

Neural Networks & Deep Learning: ICP5

1. Implement Naïve Bayes method using scikit-learn library

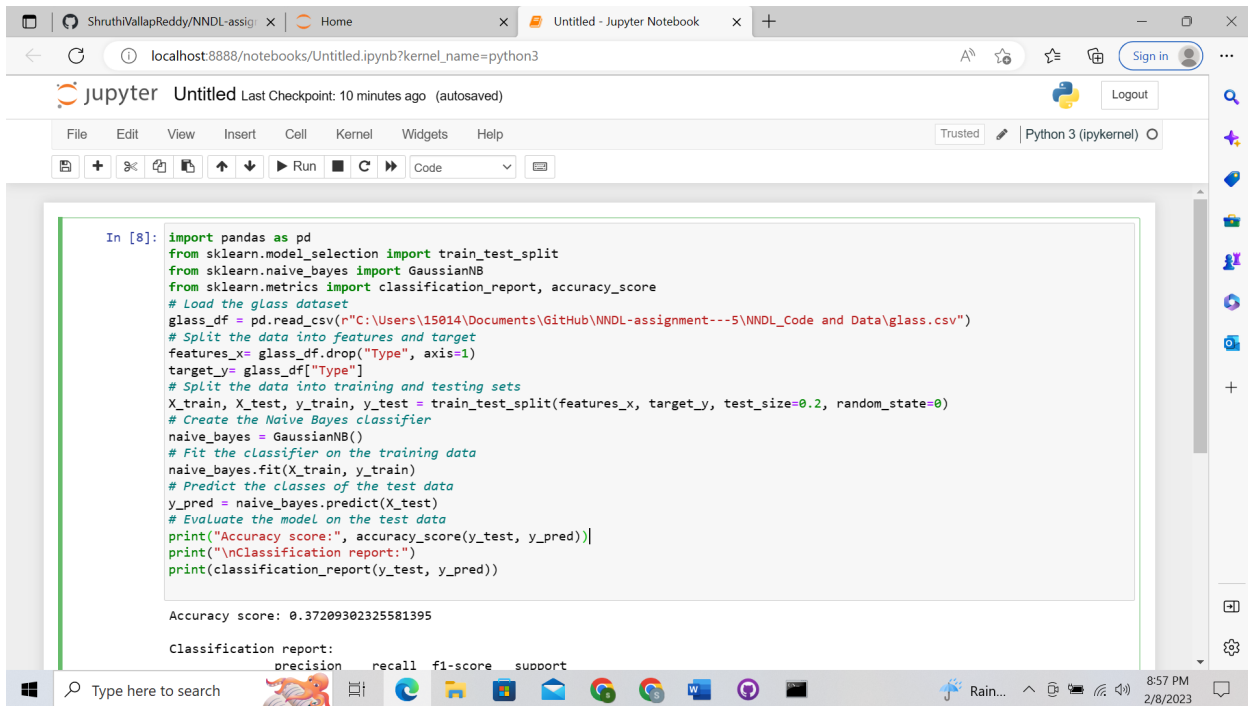
Use dataset available with name glass

Use `train_test_split` to create training and testing part

Evaluate the model on test part using score and

`classification_report(y_true, y_pred)`

Ans



```
In [8]: import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.naive_bayes import GaussianNB
from sklearn.metrics import classification_report, accuracy_score

# Load the glass dataset
glass_df = pd.read_csv(r"C:\Users\15014\Documents\GitHub\NNDL-assignment---5\NNDL_Code and Data\glass.csv")
# Split the data into features and target
features_x = glass_df.drop("Type", axis=1)
target_y = glass_df["Type"]
# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(features_x, target_y, test_size=0.2, random_state=0)
# Create the Naive Bayes classifier
naive_bayes = GaussianNB()
# Fit the classifier on the training data
naive_bayes.fit(X_train, y_train)
# Predict the classes of the test data
y_pred = naive_bayes.predict(X_test)
# Evaluate the model on the test data
print("Accuracy score:", accuracy_score(y_test, y_pred))
print("\nClassification report:")
print(classification_report(y_test, y_pred))

Accuracy score: 0.37209302325581395

Classification report:
              precision    recall  f1-score   support

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449             0.00         0.00         0.00         12
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451             0.00         0.00         0.00         12
452             0.00         0.00         0.00         12
453             0.00         0.00         0.00         12
454             0.00
```

