**RESULT**

**RESULT**

**Result:1**

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**Result:2**

# Column Non-Null Count Dtype

--- ------ -------------- -----

0 customerID 7043 non-null object

1 gender 7043 non-null object

2 SeniorCitizen 7043 non-null int64

3 Partner 7043 non-null object

4 Dependents 7043 non-null object

5 tenure 7043 non-null int64

6 PhoneService 7043 non-null object

7 MultipleLines 7043 non-null object

8 InternetService 7043 non-null object

9 OnlineSecurity 7043 non-null object

10 OnlineBackup 7043 non-null object

11 DeviceProtection 7043 non-null object

12 TechSupport 7043 non-null object

13 StreamingTV 7043 non-null object

14 StreamingMovies 7043 non-null object

15 Contract 7043 non-null object

16 PaperlessBilling 7043 non-null object

17 PaymentMethod 7043 non-null object

18 MonthlyCharges 7043 non-null float64

19 TotalCharges 7043 non-null object

20 Churn 7043 non-null object

dtypes: float64(1), int64(2), object(18)

memory usage: 1.1+ MB

**Result:3**

customerID False

gender False

SeniorCitizen False

Partner False

Dependents False

tenure False

PhoneService False

MultipleLines False

InternetService False

OnlineSecurity False

OnlineBackup False

DeviceProtection False

TechSupport False

StreamingTV False

StreamingMovies False

Contract False

PaperlessBilling False

PaymentMethod False

MonthlyCharges False

TotalCharges True

Churn False

dtype: bool

**Result:4**

 gender              0

    SeniorCitizen       0

    Partner             0

    Dependents          0

    tenure              0

    PhoneService        0

    MultipleLines       0

    InternetService     0

    OnlineSecurity      0

    OnlineBackup        0

    DeviceProtection    0

    TechSupport         0

    StreamingTV         0

    StreamingMovies     0

    Contract            0

    PaperlessBilling    0

    PaymentMethod       0

    MonthlyCharges      0

    TotalCharges        0

    Churn               0

    dtype: int64

**Result:5**

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**Result:6**

array([[0.00000e+00, 0.00000e+00, 1.00000e+00, ..., 2.00000e+00,

            2.98500e+01, 2.98500e+01],

           [1.00000e+00, 0.00000e+00, 0.00000e+00, ..., 3.00000e+00,

            5.69500e+01, 1.88950e+03],

           [1.00000e+00, 0.00000e+00, 0.00000e+00, ..., 3.00000e+00,

            5.38500e+01, 1.08150e+02],

           ...,

           [1.00000e+00, 0.00000e+00, 1.00000e+00, ..., 3.00000e+00,

            9.66500e+01, 1.16285e+03],

           [0.00000e+00, 0.00000e+00, 0.00000e+00, ..., 2.00000e+00,

            4.03500e+01, 1.67785e+03],

           [0.00000e+00, 0.00000e+00, 0.00000e+00, ..., 2.00000e+00,

            1.88500e+01, 1.88500e+01]])

**Result:7**

array([[0],

           [0],

           [1],

           ...,

           [0],

           [1],

           [0]])

**Result:8**

array([[0.00000000e+00, 1.00000000e+00, 0.00000000e+00, ...,

            1.00000000e+00, 2.98500000e+01, 2.98500000e+01],

           [1.00000000e+00, 0.00000000e+00, 0.00000000e+00, ...,

            0.00000000e+00, 5.69500000e+01, 1.88950000e+03],

           [1.00000000e+00, 0.00000000e+00, 0.00000000e+00, ...,

            1.00000000e+00, 5.38500000e+01, 1.08150000e+02],

           ...,

           [0.00000000e+00, 0.00000000e+00, 1.00000000e+00, ...,

            1.00000000e+00, 8.38882223e+01, 2.02727523e+02],

           [1.00000000e+00, 0.00000000e+00, 0.00000000e+00, ...,

            1.00000000e+00, 4.56651578e+01, 4.56651578e+01],

           [1.00000000e+00, 0.00000000e+00, 0.00000000e+00, ...,

            1.00000000e+00, 7.63709751e+01, 1.42031260e+02]])

**Result:9**

 array([0, 0, 1, ..., 1, 1, 1])

 ((1152, 40), (1704, 40))

 ((1152, 1), (1704,))

**Result:10**

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**Result:11**

￼

**Result:12**

￼

**Result:13**

￼

**Result:14**

￼

**Result:15**

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**Result:16**

    (1363, 40)

**Result:17**

Accuracy Score : 0.8202494497432135

    Accuracy Test : 0.7419354838709677

    Logistic Regression

    Confusion Matrix

    [[116  41]

