Московский государственный технический университет им. Н.Э. Баумана
Кафедра «Системы обработки информации и управления»

Рубежный контроль №1

по дисциплине

«Методы машинного обучения»

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Рубежный контроль №1

Выполнил: Ван Пэй Группа: ИУ5И-22М Вариант 16

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from scipy import stats
from scipy.stats import norm,skew

health=pd.read_csv('C:/Users/王沛/Downloads/health.csv')
health.head()
```

Out[1]:

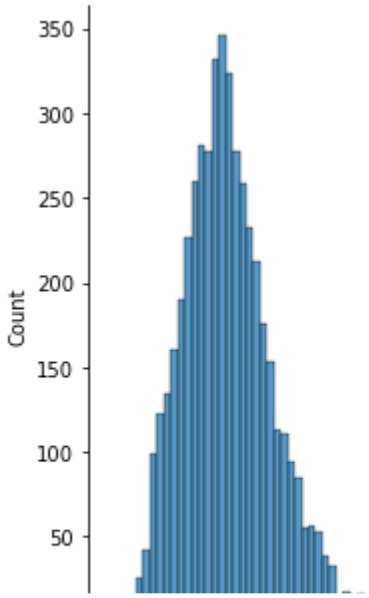
	id	gender	age	hypertension	heart_disease	ever_married	work_type	Residence_type	avg
0	9046	Male	67.0	0	1	Yes	Private	Urban	
1	51676	Female	61.0	0	0	Yes	Self-employed	Rural	
2	31112	Male	80.0	0	1	Yes	Private	Rural	
3	60182	Female	49.0	0	0	Yes	Private	Urban	
4	1665	Female	79.0	1	0	Yes	Self-employed	Rural	

Дополнительные:

Для студентов групп ИУ5-22М, ИУ5И-22М - для произвольной колонки данных построить гистограмму.

In [13]:
```
sns.displot(health['bmi'])
```

Out[13]: <seaborn.axisgrid.FacetGrid at 0x22ac77cbc70>

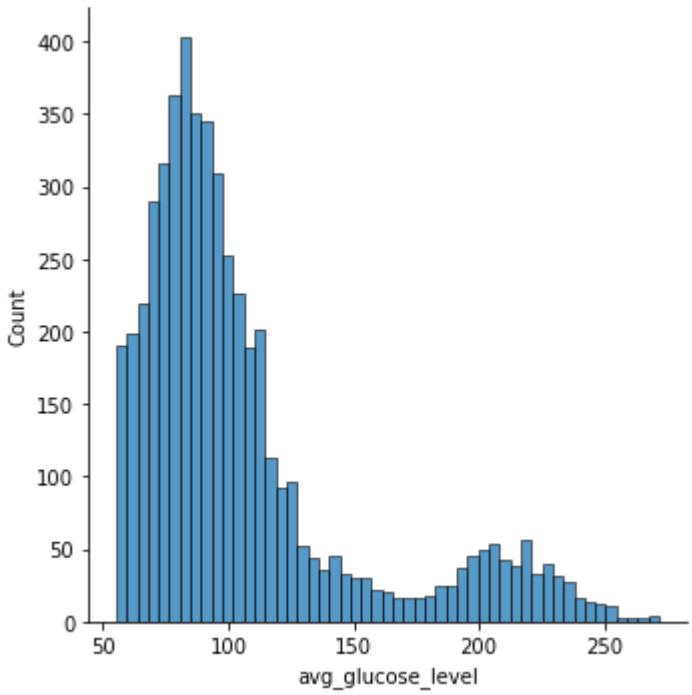


Задача №16.

Для набора данных проведите нормализацию для одного (произвольного) числового признака с использованием преобразования Бокса-Кокса (Box-Cox transformation).

In [2]:
```
sns.displot(health['avg_glucose_level'])
```

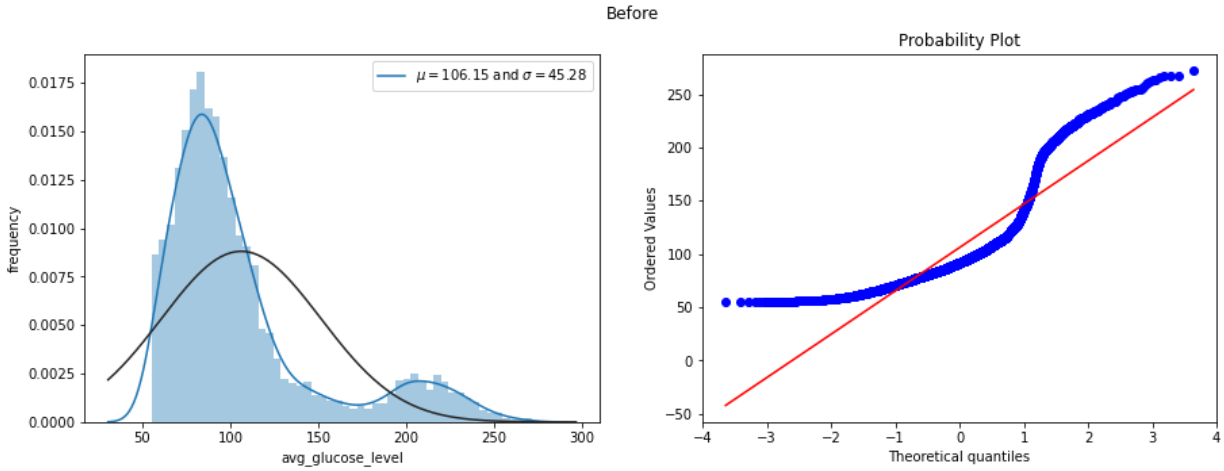
Out[2]: <seaborn.axisgrid.FacetGrid at 0x22a82598160>



In [3]:
```
fig=plt.figure(figsize=(15,5))
#pic1
plt.subplot(1,2,1)
sns.distplot(health['avg_glucose_level'],fit=norm)
(mu,sigma)=norm.fit(health['avg_glucose_level'])
plt.legend(['$\mu=${:.2f} and $\sigma=${:.2f}'.format(mu,sigma)],loc='best')
plt.ylabel('frequency')
#pic2
plt.subplot(1,2,2)
res=stats.probplot(health['avg_glucose_level'],plot=plt)
plt.suptitle('Before')
print(f"Skewness:{health['avg_glucose_level'].skew()}")
print(f"Kurtosis:{health['avg_glucose_level'].kurt()}")
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2551: FutureWarnin
g: `distplot` is a deprecated function and will be removed in a future version. Please
adapt your code to use either `displot` (a figure-level function with similar flexibili
ty) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)

