preprocess_data

September 29, 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_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
```

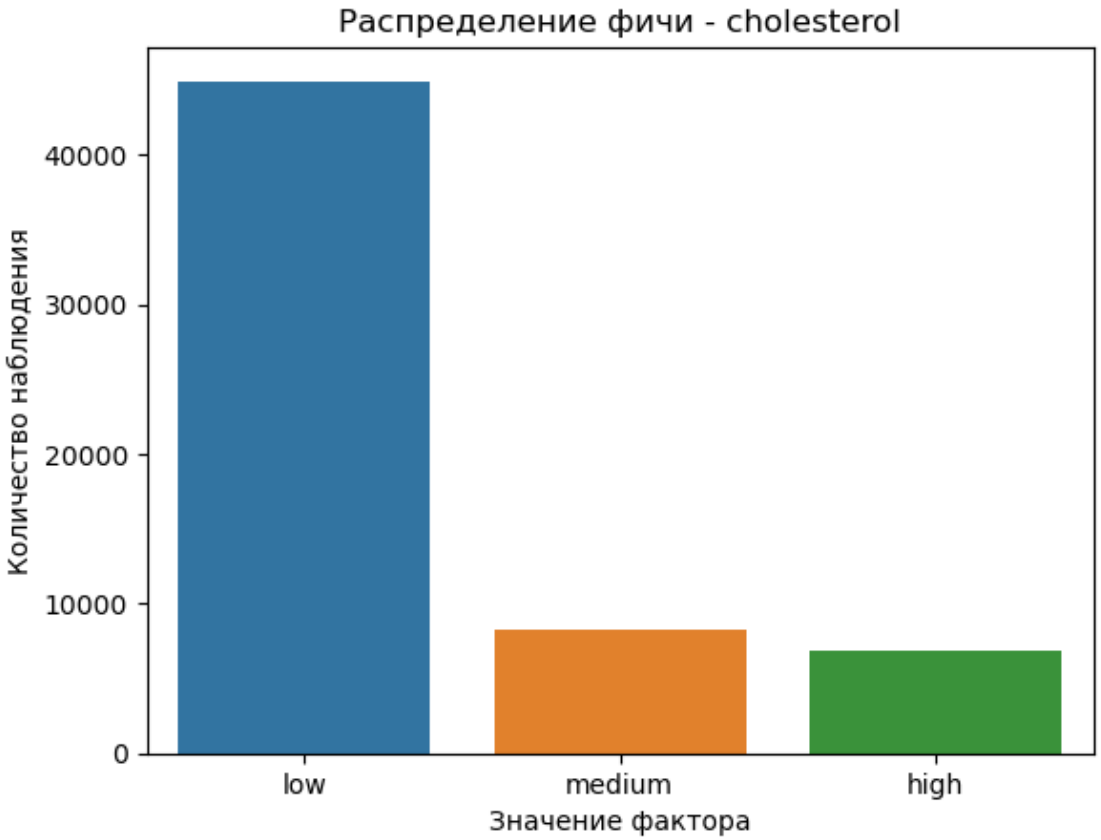
- id —
- holesterol —
- gluc —

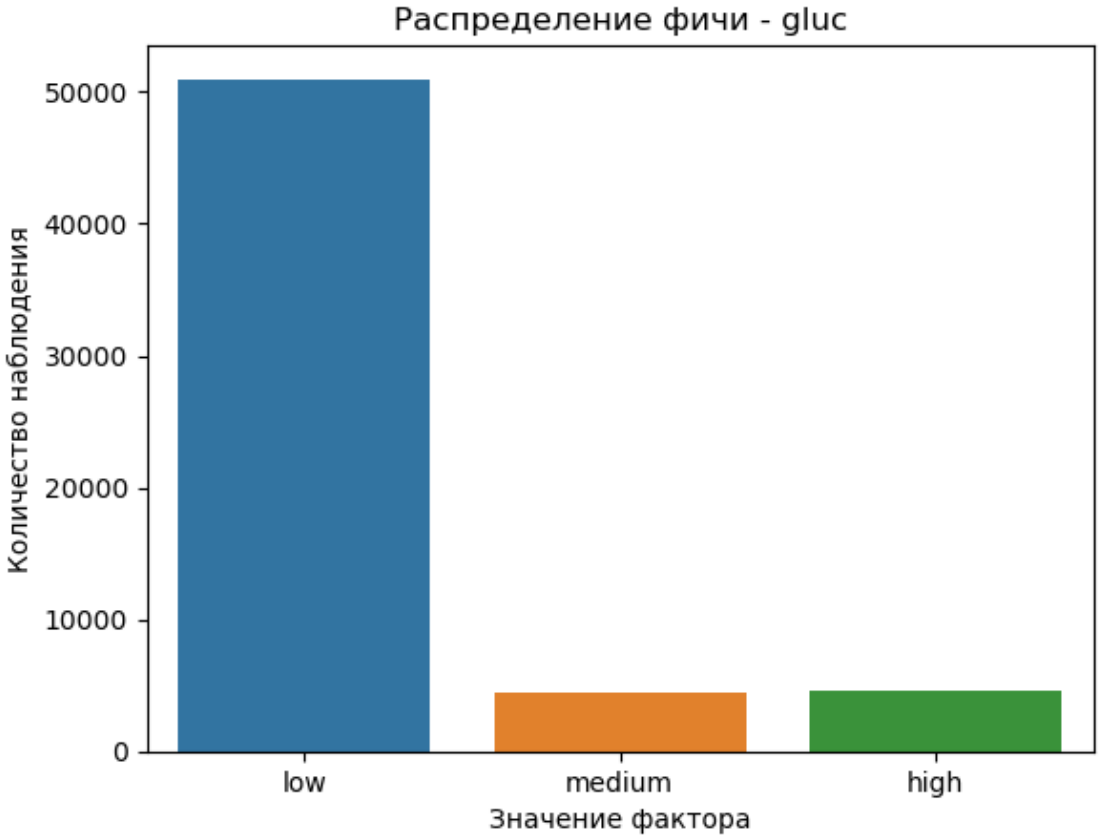
- smoke —
- alco —
- active —
- pressure —
- ket —
- age —
- height — ( )
- weight — ( )
- gender —