     [ 47 137]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.71      0.74      0.72       157

               1       0.77      0.74      0.76       184

        accuracy                           0.74       341

       macro avg       0.74      0.74      0.74       341

    weighted avg       0.74      0.74      0.74       341

**Result:18**

Accuracy Score : 1.0

    Accuracy Test : 0.7624633431085044

    Decsion Tree

    Confusion Matrix

    [[100  57]

     [ 24 160]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.81      0.64      0.71       157

               1       0.74      0.87      0.80       184

        accuracy                           0.76       341

       macro avg       0.77      0.75      0.75       341

    weighted avg       0.77      0.76      0.76       341

**Result:19**

    Accuracy Score : 0.9926632428466617

    Accuracy Test : 0.8035190615835777

    Random Forest

    Confusion Matrix

    [[108  49]

     [ 18 166]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.86      0.69      0.76       157

               1       0.77      0.90      0.83       184

        accuracy                           0.80       341

       macro avg       0.81      0.80      0.80       341

    weighted avg       0.81      0.80      0.80       341

**Result:20**

 Accuracy Score : 0.8459280997798972

    Accuracy Test : 0.7800586510263929

    KNN

    Confusion Matrix

    [[ 98  59]

     [ 16 168]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.86      0.62      0.72       157

               1       0.74      0.91      0.82       184

        accuracy                           0.78       341

       macro avg       0.80      0.77      0.77       341

    weighted avg       0.80      0.78      0.77       341

**Result:21**

Accuracy Score : 0.8459280997798972

    Accuracy Test : 0.7800586510263929

    SVM

    Confusion Matrix

    [[ 98  59]

     [ 16 168]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.86      0.62      0.72       157

               1       0.74      0.91      0.82       184

        accuracy                           0.78       341

       macro avg       0.80      0.77      0.77       341

    weighted avg       0.80      0.78      0.77       341

**Result:22**

Stream

    Epoch 1/200

    92/92 [==============================] - 2s 7ms/step - loss: 0.5555 - accuracy: 0.7306 - val\_loss: 0.4308 - val\_accuracy: 0.8244

    Epoch 2/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.4423 - accuracy: 0.7930 - val\_loss: 0.4006 - val\_accuracy: 0.8378

    Epoch 3/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.4167 - accuracy: 0.8171 - val\_loss: 0.3878 - val\_accuracy: 0.8467

    Epoch 4/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.4001 - accuracy: 0.8291 - val\_loss: 0.3837 - val\_accuracy: 0.8511

    Epoch 5/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.3856 - accuracy: 0.8313 - val\_loss: 0.3774 - val\_accuracy: 0.8444

    Epoch 6/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.3736 - accuracy: 0.8379 - val\_loss: 0.3737 - val\_accuracy: 0.8511

    Epoch 7/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.3634 - accuracy: 0.8456 - val\_loss: 0.3697 - val\_accuracy: 0.8467

    Epoch 8/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.3542 - accuracy: 0.8434 - val\_loss: 0.3693 - val\_accuracy: 0.8378

    Epoch 9/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.3450 - accuracy: 0.8554 - val\_loss: 0.3602 - val\_accuracy: 0.8489

    Epoch 10/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.3333 - accuracy: 0.8642 - val\_loss: 0.3605 - val\_accuracy: 0.8511

    Epoch 11/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.3196 - accuracy: 0.8751 - val\_loss: 0.3667 - val\_accuracy: 0.8511

    Epoch 12/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.3127 - accuracy: 0.8784 - val\_loss: 0.3543 - val\_accuracy: 0.8489

    Epoch 13/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.3015 - accuracy: 0.8806 - val\_loss: 0.3545 - val\_accuracy: 0.8378

    Epoch 14/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2925 - accuracy: 0.8839 - val\_loss: 0.3524 - val\_accuracy: 0.8578

    Epoch 15/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2849 - accuracy: 0.8905 - val\_loss: 0.3544 - val\_accuracy: 0.8489

    Epoch 16/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2736 - accuracy: 0.8970 - val\_loss: 0.3534 - val\_accuracy: 0.8578

    Epoch 17/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2621 - accuracy: 0.8959 - val\_loss: 0.3618 - val\_accuracy: 0.8622

    Epoch 18/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2552 - accuracy: 0.9014 - val\_loss: 0.3680 - val\_accuracy: 0.8533

    Epoch 19/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2465 - accuracy: 0.9168 - val\_loss: 0.3618 - val\_accuracy: 0.8533

    Epoch 20/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2372 - accuracy: 0.9080 - val\_loss: 0.3574 - val\_accuracy: 0.8578

