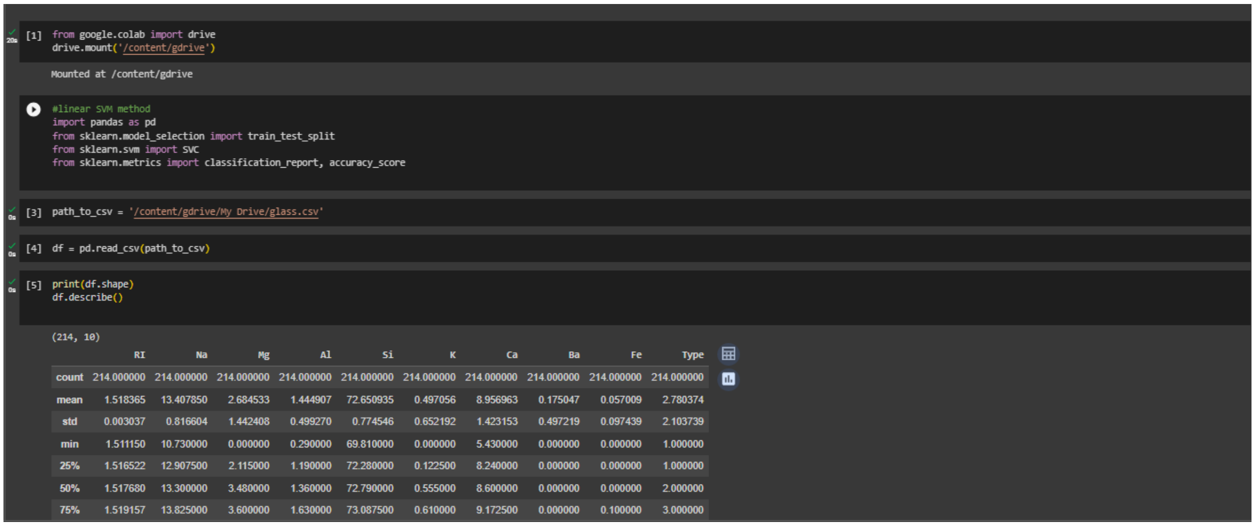
ICP 5 REPORT



```
[1] from google.colab import drive
    drive.mount('/content/gdrive')

    Mounted at /content/gdrive
```

```
#linear SVM method
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
```