Skewness:1.5722838665030459
Kurtosis:1.6804785404038278
```



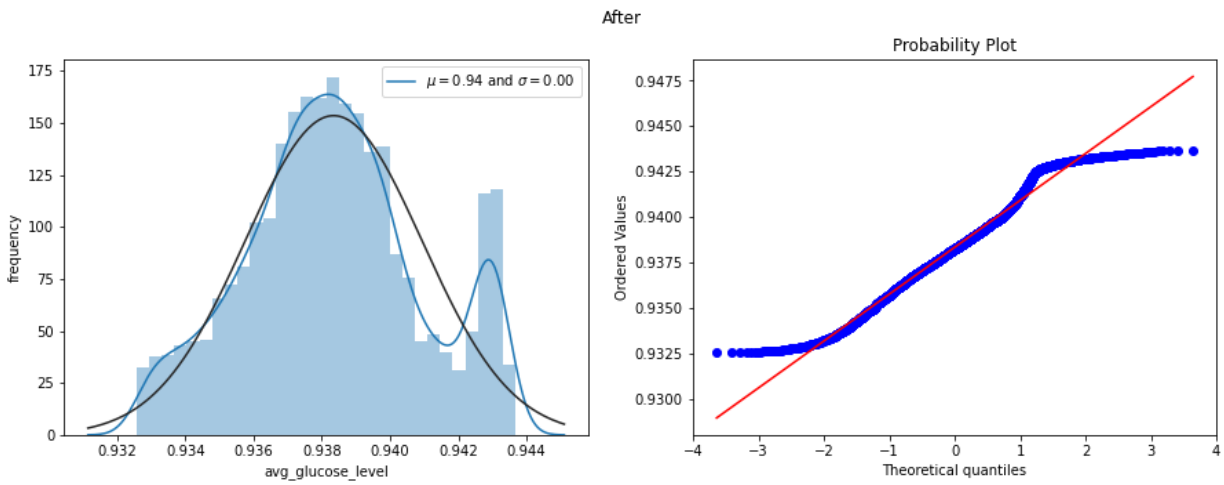
In [4]:
```
health.avg_glucose_level,lambda_=stats.boxcox(health.avg_glucose_level)
print(lambda_)
```

```
-1.0568324993842568
```

In [5]:
```
fig=plt.figure(figsize=(15,5))
#pic1
plt.subplot(1,2,1)
sns.distplot(health['avg_glucose_level'],fit=norm)
(mu,sigma)=norm.fit(health['avg_glucose_level'])
plt.legend(['$\mu=${:.2f} and $\sigma=${:.2f}'.format(mu,sigma)],loc='best')
plt.ylabel('frequency')
#pic2
plt.subplot(1,2,2)
res=stats.probplot(health['avg_glucose_level'],plot=plt)
plt.suptitle('After')
print(f"Skewness:{health['avg_glucose_level'].skew()}")
print(f"Kurtosis:{health['avg_glucose_level'].kurt()}")
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2551: FutureWarnin
g: `distplot` is a deprecated function and will be removed in a future version. Please
adapt your code to use either `displot` (a figure-level function with similar flexibili
ty) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)

Skewness:0.08329904162034814
Kurtosis:-0.49760422361296763
```



Задача №36.

Для набора данных проведите процедуру отбора признаков (feature selection). Используйте класс SelectKBest для 5 лучших признаков, и метод, основанный на взаимной информации.

In [6]:
```
X=health.drop(['avg_glucose_level','id'], axis = 1)._get_numeric_data()
y=health.avg_glucose_level
```

In [7]:
```
X.shape
```

Out[7]:
```
(5110, 5)
```

In [8]:
```
X.isnull().sum()
```

Out[8]:
```
age               0
hypertension      0
heart_disease     0
bmi             201
stroke            0
dtype: int64
```

In [9]:
```
import sklearn.impute
import sklearn.preprocessing

mean_imp = sklearn.impute.SimpleImputer(strategy="mean")
mean_bmi = mean_imp.fit_transform(X[["bmi"]])
X["bmi"] = mean_bmi
X.isnull().sum()
```

Out[9]:
```
age             0
hypertension    0
heart_disease   0
bmi             0
stroke          0
dtype: int64
```

In [10]:
```
from sklearn.feature_selection import SelectKBest
from sklearn.feature_selection import mutual_info_regression
selector=SelectKBest(mutual_info_regression,k=5)
selector.fit(X,y)
X_selected=selector.transform(X)
X_selected.shape
```

Out[10]:
```
(5110, 5)
```

In [11]:
```
from sklearn.datasets import load_iris
from sklearn.feature_selection import chi2
```

In [12]:
```
X.columns[selector.get_support(indices=True)].tolist()
```

Out[12]:
```
['age', 'hypertension', 'heart_disease', 'bmi', 'stroke']
```

In [ ]:
```

```