

Model Development Phase Template

Date	11 July 2024
Team ID	SWTID1720174920
Project Title	Human Resource Management: Predicting Employee Promotions Using Machine Learning
Maximum Marks	4 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include classification reports, accuracy, and confusion matrices for multiple models, presented through respective screenshots.

Initial Model Training Code:

```
def decisionTree(x_train,x_test,y_train,y_test):  
    dt=DecisionTreeClassifier()  
    dt.fit(x_train,y_train)  
    y_pred=dt.predict(x_test)  
    print("DecisionTreeClassifier")  
    print('Confusion matrix')  
    print(confusion_matrix(y_test,y_pred))  
    print('Classification report')  
    print(classification_report(y_test,y_pred))  
    return y_pred
```

```
def randomForest(x_train,x_test,y_train,y_test):
    rf=RandomForestClassifier()
    rf.fit(x_train,y_train)
    y_pred=rf.predict(x_test)
    print("RandomForestClassifier")
    print('Confusion matrix')
    print(confusion_matrix(y_test,y_pred))
    print('Classification report')
    print(classification_report(y_test,y_pred))
    return y_pred
```

```
from sklearn.neighbors import KNeighborsClassifier
def KNN(x_train,x_test,y_train,y_test):
    knn=KNeighborsClassifier()
    knn.fit(x_train,y_train)
    y_pred=knn.predict(x_test)
    print("KNeighboursClassifier")
    print('Confusion matrix')
    print(confusion_matrix(y_test,y_pred))
    print('Classification report')
    print(classification_report(y_test,y_pred))
    return y_pred
```

```
def xgboost(x_train,x_test,y_train,y_test):
    xg=GradientBoostingClassifier()
    xg.fit(x_train,y_train)
    y_pred=xg.predict(x_test)
    print("GradientBoostingClassifier")
    print('Confusion matrix')
    print(confusion_matrix(y_test,y_pred))
    print('Classification report')
    print(classification_report(y_test,y_pred))
    return y_pred
```

Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
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decision Tree	<div>classification_report(y_test,y_pred)</div> <table><thead><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr></thead><tbody><tr><td>0</td><td>0.95</td><td>0.93</td><td>0.94</td><td>10035</td></tr><tr><td>1</td><td>0.93</td><td>0.95</td><td>0.94</td><td>10021</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.94</td><td>20056</td></tr><tr><td>macro avg</td><td>0.94</td><td>0.94</td><td>0.94</td><td>20056</td></tr><tr><td>weighted avg</td><td>0.94</td><td>0.94</td><td>0.94</td><td>20056</td></tr></tbody></table>		precision	recall	f1-score	support	0	0.95	0.93	0.94	10035	1	0.93	0.95	0.94	10021	accuracy			0.94	20056	macro avg	0.94	0.94	0.94	20056	weighted avg	0.94	0.94	0.94	20056	93.73%	<div>confusion_matrix(y_test,y_pred)</div> <div>array([[9289, 746], [510, 9511]], dtype=int64)</div>
	precision	recall	f1-score	support																													
0	0.95	0.93	0.94	10035																													
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random Forest	<div>classification_report(y_test,y_pred)</div> <table><thead><tr><th></th><th>precision</th><th>recall</th><th>f1-score</th><th>support</th></tr></thead><tbody><tr><td>0</td><td>0.95</td><td>0.95</td><td>0.95</td><td>10035</td></tr><tr><td>1</td><td>0.95</td><td>0.95</td><td>0.95</td><td>10021</td></tr><tr><td>accuracy</td><td></td><td></td><td>0.95</td><td>20056</td></tr><tr><td>macro avg</td><td>0.95</td><td>0.95</td><td>0.95</td><td>20056</td></tr><tr><td>weighted avg</td><td>0.95</td><td>0.95</td><td>0.95</td><td>20056</td></tr></tbody></table>		precision	recall	f1-score	support	0	0.95	0.95	0.95	10035	1	0.95	0.95	0.95	10021	accuracy			0.95	20056	macro avg	0.95	0.95	0.95	20056	weighted avg	0.95	0.95	0.95	20056	94.94%	<div>confusion_matrix(y_test,y_pred)</div> <div>array([[9498, 537], [477, 9544]], dtype=int64)</div>
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