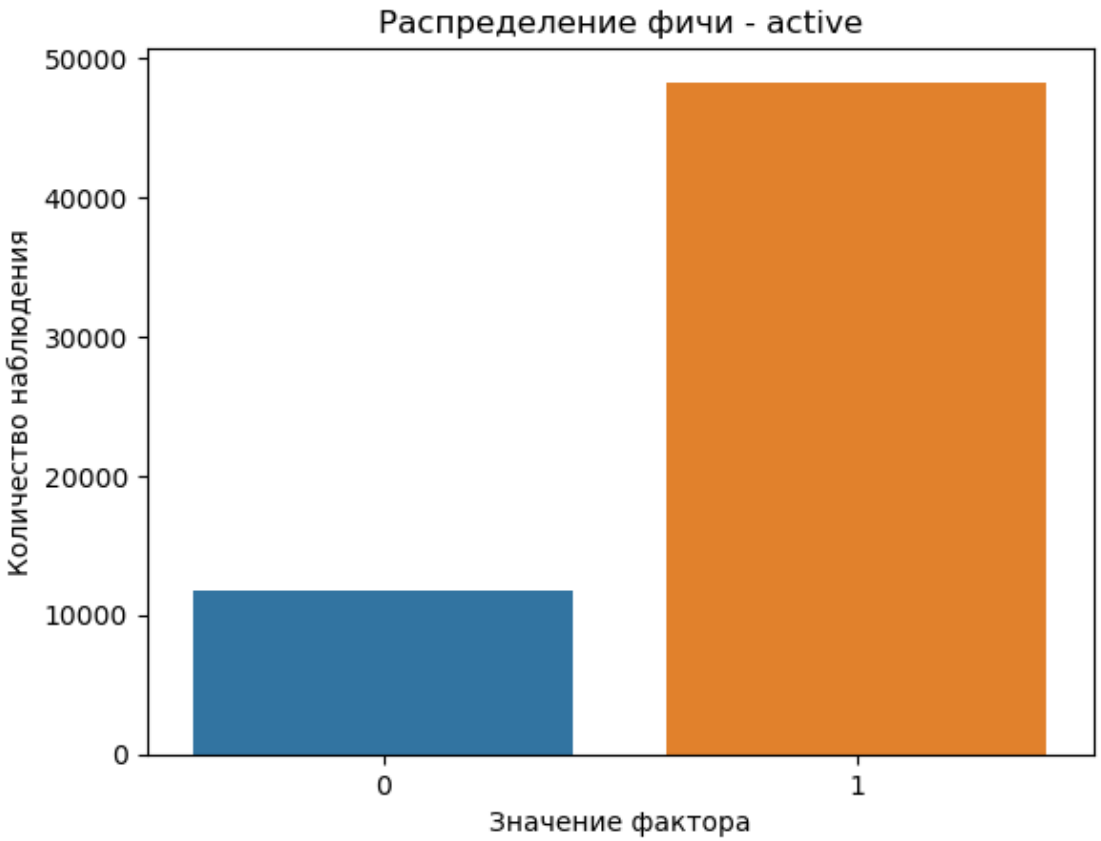
diabetes —

[ ]:
```
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')
```

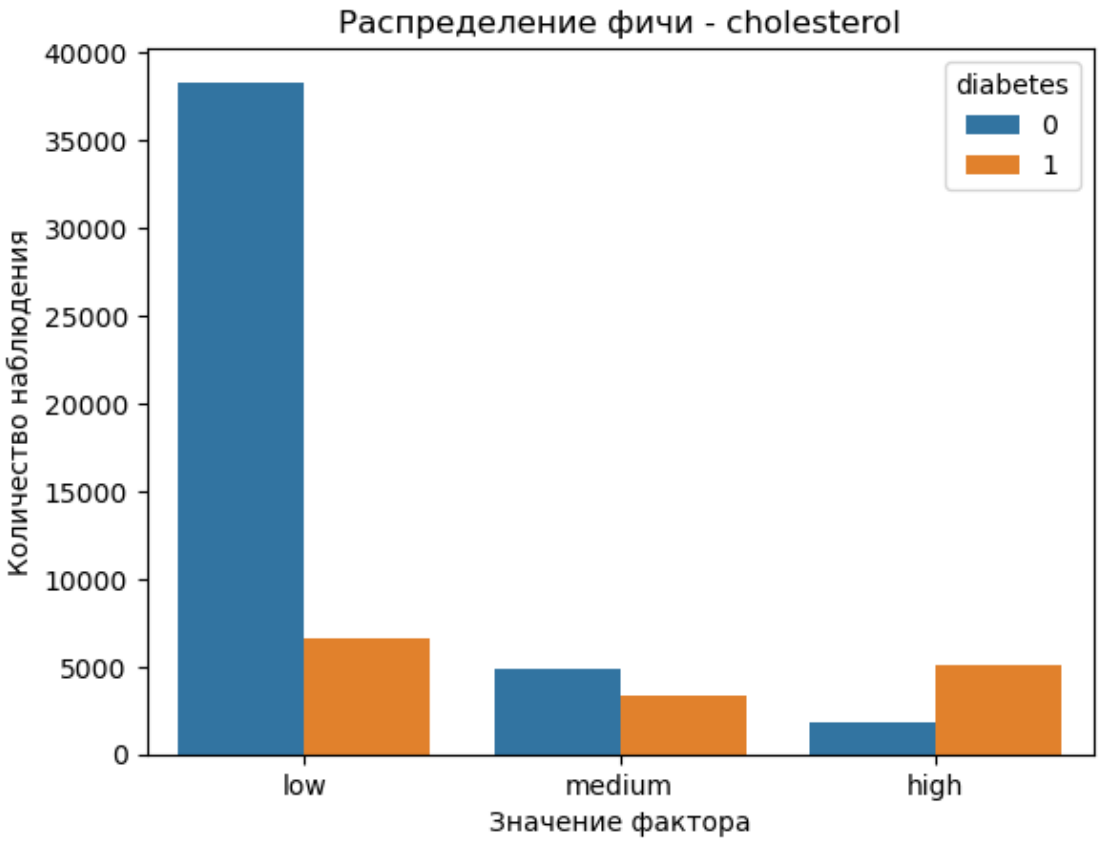


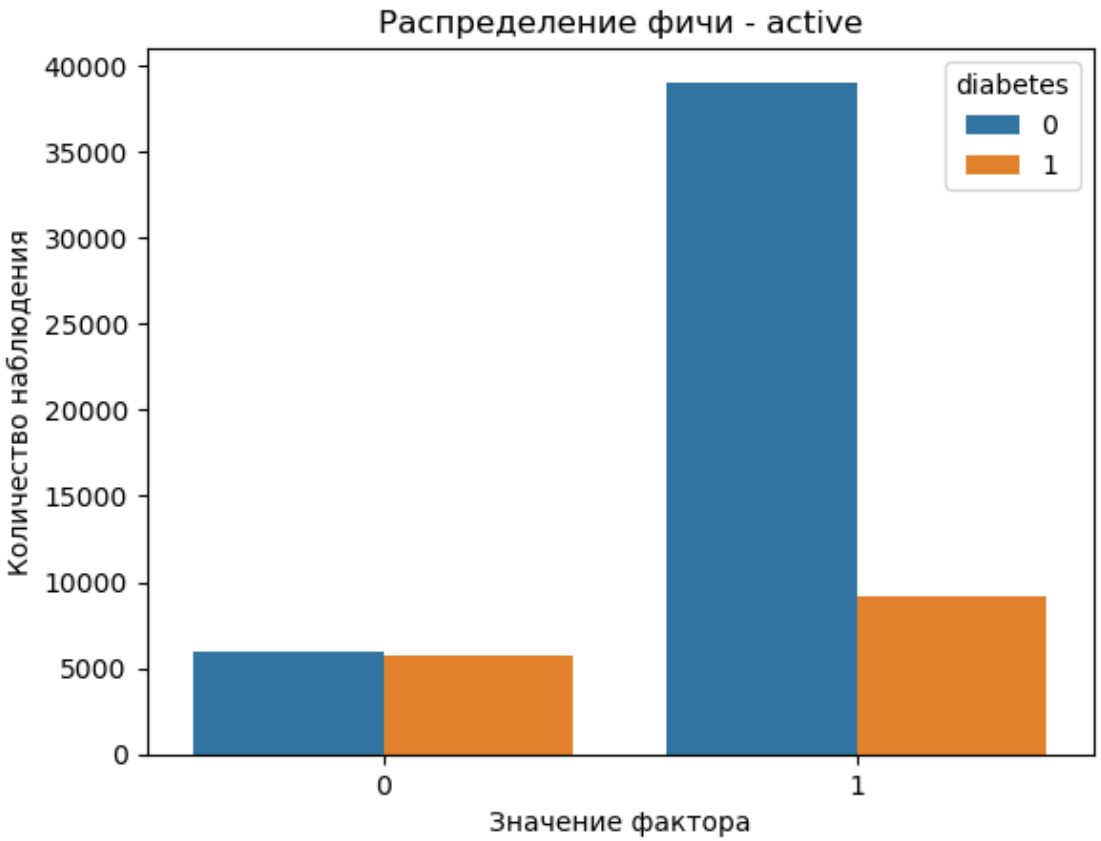

Распределение фичи - gluc
Количество наблюдения
50000
40000
30000
20000
10000
0
low
medium
high
Значение фактора

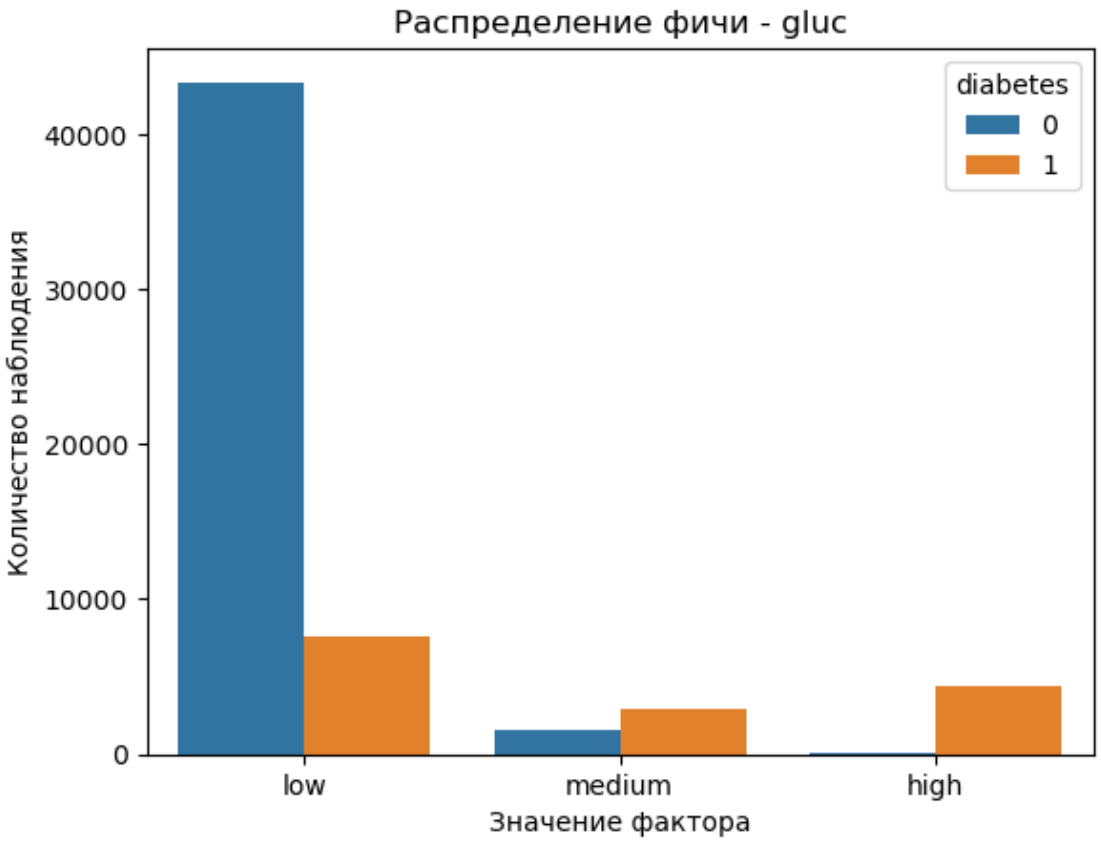


[ ]:
```
def show_category_plot_count_hue_target(df, column):
    plt.title(f'            - {column}')
    sns.countplot(data=df, x=column, hue='diabetes')
    plt.ylabel('             ')
    plt.xlabel(f'          ')
    plt.show()
```

[ ]:
```
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.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

