winequality-regression

In [1]:

```
import numpy as np
import pandas as pd
```

In [2]:

```
dataset = pd.read_csv(r"C:\Users\kotha\OneDrive\Documents\winequality.csv")
```

In [3]:

```
dataset
```

Out[3]:

	type	fixed acidity	volatile acidity	citric acid	residual sugar	chlorides	free sulfur dioxide	total sulfur dioxide	density	pH	sulpha
0	white	7.0	0.270	0.36	20.7	0.045	45.0	170.0	1.00100	3.00	0
1	white	6.3	0.300	0.34	1.6	0.049	14.0	132.0	0.99400	3.30	0
2	white	8.1	0.280	0.40	6.9	0.050	30.0	97.0	0.99510	3.26	0
3	white	7.2	0.230	0.32	8.5	0.058	47.0	186.0	0.99560	3.19	0
4	white	7.2	0.230	0.32	8.5	0.058	47.0	186.0	0.99560	3.19	0
...	...	...	...	...	...	...	...	...	...	...	
6492	red	6.2	0.600	0.08	2.0	0.090	32.0	44.0	0.99490	3.45	0
6493	red	5.9	0.550	0.10	2.2	0.062	39.0	51.0	0.99512	3.52	N
6494	red	6.3	0.510	0.13	2.3	0.076	29.0	40.0	0.99574	3.42	0
6495	red	5.9	0.645	0.12	2.0	0.075	32.0	44.0	0.99547	3.57	0
6496	red	6.0	0.310	0.47	3.6	0.067	18.0	42.0	0.99549	3.39	0

6497 rows × 13 columns

In [4]:

```
dataset.isnull().any()
```

Out[4]:

```
type                   False
fixed acidity           True
volatile acidity        True
citric acid             True
residual sugar          True
chlorides               True
free sulfur dioxide    False
total sulfur dioxide   False
density                False
pH                      True
sulphates               True
alcohol                False
quality                False
dtype: bool
```

In [5]:

```
dataset["fixed acidity"].fillna(dataset['fixed acidity'].mean(),inplace = True)
dataset["volatile acidity"].fillna(dataset["volatile acidity"].mean(),inplace = True)
dataset["citric acid"].fillna(dataset["citric acid"].mean(),inplace = True)
dataset["residual sugar"].fillna(dataset['residual sugar'].mean(),inplace = True)
dataset["chlorides"].fillna(dataset["chlorides"].mean(),inplace = True)
dataset["pH"].fillna(dataset["pH"].mean(),inplace = True)
dataset["sulphates"].fillna(dataset['sulphates'].mean(),inplace = True)
```

In [6]:

```
dataset.isnull().any()
```

Out[6]:

```
type                   False
fixed acidity          False
volatile acidity       False
citric acid            False
residual sugar         False
chlorides              False
free sulfur dioxide    False
total sulfur dioxide   False
density                False
pH                     False
sulphates              False
alcohol                False
quality                False
dtype: bool
```

In [7]:

```
from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()
dataset["type"]  = le.fit_transform(dataset["type"])
```

In [8]:

```
x  = dataset.iloc[:,0:12].values
y = dataset.iloc[:,12:13].values
```

In [9]:

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test = train_test_split(x,y, test_size = 0.2, random_state = 0)
```

In [10]:

```
x_train.shape
```

Out[10]:

```
(5197, 12)
```

In [11]:

```
import keras
from keras.models import Sequential
from keras.layers import Dense
```

