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Кафедра «Системы обработки информации и управления»

Лабораторная работа №1
по дисциплине
«Методы машинного обучения»
на тему
«Разведочный анализ данных. Исследование и визуализация данных»

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[27]:
```
import pandas as pd
import numpy as np
from matplotlib import pyplot as plt
import seaborn as sns
import plotly.offline as py
import warnings
import pycountry
warnings.filterwarnings('ignore')

py.init_notebook_mode(connected=True)
import plotly.graph_objs as go
```

[2]:
```
PATH = 'DATA/athlete_events.csv'
data = pd.read_csv(PATH)
data.head(3)
```

[2]:

	ID	Name	Sex	Age	Height	Weight	Team	NOC	Games	Year	Season	City	Sport	Event	Medal
0	1	A Dijiang	M	24.0	180.0	80.0	China	CHN	1992 Summer	1992	Summer	Barcelona	Basketball	Basketball Men's Basketball	NaN
1	2	A Lamusi	M	23.0	170.0	60.0	China	CHN	2012 Summer	2012	Summer	London	Judo	Judo Men's Extra-Lightweight	NaN
2	3	Gunnar Nielsen Aaby	M	24.0	NaN	NaN	Denmark	DEN	1920 Summer	1920	Summer	Antwerpen	Football	Football Men's Football	NaN

[4]:
```
data.shape
```

[4]:
```
(271116, 15)
```

[3]:
```
data.describe()
```

[3]:

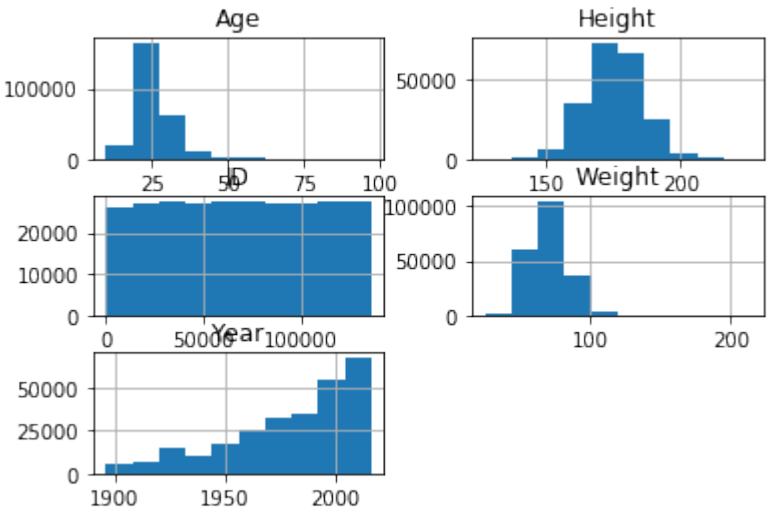
	ID	Age	Height	Weight	Year
count	271116.000000	261642.000000	210945.000000	208241.000000	271116.000000
mean	68248.954396	25.556898	175.338970	70.702393	1978.378480
std	39022.286345	6.393561	10.518462	14.348020	29.877632
min	1.000000	10.000000	127.000000	25.000000	
25%	34643.000000	21.000000	168.000000	60.000000	
50%	68205.000000	24.000000	175.000000	70.000000	
75%	102097.250000	28.000000	183.000000	79.000000	
max	135571.000000	97.000000	226.000000	214.000000	

```
min     1896.000000
25%     1960.000000
50%     1988.000000
75%     2002.000000
max     2016.000000
```

The dataset has the following features:
ID - Уникальный номер атлета
Name - Имя атлета
Sex - Пол Атлета
Age - Возраст
Height - Рост
Weight - Вес
Team - Название команды
NOC - Код НОК
Games - Год/Время года
Year - Год
Season - Летние или зимние
City - Место проведения
Sport - Вид спорта
Event - событие
Medal - Медаль

[7]:
```
data.hist()
```

[7]:
```
array([[<matplotlib.axes._subplots.AxesSubplot object at 0x108e49490>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x114a47ad0>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x1155b2150>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x1155d7950>],
       [<matplotlib.axes._subplots.AxesSubplot object at 0x115605190>,
        <matplotlib.axes._subplots.AxesSubplot object at 0x11562a990>]],
      dtype=object)
```



