

```
import tensorflow as tf
```

```
a=tf.constant([[1,2],[3,4]])  
b=tf.constant([[1,1],[3,4]])
```

```
print(a)
```

```
tf.Tensor(  
[[1 2]  
 [3 4]], shape=(2, 2), dtype=int32)
```

```
c=tf.add(a,b)  
c
```

```
<tf.Tensor: shape=(2, 2), dtype=int32, numpy=  
array([[2, 3],  
       [6, 8]], dtype=int32)>
```

```
d=tf.subtract(a,b)  
d
```

```
<tf.Tensor: shape=(2, 2), dtype=int32, numpy=  
array([[0, 1],  
       [0, 0]], dtype=int32)>
```

```
e=tf.matmul(a,b)  
e
```

```
<tf.Tensor: shape=(2, 2), dtype=int32, numpy=  
array([[ 7,  9],  
       [15, 19]], dtype=int32)>
```

```
# element wise multiplication  
f=tf.multiply(a,b)
```

```
f
```

```
<tf.Tensor: shape=(2, 2), dtype=int32, numpy=
array([[ 1,  2],
       [ 9, 16]], dtype=int32)>
```

```
g=tf.divide(a,b)
g
```

```
<tf.Tensor: shape=(2, 2), dtype=float64, numpy=
array([[1., 2.],
       [1., 1.]])>
```

```
import pandas as pd
```

```
df=pd.read_csv("/content/IRIS.csv")
df.head()
```

	sepal_length	sepal_width	petal_length	petal_width	species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa

```
df['species'].unique()
```

```
array(['Iris-setosa', 'Iris-versicolor', 'Iris-virginica'], dtype=object)
```

```
x=df.drop(columns=['species'])
x
```

	sepal_length	sepal_width	petal_length	petal_width
<b>0</b>	5.1	3.5	1.4	0.2
<b>1</b>	4.9	3.0	1.4	0.2
<b>2</b>	4.7	3.2	1.3	0.2
<b>3</b>	4.6	3.1	1.5	0.2
<b>4</b>	5.0	3.6	1.4	0.2
...	...	...	...	...
<b>145</b>	6.7	3.0	5.2	2.3
<b>146</b>	6.3	2.5	5.0	1.9
<b>147</b>	6.5	3.0	5.2	2.0
<b>148</b>	6.2	3.4	5.4	2.3
<b>149</b>	5.9	3.0	5.1	1.8

```
y=df['species']
```

```
y
```

```
0      Iris-setosa
```

```
1      Iris-setosa
```

```
2      Iris-setosa
```

```
3      Iris-setosa
```

```
4      Iris-setosa
```

```
...
```

```
145    Iris-virginica
```

```
146    Iris-virginica
```

```
147    Iris-virginica
```

```
148    Iris-virginica
```

```
149    Iris-virginica
```

```
Name: species, Length: 150, dtype: object
```

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

```
print(x_train.shape)
print(x_test.shape)
print(y_train.shape)
print(y_test.shape)
```

```
(112, 4)
(38, 4)
(112,)
(38,)
```

```
import numpy as np
x_train=np.array(x_train)
x_test=np.array(x_test)
y_train=np.array(y_train)
y_test=np.array(y_test)
```

```
def train(train,test):
    l1_distance=tf.abs(tf.add(train,tf.negative(test)))
    distance=tf.reduce_sum(l1_distance,axis=1)
    return np.array(tf.argsort(distance))
```

```
# single test
index=train(x_train,x_test[0])
print(index)
```

```
[ 0 107  98  71  75  73   7  65  49  84  38   2   5  29  59  45  46  20
 28  30 109  39  78  91  92  61  87  62  33  15  17 111   9  54  27  42
 68  67  23  12  96  40  18  36  76  70 110  77  88 104 108  66  13  80
 14  25 100  83   6  57   3  41  89  11  43  93 103  34  10  21  22  60
 85  24  51  52  32  31  48 105   1   4  69  79  16  53  86 106  56  74
 55  99  35   8  95  58  63  81 102  37  72  47  19  26  44  50  82  64
 94 101  97  90]
```

```
classes=['Iris-setosa', 'Iris-versicolor', 'Iris-virginica']
```

```
correct_count=0
for i in range(len(x_test)):
    indd=[0,0,0]
    labels=[]
    index=train(x_train,x_test[i,:])
    for j in range(k):
        labels.append(y_train[index[j]])
    for l in labels:
        if(l=='Iris-setosa'):
            indd[0]=indd[0]+1
        elif(l=='Iris-versicolor'):
            indd[1]=indd[1]+1
        else:
            indd[2]=indd[2]+1
    print("epochs ",i,'predicted ',classes[np.argmax(y_train[indd])],"actual ",y_test[i])
    if(classes[np.argmax(y_train[indd])]==y_test[i]):
        correct_count+=1
print("correctly predicted: ",correct_count)
```

```
☞ epochs 0 predicted Iris-versicolor actual Iris-versicolor
epochs 1 predicted Iris-setosa actual Iris-virginica
epochs 2 predicted Iris-setosa actual Iris-setosa
epochs 3 predicted Iris-versicolor actual Iris-versicolor
epochs 4 predicted Iris-versicolor actual Iris-versicolor
epochs 5 predicted Iris-versicolor actual Iris-virginica
epochs 6 predicted Iris-virginica actual Iris-virginica
epochs 7 predicted Iris-setosa actual Iris-setosa
epochs 8 predicted Iris-virginica actual Iris-virginica
epochs 9 predicted Iris-setosa actual Iris-virginica
epochs 10 predicted Iris-virginica actual Iris-virginica
epochs 11 predicted Iris-setosa actual Iris-setosa
epochs 12 predicted Iris-setosa actual Iris-setosa
epochs 13 predicted Iris-setosa actual Iris-virginica
epochs 14 predicted Iris-setosa actual Iris-virginica
```

epochs	15	predicted	Iris-setosa	actual	Iris-virginica
epochs	16	predicted	Iris-virginica	actual	Iris-virginica
epochs	17	predicted	Iris-versicolor	actual	Iris-versicolor
epochs	18	predicted	Iris-setosa	actual	Iris-versicolor
epochs	19	predicted	Iris-virginica	actual	Iris-virginica
epochs	20	predicted	Iris-setosa	actual	Iris-setosa
epochs	21	predicted	Iris-versicolor	actual	Iris-versicolor
epochs	22	predicted	Iris-versicolor	actual	Iris-versicolor
epochs	23	predicted	Iris-versicolor	actual	Iris-versicolor
epochs	24	predicted	Iris-virginica	actual	Iris-virginica
epochs	25	predicted	Iris-setosa	actual	Iris-setosa
epochs	26	predicted	Iris-setosa	actual	Iris-setosa
epochs	27	predicted	Iris-setosa	actual	Iris-setosa
epochs	28	predicted	Iris-virginica	actual	Iris-virginica
epochs	29	predicted	Iris-virginica	actual	Iris-virginica
epochs	30	predicted	Iris-setosa	actual	Iris-virginica
epochs	31	predicted	Iris-virginica	actual	Iris-virginica
epochs	32	predicted	Iris-setosa	actual	Iris-setosa
epochs	33	predicted	Iris-virginica	actual	Iris-virginica
epochs	34	predicted	Iris-setosa	actual	Iris-setosa
epochs	35	predicted	Iris-setosa	actual	Iris-setosa
epochs	36	predicted	Iris-versicolor	actual	Iris-versicolor
epochs	37	predicted	Iris-virginica	actual	Iris-virginica
correctly predicted:			30		