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

df_test.loc[df_test.gender.isin(['female', 'f']), 'gender'] = 0
df_test.loc[df_test.gender.isin(['male', 'm']), 'gender'] = 1
df_test['gender'] = df_test['gender'].astype(int)
```

- gluc, cholesterol

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

[ ]:
```
df_train['cholesterol'].replace(cholesterol_gluc_enc_dict, inplace=True)
df_train['gluc'].replace(cholesterol_gluc_enc_dict, inplace=True)

df_test['cholesterol'].replace(cholesterol_gluc_enc_dict, inplace=True)
df_test['gluc'].replace(cholesterol_gluc_enc_dict, inplace=True)
```

[ ]:
```
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)
```

```
2023-09-29 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)
```

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

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

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

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

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

df_test.drop(columns =['pressure'], 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['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'].unique()
```

[ ]:
```
array([  100,   120,   160,   123,   110,   150,   130,   180,    90,
         140,   170,   200,   125,    80,   115,   142,   145,    70,
         190,   135,   106,   124,   122,   105,   157,   164,   138,
          12,   131,   102,   114,   118,   165,   143,   155,   112,
         128,   210,   179,   220,   147,   151,   907,    14,   134,
         139,   171,   175,    85,   149,    16,   152,   168,    95,
         119,   132,   188,    11,    13,   199,   144,   141,   117,
         159,   193,   176,   126,   906,   129,   153, 14020,   156,
         158,   146,   137,   136,  1500,   902,   240,    10,   113,
         166,   111,   127,   148,   172,  -150,   174,    97,    15,
         104,    93,   169,   196,   173,   121,  1130,   195,   109,
         103,   107,   162,  1400,  -120,    20,   163,   116,  -140,
        1420,   178,     1,   133,   167,   184,   701,   401,   909,
          17, 16020,   108,   154,   185,   101,    96,  -100,   230,
         215,  1110,  1202,    24,   177,   309,  1620, 11500,   191,
         207,  -115,  1409,   161,    99,     7, 11020,   806,   202,
        1300, 13010,   960,   197,   181,    60])
```

[ ]:
```
df_train['high pressure'] = df_train['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_train['low pressure'].unique()
```

[ ]:
```
array([   80,    82,   100,    83,    70,  1000, 10000,    40,    90,
          79,    60,    95,   110,    99,    85,    69,    30,  1100,
          94,   120,    75,    65,    81,     0,    73,  1088,  1011,
          66,    59,    91,    87,    74,    84,    20,     8,    72,
          97,    58,  8500,    50,    96,    55,    89,    76,  8099,
         150,   103,    71,  9011,   850,    88,   104,  1007,   105,
        8000,    77,    78,   801,    98,  8200,   113,  1900,   118,
          63,    68,   130,   170,    64,    92,   109,    67,  7100,
```

```
 126,   106,  1022,    53,    10,    57,    62,   115,   182,
1110,  8100,   180,   810,  1200,   119,   160,  1125,  1003,
 820,    86,    56,   102,   140,    93,   108,   800,   710,
  61,  5700,  1111,   101,    45,     7,  1008,    52,  1001,
 902,  1120,  1044,   900,   135,  1177,  1077,   708,     9,
 190,     1,  9800,  1101,   709,   121,   122,   111,  1033,
 809,  6800,  9100,   910,   107,  1002,  7099,  8044,   802,
8079,   114,  1211,     6,   112])
```