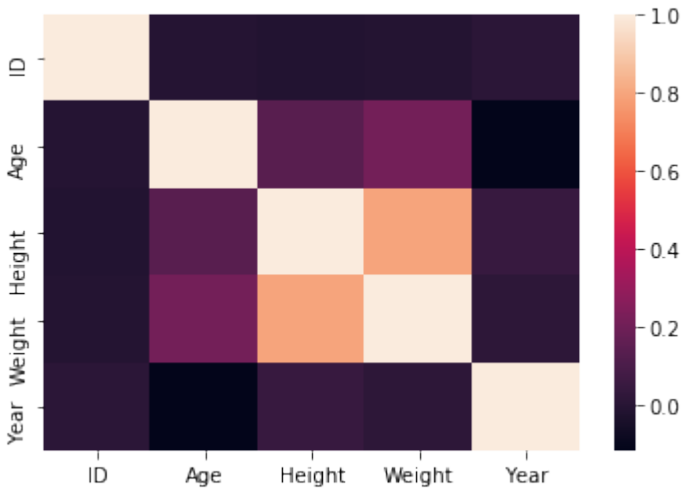
0.1. Корреляция численных признаков

[9]:
```
data.corr()
```

[9]:
```
            ID      Age    Height    Weight      Year
ID      1.000000 -0.003631 -0.011141 -0.009176  0.011885
Age    -0.003631  1.000000  0.138246  0.212069 -0.115137
Height -0.011141  0.138246  1.000000  0.796213  0.047578
Weight -0.009176  0.212069  0.796213  1.000000  0.019095
Year    0.011885 -0.115137  0.047578  0.019095  1.000000
```

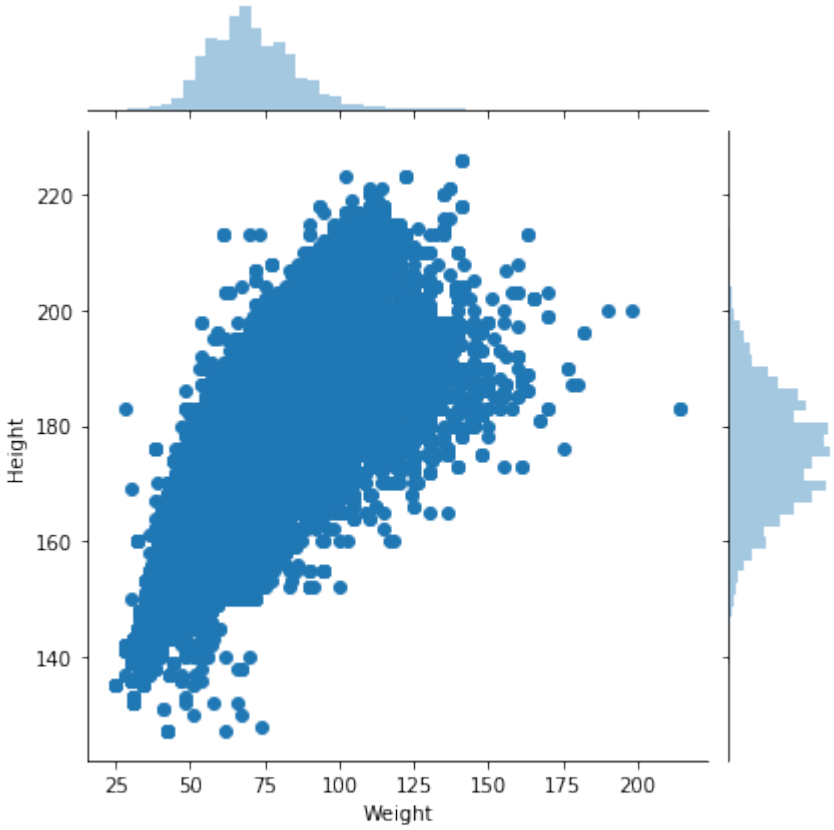
[34]:
```
# calculate the correlation matrix
corr = data.corr()

# plot the heatmap
sns.heatmap(corr,
        xticklabels=corr.columns,
        yticklabels=corr.columns)
```

