preprocess_data

October 2, 2023

[ ]:
```
import pandas as pd
import seaborn as sns
import numpy as np
from sklearn import preprocessing
import datetime
from matplotlib import pyplot as plt
from scipy. stats import pearsonr
from sklearn.preprocessing import StandardScaler
from sklearn.utils import shuffle

import warnings
warnings.filterwarnings("ignore")
```

1

[ ]:
```
df_test_analysis = pd.read_csv("../data/raw/diabetes_test_analysis.csv")
df_test_info = pd.read_csv("../data/raw/diabetes_test_info.csv")

df_train_analysis = pd.read_csv("../data/raw/diabetes_train_analysis.csv")
df_train_info = pd.read_csv("../data/raw/diabetes_train_info.csv")
```

2

[ ]:
```
print(f'    df_test_analysis: {df_test_analysis.duplicated().sum()}')
print(f'    df_test_info: {df_test_info.duplicated().sum()}')

print(f'    df_train_analysis: {df_train_analysis.duplicated().sum()}')
print(f'    df_train_info: {df_train_info.duplicated().sum()}')
```

```
    df_test_analysis: 0
    df_test_info: 0
    df_train_analysis: 0
    df_train_info: 0
```

3 id merge

[ ]:
```
print(df_train_analysis['id'].unique().shape[0])
print(df_train_info['id'].unique().shape[0])

print(df_test_analysis['id'].unique().shape[0])
print(df_test_info['id'].unique().shape[0])
```

```
60000
60000
10000
10000
```

id

[ ]:
```
print(df_test_analysis.shape)
print(df_test_info.shape)
```

```
(10000, 9)
(10000, 5)
```

[ ]:
```
print(df_train_analysis.shape)
print(df_train_info.shape)
```

```
(60000, 9)
(60000, 5)
```

[ ]:
```
df_test = pd.merge(df_test_analysis, df_test_info, on="id")
df_train = pd.merge(df_train_analysis, df_train_info, on="id")
```

[ ]:
```
print(df_test.shape)
print(df_train.shape)
```

```
(10000, 13)
(60000, 13)
```

4 features

[ ]:
```
df_train.head()
```

[ ]:

	id	cholesterol	gluc	smoke	alco	active	pressure	diabetes	ket	\
0	62538	low	low	0	0	1	100/80	0	5.92	
1	49159	low	low	0	0	1	120/82	0	3.82	
2	60683	low	low	0	0	1	120/80	0	5.05	
3	42924	low	low	0	0	0	120\80	0	3.43	
4	52888	low	low	0	0	0	120/80	0	4.99	

age height weight gender

```
0     54     169    76.0      f
1     49     165    65.0      m
2  21962     170    56.0      m
3  20287     169    62.0      m
4  16202     166    67.0   male
```

[ ]:
```
df_test.head()
```

[ ]:
```
      id cholesterol    gluc  smoke  alco  active pressure  diabetes   ket  \
0  95306         low  medium      0     0       0   120/80         1  4.86
1  86688         low     low      0     0       1   100\70         0  4.89
2  98038         low     low      0     0       0  140/100         1  3.91
3  88694         low     low      0     0       1   120\90         0  4.05
4  92856         low     low      0     0       0   130\80         0  5.35

     age  height  weight gender
0     61     165    90.0      f
1  14582     162    50.0      m
2  23389     156    74.0      m
3     47     162    89.0      m
4  18388     162    72.0      f
```

[ ]:
```
df_train.dtypes
```

[ ]:
```
id              int64
cholesterol     object
gluc            object
smoke            int64
alco             int64
active           int64
pressure        object
diabetes         int64
ket            float64
age              int64
height           int64
weight         float64
gender          object
dtype: object
```

[ ]:
```
df_test.dtypes
```

[ ]:
```
id              int64
cholesterol     object
gluc            object
smoke            int64
alco             int64
active           int64
```

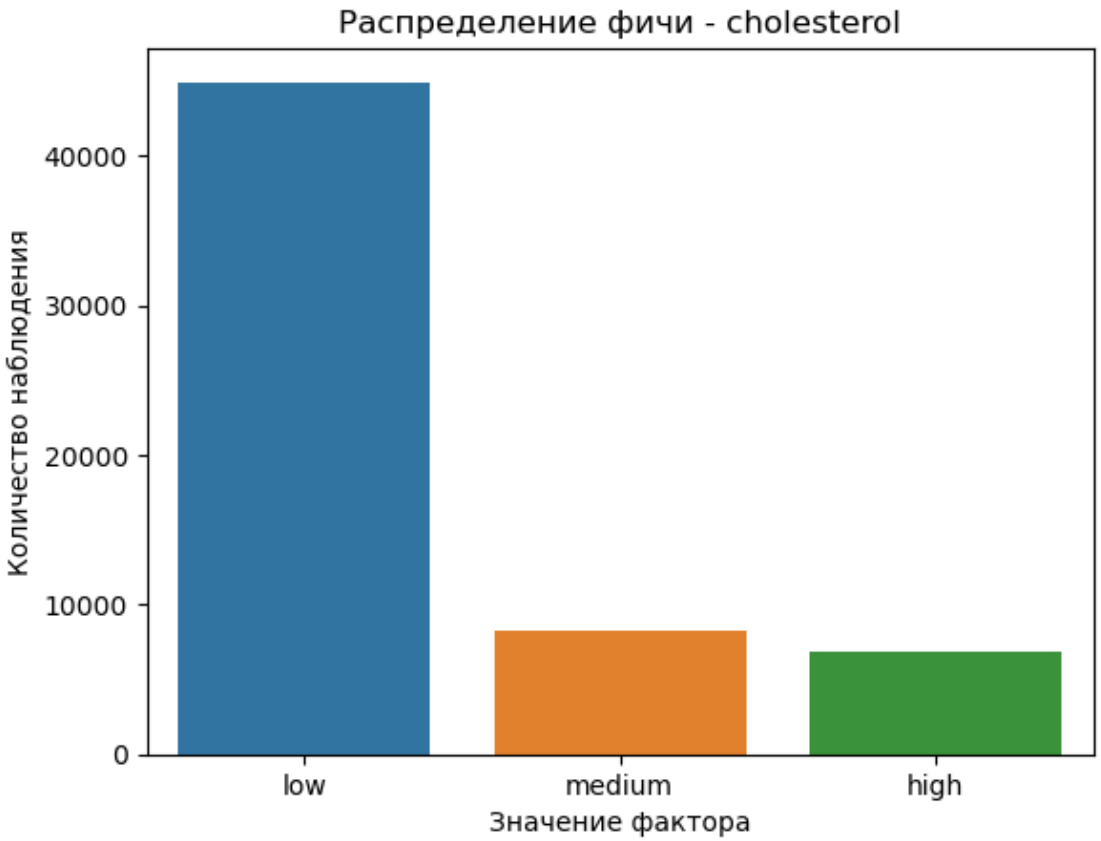
```
pressure        object
diabetes         int64
ket            float64
age              int64
height           int64
weight         float64
gender          object
dtype: object
```