ShruthiVallapReddy/NNDL-assig... xHome xUntitled - Jupyter Notebook x

localhost:8888/notebooks/Untitled.ipynb?kernel_name=python3

Sign in

jupyter

Untitled

Last Checkpoint: 17 minutes ago (autosaved)

Logout

FileEditViewInsertCellKernelWidgetsHelp

TrustedPython 3 (ipykernel)

Evaluate the model on the test data
print("Accuracy score:", accuracy_score(y_test, y_pred))
print("\nClassification report:")
print(classification_report(y_test, y_pred))

Accuracy score: 0.37209302325581395

Classification report:

	precision	recall	f1-score	support
1	0.19	0.44	0.27	9
2	0.33	0.16	0.21	19
3	0.33	0.20	0.25	5
5	0.00	0.00	0.00	2
6	0.67	1.00	0.80	2
7	1.00	1.00	1.00	6
accuracy			0.37	43
macro avg	0.42	0.47	0.42	43
weighted avg	0.40	0.37	0.36	43

In []:

Type here to search

Rain...

9:04 PM
2/8/2023

2. Implement linear SVM method using scikit library

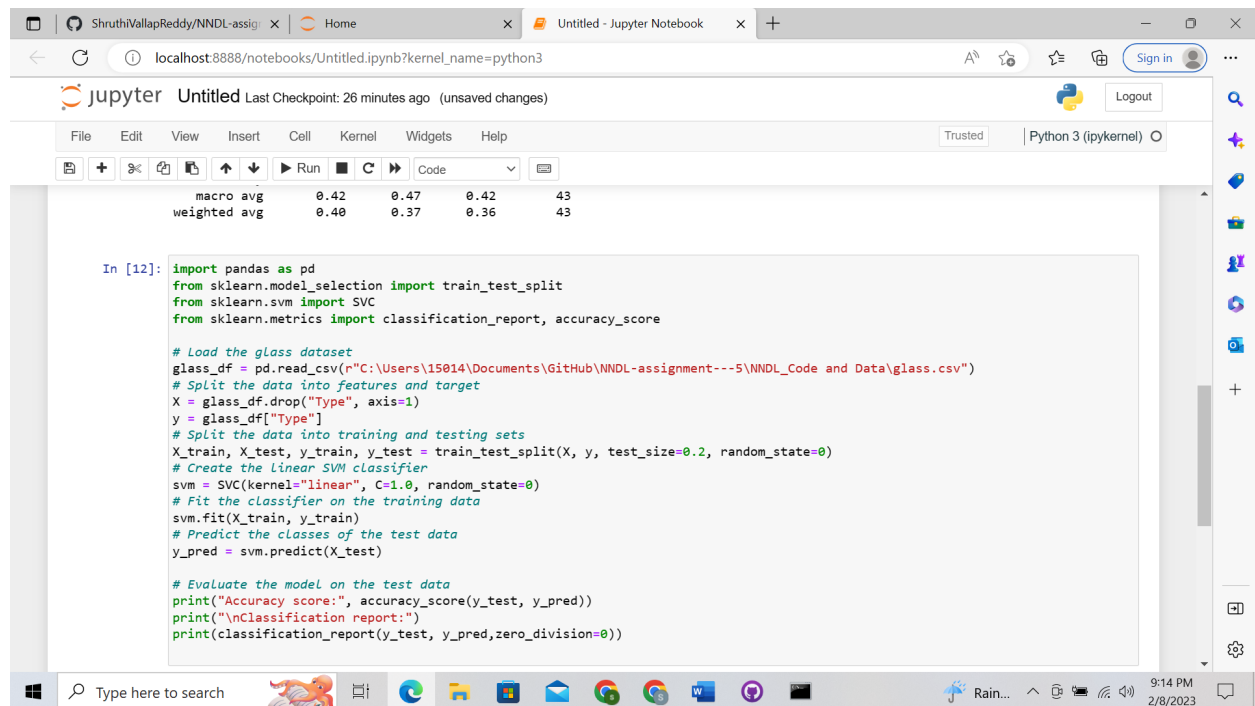
Use the same dataset above

Use train_test_split to create training and testing part

Evaluate the model on test part using score and

classification_report(y_true, y_pred)

Ans



The screenshot shows a Jupyter Notebook interface with a code cell containing the following Python code:

```
macro avg    0.42    0.47    0.42    43
weighted avg  0.40    0.37    0.36    43

In [12]: import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import classification_report, accuracy_score

# Load the glass dataset
glass_df = pd.read_csv(r"C:\Users\15014\Documents\GitHub\NNDL-assignment---5\NNDL_Code and Data\glass.csv")
# Split the data into features and target
X = glass_df.drop("Type", axis=1)
y = glass_df["Type"]
# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=0)
# Create the Linear SVM classifier
svm = SVC(kernel="linear", C=1.0, random_state=0)
# Fit the classifier on the training data
svm.fit(X_train, y_train)
# Predict the classes of the test data
y_pred = svm.predict(X_test)

# Evaluate the model on the test data
print("Accuracy score:", accuracy_score(y_test, y_pred))
print("\nClassification report:")
print(classification_report(y_test, y_pred, zero_division=0))
```