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

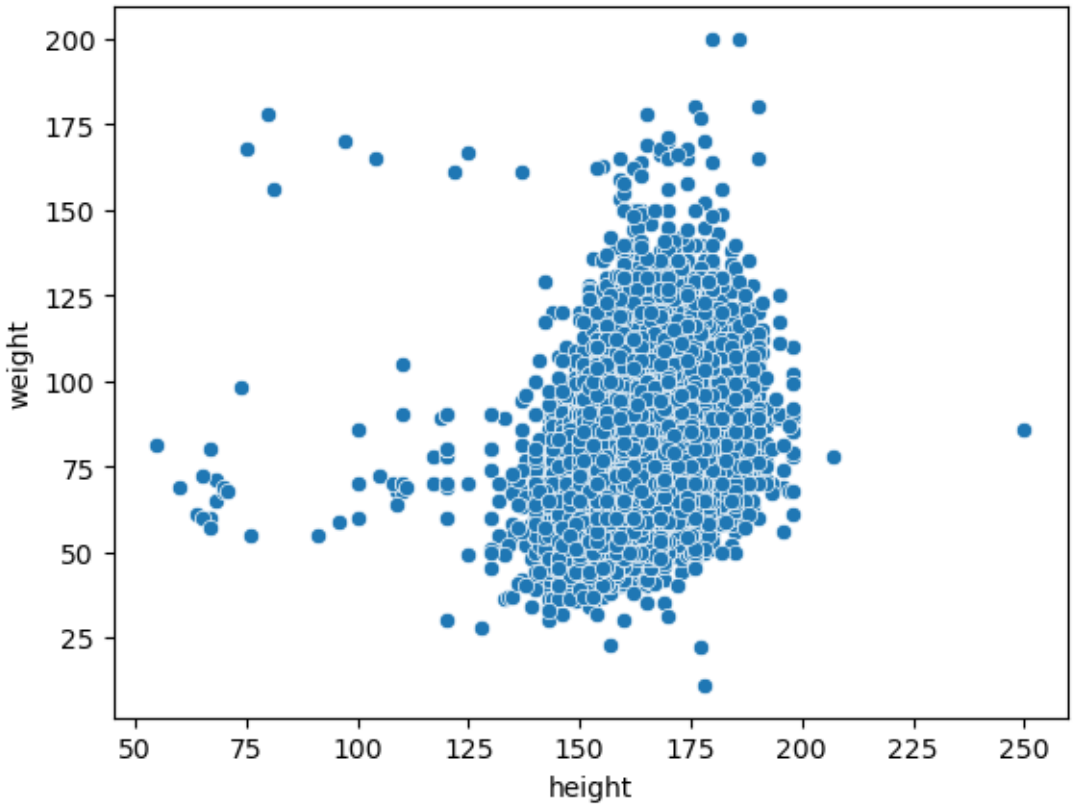
[ ]:
```
   cholesterol  gluc  smoke  alco  active  diabetes   ket  age  height  \
0            0     0      0     0       1         0  5.92   54     169
1            0     0      0     0       1         0  3.82   49     165
2            0     0      0     0       1         0  5.05   60     170
3   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

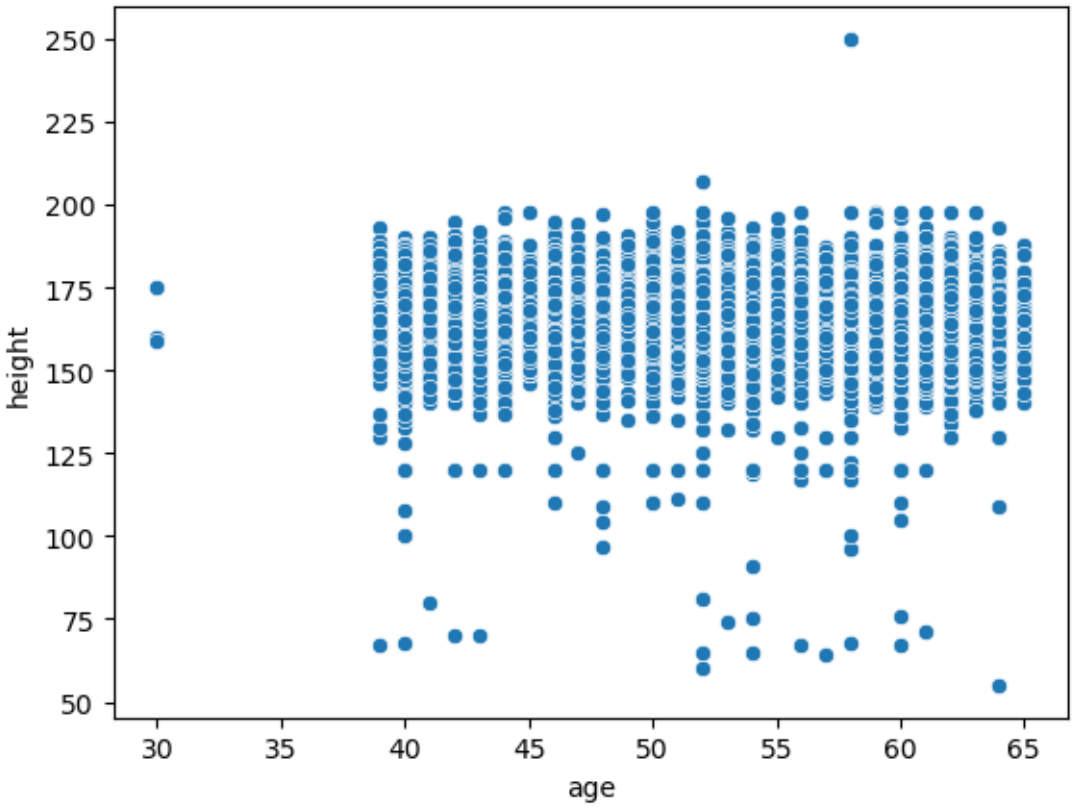
[ ]:
```
sns.scatterplot(x="height",y="weight",
        data=df_train)
```

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



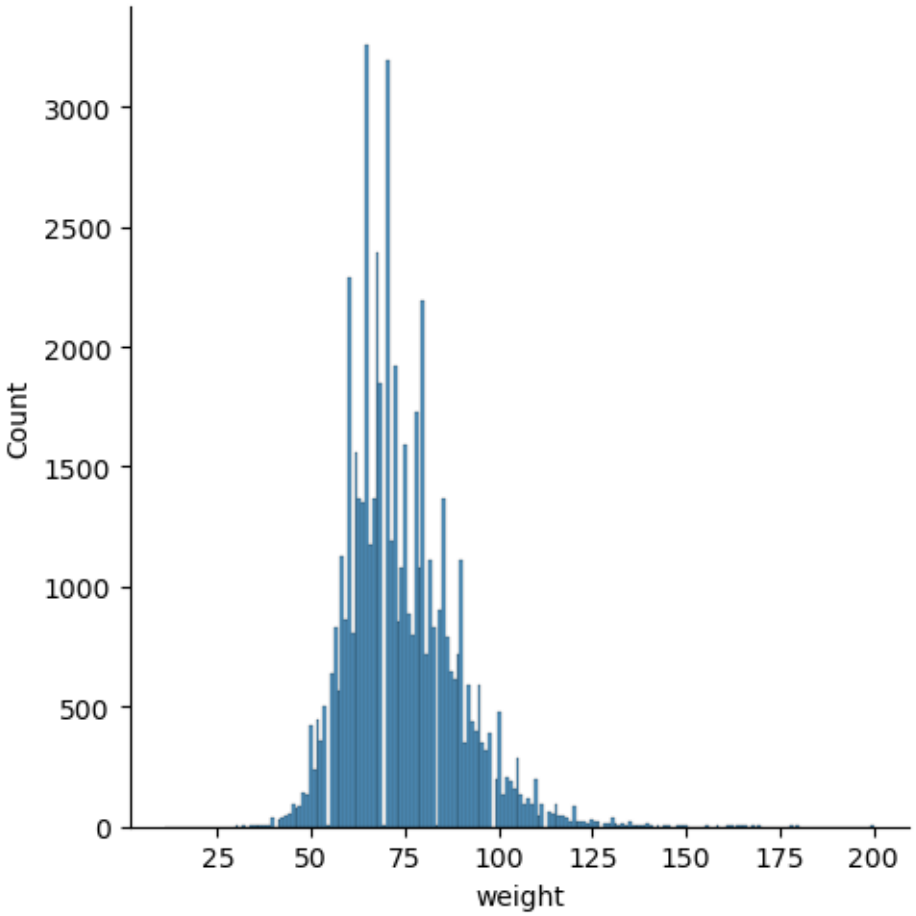
[ ]:
```
sns.scatterplot(x="age",
                y="height",
                data=df_train)
```

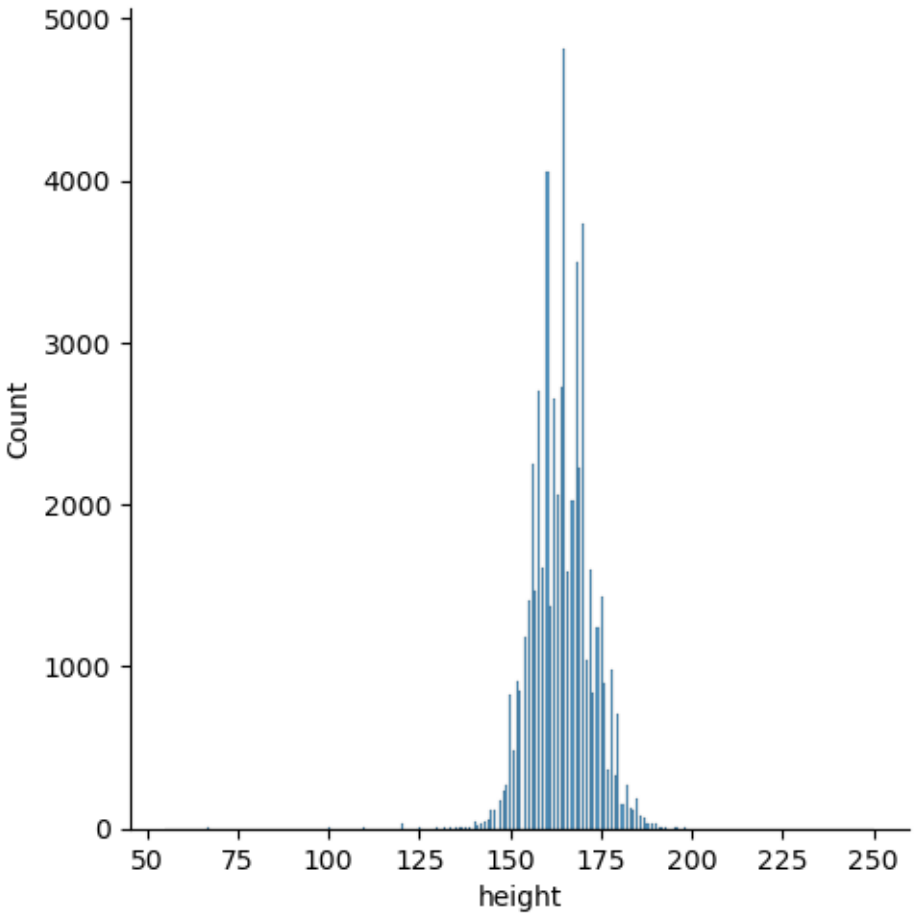
[ ]: <AxesSubplot:xlabel='age', ylabel='height'>



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

[ ]: <seaborn.axisgrid.FacetGrid at 0x7f8de9070610>


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



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

[ ]:
```
count    56241.000000
mean        53.166551
std          6.786690
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    56241.000000
mean       164.317651
std          8.158176
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    56241.000000
mean        74.001117
std         14.436693
min         11.000000
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%         64.000000
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%        117.000000
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.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	