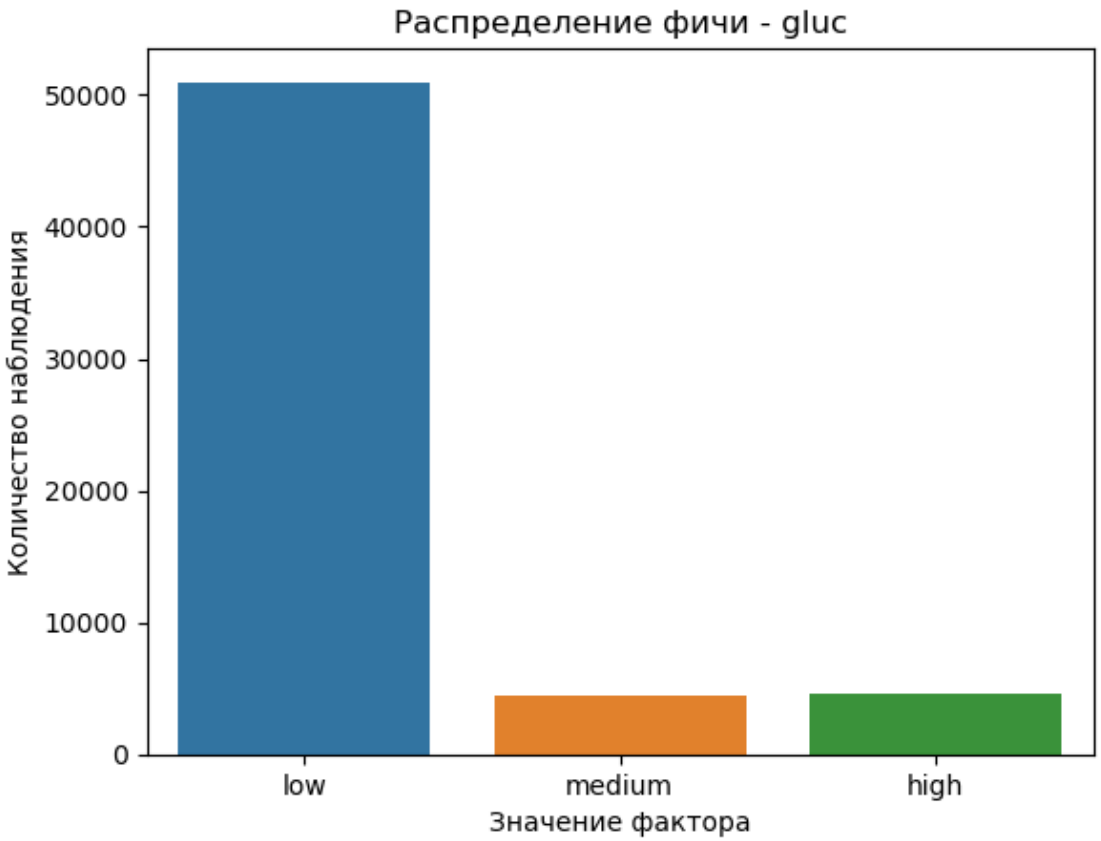
- id —
- holesterol —
- gluc —
- smoke —
- alco —
- active —
- pressure —
- ket —
- age —
- height — ( )
- weight — ( )
- gender —

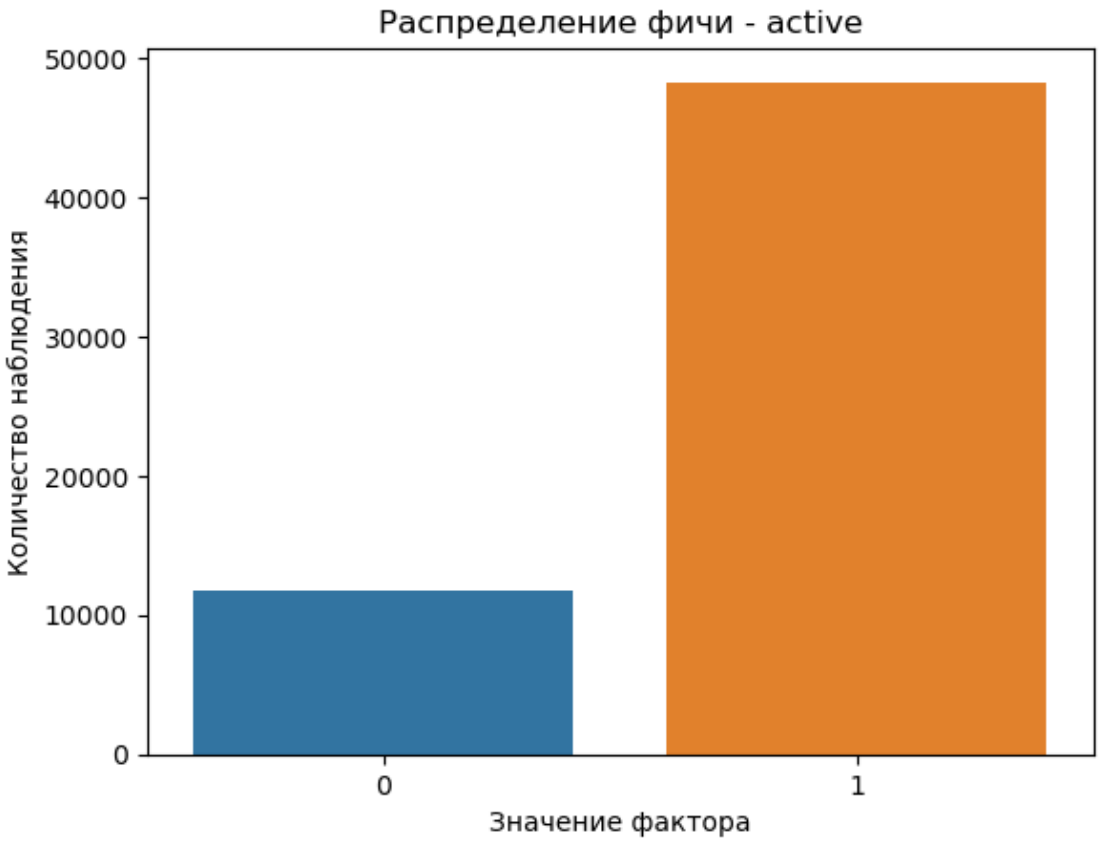
diabetes —

[ ]:
```
def show_category_plot_count(data_df, column):
    plt.title(f'           - {column}')
    sns.countplot(data=data_df, x=column)
    plt.ylabel('            ')
    plt.xlabel('         ')
    plt.show()
```

[ ]:
```
show_category_plot_count(df_train, 'cholesterol')
show_category_plot_count(df_train, 'gluc')
show_category_plot_count(df_train, 'active')
```

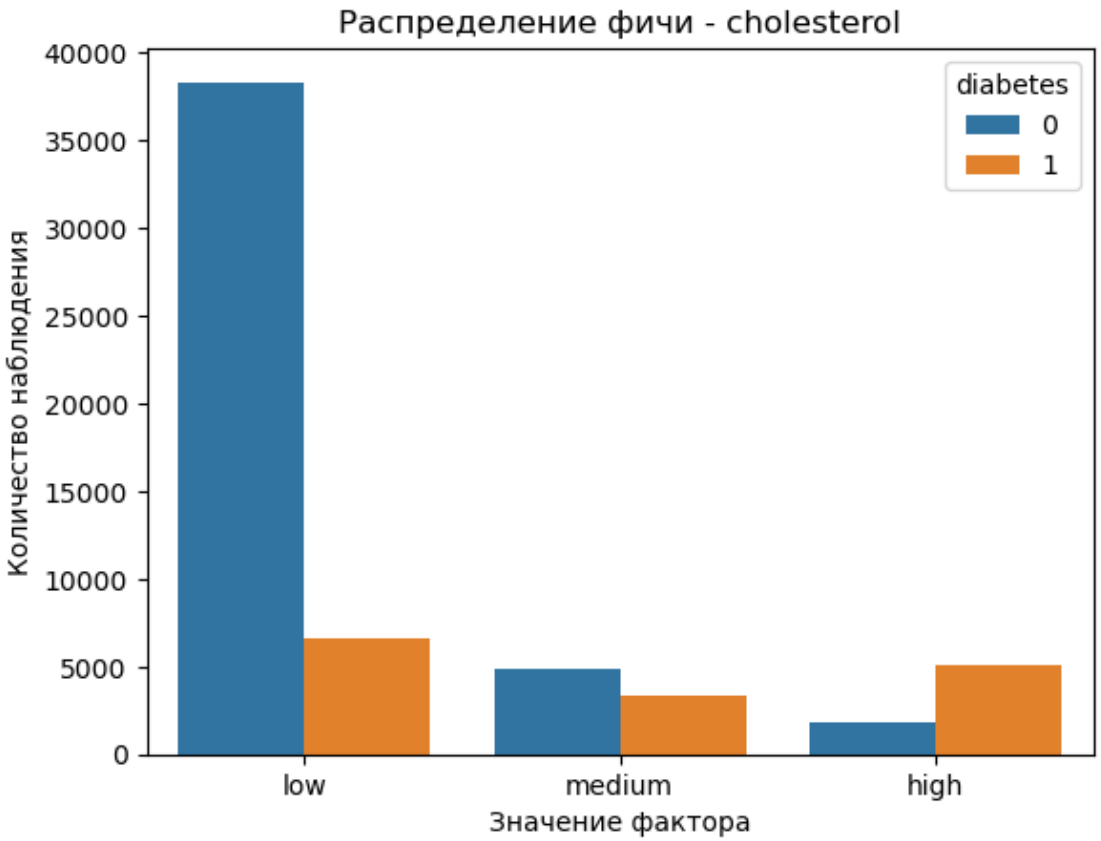

Распределение фичи - cholesterol
Количество наблюдения
40000
30000
20000
10000
0
low
medium
high
Значение фактора

