

# A **small** flowers classifier from a **little** dataset to **102** categories

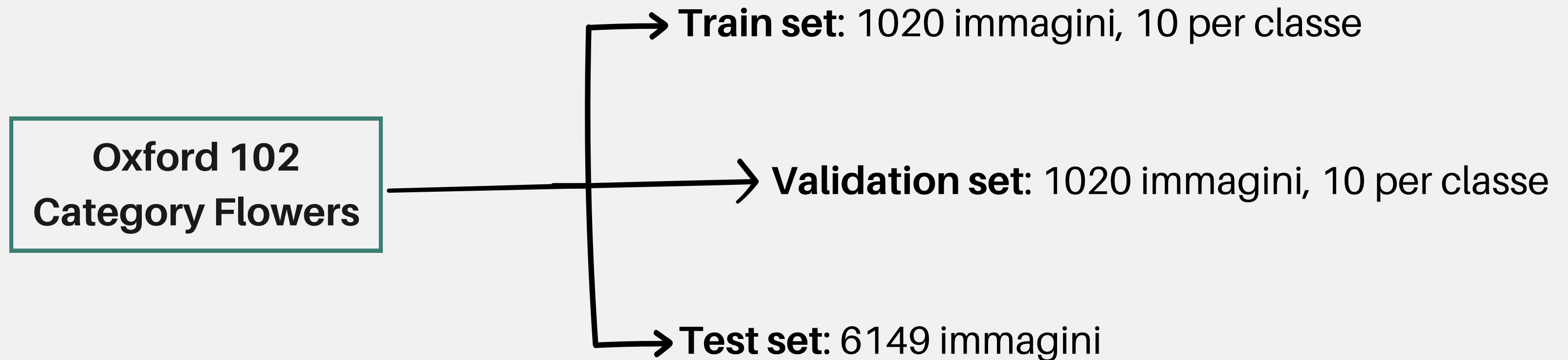
Advanced Machine Learning Final Project



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# ➤ Data exploration



**Dimensione test set >> Dimensione train set**

# ➤ Data preprocessing

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## **Data augmentation**

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- rotation range of 20
- brightness range [0.7, 1.3]
- zoom range [0.8, 1.2]
- orizontal flip

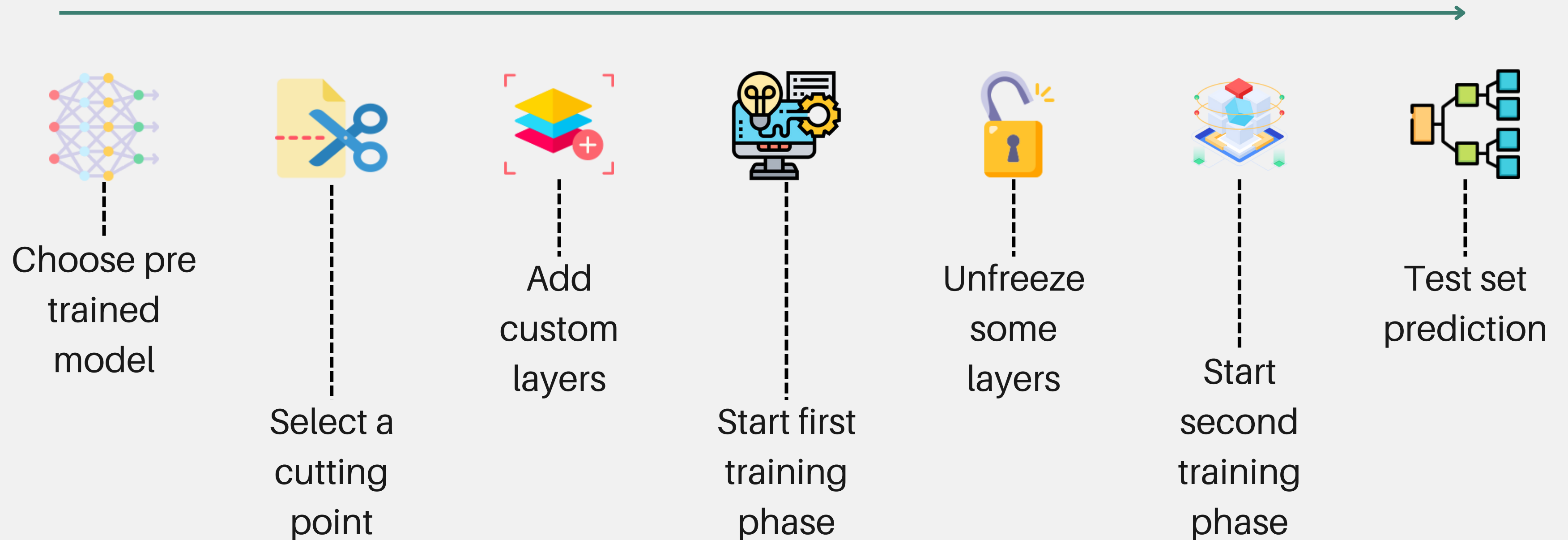
2

## **Preprocess function**

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Preprocess input function for all pre trained model used.

# ➤ Transfer learning: Fine tuning



# ➤ Training evaluation: grad-CAM



VGG16



InceptionV3



ResNet50

# ➤ Fine tuning results: performance

| MODEL        | Batch size | Step size | Policy      | Optimizer | Test loss before unfreeze | Test accuracy before unfreeze | Unfreeze layers | Test loss post unfreeze | Test accuracy before unfreeze |
|--------------|------------|-----------|-------------|-----------|---------------------------|-------------------------------|-----------------|-------------------------|-------------------------------|
| VGG16        | 64         | 16        | triangular2 | SGD       | 0.7576                    | 0.8065                        | 5               | 0.6261                  | 0.8382                        |
| ResNet50     | 64         | 4         | triangular  | SGD       | 2.0619                    | 0.7441                        | 20              | 1.2464                  | 0.8446                        |
| Inception V3 | 64         | 2         | triangular  | SGD       | 0.6209                    | 0.8333                        | 10              | 0.5154                  | 0.8614                        |

# ➤ Fine tuning results: performance

| MODEL        | Batch size | Step size | Policy      | Optimizer | Test loss before unfreeze | Test accuracy before unfreeze | Unfreeze layers | Test loss post unfreeze | Test accuracy before unfreeze |
|--------------|------------|-----------|-------------|-----------|---------------------------|-------------------------------|-----------------|-------------------------|-------------------------------|
| VGG16        | 64         | 16        | triangular2 | SGD       | 0.7686                    | 0.8037                        | 5               | 0.6731                  | 0.8291                        |
| ResNet50     | 64         | 4         | triangular  | SGD       | 2.0619                    | 0.7441                        | 20              | 1.2464                  | 0.8446                        |
| Inception V3 | 64         | 2         | triangular  | SGD       | 0.6209                    | 0.8333                        | 10              | 0.5154                  | 0.8614                        |



# ➤ Classification evaluation: misclassification



From the skearn report it was possible to identify the worse prediction classes of the model



# ➤ Classification evaluation: image-similarity-search

