 

Model Optimization and Tuning Phase Template

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| Date | 15 October 2024 |
| Team ID | 740663 |
| Project Title | Predicting Diamond Prices With ANN Using Deep Learning |
| 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** |
| Keras |  |

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|  | Hyperparameter tuning optimizes the performance of a machine learning model by testing different combinations of parameters such as the number of neurons, learning rate, and more. The code uses Keras Tuner to automate this process by defining a search space and testing two configurations (limited by max\_trials=2).  The model includes tunable parameters like the number of neurons in each dense layer and the learning rate. The tuner evaluates these configurations based on  validation accuracy or loss, helping find the best combination for your dataset. After tuning, the best parameters are used to build and train the final model. This  approach ensures efficient experimentation without manual trial and error. |

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| **Final Model** | **Reasoning** |
| Keras | Keras was chosen as the final optimized model for predicting diamond prices due to its simplicity, flexibility, and robust capabilities for  building and fine-tuning deep learning models. Keras provides an  intuitive interface for designing and training neural networks, making it easier to experiment with different architectures and  hyperparameters. Keras integrates seamlessly with TensorFlow, offering powerful tools for scalability, distributed training, and deployment. The model's ability to handle both numeric and  categorical features. Its proven performance in regression tasks and real-world applications validates its selection as the final, optimized model for accurately predicting diamond prices. |