    Epoch 21/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2274 - accuracy: 0.9146 - val\_loss: 0.3772 - val\_accuracy: 0.8533

    Epoch 22/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2187 - accuracy: 0.9168 - val\_loss: 0.3668 - val\_accuracy: 0.8644

    Epoch 23/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2079 - accuracy: 0.9332 - val\_loss: 0.3649 - val\_accuracy: 0.8556

    Epoch 24/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2040 - accuracy: 0.9310 - val\_loss: 0.3851 - val\_accuracy: 0.8533

    Epoch 25/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.2029 - accuracy: 0.9244 - val\_loss: 0.3688 - val\_accuracy: 0.8622

    Epoch 26/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1883 - accuracy: 0.9376 - val\_loss: 0.3770 - val\_accuracy: 0.8644

    Epoch 27/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1811 - accuracy: 0.9343 - val\_loss: 0.3823 - val\_accuracy: 0.8622

    Epoch 28/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1759 - accuracy: 0.9365 - val\_loss: 0.3932 - val\_accuracy: 0.8622

    Epoch 29/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.1684 - accuracy: 0.9387 - val\_loss: 0.3924 - val\_accuracy: 0.8667

    Epoch 30/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1718 - accuracy: 0.9398 - val\_loss: 0.4008 - val\_accuracy: 0.8467

    Epoch 31/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1559 - accuracy: 0.9518 - val\_loss: 0.3981 - val\_accuracy: 0.8556

    Epoch 32/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1553 - accuracy: 0.9441 - val\_loss: 0.4027 - val\_accuracy: 0.8489

    Epoch 33/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1511 - accuracy: 0.9485 - val\_loss: 0.3983 - val\_accuracy: 0.8644

    Epoch 34/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1416 - accuracy: 0.9562 - val\_loss: 0.4065 - val\_accuracy: 0.8644

    Epoch 35/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1362 - accuracy: 0.9540 - val\_loss: 0.4120 - val\_accuracy: 0.8533

    Epoch 36/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1353 - accuracy: 0.9595 - val\_loss: 0.3978 - val\_accuracy: 0.8556

    Epoch 37/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1369 - accuracy: 0.9518 - val\_loss: 0.4189 - val\_accuracy: 0.8467

    Epoch 38/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1257 - accuracy: 0.9628 - val\_loss: 0.4193 - val\_accuracy: 0.8600

    Epoch 39/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1223 - accuracy: 0.9617 - val\_loss: 0.4295 - val\_accuracy: 0.8489

    Epoch 40/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1157 - accuracy: 0.9650 - val\_loss: 0.4323 - val\_accuracy: 0.8444

    Epoch 41/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1132 - accuracy: 0.9650 - val\_loss: 0.4461 - val\_accuracy: 0.8444

    Epoch 42/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1083 - accuracy: 0.9682 - val\_loss: 0.4446 - val\_accuracy: 0.8511

    Epoch 43/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1157 - accuracy: 0.9606 - val\_loss: 0.4404 - val\_accuracy: 0.8422

    Epoch 44/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.1045 - accuracy: 0.9715 - val\_loss: 0.4454 - val\_accuracy: 0.8444

    Epoch 45/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0983 - accuracy: 0.9759 - val\_loss: 0.4465 - val\_accuracy: 0.8444

    Epoch 46/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0969 - accuracy: 0.9693 - val\_loss: 0.4520 - val\_accuracy: 0.8622

    Epoch 47/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0953 - accuracy: 0.9704 - val\_loss: 0.4778 - val\_accuracy: 0.8333

    Epoch 48/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0950 - accuracy: 0.9704 - val\_loss: 0.4763 - val\_accuracy: 0.8467

    Epoch 49/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0893 - accuracy: 0.9748 - val\_loss: 0.4503 - val\_accuracy: 0.8489

    Epoch 50/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0871 - accuracy: 0.9715 - val\_loss: 0.4697 - val\_accuracy: 0.8467

    Epoch 51/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0867 - accuracy: 0.9748 - val\_loss: 0.4836 - val\_accuracy: 0.8556

    Epoch 52/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0839 - accuracy: 0.9748 - val\_loss: 0.4742 - val\_accuracy: 0.8622

    Epoch 53/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0819 - accuracy: 0.9759 - val\_loss: 0.4758 - val\_accuracy: 0.8422

    Epoch 54/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0741 - accuracy: 0.9792 - val\_loss: 0.4917 - val\_accuracy: 0.8467

    Epoch 55/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0754 - accuracy: 0.9803 - val\_loss: 0.4906 - val\_accuracy: 0.8400

    Epoch 56/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0721 - accuracy: 0.9803 - val\_loss: 0.4886 - val\_accuracy: 0.8578

