DATA SCIENCE CAT 2

Scenario 1

Assignment Data Science.ipynb

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```
from sklearn.model_selection import train_test_split
from sklearn.ensemble import GradientBoostingClassifier
from sklearn.metrics import accuracy_score, classification_report
import numpy as np

lee = 100
e = 10

X = np.random.rand(lee, 10)
y = np.random.randint(0, e, 100)

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

model = GradientBoostingClassifier(n_estimators=100, random_state=42)
model.fit(X_train, y_train)

predictions = model.predict(X_test)

accuracy = accuracy_score(y_test, predictions)
print(f"Accuracy: {accuracy}")

print(classification_report(y_test, predictions))
```

Code

```
Accuracy: 0.2
              precision    recall  f1-score   support

           0       0.50      0.25      0.33         4
           1       0.00      0.00      0.00         0
           2       0.00      0.00      0.00         2
           3       0.00      0.00      0.00         2
           4       0.00      0.00      0.00         1
           5       0.00      0.00      0.00         0
           6       0.33      0.25      0.29         4
           7       0.00      0.00      0.00         2
           8       0.17      0.50      0.25         2
           9       0.33      0.33      0.33         3

    accuracy                           0.20        20
   macro avg       0.13      0.13      0.12        20
weighted avg       0.23      0.20      0.20        20
```

Output

Scenario 2

Assignment.ipynb

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RAM Disk

```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, classification_report

np.random.seed(42)

num_students = 1000

data = {
    'GPA': np.random.uniform(1, 4, num_students),
        'Age': np.random.randint(18, 25, num_students),
            'Ethnicity': np.random.choice(['Asian', 'Black', 'Hispanic', 'White'], num_students),
                'Attendance': np.random.randint(0, 100, num_students),
                    'Participation': np.random.randint(0, 10, num_students),
                        'Socioeconomic_Status': np.random.choice(['Low', 'Middle', 'High'], num_students),
                            'Enrollment_Status': np.random.choice([0, 1], num_students)  # Simulating enrollment status (0 or 1)
                            }

df = pd.DataFrame(data)

features = df[['GPA', 'Age', 'Ethnicity', 'Attendance', 'Participation', 'Socioeconomic_Status']]
target = df['Enrollment_Status']

features_encoded = pd.get_dummies(features)

X_train, X_test, y_train, y_test = train_test_split(features_encoded, target, test_size=0.2, random_state=42)

model = RandomForestClassifier(n_estimators=100, random_state=42)
model.fit(X_train, y_train)

predictions = model.predict(X_test)

accuracy = accuracy_score(y_test, predictions)
print(f"Accuracy: {accuracy}")

