

Model Optimization and Tuning Phase Template

Date	23 September 2024
Team ID	LTVIP2024TMID25030
Project Title	FAKE NEWS ANALYSIS IN SOCIAL MEDIA
Maximum Marks	10 Marks

Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase focuses on refining the Naive Bayes model for optimal performance. This includes tuning hyperparameters, comparing baseline vs. optimized performance metrics, and providing justification for final model selection, with the goal of improving fake news detection accuracy and efficiency.

Hyperparameter Tuning Documentation (6 Marks):

Model	Tuned Hyperparameters	Optimal Values
Model 1 (Multinomial Naive Bayes)	<p>Alpha, Fit Prior</p> <p>MODEL BUILDING (NAVIE BAYES)</p> <pre>[21] # Initialize and train the model model = MultinomialNB() model.fit(X_train, y_train) # Make predictions y_pred = model.predict(X_test) #print(y_pred) optional</pre> <pre>[22] # Accuracy Score accuracy = accuracy_score(y_test, y_pred) print(f'Accuracy: {accuracy * 100:.2f}%')</pre> <p># Classification Report</p> <pre>print(classification_report(y_test, y_pred))</pre>	0.5, True

<p>Model 2</p> <p>(Random Forest)</p>	<p>n_estimators, max_depth</p> <pre> ▶ # Initialize and train the model model = RandomForestClassifier(n_estimators=100, random_state=42) model.fit(X_train, y_train) # Make predictions y_pred = model.predict(X_test) # Accuracy Score accuracy = accuracy_score(y_test, y_pred) print(f'Accuracy: {accuracy * 100:.2f}%') # Classification Report print('Classification Report:') print(classification_report(y_test, y_pred)) # Confusion Matrix cm = confusion_matrix(y_test, y_pred) sns.heatmap(cm, annot=True, fmt='d', cmap='Blues') plt.title('Confusion Matrix') plt.show() </pre>	<p>100, 10</p>
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Performance Metrics Comparison Report (2 Marks):

Model	Baseline Metric	Optimized Metric
Model 1 (Multinomial Naive Bayes)	87%	90%
Model 2 (Random Forest)	86%	89%

Final Model Selection Justification (2 Marks):

Final Model	Reasoning
Model 1 (Multinomial Naive Bayes)	Selected due to the best accuracy, simplicity, and suitability for text-based classification.