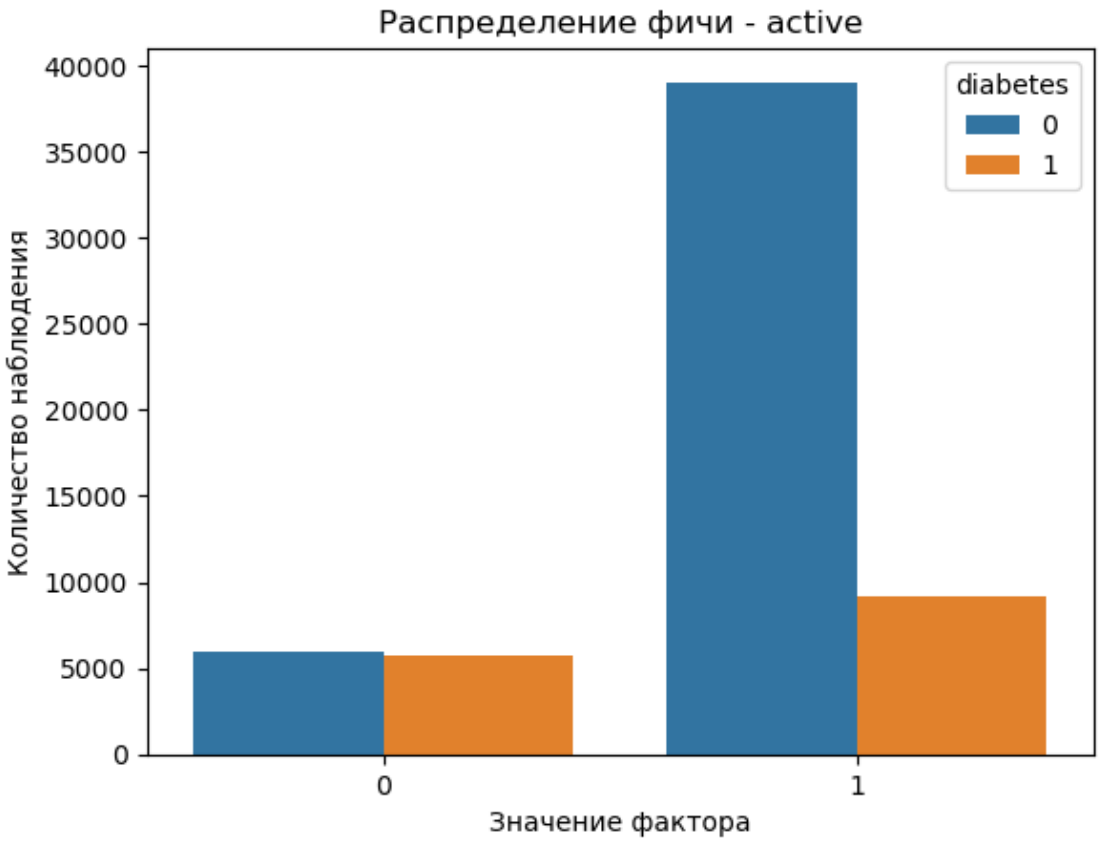

Распределение фичи - gluc
Количество наблюдения
50000
40000
30000
20000
10000
0
low
medium
high
Значение фактора

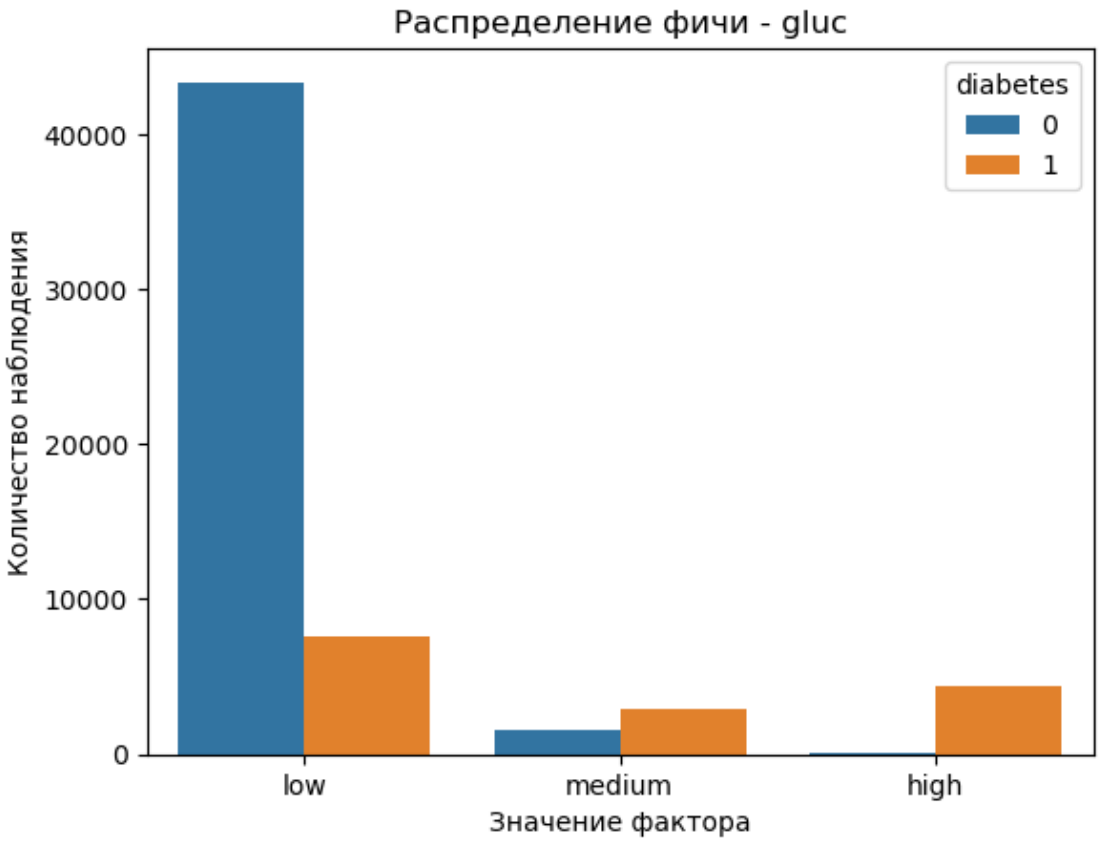


[ ]:
```
def show_category_plot_count_hue_target(df, column):
    plt.title(f'            - {column}')
    sns.countplot(data=df, x=column, hue='diabetes')
    plt.ylabel('             ')
    plt.xlabel(f'          ')
    plt.show()
```

[ ]:
```
show_category_plot_count_hue_target(df_train, 'cholesterol')
show_category_plot_count_hue_target(df_train, 'active')
show_category_plot_count_hue_target(df_train, 'gluc')
```


Распределение фичи - cholesterol
diabetes
0
1
Количество наблюдения
40000
35000
30000
25000
20000
15000
10000
5000
0
low
medium
high
Значение фактора


Распределение фичи - active
diabetes
0
1
40000
35000
30000
25000
20000
15000
10000
5000
0
Количество наблюдения
0
1
Значение фактора



[ ]:
```
df_train[['cholesterol']].value_counts()
```

[ ]:
```
cholesterol
low            44914
medium          8218
high            6868
dtype: int64
```

5

[ ]:
```
print(df_train.isna().sum())
print()
print(df_test.isna().sum())
```

```
id                0
cholesterol       0
gluc              0
smoke             0
alco              0
active            0
```

```
pressure          0
diabetes          0
ket               0
age               0
height            0
weight         1998
gender            0
dtype: int64

id               0
cholesterol      0
gluc             0
smoke            0
alco             0
active           0
pressure         0
diabetes         0
ket              0
age              0
height           0
weight         320
gender           0
dtype: int64
```