print(classification_report(y_test, predictions))
```

Code

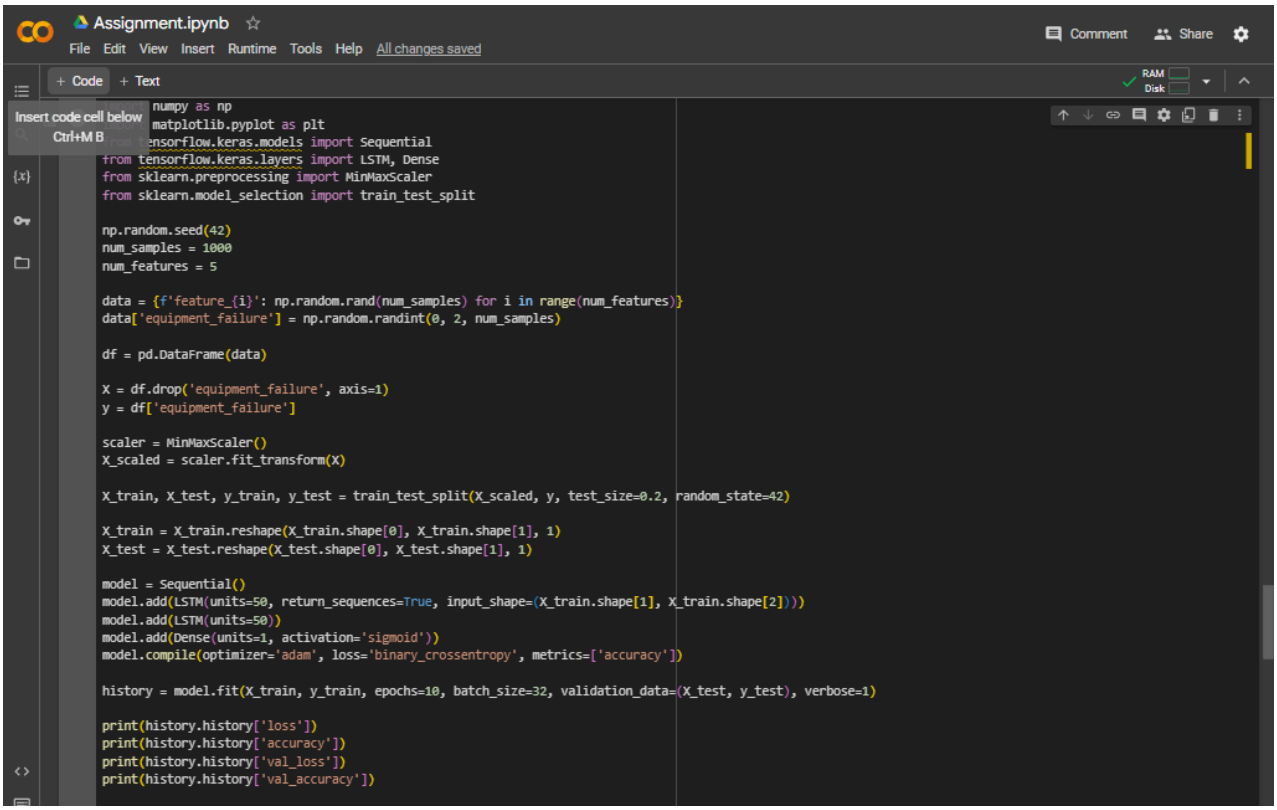
```
Accuracy: 0.485
              precision    recall  f1-score   support

           0       0.48      0.61      0.54        99
           1       0.49      0.37      0.42       101