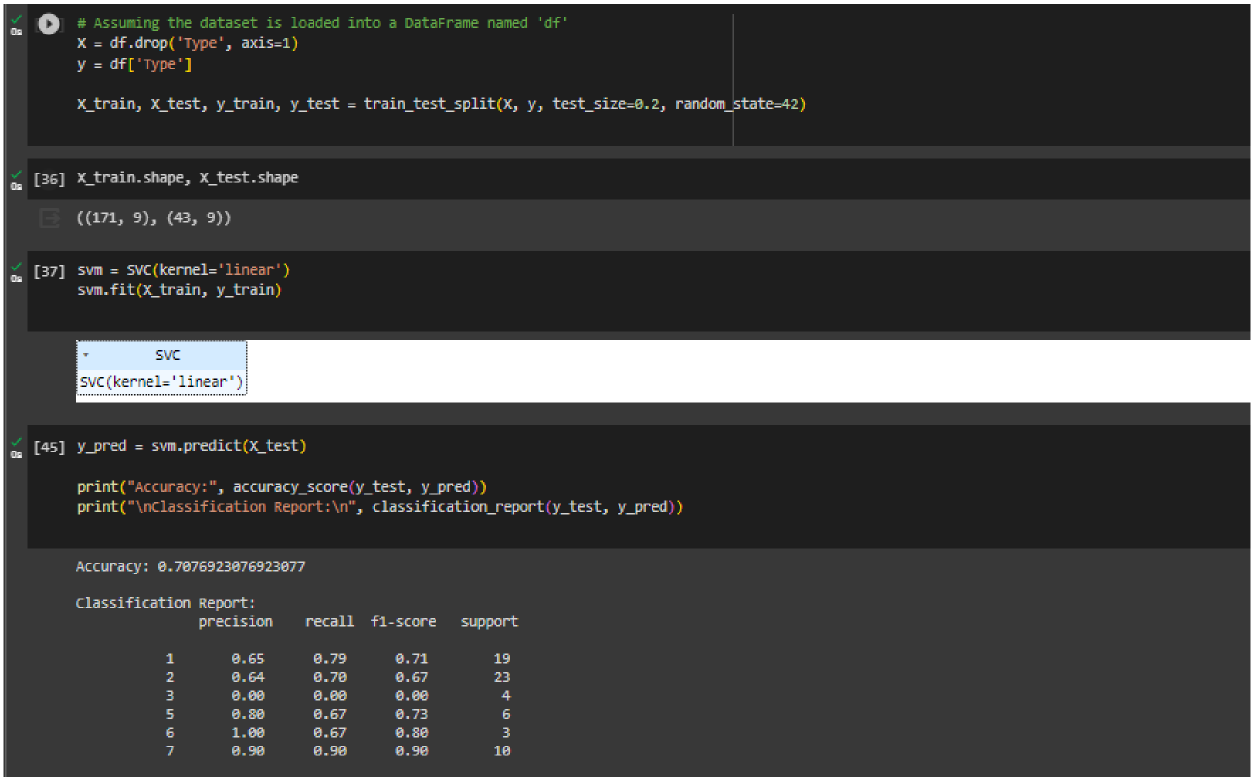
```
[3] path_to_csv = '/content/gdrive/My Drive/glass.csv'
```

```
[4] df = pd.read_csv(path_to_csv)
```

```
[5] print(df.shape)
    df.describe()

(214, 10)
```

	RI	Na	Mg	Al	Si	K	Ca	Ba	Fe	Type
count	214.000000	214.000000	214.000000	214.000000	214.000000	214.000000	214.000000	214.000000	214.000000	214.000000
mean	1.518365	13.407850	2.684533	1.444907	72.650935	0.497056	8.956963	0.175047	0.057009	2.780374
std	0.003037	0.816604	1.442408	0.499270	0.774546	0.652192	1.423153	0.497219	0.097439	2.103739
min	1.511150	10.730000	0.000000	0.290000	69.810000	0.000000	5.430000	0.000000	0.000000	1.000000
25%	1.516522	12.907500	2.115000	1.190000	72.280000	0.122500	8.240000	0.000000	0.000000	1.000000
50%	1.517680	13.300000	3.480000	1.360000	72.790000	0.555000	8.600000	0.000000	0.000000	2.000000
75%	1.519157	13.825000	3.600000	1.630000	73.087500	0.610000	9.172500	0.000000	0.100000	3.000000



```
# Assuming the dataset is loaded into a DataFrame named 'df'
X = df.drop('Type', axis=1)
y = df['Type']

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

```
[36] X_train.shape, X_test.shape

     ((171, 9), (43, 9))
```

```
[37] svm = SVC(kernel='linear')
     svm.fit(X_train, y_train)

