	158.0	158.0	158.0



	Economy	Family	Health	Freedom	Trust	Generosity
High	66	89	2	NaN	NaN	NaN
Low	92	69	156	158.0	158.0	158.0

```
def v_counts(col):
    num = col.value_counts()
    den = col.size
    return num/den
factors_impact.apply(v_counts)
```

	Economy	Family	Health	Freedom	Trust	Generosity
High	0.417722	0.563291	0.012658	NaN	NaN	NaN
Low	0.582278	0.436709	0.987342	1.0	1.0	1.0

	Country	Happiness Score	Economy	Family	Health
0	Switzerland	7.587	1.39651	1.34951	0.94143
1	Iceland	7.561	1.30232	1.40223	0.94784

	Country	variable	value
0	Switzerland	Economy	1.39651
1	Iceland	Economy	1.30232
2	Switzerland	Family	1.34951
3	Iceland	Family	1.40223
4	Switzerland	Health	0.94143
5	Iceland	Health	0.94784

Reshaping Data for #tidy format

```
pd.melt(happy_two, id_vars=['Country'], value_vars=['Economy', 'Family', 'Health'])
```

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