    Epoch 57/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0670 - accuracy: 0.9781 - val\_loss: 0.5004 - val\_accuracy: 0.8467

    Epoch 58/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0705 - accuracy: 0.9770 - val\_loss: 0.5095 - val\_accuracy: 0.8578

    Epoch 59/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0667 - accuracy: 0.9814 - val\_loss: 0.4955 - val\_accuracy: 0.8533

    Epoch 60/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0650 - accuracy: 0.9781 - val\_loss: 0.4914 - val\_accuracy: 0.8622

    Epoch 61/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0647 - accuracy: 0.9814 - val\_loss: 0.4927 - val\_accuracy: 0.8533

    Epoch 62/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0597 - accuracy: 0.9825 - val\_loss: 0.4999 - val\_accuracy: 0.8533

    Epoch 63/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0622 - accuracy: 0.9847 - val\_loss: 0.5012 - val\_accuracy: 0.8556

    Epoch 64/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0569 - accuracy: 0.9792 - val\_loss: 0.5200 - val\_accuracy: 0.8644

    Epoch 65/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0598 - accuracy: 0.9836 - val\_loss: 0.5220 - val\_accuracy: 0.8467

    Epoch 66/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0551 - accuracy: 0.9858 - val\_loss: 0.5223 - val\_accuracy: 0.8578

    Epoch 67/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0559 - accuracy: 0.9825 - val\_loss: 0.5739 - val\_accuracy: 0.8400

    Epoch 68/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0617 - accuracy: 0.9825 - val\_loss: 0.5361 - val\_accuracy: 0.8578

    Epoch 69/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0532 - accuracy: 0.9847 - val\_loss: 0.5654 - val\_accuracy: 0.8489

    Epoch 70/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0512 - accuracy: 0.9847 - val\_loss: 0.5398 - val\_accuracy: 0.8600

    Epoch 71/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0491 - accuracy: 0.9858 - val\_loss: 0.5794 - val\_accuracy: 0.8422

    Epoch 72/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0577 - accuracy: 0.9792 - val\_loss: 0.5484 - val\_accuracy: 0.8600

    Epoch 73/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0472 - accuracy: 0.9847 - val\_loss: 0.5689 - val\_accuracy: 0.8644

    Epoch 74/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0481 - accuracy: 0.9825 - val\_loss: 0.5683 - val\_accuracy: 0.8600

    Epoch 75/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0463 - accuracy: 0.9880 - val\_loss: 0.5912 - val\_accuracy: 0.8622

    Epoch 76/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0448 - accuracy: 0.9847 - val\_loss: 0.5725 - val\_accuracy: 0.8600

    Epoch 77/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0453 - accuracy: 0.9847 - val\_loss: 0.5795 - val\_accuracy: 0.8578

    Epoch 78/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0462 - accuracy: 0.9858 - val\_loss: 0.6049 - val\_accuracy: 0.8511

    Epoch 79/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0456 - accuracy: 0.9792 - val\_loss: 0.6344 - val\_accuracy: 0.8578

    Epoch 80/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0430 - accuracy: 0.9858 - val\_loss: 0.5910 - val\_accuracy: 0.8600

    Epoch 81/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0396 - accuracy: 0.9869 - val\_loss: 0.5934 - val\_accuracy: 0.8578

    Epoch 82/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0406 - accuracy: 0.9869 - val\_loss: 0.5906 - val\_accuracy: 0.8622

    Epoch 83/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0377 - accuracy: 0.9836 - val\_loss: 0.6055 - val\_accuracy: 0.8556

    Epoch 84/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0381 - accuracy: 0.9880 - val\_loss: 0.6349 - val\_accuracy: 0.8400

    Epoch 85/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0407 - accuracy: 0.9847 - val\_loss: 0.6203 - val\_accuracy: 0.8556

    Epoch 86/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0411 - accuracy: 0.9847 - val\_loss: 0.6279 - val\_accuracy: 0.8489

    Epoch 87/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0383 - accuracy: 0.9847 - val\_loss: 0.6378 - val\_accuracy: 0.8533

    Epoch 88/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0411 - accuracy: 0.9858 - val\_loss: 0.6444 - val\_accuracy: 0.8422

    Epoch 89/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0406 - accuracy: 0.9869 - val\_loss: 0.6633 - val\_accuracy: 0.8533

    Epoch 90/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0370 - accuracy: 0.9869 - val\_loss: 0.6388 - val\_accuracy: 0.8556

    Epoch 91/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0341 - accuracy: 0.9890 - val\_loss: 0.6690 - val\_accuracy: 0.8378