    accuracy                           0.48       200
   macro avg       0.49      0.49      0.48       200
weighted avg       0.49      0.48      0.48       200
```

Output

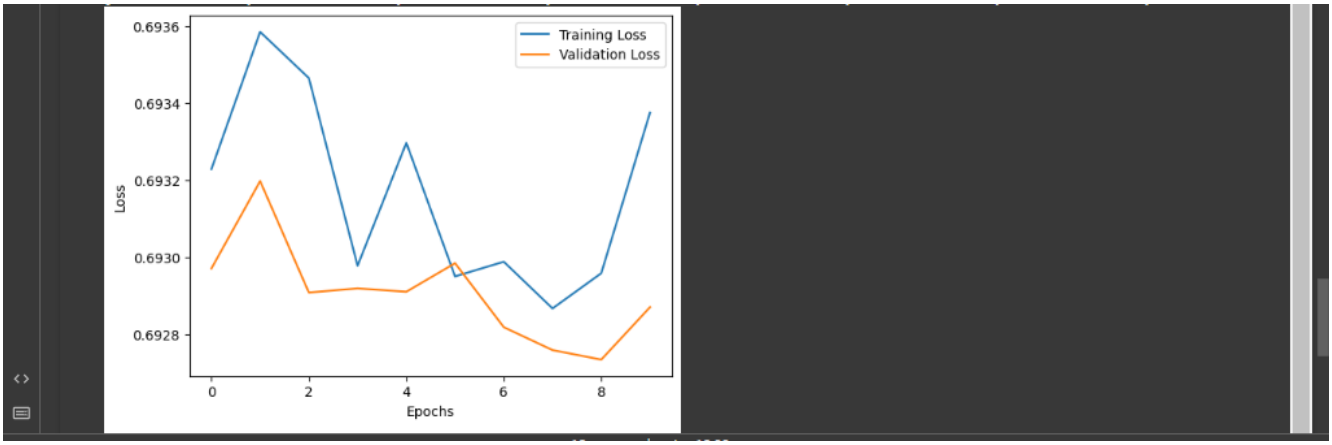
Scenario 3

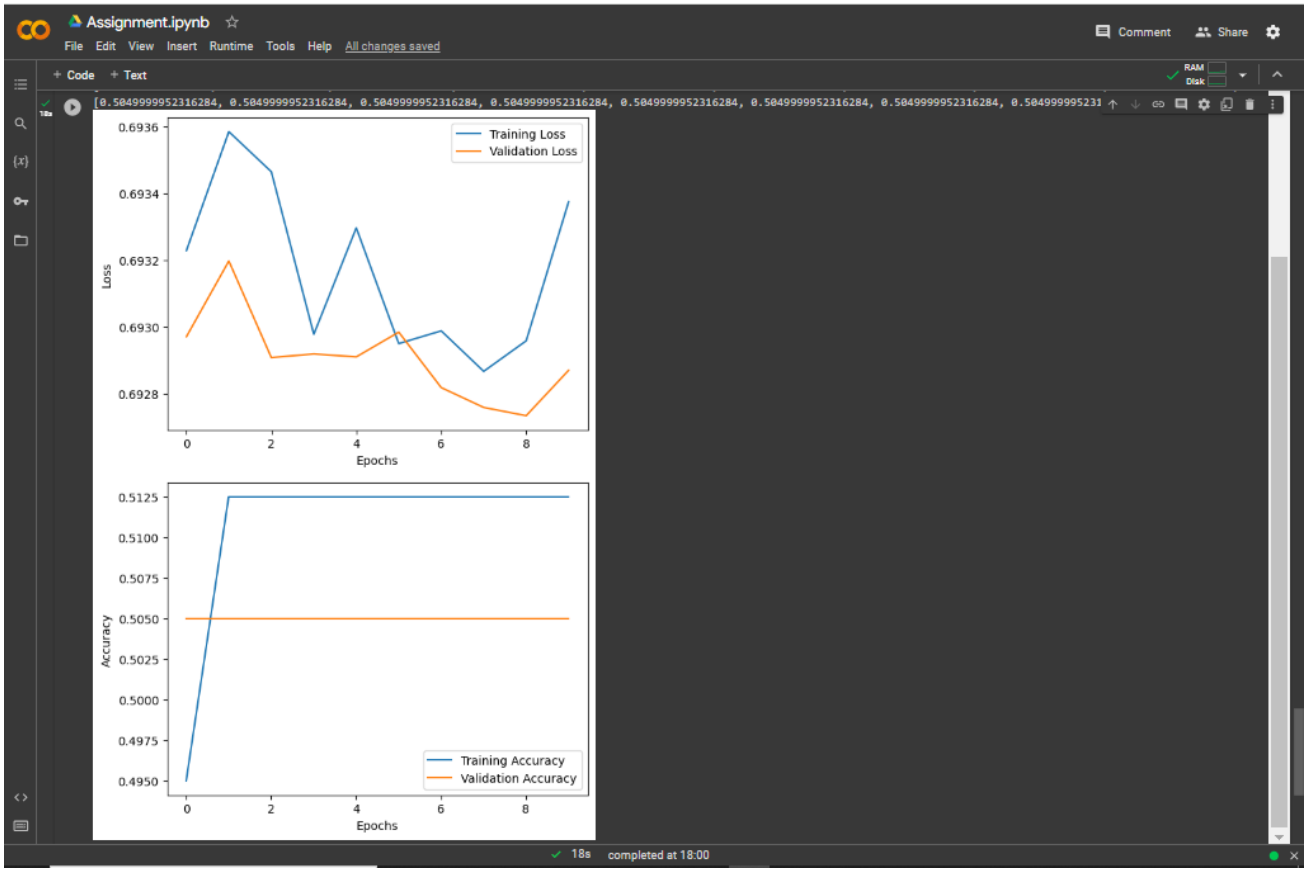



```
plt.plot(history.history['loss'], label='Training Loss')
plt.plot(history.history['val_loss'], label='Validation Loss')
plt.xlabel('Epochs')
plt.ylabel('Loss')
plt.legend()
plt.show()

plt.plot(history.history['accuracy'], label='Training Accuracy')
plt.plot(history.history['val_accuracy'], label='Validation Accuracy')
plt.xlabel('Epochs')
plt.ylabel('Accuracy')
plt.legend()
plt.show()
```

Code





Output

GITHUB LINK: https://github.com/TrevorBrian430/Data-Science