Machine Learning

Ex: 08 Multi-Layer Peceptron

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Code:

```
import pandas as pd
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
from sklearn.neural_network import MLPClassifier
from sklearn.metrics import confusion_matrix
from sklearn.metrics import classification_report
import matplotlib.pyplot as plt


df=pd.read_csv("Forest_Fire_Dataset.csv")
#print(df)
#le=LabelEncoder()
df['Fire'], unique_values = pd.factorize(df['Classes'])
#df['Classes']=le.fit_transform(df['Classes'])
#df['Classes']=df['Classes'].replace('fire','1')
```

```
inplist=df.columns[:-3]

scale=StandardScaler()

df[inplist]=scale.fit_transform(df[inplist])

#print(df.tail(10))

"""

y=df.values[:,-1]

for i in range(len(y)):

    print(str(i+2)+" "+str(y[i]))

"""

x=df.iloc[:,:-3].values

y=df['Fire'].values

x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.3, random_state=11)

clf=MLPClassifier(hidden_layer_sizes=(3,),activation='logistic',max_iter=150,solver='ada
m',learning_rate='constant',learning_rate_init=0.19)

clf.fit(x_train,y_train)

ypred = clf.predict(x_test)

cm = confusion_matrix(y_test, ypred)

print("Confusion Matrix:")

print(cm)

print("--------------------------------------------------------------------------")

print('Classification Report:\n',classification_report(y_test,ypred))

print("--------------------------------------------------------------------------")

print('Coefficient: ',clf.coefs_)
```

```
print("------------------------------------------------------------------------")

print("Intercepts: ",clf.intercepts_)

print("------------------------------------------------------------------------")

loss_values=clf.loss_curve_

plt.plot(loss_values)

plt.xlabel('Epochs')

plt.ylabel('Loss')

plt.show()
```

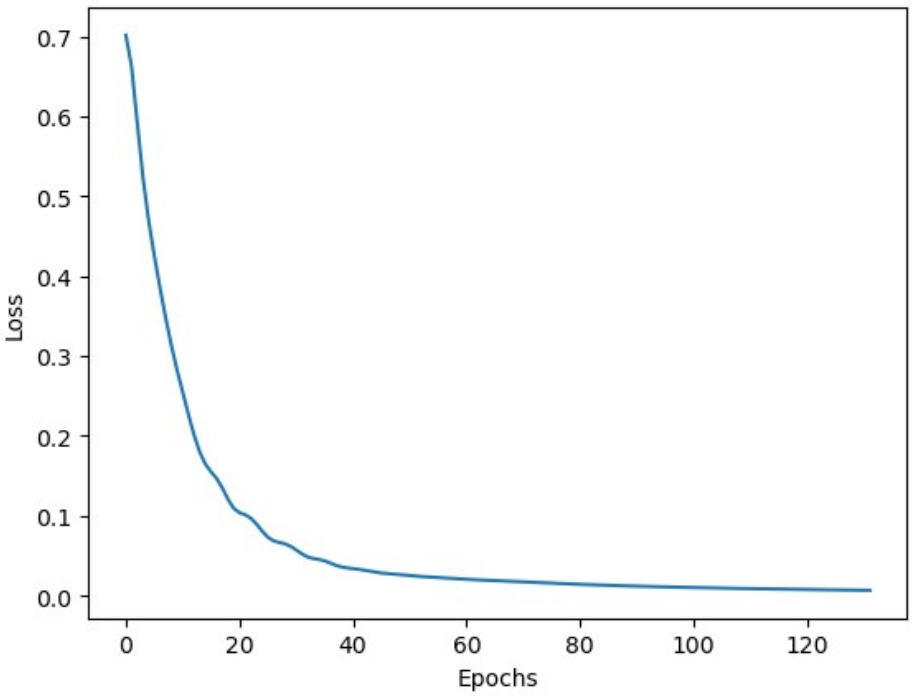
Output:

```
Confusion Matrix:
[[35  0]
 [ 1 37]]
--------------------------------------------------------------------------
Classification Report:
              precision    recall  f1-score   support

           0       0.97      1.00      0.99        35
           1       1.00      0.97      0.99        38

    accuracy                           0.99        73
   macro avg       0.99      0.99      0.99        73
weighted avg       0.99      0.99      0.99        73

--------------------------------------------------------------------------
Coefficient:  [array([[ 4.79873086e-01, -8.47539883e-01,  1.34486932e+00],
       [ 3.08981827e-01, -3.60204791e-01, -7.68671814e-01],
       [-4.57125122e-05, -1.48302486e-04, -1.56875026e-04],
       [ 1.88447921e+00, -2.03056008e+00, -8.66999149e-01],
       [ 2.58240291e-01, -3.68445189e-01,  1.07183967e+00],
       [-8.87574260e-01,  1.13986305e+00,  5.90327641e-01],
       [-2.25442844e+00,  2.12158641e+00,  1.82922542e+00],
       [-7.73446782e+00,  7.81758132e+00, -4.94384873e+00],
       [ 3.26448042e+00, -1.38008889e+00,  1.03817157e+00],
       [-2.35819778e+00,  1.47856300e+00, -1.44849479e+00],
       [-6.00181584e+00,  5.97864676e+00, -3.90936541e+00],
       [-6.41036319e-01,  1.15894680e-01, -2.23260119e-01],
       [-4.88887482e+00,  4.73072986e+00, -3.21442994e+00]]), array([[-5.49690706],
       [ 6.2829978 ],
       [-4.35770439]])]
--------------------------------------------------------------------------
Intercepts:  [array([-3.48291379,  3.79760157, -3.16648154]), array([1.30733821])]
--------------------------------------------------------------------------
```


0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Loss
0
20
40
60
80
100
120
Epochs