     SVC
     SVC(kernel='linear')
```

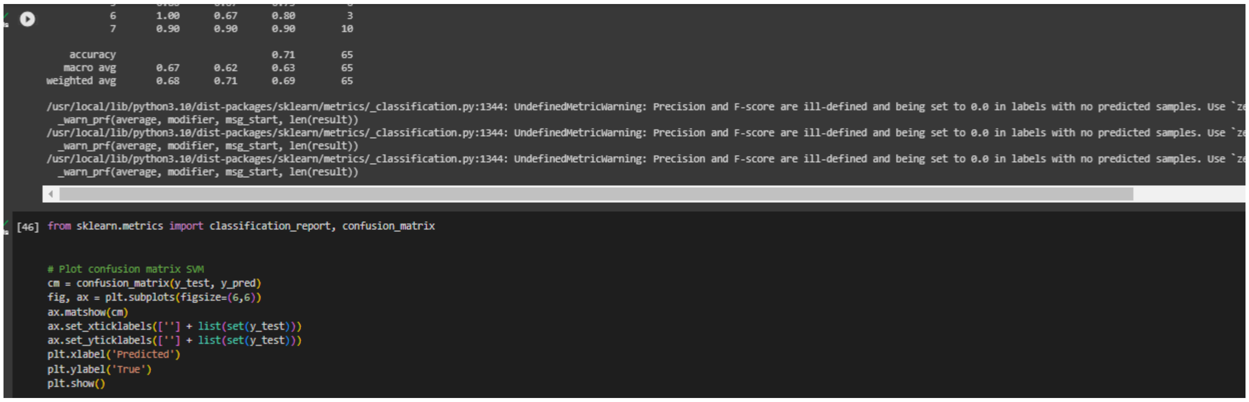
```
[45] y_pred = svm.predict(X_test)

     print("Accuracy:", accuracy_score(y_test, y_pred))
     print("\nClassification Report:\n", classification_report(y_test, y_pred))

     Accuracy: 0.7076923076923077

     Classification Report:
                    precision    recall  f1-score   support

                1       0.65      0.79      0.71        19
                2       0.64      0.70      0.67        23
                3       0.00      0.00      0.00         4
                5       0.80      0.67      0.73         6
                6       1.00      0.67      0.80         3
                7       0.90      0.90      0.90        10
```



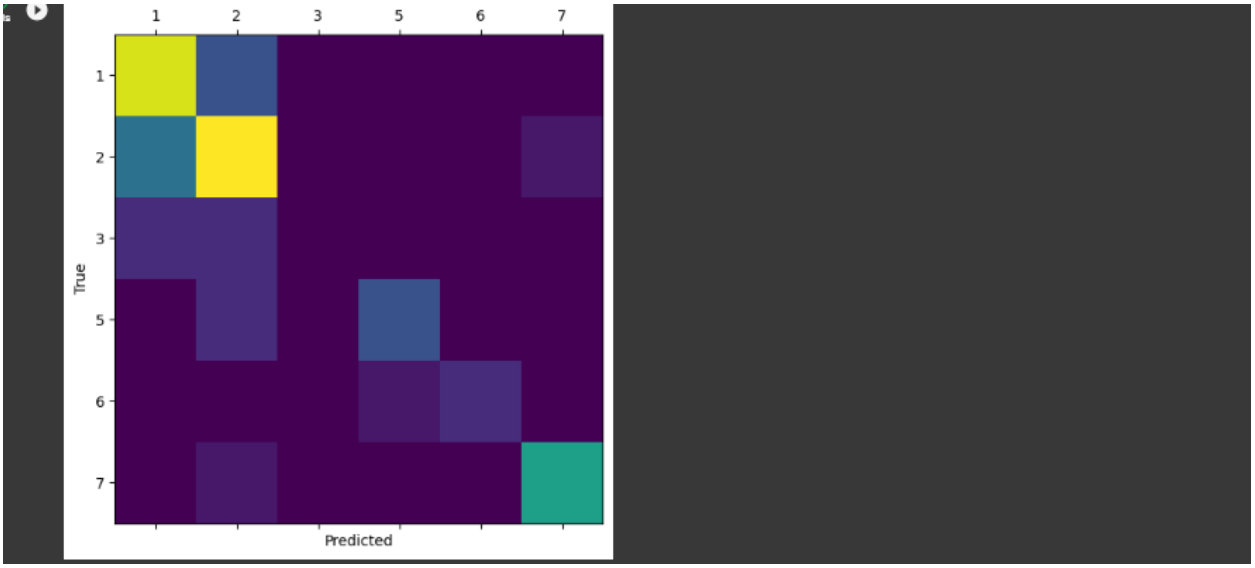
```
           6       1.00      0.67      0.80         3
           7       0.90      0.90      0.90        10

