[Personal Key Indicators of Heart Disease 데이터 분석]

- [의료-심장병]
- 건강 상태와 관련된 40만 명의 성인을 대상으로 한 2020년 연간 CDC 설문 조사 데이터
- 데이터 출처 : https://www.kaggle.com/datasets/kamilpytlak/personal-key-indicators-of-heart-disease (https://www.kaggle.com/datasets/kamilpytlak/personal-key-indicators-of-heart-disease)
- 데이터 분석 코드
  - github 코드 (https://github.com/LDJWJ/dataAnalysis/blob/main/01_10_Heart_Disease.ipynb)
  - HTML코드 (https://ldjwj.github.io/dataAnalysis/01_10_Heart_Disease.html)

데이터 셋 개요

- 데이터 파일
  - heart_2020_cleaned.csv

데이터 설명

- Input/output variables

라이브러리 불러오기

In [5]:

```
import pandas as pd
import seaborn as sns
import numpy as np
import matplotlib.pyplot as plt

from sklearn.model_selection import train_test_split
```

데이터 불러오기

In [6]:

```
HDisease = pd.read_csv("../dataset/HeartDisease/heart_2020_cleaned.csv")

HDisease.shape, HDisease.columns
```

Out[6]:

```
((319795, 18),
 Index(['HeartDisease', 'BMI', 'Smoking', 'AlcoholDrinking', 'Stroke',
        'PhysicalHealth', 'MentalHealth', 'DiffWalking', 'Sex', 'AgeCategory',
        'Race', 'Diabetic', 'PhysicalActivity', 'GenHealth', 'SleepTime',
        'Asthma', 'KidneyDisease', 'SkinCancer'],
       dtype='object'))
```

- 데이터 셋 : 319795개 18열

In [7]:

```
HDisease.head()
```

Out[7]:

	HeartDisease	BMI	Smoking	AlcoholDrinking	Stroke	PhysicalHealth	MentalHealth	DiffWa
0	No	16.60	Yes	No	No	3.0	30.0	
1	No	20.34	No	No	Yes	0.0	0.0	
2	No	26.58	Yes	No	No	20.0	30.0	
3	No	24.21	No	No	No	0.0	0.0	
4	No	23.71	No	No	No	28.0	0.0	

In [8]:

```
HDisease.HeartDisease.unique()
```

Out[8]:

```
array(['No', 'Yes'], dtype=object)
```

In [9]:

```
### 데이터 전처리
HDisease.loc[ HDisease['HeartDisease']=="No" ,   'HeartDisease_0_1'] = 0
HDisease.loc[ HDisease['HeartDisease']=="Yes" ,   'HeartDisease_0_1'] = 1

HDisease['HeartDisease_0_1'] = HDisease['HeartDisease_0_1'].astype("int32")
HDisease.HeartDisease_0_1.unique()
```

Out[9]:

```
array([0, 1])
```

In [10]:

```
HDisease.info()  # 결측치 없음.
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 319795 entries, 0 to 319794
Data columns (total 19 columns):
 #   Column            Non-Null Count   Dtype
---  ------            --------------   -----
 0   HeartDisease      319795 non-null  object
 1   BMI               319795 non-null  float64
 2   Smoking           319795 non-null  object
 3   AlcoholDrinking   319795 non-null  object
 4   Stroke            319795 non-null  object
 5   PhysicalHealth    319795 non-null  float64
 6   MentalHealth      319795 non-null  float64
 7   DiffWalking       319795 non-null  object
 8   Sex               319795 non-null  object
 9   AgeCategory       319795 non-null  object
 10  Race              319795 non-null  object
 11  Diabetic          319795 non-null  object
 12  PhysicalActivity  319795 non-null  object
 13  GenHealth         319795 non-null  object
 14  SleepTime         319795 non-null  float64
 15  Asthma            319795 non-null  object
 16  KidneyDisease     319795 non-null  object
 17  SkinCancer        319795 non-null  object
 18  HeartDisease_0_1  319795 non-null  int32
dtypes: float64(4), int32(1), object(14)
memory usage: 45.1+ MB
```

과제 - 다른 데이터를 이용하여 체지방을 예측

In [11]:

```
HDisease.columns
```

Out[11]:

```
Index(['HeartDisease', 'BMI', 'Smoking', 'AlcoholDrinking', 'Stroke',
       'PhysicalHealth', 'MentalHealth', 'DiffWalking', 'Sex', 'AgeCategory',
       'Race', 'Diabetic', 'PhysicalActivity', 'GenHealth', 'SleepTime',
       'Asthma', 'KidneyDisease', 'SkinCancer', 'HeartDisease_0_1'],
      dtype='object')
```