    Epoch 92/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0399 - accuracy: 0.9869 - val\_loss: 0.6745 - val\_accuracy: 0.8467

    Epoch 93/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0390 - accuracy: 0.9847 - val\_loss: 0.6719 - val\_accuracy: 0.8556

    Epoch 94/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0365 - accuracy: 0.9858 - val\_loss: 0.6526 - val\_accuracy: 0.8622

    Epoch 95/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0404 - accuracy: 0.9858 - val\_loss: 0.7069 - val\_accuracy: 0.8667

    Epoch 96/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0391 - accuracy: 0.9858 - val\_loss: 0.6704 - val\_accuracy: 0.8489

    Epoch 97/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0405 - accuracy: 0.9847 - val\_loss: 0.6728 - val\_accuracy: 0.8533

    Epoch 98/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0345 - accuracy: 0.9890 - val\_loss: 0.6730 - val\_accuracy: 0.8511

    Epoch 99/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0418 - accuracy: 0.9814 - val\_loss: 0.7073 - val\_accuracy: 0.8467

    Epoch 100/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0461 - accuracy: 0.9792 - val\_loss: 0.7135 - val\_accuracy: 0.8489

    Epoch 101/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0352 - accuracy: 0.9847 - val\_loss: 0.6969 - val\_accuracy: 0.8644

    Epoch 102/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0351 - accuracy: 0.9814 - val\_loss: 0.7215 - val\_accuracy: 0.8511

    Epoch 103/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0318 - accuracy: 0.9880 - val\_loss: 0.7107 - val\_accuracy: 0.8533

    Epoch 104/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0333 - accuracy: 0.9869 - val\_loss: 0.7443 - val\_accuracy: 0.8422

    Epoch 105/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0345 - accuracy: 0.9869 - val\_loss: 0.7308 - val\_accuracy: 0.8444

    Epoch 106/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0379 - accuracy: 0.9880 - val\_loss: 0.7325 - val\_accuracy: 0.8511

    Epoch 107/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0344 - accuracy: 0.9858 - val\_loss: 0.7271 - val\_accuracy: 0.8511

    Epoch 108/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0377 - accuracy: 0.9858 - val\_loss: 0.7103 - val\_accuracy: 0.8600

    Epoch 109/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0313 - accuracy: 0.9890 - val\_loss: 0.7469 - val\_accuracy: 0.8511

    Epoch 110/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0381 - accuracy: 0.9869 - val\_loss: 0.7330 - val\_accuracy: 0.8556

    Epoch 111/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0316 - accuracy: 0.9880 - val\_loss: 0.7374 - val\_accuracy: 0.8711

    Epoch 112/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0319 - accuracy: 0.9858 - val\_loss: 0.7438 - val\_accuracy: 0.8556

    Epoch 113/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0381 - accuracy: 0.9869 - val\_loss: 0.7150 - val\_accuracy: 0.8600

    Epoch 114/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0320 - accuracy: 0.9847 - val\_loss: 0.7393 - val\_accuracy: 0.8756

    Epoch 115/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0301 - accuracy: 0.9912 - val\_loss: 0.7712 - val\_accuracy: 0.8356

    Epoch 116/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0368 - accuracy: 0.9825 - val\_loss: 0.8155 - val\_accuracy: 0.8622

    Epoch 117/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0376 - accuracy: 0.9836 - val\_loss: 0.7680 - val\_accuracy: 0.8667

    Epoch 118/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0385 - accuracy: 0.9858 - val\_loss: 0.7671 - val\_accuracy: 0.8644

    Epoch 119/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0297 - accuracy: 0.9869 - val\_loss: 0.7981 - val\_accuracy: 0.8600

    Epoch 120/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0332 - accuracy: 0.9890 - val\_loss: 0.8005 - val\_accuracy: 0.8378

    Epoch 121/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0336 - accuracy: 0.9858 - val\_loss: 0.7799 - val\_accuracy: 0.8556

    Epoch 122/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0320 - accuracy: 0.9869 - val\_loss: 0.8021 - val\_accuracy: 0.8467

    Epoch 123/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0291 - accuracy: 0.9858 - val\_loss: 0.8181 - val\_accuracy: 0.8511

    Epoch 124/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0292 - accuracy: 0.9847 - val\_loss: 0.7969 - val\_accuracy: 0.8689

    Epoch 125/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0341 - accuracy: 0.9869 - val\_loss: 0.7959 - val\_accuracy: 0.8600

    Epoch 126/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0313 - accuracy: 0.9858 - val\_loss: 0.8015 - val\_accuracy: 0.8578

    Epoch 127/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0295 - accuracy: 0.9847 - val\_loss: 0.8081 - val\_accuracy: 0.8600

