**Model Optimization and Tuning Phase Template**

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| Date | 15 March 2024 |
| Team ID | 739724 |
| Project Title | Analysis of amazon cell phone reviews |
| 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):

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| **Model** | **Tuned Hyperparameters** |
| Model | - |

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

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| **Final Model** | **Reasoning** |
| Model | Keras, a high-level neural network API, is used in this project to build and train a **sentiment analysis model** for Amazon cell phone reviews. It simplifies the process of creating deep learning models with its intuitive interface. Key steps include:   1. **Text Tokenization and Embedding:** Keras's Tokenizer is used to preprocess text data by converting reviews into numerical sequences. The Embedding layer maps words into dense vector representations, capturing semantic relationships. 2. **Model Architecture:** A sequential model is created using layers such as:    * **Embedding Layer:** For word embeddings.    * **LSTM/GRU Layers:** To capture the context and sequence of words in reviews.    * **Dense Layers:** For classification into sentiments like positive, negative, or neutral. 3. **Training and Validation:** The model is trained using labeled review data with Keras's easy-to-use fit() method, optimizing for accuracy through loss functions like binary\_crossentropy or categorical\_crossentropy. 4. **Evaluation:** The trained model is tested on unseen review data to predict sentiment and provide insights into customer feedback trends. |