

- **Rishabh Patil**
- **SAP : 60009200056 (K/K2)**

```
import numpy as np
import pandas as pd
import matplotlib as plt
```

```
from sklearn import datasets
df=datasets.load_iris()
df
```

## ▼ Converting 1d target in to 3d array

```
y=pd.get_dummies(df.target).values
y
```

Splitting the dataset into train and test

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(df.data, y, test_size=0.2, random_state=42)
```

Weight initialization

```
w = np.random.normal(size=(2,3))
v=np.random.normal(size=(4,2))
```

```
def sigmoid(a):
    return 1/(1 + np.exp(-a))
```

```
def error(y_train,y_hat):
    temp=((y_train-y_hat)**2)/len(y_train))
    # print(temp)
    mse=temp.mean()
    # print(mse)
    return mse
```

```
def accu(y_train,y_hat):
    a=[]
    a=y_train.argmax(axis=1)==y_hat.argmax(axis=1)
    # print(a)
    return a.mean()
```

Calculating the zin

```
def forward_pass(X_train,y_train,w,v,accuracy):
    #forward pass
```

```
#Calculating z
z = sigmoid(zin)
yin=np.dot(z,w)
y_hat=sigmoid(yin)
mse=error(y_train,y_hat)
accuracy1=accu(y_train,y_hat)
accuracy.append(accuracy1)
return y_hat,z,mse
```

```
def backpropogation(y_train,y_hat,z,w,v,alpha):
    dy=(y_train-y_hat)*y_hat*(1-y_hat)

    dw=np.dot(z.T,dy)

    dz=np.dot(dy,w.T)*z*(1-z)

    dv=np.dot(X_train.T,dz)

    w=w-alpha*dw
    v=v-alpha*dv
    return w,v
```

```
accuracy=[]
mse=[]

def solve(X_train,y_train,w,v):
    alpha=1
    epoch=1000
    for _ in range(epoch):

        y_hat,z,mse=forward_pass(X_train,y_train,w,v,accuracy)
        mse.append(mse)
        w,v=backpropogation(y_train,y_hat,z,w,v,alpha)

solve(X_train,y_train,w,v)
print(accuracy)

# print(sum(accuracy)/len(accuracy))
```

```
[0.325, 0.03333333333333333, 0.03333333333333333, 0.03333333333333333, 0.03333333333333333, 0.
```

```
x=list(range(1000))
print(x)

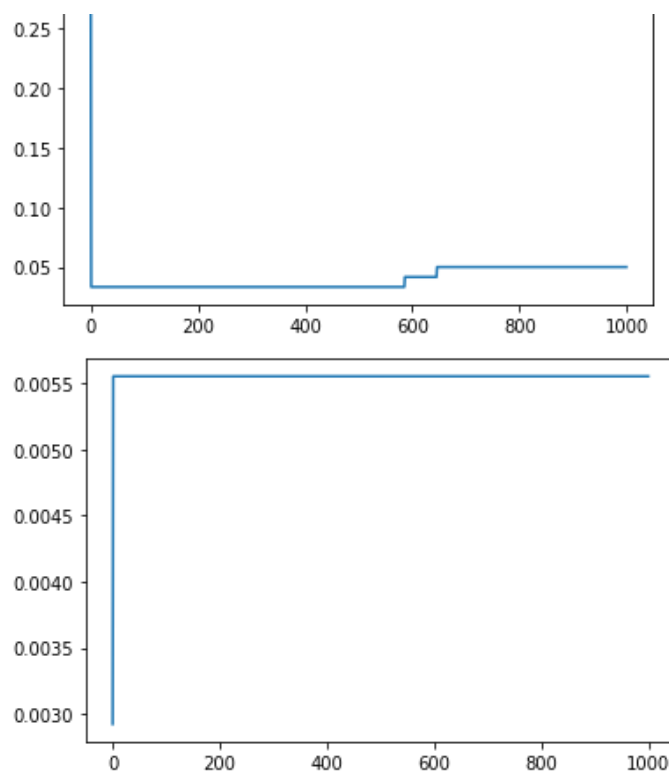
import matplotlib.pyplot as plt

plt.plot(x,accuracy)
plt.show()
plt.plot(x,msee)
plt.show()
```

```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25,
```

```
0.30
```





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