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import numpy as np
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import
MinMaxScaler,StandardScaler,OrdinalEncoder,OneHotEncoder
from sklearn.neural_network import MLPClassifier
from sklearn.metrics import accuracy_score,classification_report

df=pd.read_csv('car_data.csv')
print("No of Data rows :",df.shape[0])

#Normalization
scaler=MinMaxScaler()
df[['Present_Price']]=scaler.fit_transform(df[['Present_Price']])

#Standardization
standard_scaler=StandardScaler()
df[['Year','Kms_Driven']]=standard_scaler.fit_transform(df[['Year','Kms_Driven']])

#One Hot Encoding
one_hot_encoder=OneHotEncoder(sparse_output=False).set_output(transform="pandas")

df=pd.concat([
    df.drop(columns=['Fuel_Type','Seller_Type']),
    one_hot_encoder.fit_transform(df[['Fuel_Type','Seller_Type']])
],axis=1)

# Ordinal Encoding
ordinal_encoder = OrdinalEncoder(categories=[['Manual', 'Automatic']])
df['Transmission'] = ordinal_encoder.fit_transform(df[['Transmission']])

#Bining
df['Price_Category']=pd.qcut(df['Selling_Price'],q=3,labels=False)

#Scaling
df['Selling_Price']=scaler.fit_transform(df[['Selling_Price']])

df.to_csv('processed_data.csv',index=False)

X=df.drop(['Car_Name','Selling_Price','Price_Category'],axis=1)
y=df['Price_Category']

X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.2)

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print("No of Training rows :",X_train.shape[0])
print("No of Testing rows :",X_test.shape[0])

mlp_classifier=MLPClassifier(hidden_layer_sizes=(100,),max_iter=1000)

mlp_classifier.fit(X_train,y_train)

y_pred=mlp_classifier.predict(X_test)

print("Hidden Layer Size:",mlp_classifier.hidden_layer_sizes)
print("Number of Layers:",mlp_classifier.n_layers_)
print("Number of Iterations:",mlp_classifier.n_iter_)
print("Classes :",mlp_classifier.classes_)
print("Accuracy :",accuracy_score(y_test,y_pred))
print(classification_report(y_test,y_pred))

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Car_Name	Year	Selling_Price	Present_Price	Kms_Driven	Fuel_Type	Seller_Type	Transmission	Owner
ritz	2014	3.35	5.59	27000	Petrol	Dealer	Manual	0
sw4	2013	4.75	9.54	43000	Diesel	Dealer	Manual	0
claz	2017	7.25	9.85	6900	Petrol	Dealer	Manual	0
wagon r	2011	2.85	4.15	5200	Petrol	Dealer	Manual	0
swift	2014	4.6	6.87	42450	Diesel	Dealer	Manual	0
vitara brex	2018	9.25	9.83	2071	Diesel	Dealer	Manual	0
claz	2015	6.75	8.12	18796	Petrol	Dealer	Manual	0
s cross	2015	6.5	8.61	33429	Diesel	Dealer	Manual	0
claz	2016	8.75	8.89	20273	Diesel	Dealer	Manual	0
claz	2015	7.45	8.92	42367	Diesel	Dealer	Manual	0
alto 800	2017	2.85	3.6	2135	Petrol	Dealer	Manual	0
claz	2015	6.85	10.38	51000	Diesel	Dealer	Manual	0
claz	2015	7.5	9.94	15000	Petrol	Dealer	Automatic	0
ertiga	2015	6.1	7.71	26000	Petrol	Dealer	Manual	0
dzire	2009	2.25	7.21	77427	Petrol	Dealer	Manual	0
ertiga	2016	7.75	10.79	43000	Diesel	Dealer	Manual	0
ertiga	2015	7.25	10.79	41678	Diesel	Dealer	Manual	0
ertiga	2016	7.75	10.79	43000	Diesel	Dealer	Manual	0
wagon r	2015	3.25	5.09	35500	CNG	Dealer	Manual	0
sw4	2010	2.65	7.98	41442	Petrol	Dealer	Manual	0
alto k10	2016	2.85	3.95	25000	Petrol	Dealer	Manual	0
lania	2017	4.9	5.73	2400	Petrol	Dealer	Manual	0

Car_Name	Year	Selling_Price	Present_Price	Kms_Driven	Transmission	Owner	Fuel_Type_CNG	Fuel_Type_Diesel	Fuel_Type_Petrol	Seller_Type_Dealer	Seller_Type_Individual	Price_Category
ritz	0.128897003	0.093122209	0.0571088	-0.2562245	0	0	0	0	1	1	0	1
sw4	-0.21751389	0.133237822	0.09991531	0.1599105	0	0	0	1	0	1	0	1
claz	1.168329094	0.20487106	0.10327265	-0.773969	0	0	0	0	1	1	0	2
wagon r	-0.91032599	0.078796502	0.04150412	-0.8177583	0	0	0	0	1	1	0	1
swift	0.128897003	0.128939828	0.07097963	0.14174336	0	0	0	1	0	1	0	1
vitara brex	1.514539791	0.26237765	0.10305592	-0.8983565	0	0	0	1	0	1	0	2
claz	0.4753077	0.190244413	0.08432536	-0.4675467	0	0	0	0	1	1	0	2
s cross	0.4753077	0.183181089	0.08983528	-0.0906235	0	0	0	1	0	1	0	2
claz	0.823718397	0.247851003	0.09286953	-0.4295015	0	0	0	1	0	1	0	2
claz	0.4753077	0.210601719	0.09319463	0.13980541	0	0	0	1	0	1	0	2
alto 800	1.168329094	0.078796502	0.035544	-0.896708	0	0	0	0	1	1	0	1
claz	0.4753077	0.193409762	0.10901609	0.16197798	0	0	0	1	0	1	0	2
claz	0.4753077	0.212034384	0.10424794	-0.5053257	1	0	0	0	1	1	0	2
ertiga	0.4753077	0.171919771	0.08008236	-0.2819629	0	0	0	0	1	1	0	2
dzire	-1.60315448	0.061604585	0.07466407	1.04269615	0	0	0	0	1	1	0	1
ertiga	0.823718397	0.219287708	0.11345904	0.1599105	0	0	0	1	0	1	0	2
ertiga	0.4753077	0.20487106	0.11345904	0.12185785	0	0	0	1	0	1	0	2
ertiga	0.823718397	0.219197708	0.11345904	0.1599105	0	0	0	1	0	1	0	2
wagon r	0.4753077	0.09025788	0.05180051	-0.0372778	0	0	1	0	0	1	0	1
sw4	-1.25678578	0.073065903	0.08306024	0.11577886	0	0	0	0	1	1	0	1
alto k10	0.823718397	0.078796502	0.0393369	-0.3077413	0	0	0	0	1	1	0	1
lania	1.168329094	0.137533817	0.05840019	-0.889887	0	0	0	0	1	1	0	1