```
Using TensorFlow backend.
C:\Users\kotha\anaconda3\lib\site-packages\tensorflow\python\framework\dtype
s.py:516: FutureWarning: Passing (type, 1) or '1type' as a synonym of type i
s deprecated; in a future version of numpy, it will be understood as (type,
(1,)) / '(1,)type'.
  _np_qint8 = np.dtype([("qint8", np.int8, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorflow\python\framework\dtype
s.py:517: FutureWarning: Passing (type, 1) or '1type' as a synonym of type i
s deprecated; in a future version of numpy, it will be understood as (type,
(1,)) / '(1,)type'.
  _np_quint8 = np.dtype([("quint8", np.uint8, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorflow\python\framework\dtype
s.py:518: FutureWarning: Passing (type, 1) or '1type' as a synonym of type i
s deprecated; in a future version of numpy, it will be understood as (type,
(1,)) / '(1,)type'.
  _np_qint16 = np.dtype([("qint16", np.int16, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorflow\python\framework\dtype
s.py:519: FutureWarning: Passing (type, 1) or '1type' as a synonym of type i
s deprecated; in a future version of numpy, it will be understood as (type,
(1,)) / '(1,)type'.
  _np_quint16 = np.dtype([("quint16", np.uint16, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorflow\python\framework\dtype
s.py:520: FutureWarning: Passing (type, 1) or '1type' as a synonym of type i
s deprecated; in a future version of numpy, it will be understood as (type,
(1,)) / '(1,)type'.
  _np_qint32 = np.dtype([("qint32", np.int32, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorflow\python\framework\dtype
s.py:525: FutureWarning: Passing (type, 1) or '1type' as a synonym of type i
s deprecated; in a future version of numpy, it will be understood as (type,
(1,)) / '(1,)type'.
  np_resource = np.dtype([("resource", np.ubyte, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorboard\compat\tensorflow_stu
b\dtypes.py:541: FutureWarning: Passing (type, 1) or '1type' as a synonym of
type is deprecated; in a future version of numpy, it will be understood as
(type, (1,)) / '(1,)type'.
  _np_qint8 = np.dtype([("qint8", np.int8, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorboard\compat\tensorflow_stu
b\dtypes.py:542: FutureWarning: Passing (type, 1) or '1type' as a synonym of
type is deprecated; in a future version of numpy, it will be understood as
(type, (1,)) / '(1,)type'.
  _np_quint8 = np.dtype([("quint8", np.uint8, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorboard\compat\tensorflow_stu
b\dtypes.py:543: FutureWarning: Passing (type, 1) or '1type' as a synonym of
type is deprecated; in a future version of numpy, it will be understood as
(type, (1,)) / '(1,)type'.
  _np_qint16 = np.dtype([("qint16", np.int16, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorboard\compat\tensorflow_stu
b\dtypes.py:544: FutureWarning: Passing (type, 1) or '1type' as a synonym of
type is deprecated; in a future version of numpy, it will be understood as
(type, (1,)) / '(1,)type'.
  _np_quint16 = np.dtype([("quint16", np.uint16, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorboard\compat\tensorflow_stu
b\dtypes.py:545: FutureWarning: Passing (type, 1) or '1type' as a synonym of
type is deprecated; in a future version of numpy, it will be understood as
```

```
(type, (1,)) / '(1,)type'.
  _np_qint32 = np.dtype([("qint32", np.int32, 1)])
C:\Users\kotha\anaconda3\lib\site-packages\tensorboard\compat\tensorflow_stu
b\dtypes.py:550: FutureWarning: Passing (type, 1) or '1type' as a synonym of
type is deprecated; in a future version of numpy, it will be understood as
(type, (1,)) / '(1,)type'.
  np_resource = np.dtype([("resource", np.ubyte, 1)])
```

In [12]:

```
regressor = Sequential()
```

```
WARNING:tensorflow:From C:\Users\kotha\anaconda3\lib\site-packages\keras\bac
kend\tensorflow_backend.py:74: The name tf.get_default_graph is deprecated.
Please use tf.compat.v1.get_default_graph instead.
```

In [13]:

```
x_train.shape
```

Out[13]:

```
(5197, 12)
```

In [14]:

```
regressor.add(Dense(units = 12,init = 'random_uniform',activation = 'relu'))
```