    Epoch 128/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0335 - accuracy: 0.9858 - val\_loss: 0.8078 - val\_accuracy: 0.8511

    Epoch 129/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0314 - accuracy: 0.9836 - val\_loss: 0.8122 - val\_accuracy: 0.8600

    Epoch 130/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0341 - accuracy: 0.9869 - val\_loss: 0.8203 - val\_accuracy: 0.8600

    Epoch 131/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0307 - accuracy: 0.9858 - val\_loss: 0.8047 - val\_accuracy: 0.8533

    Epoch 132/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0303 - accuracy: 0.9890 - val\_loss: 0.8330 - val\_accuracy: 0.8556

    Epoch 133/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0306 - accuracy: 0.9836 - val\_loss: 0.7905 - val\_accuracy: 0.8533

    Epoch 134/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0261 - accuracy: 0.9923 - val\_loss: 0.8108 - val\_accuracy: 0.8711

    Epoch 135/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0429 - accuracy: 0.9847 - val\_loss: 0.8299 - val\_accuracy: 0.8689

    Epoch 136/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0328 - accuracy: 0.9858 - val\_loss: 0.8438 - val\_accuracy: 0.8400

    Epoch 137/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0266 - accuracy: 0.9890 - val\_loss: 0.8083 - val\_accuracy: 0.8556

    Epoch 138/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0290 - accuracy: 0.9880 - val\_loss: 0.8339 - val\_accuracy: 0.8556

    Epoch 139/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0290 - accuracy: 0.9847 - val\_loss: 0.8225 - val\_accuracy: 0.8600

    Epoch 140/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0247 - accuracy: 0.9869 - val\_loss: 0.8281 - val\_accuracy: 0.8667

    Epoch 141/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0241 - accuracy: 0.9890 - val\_loss: 0.8561 - val\_accuracy: 0.8622

    Epoch 142/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0310 - accuracy: 0.9858 - val\_loss: 0.8763 - val\_accuracy: 0.8644

    Epoch 143/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0324 - accuracy: 0.9836 - val\_loss: 0.8536 - val\_accuracy: 0.8444

    Epoch 144/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0306 - accuracy: 0.9869 - val\_loss: 0.8443 - val\_accuracy: 0.8644

    Epoch 145/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0278 - accuracy: 0.9890 - val\_loss: 0.8850 - val\_accuracy: 0.8556

    Epoch 146/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0271 - accuracy: 0.9880 - val\_loss: 0.8606 - val\_accuracy: 0.8578

    Epoch 147/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0295 - accuracy: 0.9847 - val\_loss: 0.8701 - val\_accuracy: 0.8733

    Epoch 148/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0328 - accuracy: 0.9901 - val\_loss: 0.8771 - val\_accuracy: 0.8467

    Epoch 149/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0257 - accuracy: 0.9901 - val\_loss: 0.8572 - val\_accuracy: 0.8644

    Epoch 150/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0286 - accuracy: 0.9880 - val\_loss: 0.8777 - val\_accuracy: 0.8689

    Epoch 151/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0282 - accuracy: 0.9858 - val\_loss: 0.8943 - val\_accuracy: 0.8556

    Epoch 152/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0262 - accuracy: 0.9858 - val\_loss: 0.8792 - val\_accuracy: 0.8556

    Epoch 153/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0293 - accuracy: 0.9869 - val\_loss: 0.9168 - val\_accuracy: 0.8533

    Epoch 154/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0386 - accuracy: 0.9781 - val\_loss: 0.8926 - val\_accuracy: 0.8689

    Epoch 155/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0356 - accuracy: 0.9847 - val\_loss: 0.8974 - val\_accuracy: 0.8400

    Epoch 156/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0262 - accuracy: 0.9869 - val\_loss: 0.8787 - val\_accuracy: 0.8578

    Epoch 157/200

    92/92 [==============================] - 0s 4ms/step - loss: 0.0312 - accuracy: 0.9869 - val\_loss: 0.9036 - val\_accuracy: 0.8644

    Epoch 158/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0286 - accuracy: 0.9858 - val\_loss: 0.9228 - val\_accuracy: 0.8467

    Epoch 159/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0258 - accuracy: 0.9890 - val\_loss: 0.9019 - val\_accuracy: 0.8578

    Epoch 160/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0278 - accuracy: 0.9869 - val\_loss: 0.8992 - val\_accuracy: 0.8622

    Epoch 161/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0323 - accuracy: 0.9825 - val\_loss: 0.9111 - val\_accuracy: 0.8556

    Epoch 162/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0278 - accuracy: 0.9858 - val\_loss: 0.9248 - val\_accuracy: 0.8622

