Model Optimization and Tuning Phase Report

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| Date | 03 October 2024 |
| Team ID | LTVIP2024TMID24818 |
| Project Title | Toxic Comments Classification For Social Media |
| Maximum Marks | 10 Marks |

**Model Optimization and Tuning Phase**

The Model Optimization and Tuning Phase involves refining machine learning 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 (6 Marks):**

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| **Model** | **Tuned Hyperparameters** | **Optimal Values** |
| Logistic  Regression |  |  |
| LinearSVM  model |  |  |

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| Long Short-Term Memory (LSTM) Model |  |  |

**Performance Metrics Comparison Report (2 Marks):**

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| **Model** | **Optimized Metric** |
| Logistic  Regression |  |

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| LinearSVM  model |  |
| Long Short-Term Memory (LSTM) Model |  |

**Final Model Selection Justification (2 Marks):**

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| **Final Model** | **Reasoning** |
| Long Short-Term Memory (LSTM) Model | After evaluating the models based on several metrics such as **accuracy**, **precision**, **recall**, and **F1-score**, all models demonstrated good performance**. Long Short-Term Memory (LSTM)** is a specialized type of recurrent neural network (RNN) designed to effectively capture long-range dependencies in sequential data. It consists of memory cells that store information over time and gating mechanisms (input, output, and forget gates) that control the flow of information. This architecture helps mitigate issues like vanishing gradients, making LSTMs suitable for tasks involving long sequences. LSTMs excel in applications such as natural language processing, speech recognition, and time series forecasting. Their ability to maintain context over long periods allows them to model complex temporal relationships effectively..  **Final Choice**: **. Long Short-Term Memory (LSTM)** was chosen as the model for predicting loan eligibility because of its high performance and the ability to generalize well to new, unseen data. |