

**Model Optimization and Tuning Phase**

|  |  |
| --- | --- |
| Date | 15 March 2024 |
| Team ID | 739675 |
| Project Title | Cleantech: Transforming Waste Management With Transfer 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):**

|  |  |
| --- | --- |
| **Model** | **Tuned Hyperparameters** |
| Vgg16\_model | **Batch Size**: Set to 15 for efficient training    **Epochs**: Set to 9 epochs for good balance between underfitting and  Overfitting  **Augmentation Parameters**: Shear range, zoom range, and horizontal flipping used to improve generalization . |

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

|  |  |
| --- | --- |
| **Final Model** | **Reasoning** |
| VGG16 (Transfer  Learning) | Selected because it achieves high accuracy with fewer epochs, uses pretrained "ImageNet" features effectively, avoids overfitting (due to augmentation and freezing initial layers), reduces training time compared to building CNN from scratch, and is suitable for waste image classification. |