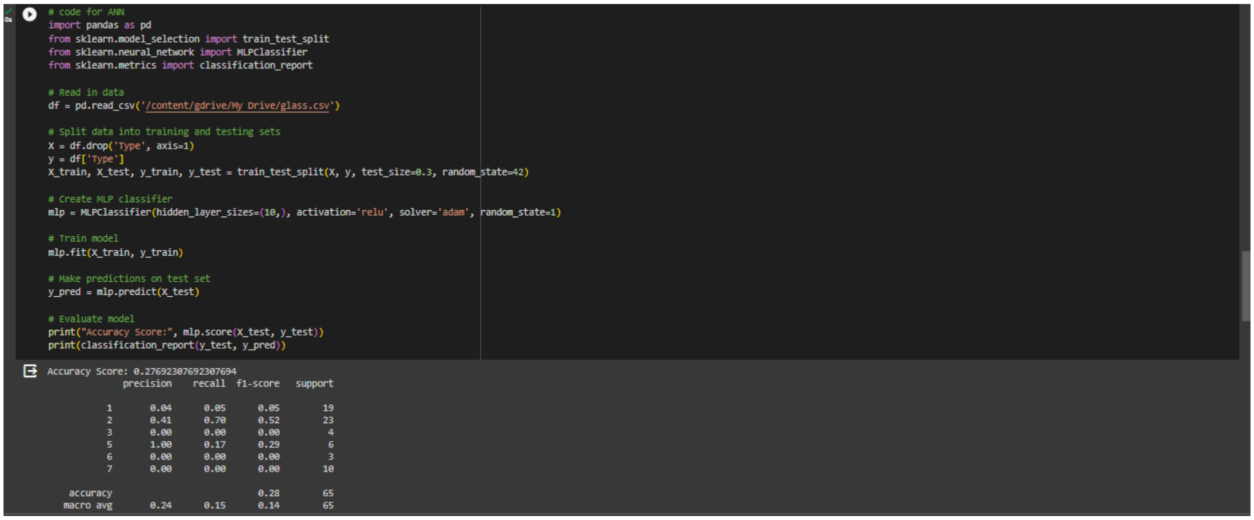
    accuracy                           0.71        65
   macro avg       0.67      0.62      0.63        65
weighted avg       0.68      0.71      0.69        65

/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1344: UndefinedMetricWarning: Precision and F-score are ill-defined and being set to 0.0 in labels with no predicted samples. Use `ze
  _warn_prf(average, modifier, msg_start, len(result))
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1344: UndefinedMetricWarning: Precision and F-score are ill-defined and being set to 0.0 in labels with no predicted samples. Use `ze
  _warn_prf(average, modifier, msg_start, len(result))
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1344: UndefinedMetricWarning: Precision and F-score are ill-defined and being set to 0.0 in labels with no predicted samples. Use `ze
  _warn_prf(average, modifier, msg_start, len(result))
```

```
[46] from sklearn.metrics import classification_report, confusion_matrix


     # Plot confusion matrix SVM
     cm = confusion_matrix(y_test, y_pred)
     fig, ax = plt.subplots(figsize=(6,6))
     ax.matshow(cm)
     ax.set_xticklabels([''] + list(set(y_test)))
     ax.set_yticklabels([''] + list(set(y_test)))
     plt.xlabel('Predicted')
     plt.ylabel('True')
     plt.show()
```





```
# code for ANN
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.neural_network import MLPClassifier
from sklearn.metrics import classification_report

# Read in data
df = pd.read_csv('/content/gdrive/My Drive/glass.csv')

# Split data into training and testing sets
X = df.drop('Type', axis=1)
y = df['Type']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)

