LAB 1: STUDENT WORKSHEET

# Working with Pre-trained Models

**Name:**  **Student ID:**  **Date:**

# PART 1: MODEL PARAMETERS AND PERFORMANCE

Complete the table below with the numerical values from your experiments:

* 1. **Basic Performance Metrics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model** | **Trainable**  **Parameters** | **Total**  **Parameters** | **Test Accuracy**  **(%)** | **Training Time**  **(s)** | **Inference Time**  **(ms)** |
| MobileNetV2 |  |  |  |  |  |
| ResNet50 |  |  |  |  |  |
| VGG16 |  |  |  |  |  |
| C |  |  |  |  | C |

* 1. **Efficiency Metrics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Model** | **Parameters/Second**  **(training)** | **Accuracy/Million**  **Parameters** | **Inference Time/Batch**  **(ms)** |
| MobileNetV2 |  |  |  |
| ResNet50 |  |  |  |
| VGG16 |  |  |  |
| C |  |  | C |

# PART 2: MODEL COMPARISON

* 1. **Most Confused Digit Pairs**

|  |  |  |
| --- | --- | --- |
| **Model** | **Most Confused Digit Pair** | **Number of Misclassifications** |
| MobileNetV2 | and |  |
| ResNet50 | and |  |
| VGG16 | and |  |
| C |  | C |

* 1. **Per-Class Precision for Best Model**

Record the precision values for each digit class from your best performing model:

|  |  |
| --- | --- |
| **Digit** | **Precision** |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| C | C |
|  |  |

# PART 3: ANALYSIS QUESTIONS

* + 1. Which model provides the best balance between accuracy and computational efficiency? Explain your reasoning with specific metrics from your experiments.
    2. How does model size affect training time versus inference time? Explain the differences you observed.
    3. Why might you choose MobileNetV2 over ResNet50 or VGG16 for a mobile application? Cite specific metrics from your results.
    4. What hardware factors significantly impact the performance of these pre-trained models? How might this influence model selection for different deployment scenarios?

# PART 4: REFLECTION (100 words)

Write a short reflection on model selection criteria for different applications based on your experiment results.

# INSTRUCTOR COMMENTS

Grade: /