In [12]:

```
HDisease.head()
```

Out[12]:

	HeartDisease	BMI	Smoking	AlcoholDrinking	Stroke	PhysicalHealth	MentalHealth	DiffWa
0	No	16.60	Yes	No	No	3.0	30.0	
1	No	20.34	No	No	Yes	0.0	0.0	
2	No	26.58	Yes	No	No	20.0	30.0	
3	No	24.21	No	No	No	0.0	0.0	
4	No	23.71	No	No	No	28.0	0.0	

In [13]:

```
HDisease.columns
```

Out[13]:

```
Index(['HeartDisease', 'BMI', 'Smoking', 'AlcoholDrinking', 'Stroke',
       'PhysicalHealth', 'MentalHealth', 'DiffWalking', 'Sex', 'AgeCategory',
       'Race', 'Diabetic', 'PhysicalActivity', 'GenHealth', 'SleepTime',
       'Asthma', 'KidneyDisease', 'SkinCancer', 'HeartDisease_0_1'],
      dtype='object')
```

In [14]:

```
# BMI, PyysicalHealth, MentalHealth, SleepTime
sel = ['BMI', 'PhysicalHealth', 'MentalHealth', 'SleepTime']

X = HDisease[sel]
y = HDisease['HeartDisease_0_1']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=0)

X_train.shape, X_test.shape, y_train.shape, y_test.shape
```

Out[14]:

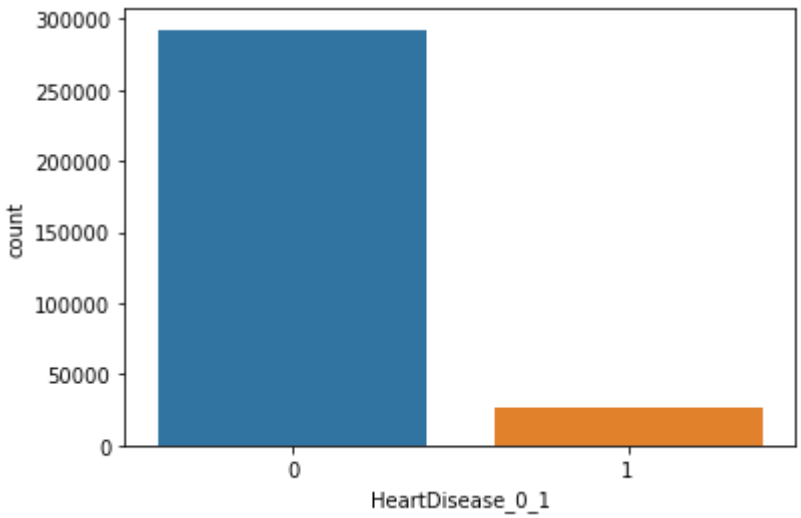
```
((223856, 4), (95939, 4), (223856,), (95939,))
```

In [15]:

```
sns.countplot(x="HeartDisease_0_1", data=HDisease)
```

Out[15]:

<AxesSubplot:xlabel='HeartDisease_0_1', ylabel='count'>



In [20]:

```
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier

model1 = DecisionTreeClassifier()
model1.fit(X_train, y_train)
print("의사결정트리 score :", model1.score(X_train, y_train), model1.score(X_test, y_test) )
```

의사결정트리 score : 0.9500437781430919 0.8849373039118607

In [21]:

```
model2 = RandomForestClassifier(max_depth=4, n_estimators=30, random_state=0)
model2.fit(X_train, y_train)
print("랜덤포레스트 score :", model2.score(X_train, y_train), model2.score(X_test, y_test) )
```

랜덤포레스트 score : 0.9143913944678722 0.914435214042256

최종 모델로 예측 후, mse, rmse 구하기

In [18]:

```
model1 = RandomForestRegressor(max_depth=4, n_estimators=30, random_state=0)
model1.fit(X_train, y_train)
pred = model1.predict(X_test)
```

In [19]:

```
# mse, rmse
mse_val = np.sum(  (pred - y_test) ** 2 ) / len(pred)
rmse_val = np.sqrt(mse_val)

print(f"mse value : {mse_val} rmse value : {rmse_val}")
```

```
mse value : 0.07544807806660697 rmse value : 0.2746781353996109
```