[34]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x135ab1490>
```



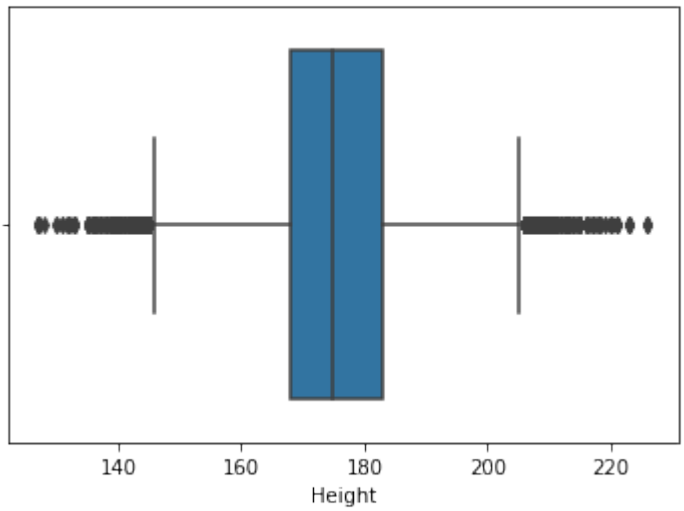
[32]:
```
sns.jointplot(x='Weight', y='Height', data=data)
```

[32]:
```
<seaborn.axisgrid.JointGrid at 0x13be5dcd0>
```



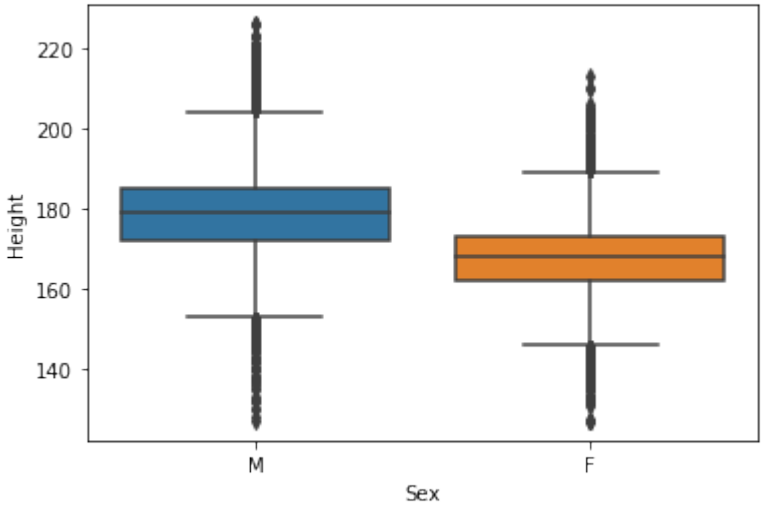
[11]:
```
tips = sns.load_dataset("tips")
sns.boxplot(x=data["Height"])
```

[11]: <matplotlib.axes._subplots.AxesSubplot at 0x1215b1650>



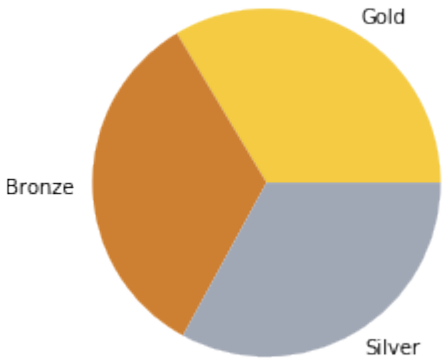
[20]:
```
sns.boxplot(x="Sex", y="Height", data=data)
```

[20]: <matplotlib.axes._subplots.AxesSubplot at 0x13386c9d0>



[31]:
```
colors = ['#f4cb42', '#cd7f32', '#a1a8b5']
medal_counts = data.Medal.value_counts(sort=True)
labels = medal_counts.index
values = medal_counts.values

plt.pie(medal_counts, labels=labels, colors=colors)
```

[31]:
```
([<matplotlib.patches.Wedge at 0x13be74050>,
  <matplotlib.patches.Wedge at 0x13be74390>,
  <matplotlib.patches.Wedge at 0x13be74410>],
 [Text(0.5416287540153236, 0.9574122898855061, 'Gold'),
  Text(-1.099775232453987, -0.022235963680029166, 'Bronze'),
  Text(0.5608717034142483, -0.946267896691629, 'Silver')])
```



[ ]: