Model Optimization and Tuning Phase Template

Date	16 July 2024
Team ID	739870
Project Title	Freedom Of The World Classification
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining neural network models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

Hyperparameter Tuning Documentation (8 Marks):

Model	Tuned Hyperparameters
KNN	The performance of the KNN model, we calculate the accuracy of the model on the test set using the accuracy_score function from sklearn.metrics. The accuracy is printed as a percentage. class (F, PF, and NF) and overall. This report gives us a more detailed understanding of the performance of the KNN model.
Decision Tree	-

```
# Calculate accuracy of the model

from sklearn.metrics import accuracy_score
accuracy = accuracy_score(y_test, y_pred)
print(f'Accuracy: {accuracy*100}')
```

```
Accuracy: 99.76133651551312
```

```
from sklearn.metrics import classification_report
print("Report : ", classification_report(y_test, y_pred))
```

```
Report :               precision    recall  f1-score   support

           F       1.00      1.00      1.00       179
          NF       0.99      1.00      1.00       108
          PF       1.00      0.99      1.00       132

    accuracy                           1.00       419
   macro avg       1.00      1.00      1.00       419
weighted avg       1.00      1.00      1.00       419
```

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
KNN	K-Nearest Neighbors (KNN) is a simple yet powerful supervised machine learning algorithm used for classification and regression tasks while providing high predictive accuracy. Report : precision recall f1-score support F 1.00 1.00 1.00 179 NF 0.99 1.00 1.00 108 PF 1.00 0.99 1.00 132 accuracy 1.00 419 macro avg 1.00 1.00 1.00 419 weighted avg 1.00 1.00 1.00 419 Above KNN model have the highest accuracy among the models.