= -100 ->

[ ]:
```
weight_na_const = -100
```

[ ]:
```
df_train['weight'].fillna(weight_na_const, inplace=True)
df_test['weight'].fillna(weight_na_const, inplace=True)

df_train_no_weight = df_train[df_train['weight'] == weight_na_const]
df_test_no_weight = df_test[df_test['weight'] == weight_na_const]

df_train.drop(df_train_no_weight.index, inplace = True)
df_test.drop(df_test_no_weight.index, inplace = True)
```

- **!df_train_no_weight!** - ,
- **!df_test_no_weight!** - ,

id -

[ ]:
```
df_train = df_train.drop(['id'], axis=1)
df_test = df_test.drop(['id'], axis=1)

df_train_no_weight = df_train_no_weight.drop(['id'], axis=1)
df_test_no_weight = df_test_no_weight.drop(['id'], axis=1)
```

[ ]:
```
df_train.head()
```

[ ]:

	cholesterol	gluc	smoke	alco	active	pressure	diabetes	ket	age	\
0	low	low	0	0	1	100/80	0	5.92	54	
1	low	low	0	0	1	120/82	0	3.82	49	
2	low	low	0	0	1	120/80	0	5.05	21962	
3	low	low	0	0	0	120\80	0	3.43	20287	
4	low	low	0	0	0	120/80	0	4.99	16202	

	height	weight	gender
0	169	76.0	f
1	165	65.0	m
2	170	56.0	m
3	169	62.0	m
4	166	67.0	male

- holesterol, gluc, smoke, alco, active, gender

[ ]:
```
category_features = ['cholesterol', 'gluc', 'smoke', 'alco', 'active', 'gender']
```

[ ]:
```
for feature in category_features:
    print(feature ,df_train[feature].unique())
```

```
cholesterol ['low' 'medium' 'high']
gluc ['low' 'medium' 'high']
smoke [0 1]
alco [0 1]
active [1 0]
gender ['f' 'm' 'male' 'female']
```

[ ]:
```
for feature in category_features:
    print(feature ,df_test[feature].unique())
```

```
cholesterol ['low' 'high' 'medium']
gluc ['medium' 'low' 'high']
smoke [0 1]
alco [0 1]
active [0 1]
gender ['f' 'm' 'female' 'male']
```

- gender

[ ]:
```
def code_gen(df):
    df.loc[df.gender.isin(['female', 'f']), 'gender'] = 0
    df.loc[df.gender.isin(['male', 'm']), 'gender'] = 1
    df['gender'] = df['gender'].astype(int)
    return df
```

[ ]:
```
df_train = code_gen(df_train)
df_test = code_gen(df_test)
```

```
df_train_no_weight = code_gen(df_train_no_weight)
df_test_no_weight = code_gen(df_test_no_weight)
```

- gluc, cholesterol

[ ]:
```
cholesterol_gluc_enc_dict = {'low':0, 'medium':1, 'high':2}

def code_gluc_chol(df):
    df['cholesterol'].replace(cholesterol_gluc_enc_dict, inplace=True)
    df['gluc'].replace(cholesterol_gluc_enc_dict, inplace=True)
    return df
```

[ ]:
```
df_train = code_gluc_chol(df_train)
df_test = code_gluc_chol(df_test)

df_train_no_weight = code_gluc_chol(df_train_no_weight)
df_test_no_weight = code_gluc_chol(df_test_no_weight)
```

[ ]:
```
df_train.head()
```

[ ]:

	cholesterol	gluc	smoke	alco	active	pressure	diabetes	ket	age	\
0	0	0	0	0	1	100/80	0	5.92	54	
1	0	0	0	0	1	120/82	0	3.82	49	
2	0	0	0	0	1	120/80	0	5.05	21962	
3	0	0	0	0	0	120\80	0	3.43	20287	
4	0	0	0	0	0	120/80	0	4.99	16202	

	height	weight	gender
0	169	76.0	0
1	165	65.0	1
2	170	56.0	1
3	169	62.0	1
4	166	67.0	1

:

[ ]:
```
today = pd.Timestamp(datetime.date.today())

then = datetime.datetime(2012, 3, 5, 23, 8, 15)

print(today)

duration = today - then
duration_in_s = duration.total_seconds()
years = divmod(duration_in_s, 31536000)[0]

print(years)
```

```
2023-10-02 00:00:00
11.0
```

: - 21109 - 21-01-2009 — - 02-11-2009 —

[ ]:
```
def get_age(x):
    x = str(x)
    if len(x) < 5:
        return int(x)
    else:
        res = int(round(int(x) / 365))

    #print(f'in: {x}, convert: {res}')
    return res
```

[ ]:
```
df_train['age'] = df_train['age'].apply(get_age)
df_test['age'] = df_test['age'].apply(get_age)

df_train_no_weight['age'] = df_train_no_weight['age'].apply(get_age)
df_test_no_weight['age'] = df_test_no_weight['age'].apply(get_age)
```

[ ]:
```
def parse_pressure(df):
    pressure = df['pressure'].str.split(r'[^0-9a-zA-Z-]+', expand=True)

    df["high pressure"]= pressure[0].astype(int)
    df["low pressure"]= pressure[1].astype(int)

    df.drop(columns =['pressure'], inplace = True)
    return df
```

[ ]:
```
df_test = parse_pressure(df_test)
df_train = parse_pressure(df_train)

df_train_no_weight = parse_pressure(df_train_no_weight)
df_test_no_weight = parse_pressure(df_test_no_weight)
```

[ ]:
```
df_train.head()
```

[ ]:

	cholesterol	gluc	smoke	alco	active	diabetes	ket	age	height	\
0	0	0	0	0	1	0	5.92	54	169	
1	0	0	0	0	1	0	3.82	49	165	
2	0	0	0	0	1	0	5.05	60	170	
3	0	0	0	0	0	0	3.43	56	169	
4	0	0	0	0	0	0	4.99	44	166	

	weight	gender	high pressure	low pressure

```
0    76.0       0            100            80
1    65.0       1            120            82
2    56.0       1            120            80
3    62.0       1            120            80
4    67.0       1            120            80
```

[ ]:
```
df_train['age'].describe()
```

[ ]:
```
count    58002.000000
mean        53.181994
std          6.780185
min         30.000000
25%         48.000000
50%         54.000000
75%         58.000000
max         65.000000
Name: age, dtype: float64
```

[ ]:
```
df_train['high pressure'].describe()
```

[ ]:
```
count    58002.000000
mean       128.695148
std        149.233670
min       -150.000000
25%        120.000000
50%        120.000000
75%        140.000000
max      16020.000000
Name: high pressure, dtype: float64
```

[ ]:
```
df_train['high pressure'] = df_train['high pressure'].apply(lambda x: abs(x))
df_train_no_weight['high pressure'] = df_train_no_weight['high pressure'].
 ↪apply(lambda x: abs(x))
```

( ) - high : **80-200** - low : **110-50**

[ ]:
```
df_drop = df_train[(df_train["high pressure"] >= 200) | (df_train["high␣
 ↪pressure"] <= 80)]
df_drop.shape
```

[ ]:
```
(430, 13)
```

[ ]:
```
df_train.drop(df_drop.index, inplace = True)
```

[ ]:
```
df_drop = df_train_no_weight[(df_train_no_weight["high pressure"] >= 200) |␣
 ↪(df_train_no_weight["high pressure"] <= 80)]
df_drop.shape
```

[ ]: (8, 13)

[ ]:
```
df_train_no_weight.drop(df_drop.index, inplace = True)
```

[ ]:
```
df_train['low pressure'].describe()
```

[ ]:
```
count    57572.000000
mean        96.231189
std        186.746936
min          0.000000
25%         80.000000
50%         80.000000
75%         90.000000
max      10000.000000
Name: low pressure, dtype: float64
```

[ ]:
```
df_drop = df_train[(df_train["low pressure"] >= 110) | (df_train["low␣
 ↪pressure"] <= 50)]
df_drop.shape
```

[ ]: (1331, 13)

[ ]:
```
df_train.drop(df_drop.index, inplace = True)
```

[ ]:
```
df_drop = df_train_no_weight[(df_train_no_weight["low pressure"] >= 110) |␣
 ↪(df_train_no_weight["low pressure"] <= 50)]
df_drop.shape
```