```
C:\Users\kotha\anaconda3\lib\site-packages\ipykernel_launcher.py:1: UserWarn
ing: Update your `Dense` call to the Keras 2 API: `Dense(units=12, activatio
n="relu", kernel_initializer="random_uniform")`
  """Entry point for launching an IPython kernel.
```

In [15]:

```
regressor.add(Dense(units = 24,init = 'random_uniform',activation = 'relu'))
```

```
C:\Users\kotha\anaconda3\lib\site-packages\ipykernel_launcher.py:1: UserWarn
ing: Update your `Dense` call to the Keras 2 API: `Dense(units=24, activatio
n="relu", kernel_initializer="random_uniform")`
  """Entry point for launching an IPython kernel.
```

In [16]:

```
regressor.add(Dense(units = 24,init = 'random_uniform',activation = 'relu'))
```

```
C:\Users\kotha\anaconda3\lib\site-packages\ipykernel_launcher.py:1: UserWarn
ing: Update your `Dense` call to the Keras 2 API: `Dense(units=24, activatio
n="relu", kernel_initializer="random_uniform")`
  """Entry point for launching an IPython kernel.
```

In [17]:

```
regressor.add(Dense(units = 1,init = 'random_uniform'))
```

```
C:\Users\kotha\anaconda3\lib\site-packages\ipykernel_launcher.py:1: UserWarn
ing: Update your `Dense` call to the Keras 2 API: `Dense(units=1, kernel_ini
tializer="random_uniform")`
  """Entry point for launching an IPython kernel.
```

In [18]:

```
regressor.compile (optimizer = 'adam',loss = 'mse',metrics = ['mse'])
```

```
WARNING:tensorflow:From C:\Users\kotha\anaconda3\lib\site-packages\keras\opt
imizers.py:790: The name tf.train.Optimizer is deprecated. Please use tf.com
pat.v1.train.Optimizer instead.
```

In [19]:

```
regressor.fit(x_train,y_train,batch_size=32,epochs=100)
```

```
WARNING:tensorflow:From C:\Users\kotha\anaconda3\lib\site-packages\keras\b
ackend\tensorflow_backend.py:517: The name tf.placeholder is deprecated. P
lease use tf.compat.v1.placeholder instead.

WARNING:tensorflow:From C:\Users\kotha\anaconda3\lib\site-packages\keras\b
ackend\tensorflow_backend.py:4138: The name tf.random_uniform is deprecate
d. Please use tf.random.uniform instead.

WARNING:tensorflow:From C:\Users\kotha\anaconda3\lib\site-packages\keras\b
ackend\tensorflow_backend.py:986: The name tf.assign_add is deprecated. Pl
ease use tf.compat.v1.assign_add instead.

WARNING:tensorflow:From C:\Users\kotha\anaconda3\lib\site-packages\keras\b
ackend\tensorflow_backend.py:973: The name tf.assign is deprecated. Please
use tf.compat.v1.assign instead.

Epoch 1/100
5197/5197 [==============================] - 1s 137us/step - loss: 11.8010
- mean_squared_error: 11.8010
```

In [20]:

```
y_pred = regressor.predict(x_test)
```

In [21]:

```
y_pred
```

Out[21]:

```
array([[5.840246 ],
       [5.3927155],
       [6.0796466],
       ...,
       [6.383899 ],
       [5.704981 ],
       [6.364659 ]], dtype=float32)
```

In [22]:

```
y_test
```

Out[22]:

```
array([[6],
       [6],
       [5],
       ...,
       [6],
       [5],
       [5]], dtype=int64)
```

In [25]:

```
regressor.save('regressor.h5')
```

In [26]:

```
x_train.shape
```

Out[26]:

```
(5197, 12)
```

In [28]:

```
regressor.predict(np.array([[1,6.6,0.16,0.4,1.5,0.044,48,143,0.9912,3.54,0.52,12.4]]))
```

Out[28]:

```
array([[6.9412007]], dtype=float32)
```

In [ ]:

```

```