    Epoch 163/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0254 - accuracy: 0.9880 - val\_loss: 0.9054 - val\_accuracy: 0.8511

    Epoch 164/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0255 - accuracy: 0.9880 - val\_loss: 0.9635 - val\_accuracy: 0.8444

    Epoch 165/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0323 - accuracy: 0.9847 - val\_loss: 0.9167 - val\_accuracy: 0.8667

    Epoch 166/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0251 - accuracy: 0.9880 - val\_loss: 0.9700 - val\_accuracy: 0.8444

    Epoch 167/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0282 - accuracy: 0.9901 - val\_loss: 0.9251 - val\_accuracy: 0.8600

    Epoch 168/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0277 - accuracy: 0.9869 - val\_loss: 0.9776 - val\_accuracy: 0.8422

    Epoch 169/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0335 - accuracy: 0.9847 - val\_loss: 0.9572 - val\_accuracy: 0.8644

    Epoch 170/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0337 - accuracy: 0.9869 - val\_loss: 0.9300 - val\_accuracy: 0.8644

    Epoch 171/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0247 - accuracy: 0.9869 - val\_loss: 0.9710 - val\_accuracy: 0.8511

    Epoch 172/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0277 - accuracy: 0.9869 - val\_loss: 0.9153 - val\_accuracy: 0.8622

    Epoch 173/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0338 - accuracy: 0.9869 - val\_loss: 0.9586 - val\_accuracy: 0.8644

    Epoch 174/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0249 - accuracy: 0.9890 - val\_loss: 0.9287 - val\_accuracy: 0.8556

    Epoch 175/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0324 - accuracy: 0.9836 - val\_loss: 0.9396 - val\_accuracy: 0.8511

    Epoch 176/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0280 - accuracy: 0.9901 - val\_loss: 0.9270 - val\_accuracy: 0.8533

    Epoch 177/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0239 - accuracy: 0.9901 - val\_loss: 0.9315 - val\_accuracy: 0.8711

    Epoch 178/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0288 - accuracy: 0.9858 - val\_loss: 0.9185 - val\_accuracy: 0.8644

    Epoch 179/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0251 - accuracy: 0.9890 - val\_loss: 0.9889 - val\_accuracy: 0.8444

    Epoch 180/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0252 - accuracy: 0.9901 - val\_loss: 0.9497 - val\_accuracy: 0.8600

    Epoch 181/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0281 - accuracy: 0.9836 - val\_loss: 0.9486 - val\_accuracy: 0.8489

    Epoch 182/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0267 - accuracy: 0.9880 - val\_loss: 0.9645 - val\_accuracy: 0.8733

    Epoch 183/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0230 - accuracy: 0.9869 - val\_loss: 0.9898 - val\_accuracy: 0.8444

    Epoch 184/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0276 - accuracy: 0.9858 - val\_loss: 1.0053 - val\_accuracy: 0.8467

    Epoch 185/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0250 - accuracy: 0.9880 - val\_loss: 0.9834 - val\_accuracy: 0.8689

    Epoch 186/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0339 - accuracy: 0.9836 - val\_loss: 0.9347 - val\_accuracy: 0.8644

    Epoch 187/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0267 - accuracy: 0.9858 - val\_loss: 0.9904 - val\_accuracy: 0.8622

    Epoch 188/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0337 - accuracy: 0.9825 - val\_loss: 1.0675 - val\_accuracy: 0.8444

    Epoch 189/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0414 - accuracy: 0.9814 - val\_loss: 1.0087 - val\_accuracy: 0.8333

    Epoch 190/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0376 - accuracy: 0.9847 - val\_loss: 0.9839 - val\_accuracy: 0.8467

    Epoch 191/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0278 - accuracy: 0.9858 - val\_loss: 1.0051 - val\_accuracy: 0.8511

    Epoch 192/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0264 - accuracy: 0.9869 - val\_loss: 1.0057 - val\_accuracy: 0.8489

    Epoch 193/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0300 - accuracy: 0.9836 - val\_loss: 0.9950 - val\_accuracy: 0.8444

    Epoch 194/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0308 - accuracy: 0.9858 - val\_loss: 0.9953 - val\_accuracy: 0.8533

    Epoch 195/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0264 - accuracy: 0.9869 - val\_loss: 1.0188 - val\_accuracy: 0.8422

    Epoch 196/200

    92/92 [==============================] - 0s 3ms/step - loss: 0.0249 - accuracy: 0.9912 - val\_loss: 1.0076 - val\_accuracy: 0.8622

    Epoch 197/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0247 - accuracy: 0.9890 - val\_loss: 1.0079 - val\_accuracy: 0.8511

