**Model Optimization and Tuning Phase Template**

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| Date | 10 November 2024 |
| Team ID | 739889 |
| Project Title | Image Caption Generator |
| Maximum Marks | 10 Marks |

**Model Optimization and Tuning Phase**

Model optimization for an image caption generator aims to improve its performance (e.g., caption accuracy, fluency) and efficiency (e.g., training time, memory usage). This often involves techniques like tuning hyperparameters (learning rate, batch size), applying regularization (dropout, weight decay), and potentially using more efficient network architectures or optimization algorithms (e.g., AdamW).

### Hyperparameter Tuning Documentation (8 Marks):

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| **Model** | **Tuned Hyperparameters(Epochs)** |
| ResNet50 | In this image caption generator project, training involves iterating through the entire image-caption dataset multiple times, with each full pass being an epoch. The number of epochs is a hyperparameter that determines how long the model trains, aiming for optimal performance without overfitting or underfitting the data. |

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

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| **Final Model** | **Reasoning** |
| ResNet50 | ResNet50 is a strong choice as the image encoder in this project due to its proven ability to extract robust and hierarchical visual features from images, thanks to its deep architecture and residual connections. Leveraging pre-trained ResNet50 weights allows the model to benefit from features learned on large image datasets, leading to better understanding of image content and ultimately, more accurate and relevant captions. |