# Create MLP classifier
mlp = MLPClassifier(hidden_layer_sizes=(10,), activation='relu', solver='adam', random_state=1)

# Train model
mlp.fit(X_train, y_train)

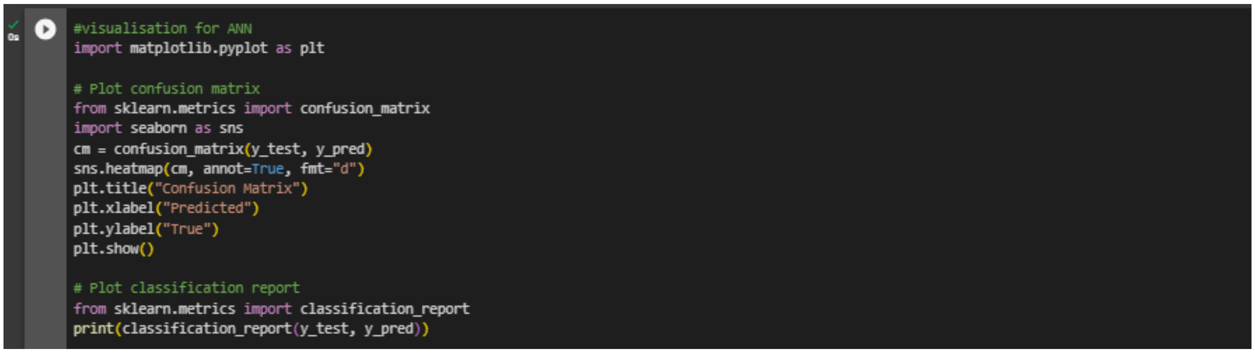
# Make predictions on test set
y_pred = mlp.predict(X_test)

# Evaluate model
print("Accuracy Score:", mlp.score(X_test, y_test))
print(classification_report(y_test, y_pred))
```

```
Accuracy Score: 0.27692307692307694
              precision    recall  f1-score   support

           1       0.04      0.05      0.05        19
           2       0.41      0.70      0.52        23
           3       0.00      0.00      0.00         4
           5       1.00      0.17      0.29         6
           6       0.00      0.00      0.00         3
           7       0.00      0.00      0.00        10

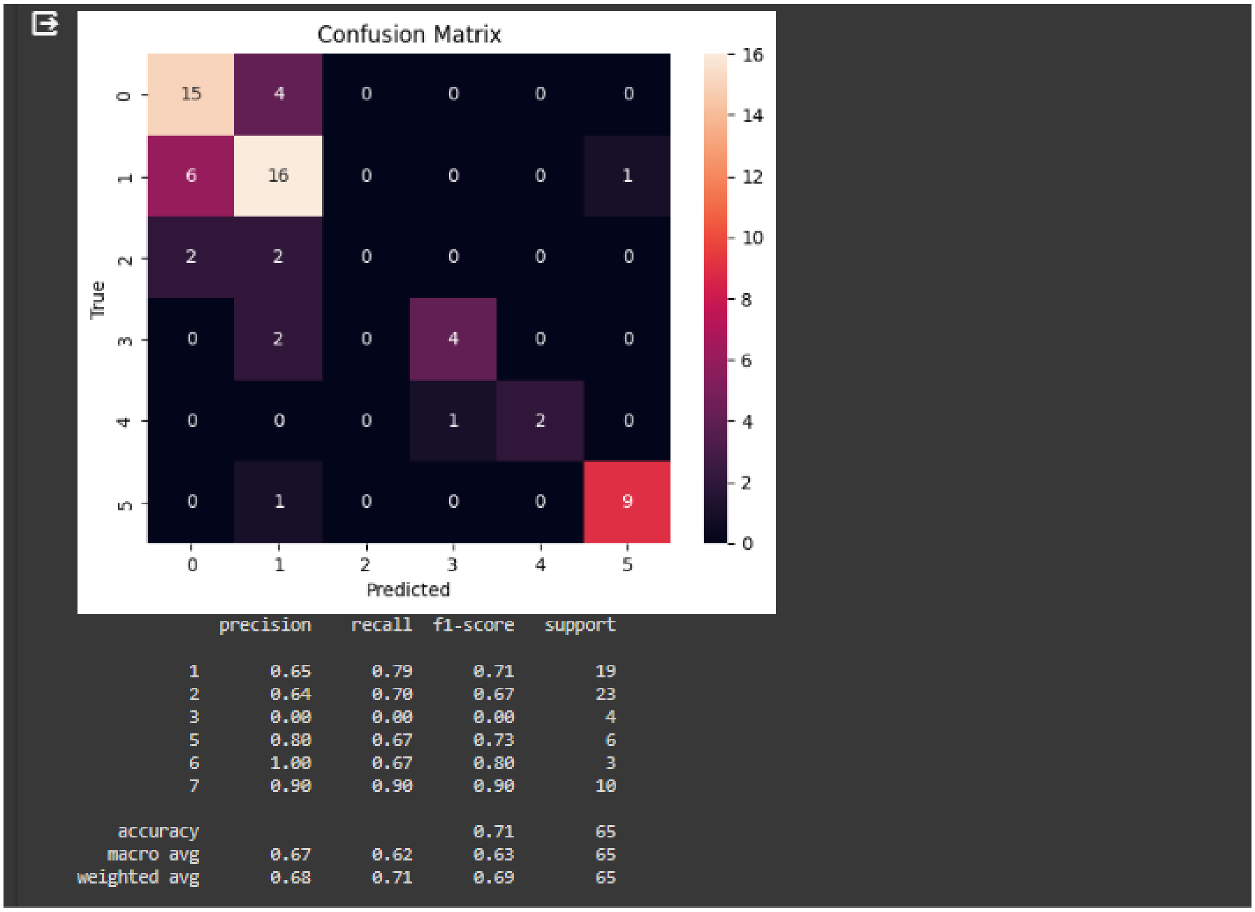
    accuracy                           0.28        65
   macro avg       0.24      0.15      0.14        65
```