    Epoch 198/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0222 - accuracy: 0.9912 - val\_loss: 0.9891 - val\_accuracy: 0.8511

    Epoch 199/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0263 - accuracy: 0.9847 - val\_loss: 1.0260 - val\_accuracy: 0.8489

    Epoch 200/200

    92/92 [==============================] - 0s 2ms/step - loss: 0.0290 - accuracy: 0.9847 - val\_loss: 1.0507 - val\_accuracy: 0.8400

**Result:23**

  Stream

    11/11 [==============================] - 0s 1ms/step

  text/plain

    array([[False],

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           [False],

           [ True],

           [False],

           [False],

           [False],

           [ True]])

**Result:23**

Stream

    Accuracy Test : 0.7947214076246334

    ANN model

    Confusion Matrix

    [[129  28]

     [ 42 142]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.75      0.82      0.79       157

               1       0.84      0.77      0.80       184

        accuracy                           0.79       341

       macro avg       0.79      0.80      0.79       341

    weighted avg       0.80      0.79      0.80       341

**Result:24**

Stream

    Predicting on random input

    output is : [0]

**Result:25**

  Stream

    Predicting on random input

    output is : [0]

**Result:26**

  Stream

    Predicting on random input

    output is : [0]

**Result:27**

  Stream

    Predicting on random input

    output is : [0]

**Result:28**

  Stream

    Predicting on random input

    output is : [0]

**Result:29**

 Predicting on random input

    1/1 [==============================] - 0s 19ms/step

    output is : [[False]]

**Result:30**

  Stream

    Accuracy Score : 0.8202494497432135

    Accuracy Test : 0.7419354838709677

    Logistic Regression

    Confusion Matrix

    [[116  41]

     [ 47 137]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.71      0.74      0.72       157

               1       0.77      0.74      0.76       184

        accuracy                           0.74       341

       macro avg       0.74      0.74      0.74       341

    weighted avg       0.74      0.74      0.74       341

 -----------------------------------------------------------------------------

-

  Accuracy Score : 1.0

    Accuracy Test : 0.7624633431085044

    Decsion Tree

    Confusion Matrix

    [[100  57]

     [ 24 160]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.81      0.64      0.71       157

               1       0.74      0.87      0.80       184

        accuracy                           0.76       341

       macro avg       0.77      0.75      0.75       341

    weighted avg       0.77      0.76      0.76       341

    ----------------------------------------------------------------------------------------------------

    Accuracy Score : 0.9926632428466617

    Accuracy Test : 0.8035190615835777

    Random Forest

    Confusion Matrix

    [[108  49]

     [ 18 166]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.86      0.69      0.76       157

               1       0.77      0.90      0.83       184

        accuracy                           0.80       341

       macro avg       0.81      0.80      0.80       341

    weighted avg       0.81      0.80      0.80       341

    ------------------------------------------------------------------------------

    Accuracy Score : 0.8459280997798972

    Accuracy Test : 0.7800586510263929

    SVM

    Confusion Matrix

    [[ 98  59]

     [ 16 168]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.86      0.62      0.72       157

               1       0.74      0.91      0.82       184

        accuracy                           0.78       341

       macro avg       0.80      0.77      0.77       341

    weighted avg       0.80      0.78      0.77       341

    -----------------------------------------------------------------------------

    Accuracy Score : 0.8459280997798972

    Accuracy Test : 0.7800586510263929

    KNN

    Confusion Matrix

    [[ 98  59]

     [ 16 168]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.86      0.62      0.72       157

               1       0.74      0.91      0.82       184

        accuracy                           0.78       341

       macro avg       0.80      0.77      0.77       341

    weighted avg       0.80      0.78      0.77       341

    ------------------------------------------------------------------------------

**Result:31**

    Accuracy Score : 0.8067632850241546

    Accuracy Test : 0.7800586510263929

    ANN

    Confusion Matrix

    [[ 840  143]

     [ 207 830]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.80      0.81      0.81       157

               1       0.81      0.91      0.81       184

        accuracy                           0.81       341

       macro avg       0.81      0.77      0.81       341

    weighted avg       0.81      0.78      0.81       341

**Result:32**

  Stream

    1.0

    0.8152492668621701

    \*\*Random Forest after Hyperparameter tuning\*\*

    Confusion Matrix

    [[112  45]

     [ 18 166]]

    Classification Reprot

                  precision    recall  f1-score   support

               0       0.86      0.71      0.78       157

               1       0.79      0.90      0.84       184

        accuracy                           0.82       341

       macro avg       0.82      0.81      0.81       341

    weighted avg       0.82      0.82      0.81       341

**Result 33**

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