- 1) Load the glass dataset using `pd.read_csv()` function and store in the variable.
- 2) Split the data in to features and target using `drop()` function
- 3) Split the dataset into training and testing sets using `train_test_split()` function.
- 4) Created the Linear SVM classifier using `SVC(kernel="linear")`.
- 5) Fit the classifier on the training data using `fit()` function.
- 6) Predict the test data using `predict()` function.
- 7) Calculated the accuracy score using `accuracy_score()` function.
- 8) Generated the Classification report using `classification_report()` function.

The screenshot shows a Jupyter Notebook running on a local host. The code defines an SVM classifier with a linear kernel and evaluates it on test data. The output displays the accuracy score and a detailed classification report.

```
svm = SVC(kernel='linear', C=1.0, random_state=0)
# Fit the classifier on the training data
svm.fit(X_train, y_train)
# Predict the classes of the test data
y_pred = svm.predict(X_test)

# Evaluate the model on the test data
print("Accuracy score:", accuracy_score(y_test, y_pred))
print("\nClassification report:")
print(classification_report(y_test, y_pred, zero_division=0))
```

Accuracy score: 0.5116279069767442

Classification report:

	precision	recall	f1-score	support
1	0.36	0.89	0.52	9
2	0.58	0.37	0.45	19
3	0.00	0.00	0.00	5
5	0.50	0.50	0.50	2
6	0.00	0.00	0.00	2
7	0.86	1.00	0.92	6
accuracy			0.51	43
macro avg	0.38	0.46	0.40	43
weighted avg	0.48	0.51	0.46	43

Which algorithm you got better accuracy? Can you justify why?

Ans

- 1) Based on the accuracy scores , the linear SVM method has a better accuracy score compared to the Naive Bayes method.
- 2)The accuracy score of 0.51 for the linear SVM method indicates that it correctly predicted the target class for 51% of the instances in your data.
- 3) On the other hand, the accuracy score of 0.37 for the Naive Bayes method indicates that it correctly predicted the target class for only 37% of the instances in your data.

Git hub repo link : <https://github.com/ShruthiVallapReddy/NNDL-assignment---5.git>