[ ]: (43, 13)

[ ]:
```
df_train.head()
```

[ ]:

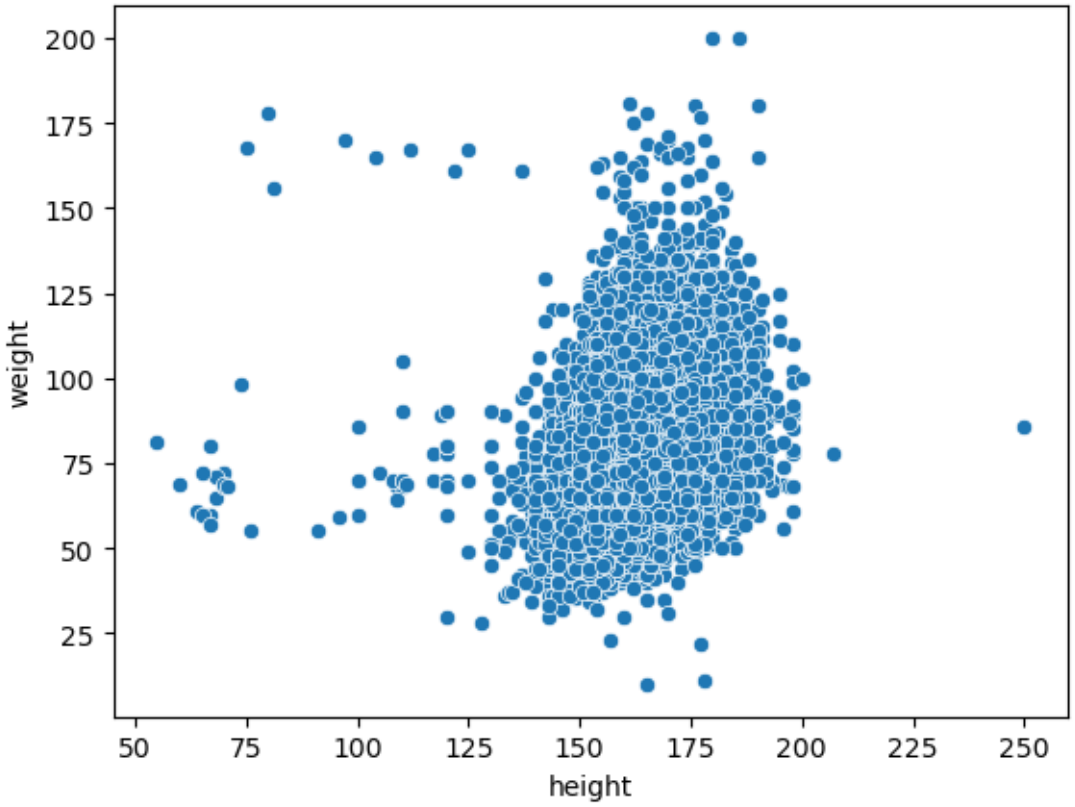
	cholesterol	gluc	smoke	alco	active	diabetes	ket	age	height	\
0	0	0	0	0	1	0	5.92	54	169	
1	0	0	0	0	1	0	3.82	49	165	
2	0	0	0	0	1	0	5.05	60	170	
3	0	0	0	0	0	0	3.43	56	169	
4	0	0	0	0	0	0	4.99	44	166	

	weight	gender	high pressure	low pressure
0	76.0	0	100	80
1	65.0	1	120	82
2	56.0	1	120	80
3	62.0	1	120	80
4	67.0	1	120	80

[ ]:
```
perc = [0.009,0.01, 0.02, 0.03, 0.031, 0.035, 0.04,  0.05, 0.1, 0.15, 0.2, 0.
↪25, 0.3, 0.5, 0.7, 0.75, 0.8, 0.85, 0.9, 0.95, 0.97 ,0.99]
```

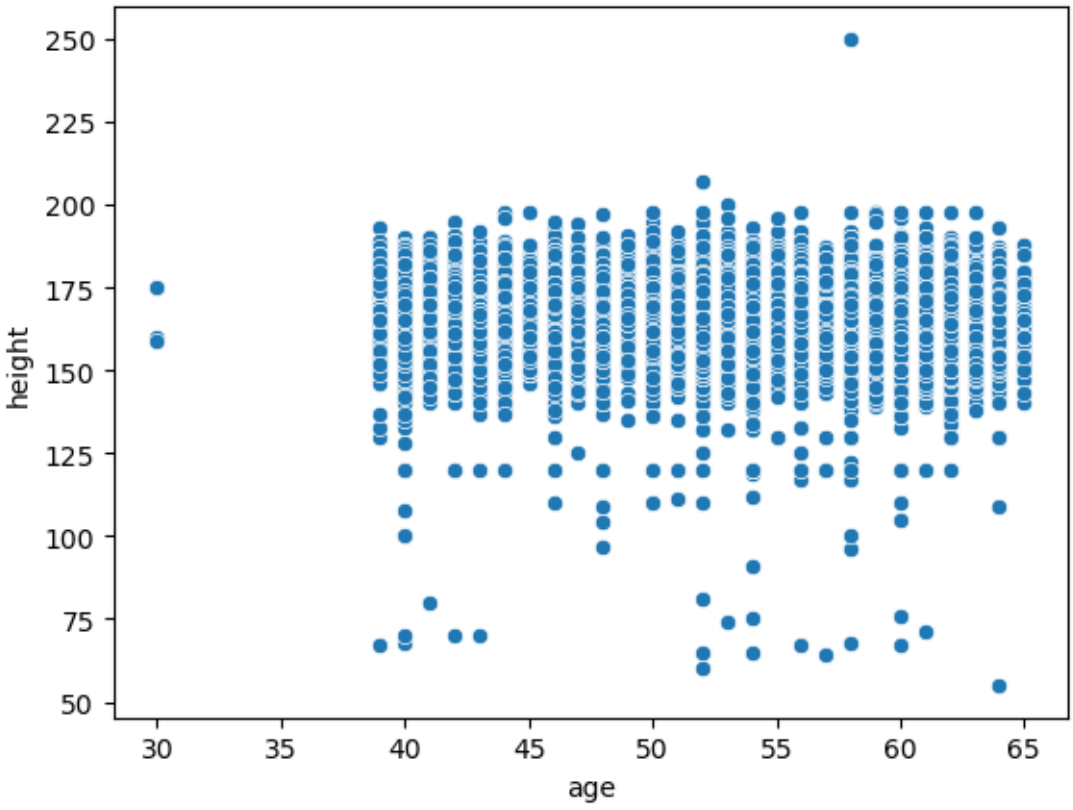
[ ]:
```
sns.scatterplot(x="height",y="weight",
        data=df_train)
```

[ ]:
```
<AxesSubplot:xlabel='height', ylabel='weight'>
```



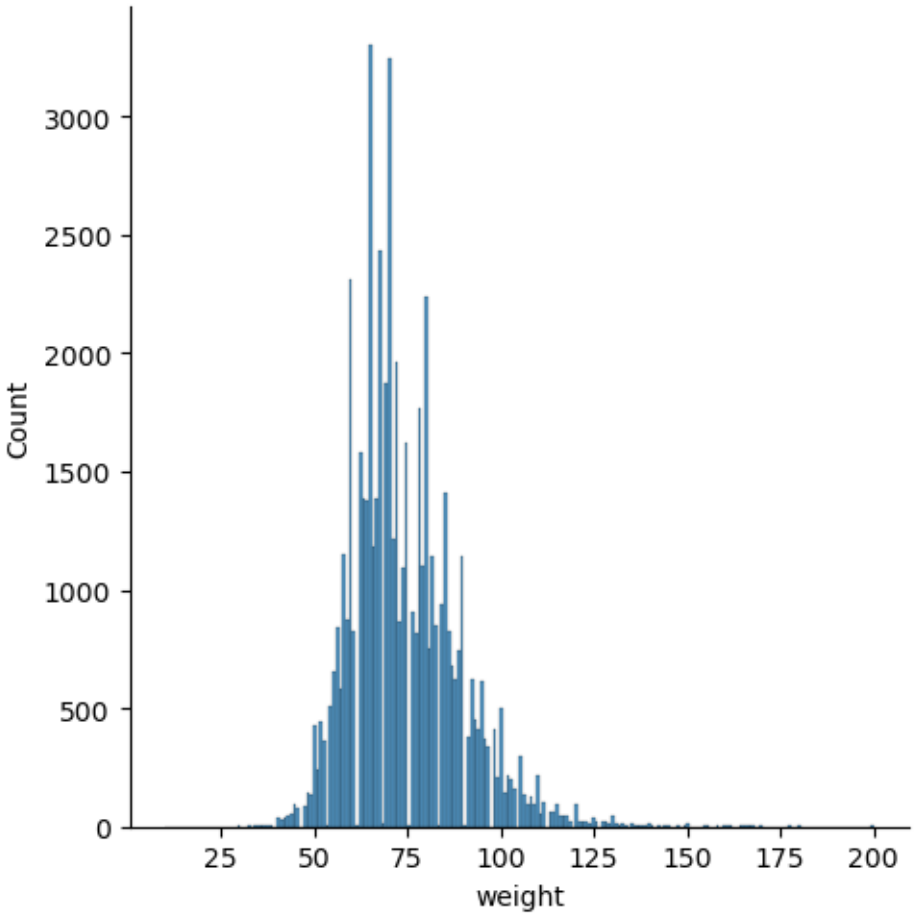
[ ]:
```
sns.scatterplot(x="age",
                    y="height",
                    data=df_train)
```