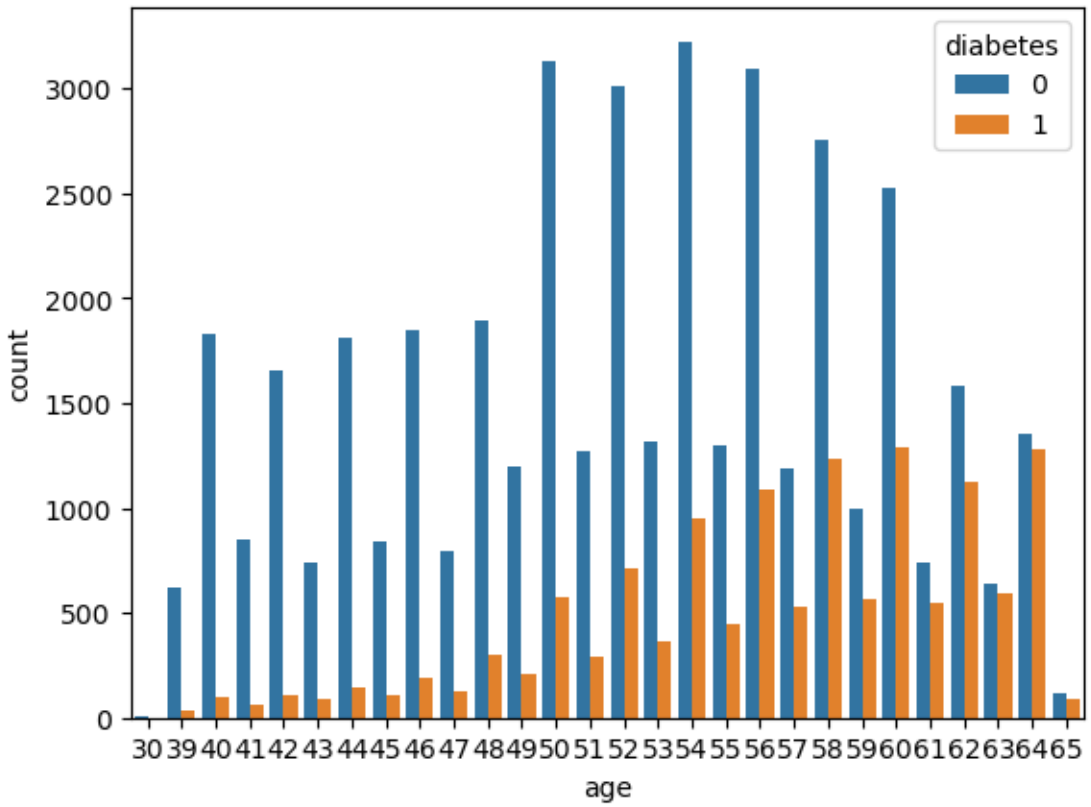
	weight	gender	high pressure	low pressure
0	76.0	0	100	80
1	65.0	1	120	82
2	56.0	1	120	80
3	62.0	1	120	80

```
4     67.0         1              120              80
```