```
#visualisation for ANN
import matplotlib.pyplot as plt

# Plot confusion matrix
from sklearn.metrics import confusion_matrix
import seaborn as sns
cm = confusion_matrix(y_test, y_pred)
sns.heatmap(cm, annot=True, fmt="d")
plt.title("Confusion Matrix")
plt.xlabel("Predicted")
plt.ylabel("True")
plt.show()

# Plot classification report
from sklearn.metrics import classification_report
print(classification_report(y_test, y_pred))
```



Confusion Matrix

True \ Predicted	0	1	2	3	4	5
0	15	4	0	0	0	0
1	6	16	0	0	0	1
2	2	2	0	0	0	0
3	0	2	0	4	0	0
4	0	0	0	1	2	0
5	0	1	0	0	0	9

```
              precision    recall  f1-score   support

           1       0.65      0.79      0.71        19
           2       0.64      0.70      0.67        23
           3       0.00      0.00      0.00         4
           5       0.80      0.67      0.73         6
           6       1.00      0.67      0.80         3
           7       0.90      0.90      0.90        10

    accuracy                           0.71        65
   macro avg       0.67      0.62      0.63        65
weighted avg       0.68      0.71      0.69        65
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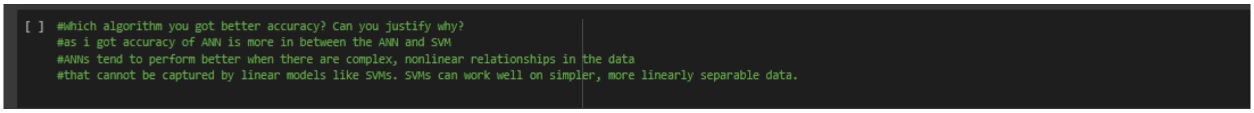

```
[ ] #Which algorithm you got better accuracy? Can you justify why?
    #as i got accuracy of ANN is more in between the ANN and SVM
    #ANNs tend to perform better when there are complex, nonlinear relationships in the data
    #that cannot be captured by linear models like SVMs. SVMs can work well on simpler, more linearly separable data.
```

GITHUB REPO LINK:- https://github.com/sxk7912/Bigdata

YOUTUBE LINK:- https://youtu.be/og4icxa8m24