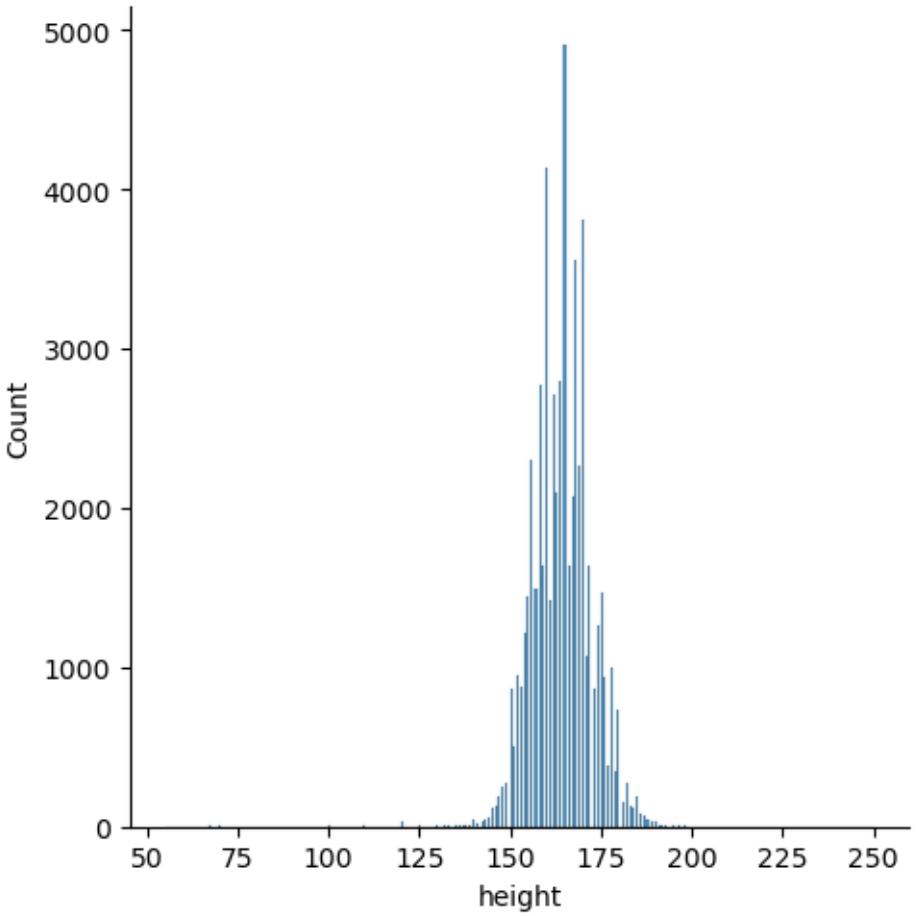
[ ]:
```
<AxesSubplot:xlabel='age', ylabel='height'>
```



[ ]:
```
sns.displot(df_train['weight'])
sns.displot(df_train['height'])
```

[ ]:
```
<seaborn.axisgrid.FacetGrid at 0x7fda902002b0>
```


3000
2500
2000
1500
1000
500
0
Count
25
50
75
100
125
150
175
200
weight



[ ]:
```
df_train['age'].describe(percentiles=perc)
```

[ ]:
```
count    57572.000000
mean        53.182293
std          6.779773
min         30.000000
0.9%        39.000000
1%          39.000000
2%          40.000000
3%          40.000000
3.1%        40.000000
3.5%        40.000000
4%          40.000000
5%          41.000000
10%         43.000000
15%         45.000000
20%         47.000000
25%         48.000000
```

```
30%         50.000000
50%         54.000000
70%         58.000000
75%         58.000000
80%         60.000000
85%         60.000000
90%         62.000000
95%         64.000000
97%         64.000000
99%         64.000000
max         65.000000
Name: age, dtype: float64
```

[ ]:
```
df_train['height'].describe(percentiles=perc)
```

[ ]:
```
count    57572.000000
mean       164.315396
std          8.186726
min         55.000000
0.9%       146.000000
1%         147.000000
2%         149.000000
3%         150.000000
3.1%       150.000000
3.5%       150.000000
4%         151.000000
5%         152.000000
10%        155.000000
15%        156.000000
20%        158.000000
25%        159.000000
30%        160.000000
50%        165.000000
70%        168.000000
75%        170.000000
80%        170.000000
85%        172.000000
90%        175.000000
95%        178.000000
97%        180.000000
99%        184.000000
max        250.000000
Name: height, dtype: float64
```

[ ]:
```
df_train['weight'].describe(percentiles=perc)
```

[ ]:
```
count    57572.000000
mean        74.170328
std         14.580278
min         10.000000
0.9%        48.000000
1%          48.000000
2%          50.000000
3%          52.000000
3.1%        52.000000
3.5%        53.000000
4%          54.000000
5%          55.000000
10%         58.000000
15%         60.000000
20%         62.000000
25%         65.000000
30%         65.000000
50%         71.000000
70%         80.000000
75%         82.000000
80%         85.000000
85%         89.000000
90%         93.000000
95%        100.000000
97%        105.000000
99%        118.000000
max        200.000000
Name: weight, dtype: float64
```

[ ]:
```
df_train.drop(df_train[(df_train["height"] == 250) | (df_train["height"] <␣
↪146)].index, inplace=True)
df_train.drop(df_train[(df_train["weight"] < 47)].index, inplace=True)

df_train_no_weight.drop(df_train_no_weight[(df_train_no_weight["height"] ==␣
↪250) | (df_train_no_weight["height"] < 146)].index, inplace=True)
```

[ ]:
```
df_train.head()
```

[ ]:

	cholesterol	gluc	smoke	alco	active	diabetes	ket	age	height	\
0	0	0	0	0	1	0	5.92	54	169	
1	0	0	0	0	1	0	3.82	49	165	
2	0	0	0	0	1	0	5.05	60	170	
3	0	0	0	0	0	0	3.43	56	169	
4	0	0	0	0	0	0	4.99	44	166	