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

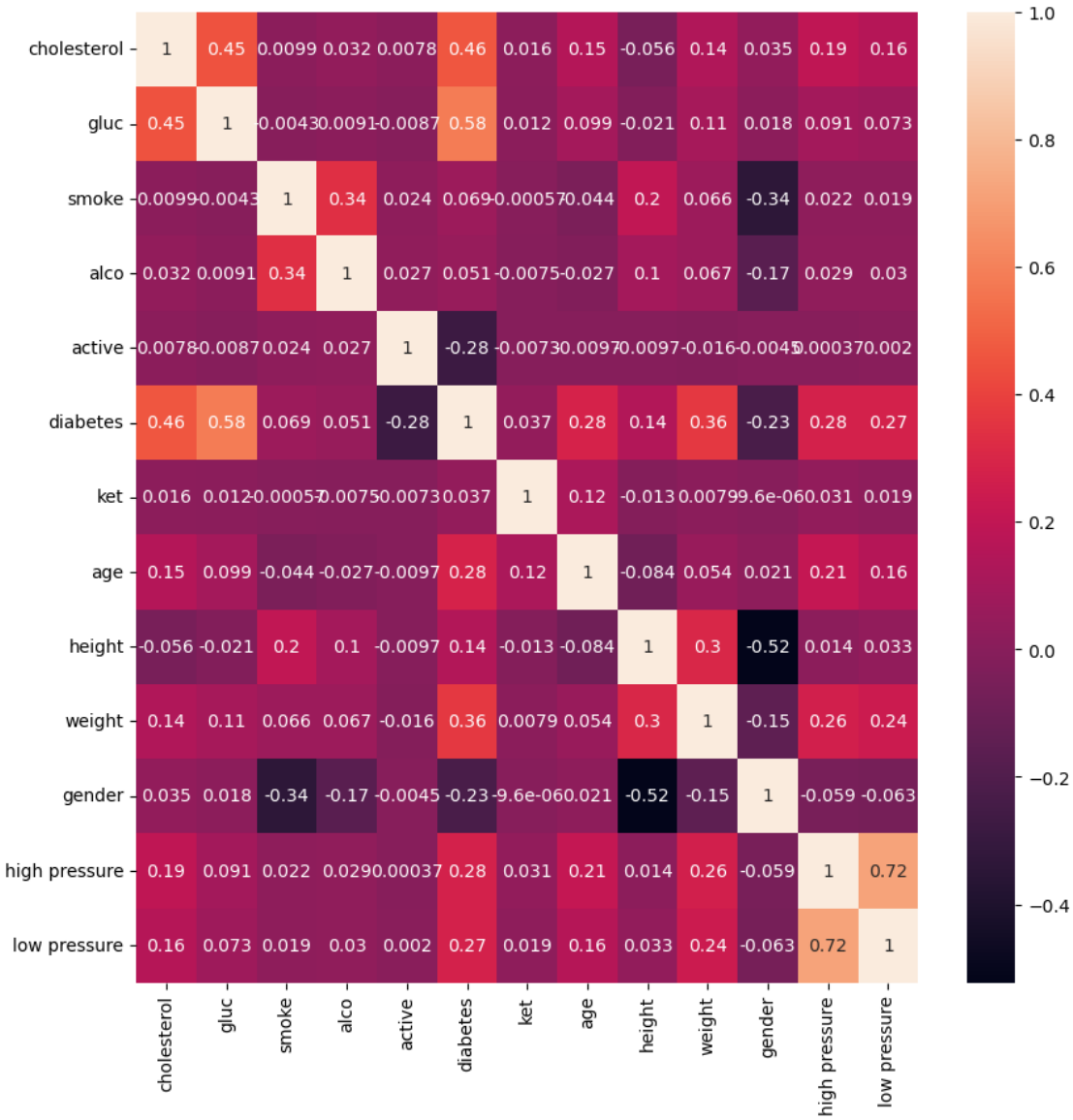
[ ]:
```
55442
```

[ ]:
```
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=0.7151246943258545, pvalue=0.0)
```

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']
```

```
scaler_train = StandardScaler()
scaler_test = StandardScaler()

scaler_train.fit(df_train[numeric])
scaler_test.fit(df_test[numeric])
```

```
StandardScaler()
```

```
df_train[numeric] = scaler_train.transform(df_train[numeric])
df_test[numeric] = scaler_test.transform(df_test[numeric])
```

```
df_train.head()
```

[ ]:

	cholesterol	gluc	smoke	alco	active	diabetes	ket	age
0	0	0	0	0	1	0	1.300898	0.123787
1	0	0	0	0	1	0	-1.152594	-0.613934
2	0	0	0	0	1	0	0.284451	1.009054
3	0	0	0	0	0	0	-1.608242	0.418876
4	0	0	0	0	0	0	0.214352	-1.351656

	height	weight	gender	high pressure	low pressure
0	0.578365	0.121887	0	-1.659301	-0.121695
1	0.053117	-0.653935	1	-0.397122	0.106007
2	0.709677	-1.288699	1	-0.397122	-0.121695
3	0.578365	-0.865523	1	-0.397122	-0.121695
4	0.184429	-0.512877	1	-0.397122	-0.121695

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

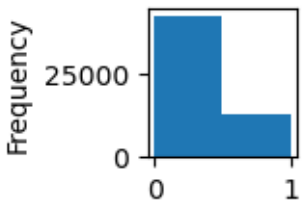
[ ]:

	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
```

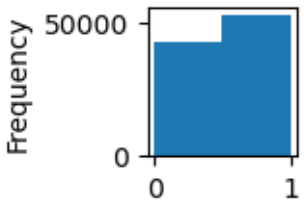
[ ]:
```
features_train_upsampled, target_train_upsampled = upsample(df_train.loc[:,␣
 ↪df_train.columns != 'diabetes'],

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

```
1    0.554019
0    0.445981
Name: diabetes, dtype: float64
(94856,)
```

[ ]:
```
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  \
59922            1     0      0     1       1 -1.246060  1.009054  0.447053
26411            2     0      0     0       1  1.686447  0.123787  1.366237
6662             0     0      0     0       1 -1.374576 -1.351656  1.628861
12189            1     1      0     0       1  0.436334  1.156598  2.022797
51751            0     0      0     0       1  1.592980  0.418876  0.053117
…              …   …    …   …      …       …       …       …
5828             0     0      0     0       1 -0.147830  1.009054 -1.128691
16766            1     1      0     0       1  1.826646  0.566421  0.709677
3088             0     0      0     0       1 -0.124464  0.418876  0.578365
39666            1     0      1     0       1 -0.486646  1.009054  1.760173
21895            2     0      1     0       1  0.050786  1.451687  2.679358

         weight  gender  high pressure  low pressure  diabetes
59922  1.391415       0       1.496146      1.016814         1
26411  1.320886       0       2.127235      1.016814         1
6662   0.968239       0       1.180601      1.016814         0
12189  0.121887       0      -1.659301     -0.121695         1
51751 -0.301289       1      -0.397122     -0.121695         0
…         …     …             …            …       …
5828  -0.865523       0       0.865056      1.016814         0
16766  1.320886       1      -0.397122     -0.121695         1
3088  -1.274593       1       1.496146      1.016814         0
39666  1.250357       0      -0.397122     -0.121695         1
21895  0.827181       0       0.865056      2.155323         1

[94856 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_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)
```