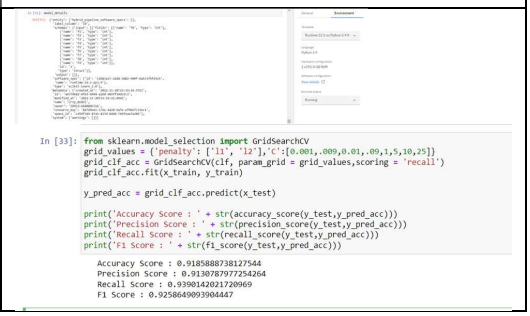
Project Development Phase
Model Performance Test

Date	17 November 2022
Team ID	PNT2022TMID23585
Project Name	Project – Car Resale Value Prediction
Maximum Marks	10 Marks

Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Values	Screenshot
1.	Metrics	**Regression Model:** MAE -1625.969 , MSE – 10786201.379, RMSE -3284.235 , R2 score – 0.8446 **Classification Model:** Confusion Matrix - , Accuray Score- & Classification Report -	
2.	Tune the Model	Hyperparameter Tuning - Validation Method -	

Screenshots :

In [51]:
```
model_details
```

Out[51]:

```
{'entity': {'hybrid_pipeline_software_specs': [],
  'label_column': 'l0',
  'schemas': {'input': [{'fields': [{'name': 'f0', 'type': 'int'},
      {'name': 'f1', 'type': 'int'},
      {'name': 'f2', 'type': 'int'},
      {'name': 'f3', 'type': 'int'},
      {'name': 'f4', 'type': 'int'},
      {'name': 'f5', 'type': 'int'},
      {'name': 'f6', 'type': 'int'},
      {'name': 'f7', 'type': 'int'},
      {'name': 'f8', 'type': 'int'},
      {'name': 'f9', 'type': 'int'}],
     'id': '1',
     'type': 'struct'}],
   'output': []},
  'software_spec': {'id': '12b83a17-24d8-5082-900f-0ab31fbfd3cb',
   'name': 'runtime-22.1-py3.9'},
  'type': 'scikit-learn_1.0'},
 'metadata': {'created_at': '2022-11-20T15:19:14.755Z',
  'id': 'a9779682-4fb3-4994-a26d-985ff59dc6c3',
  'modified_at': '2022-11-20T15:19:22.494Z',
  'name': 'Crvp_model',
  'owner': 'IBMid-668000CIU6',
  'resource_key': '847d9ea1-172e-4a20-9afe-efbb6fc31ec1',
  'space_id': 'cd59f349-87a5-427d-b460-769feaa7a289'},
 'system': {'warnings': []}}
```


Metrics Evaluation

In [29]:
```
mae = mean_absolute_error(Y_test, y_pred)
mse = mean_squared_error(Y_test, y_pred)
rmse = np.sqrt(mse)
rmsle = np.log(rmse)
n,k = X_train.shape
r2=r2_score(Y_test,y_pred)
adj_r2= 1 - ((1-r2)*(n-1)/(n-k-1))
print(mae,mse,rmse,rmsle,r2,adj_r2)
```

```
1625.9697221517592 10786201.379626777 3284.235280796243 8.096889112584606 0.8446193085721447 0.8446113399637768
```

In [33]:
```
from sklearn.model_selection import GridSearchCV
grid_values = {'penalty': ['l1', 'l2'],'C':[0.001,.009,0.01,.09,1,5,10,25]}
grid_clf_acc = GridSearchCV(clf, param_grid = grid_values,scoring = 'recall')
grid_clf_acc.fit(x_train, y_train)

y_pred_acc = grid_clf_acc.predict(x_test)

print('Accuracy Score : ' + str(accuracy_score(y_test,y_pred_acc)))
print('Precision Score : ' + str(precision_score(y_test,y_pred_acc)))
print('Recall Score : ' + str(recall_score(y_test,y_pred_acc)))
print('F1 Score : ' + str(f1_score(y_test,y_pred_acc)))
```

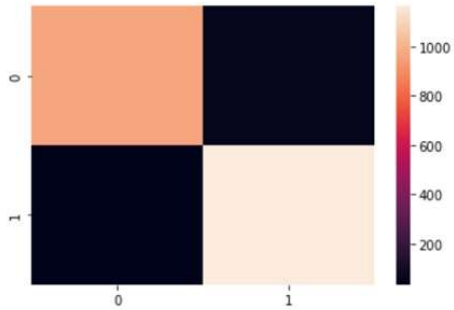
```
Accuracy Score : 0.9185888738127544
Precision Score : 0.9130787977254264
Recall Score : 0.9390142021720969
F1 Score : 0.9258649093904447
```

In [26]:
```
from sklearn.metrics import confusion_matrix
print('Confusion Matrix : \n' + str(confusion_matrix(y_test,y_pred2)))

import seaborn
seaborn.heatmap(confusion_matrix(y_test,y_pred2))
```

```
Confusion Matrix :
[[ 962   52]
 [  33 1164]]
```

Out[26]: <AxesSubplot:>



In [25]:
```
print('Accuracy Score : ' + str(accuracy_score(y_test,y_pred2)))

from sklearn.metrics import confusion_matrix
print('Confusion Matrix : \n' + str(confusion_matrix(y_test,y_pred2)))
```

```
Accuracy Score : 0.9624604251469923
Confusion Matrix :
[[ 960   54]
 [  29 1168]]
```