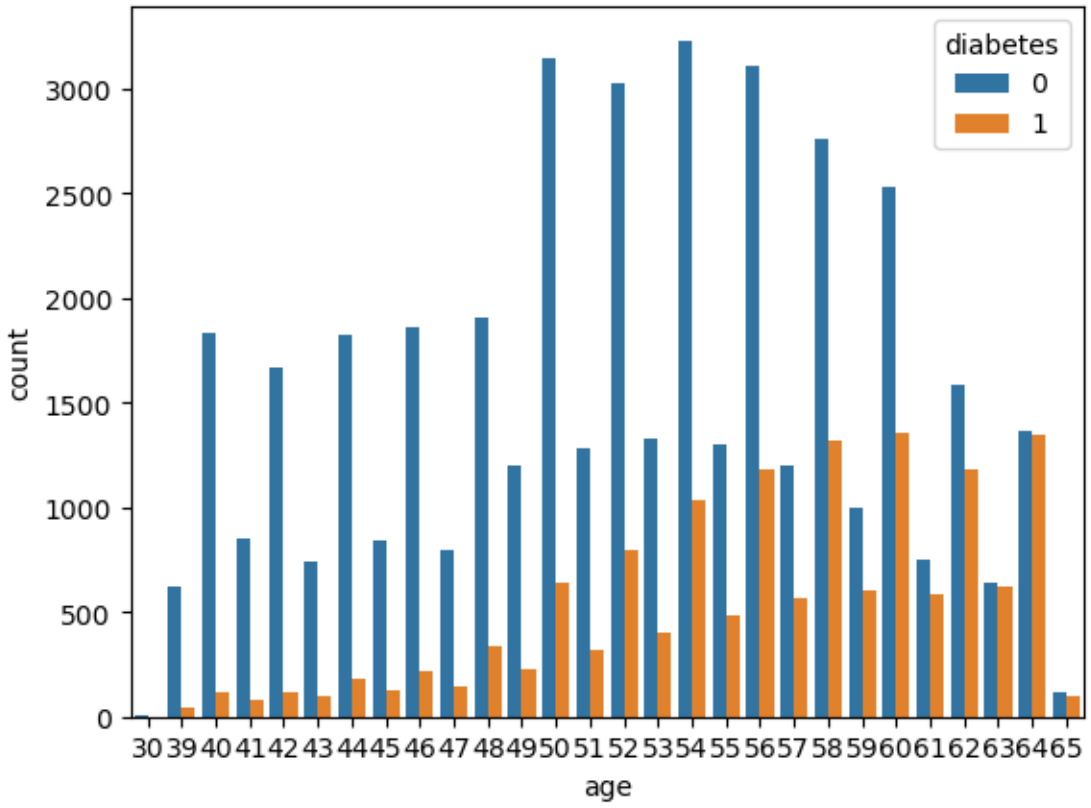
	weight	gender	high pressure	low pressure
0	76.0	0	100	80

1	65.0	1	120	82
2	56.0	1	120	80
3	62.0	1	120	80
4	67.0	1	120	80

[ ]:
```
df_train.shape[0]
```

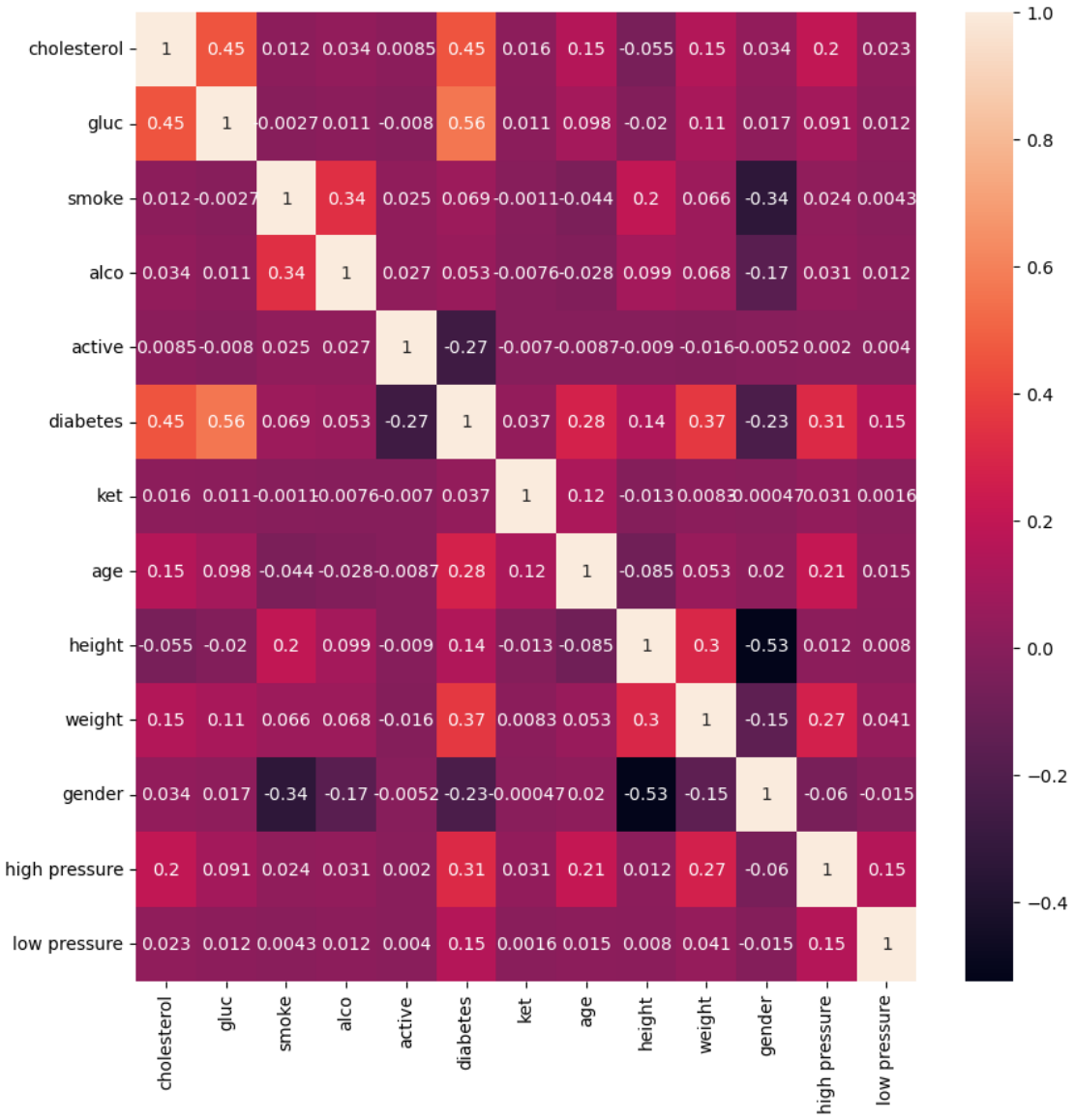
[ ]: 56757

[ ]:
```
sns.countplot(x='age', hue='diabetes', data = df_train);
```



[ ]:
```
plt.figure(figsize=(10, 10))
sns.heatmap(df_train.corr(), annot = True)
```

[ ]: <AxesSubplot:>



[ ]:
```
pearsonr(df_train['high pressure'], df_train['low pressure'])
```

[ ]:
```
PearsonRResult(statistic=0.1514996735589224, pvalue=1.5161701695391488e-288)
```

p-value < 0.05 ( ), :

- (high pressure, low pressure)

.

[ ]:
```
df_train.dtypes
```

[ ]:
```
cholesterol        int64
gluc               int64
smoke              int64
alco               int64
active             int64
diabetes           int64
ket              float64
age                int64
height             int64
weight           float64
gender             int64
high pressure      int64
low pressure       int64
dtype: object
```

[ ]:
```
df_train.head()
```

[ ]:
```
   cholesterol  gluc  smoke  alco  active  diabetes   ket  age  height  \
0            0     0      0     0       1         0  5.92   54     169
1            0     0      0     0       1         0  3.82   49     165
2            0     0      0     0       1         0  5.05   60     170
3            0     0      0     0       0         0  3.43   56     169
4            0     0      0     0       0         0  4.99   44     166

   weight  gender  high pressure  low pressure
0    76.0       0            100            80
1    65.0       1            120            82
2    56.0       1            120            80
3    62.0       1            120            80
4    67.0       1            120            80
```

[ ]:
```
numeric = ['ket', 'age', 'height', 'weight', 'high pressure', 'low pressure']

def scale(df, scaler=None):
    if scaler is None:
        scaler = StandardScaler()
        scaler.fit(df[numeric])
    new_df = scaler.transform(df[numeric])
    return new_df
```

[ ]:
```
df_train[numeric] = scale(df_train)
df_test[numeric] = scale(df_test)

df_train_no_weight[numeric] = scale(df_train_no_weight)
df_test_no_weight[numeric] = scale(df_test_no_weight)
```

[ ]:
```
df_train.head()
```

[ ]:

	cholesterol	gluc	smoke	alco	active	diabetes	ket	age	\
0	0	0	0	0	1	0	1.299965	0.121455	
1	0	0	0	0	1	0	-1.153057	-0.617023	
2	0	0	0	0	1	0	0.283713	1.007628	
3	0	0	0	0	0	0	-1.608618	0.416846	
4	0	0	0	0	0	0	0.213626	-1.355501	

	height	weight	gender	high pressure	low pressure
0	0.576698	0.108842	0	-1.628953	-0.087215
1	0.053203	-0.659374	1	-0.419596	-0.076565
2	0.707572	-1.287914	1	-0.419596	-0.087215
3	0.576698	-0.868887	1	-0.419596	-0.087215
4	0.184077	-0.519699	1	-0.419596	-0.087215

[ ]:
```
df_test.head()
```

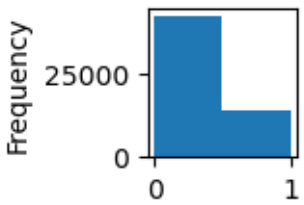
[ ]:

	cholesterol	gluc	smoke	alco	active	diabetes	ket	age	\
0	0	1	0	0	0	1	0.124082	1.161299	
1	0	0	0	0	1	0	0.159613	-1.958333	
2	0	0	0	0	0	1	-1.001096	1.606960	
3	0	0	0	0	1	0	-0.835280	-0.918456	
4	0	0	0	0	0	0	0.704436	-0.472794	

	height	weight	gender	high pressure	low pressure
0	0.074048	1.063822	0	-0.239697	-0.096371
1	-0.287417	-1.636216	1	-0.896346	-0.151684
2	-1.010348	-0.016193	1	0.416951	0.014254
3	-0.287417	0.996321	1	-0.239697	-0.041059
4	-0.287417	-0.151195	0	0.088627	-0.096371

[ ]:
```
df_train['diabetes'].plot(kind ='hist', bins=2, figsize=(1,1))
```

[ ]: <AxesSubplot:ylabel='Frequency'>



!

[ ]:
```
def upsample(features, target, repeat, upsampled_ lass):
    features_zeros = features[target == 0]
```

```
    features_ones = features[target == 1]
    target_zeros = target[target == 0]
    target_ones = target[target == 1]

    if upsampled_lass == 0:
        features_upsampled = pd.concat([features_zeros]* repeat +␣
↪[features_ones] )
        target_upsampled = pd.concat([target_zeros]* repeat + [target_ones] )
        features_upsampled, target_upsampled = shuffle(
        features_upsampled, target_upsampled, random_state=12345)

    elif upsampled_lass == 1:
        features_upsampled = pd.concat([features_zeros] + [features_ones] *␣
↪repeat)
        target_upsampled = pd.concat([target_zeros] + [target_ones] * repeat)
        features_upsampled, target_upsampled = shuffle(
        features_upsampled, target_upsampled, random_state=12345)
    else:
        features_upsampled = 0
        target_upsampled = 0



    return features_upsampled, target_upsampled
```

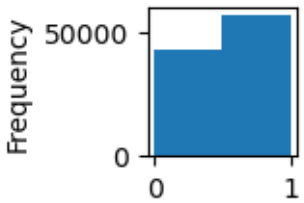
[ ]:
```
features_train_upsampled, target_train_upsampled = upsample(df_train.loc[:,␣
↪df_train.columns != 'diabetes'],

                                                            ␣
↪df_train['diabetes'], 4, 1)
print(target_train_upsampled.value_counts(normalize = 1))
print(target_train_upsampled.shape)
```

```
1    0.572342
0    0.427658
Name: diabetes, dtype: float64
(99444,)
```

[ ]:
```
target_train_upsampled.plot(kind ='hist', bins=2, figsize=(1,1))
```

[ ]: <AxesSubplot:ylabel='Frequency'>



[ ]:
```
features_train_upsampled['diabetes'] = target_train_upsampled
```

[ ]:
```
features_train_upsampled
```

[ ]:
```
       cholesterol  gluc  smoke  alco  active       ket       age    height  \
3432             1     1      1     0       1  0.564058  0.416846  1.885435
41313            0     2      0     0       0 -0.604047 -1.650893  0.576698
34686            2     2      0     0       1  1.171473  0.416846 -1.124660
20867            2     2      0     0       0  1.825612  0.564541 -0.601165
21671            0     0      0     0       0  0.272032  1.155324 -0.208544
…              …   …    …   …      …       …       …       …
5791             0     0      0     0       1 -0.685815  1.450715  0.969319
861              0     0      0     0       0  0.423885  1.598411  0.053203
3071             0     0      0     0       1  0.388842  0.416846 -0.732039
26568            0     0      0     1       0 -0.347064  0.121455  0.053203
5425             2     2      1     1       1 -1.036246 -0.764719  2.016309

         weight  gender  high pressure  low pressure  diabetes
3432   1.365922       0       0.185082     -0.033964         1
41313  1.226246       0       0.185082     -0.033964         1
34686 -1.008563       1      -0.419596     -0.087215         1
20867 -1.008563       1       0.185082     -0.087215         1
21671  1.784949       0       0.789761     -0.087215         1
…         …     …             …             …       …
5791   0.248517       0      -0.419596     -0.087215         0
861    0.388193       1      -0.419596     -0.087215         1
3071  -0.170510       1      -0.721935     -0.087215         0
26568  1.016733       1       0.789761     -0.033964         1
5425   0.527868       0       0.185082     -0.087215         1

[99444 rows x 13 columns]
```

[ ]:
```
df_test
```

[ ]:
```
       cholesterol  gluc  smoke  alco  active  diabetes       ket       age  \
0                0     1      0     0       0         1  0.124082  1.161299
1                0     0      0     0       1         0  0.159613 -1.958333
2                0     0      0     0       0         1 -1.001096  1.606960
3                0     0      0     0       1         0 -0.835280 -0.918456
4                0     0      0     0       0         0  0.704436 -0.472794
…              …   …    …   …      …       …       …       …       …
9995             0     0      0     0       0         0  0.538620 -0.175686
9996             1     0      0     0       1         0 -0.586557 -0.175686
```

```
9997            0     0      1     1       1         0 -0.385209  0.269975
9998            0     0      0     0       1         0  0.218833 -0.175686
9999            2     0      0     0       1         0  0.313585  0.121421

        height    weight  gender  high pressure  low pressure
0     0.074048  1.063822       0      -0.239697     -0.096371
1    -0.287417 -1.636216       1      -0.896346     -0.151684
2    -1.010348 -0.016193       1       0.416951      0.014254
3    -0.287417  0.996321       1      -0.239697     -0.041059
4    -0.287417 -0.151195       0       0.088627     -0.096371
…          …         …       …              …             …
9995  0.435513  0.253811       1      -0.239697     -0.096371
9996 -0.528394  0.321311       1      -0.239697     -0.096371
9997  2.965771 -0.151195       0       0.088627     -0.096371
9998 -0.648883 -0.623702       1      -0.239697     -0.096371
9999 -0.889860 -1.096208       1       0.416951      0.014254

[9680 rows x 13 columns]
```

[ ]:
```
df_test_target = df_test['diabetes']
df_test_features = df_test.drop(['diabetes'], axis=1)

df_train_target = features_train_upsampled['diabetes']
df_train_features = features_train_upsampled.drop(['diabetes'], axis=1)

df_test_no_weight_target = df_test_no_weight['diabetes']
df_test_no_weight_features = df_test_no_weight.drop(['diabetes'], axis=1)

df_train_no_weight_target = df_train_no_weight['diabetes']
df_train_no_weight_features = df_train_no_weight.drop(['diabetes'], axis=1)
```

[ ]:
```
df_test_target.to_csv('../data/processed/test_target.csv', index=False)
df_test_features.to_csv('../data/processed/test_features.csv', index=False)

df_train_target.to_csv('../data/processed/train_target.csv', index=False)
df_train_features.to_csv('../data/processed/train_features.csv', index=False)

df_test_no_weight_target.to_csv('../data/processed/test_no_weight_target.csv',␣
 ↪index=False)
df_test_no_weight_features.to_csv('../data/processed/test_no_weight_features.
 ↪csv', index=False)

df_train_no_weight_target.to_csv('../data/processed/train_no_weight_train.csv',␣
 ↪index=False)
df_train_no_weight_features.to_csv('../data/processed/train_no_weight_features.
 ↪csv', index=False)
```

[ ]: