Part 4
Lecture 1 Key Concepts

Who I am…

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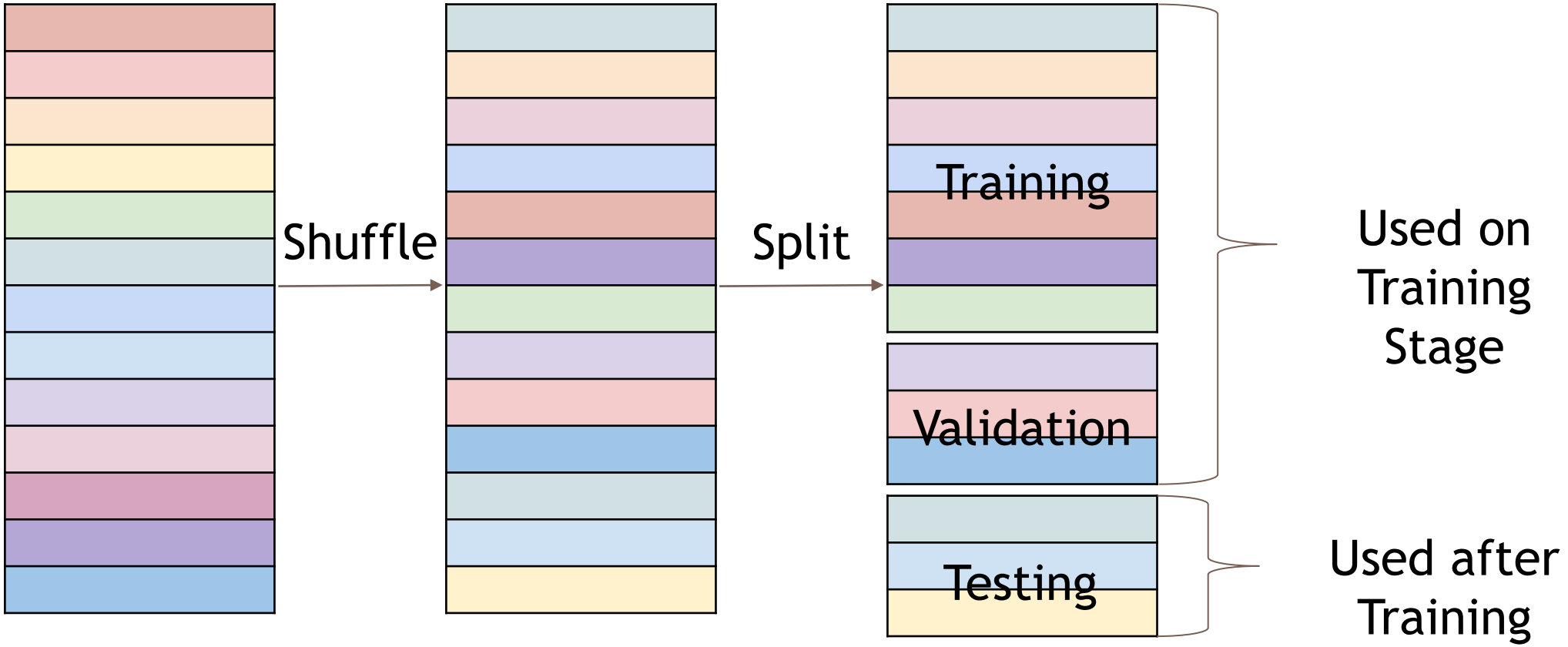
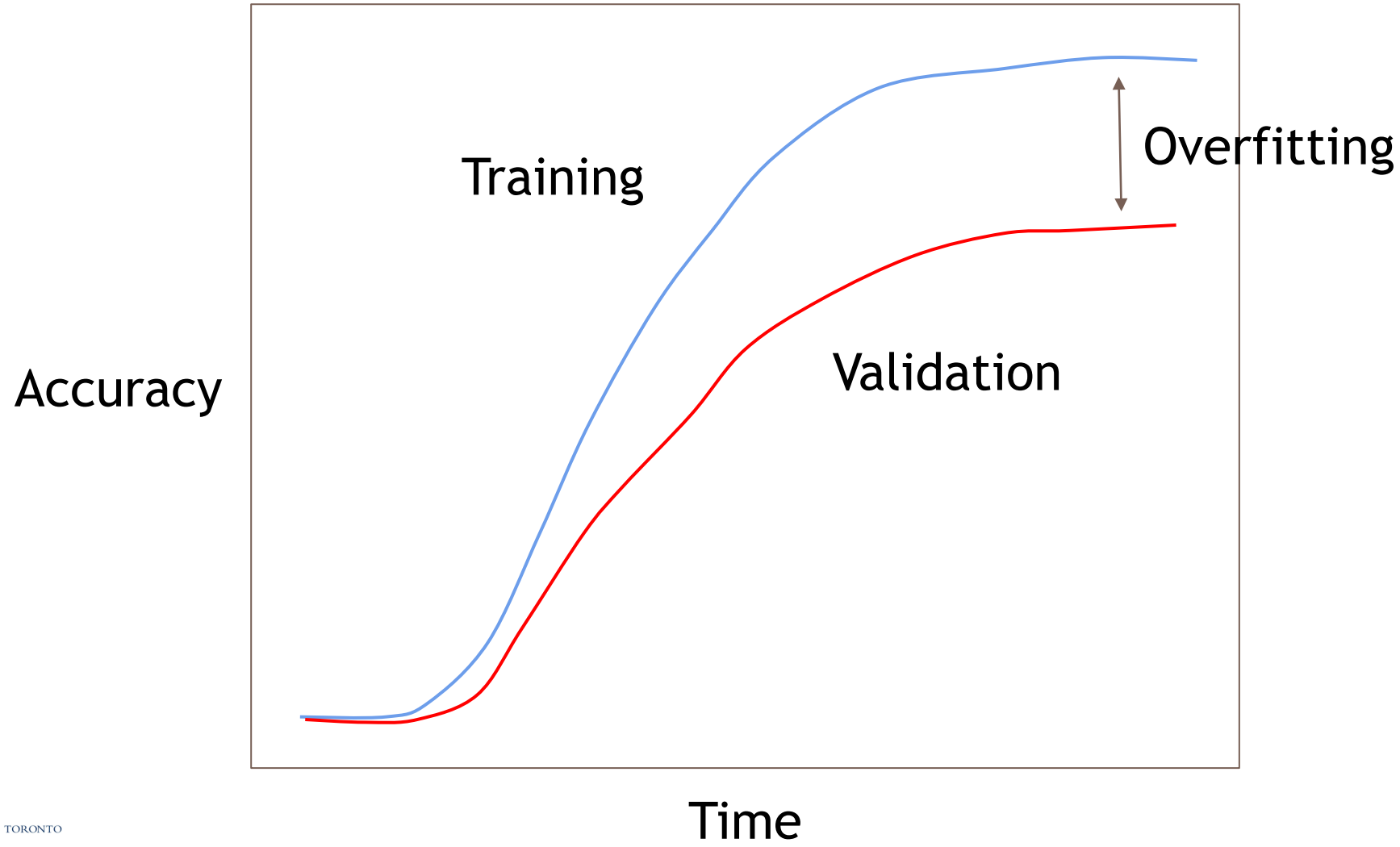
Dataset Splits

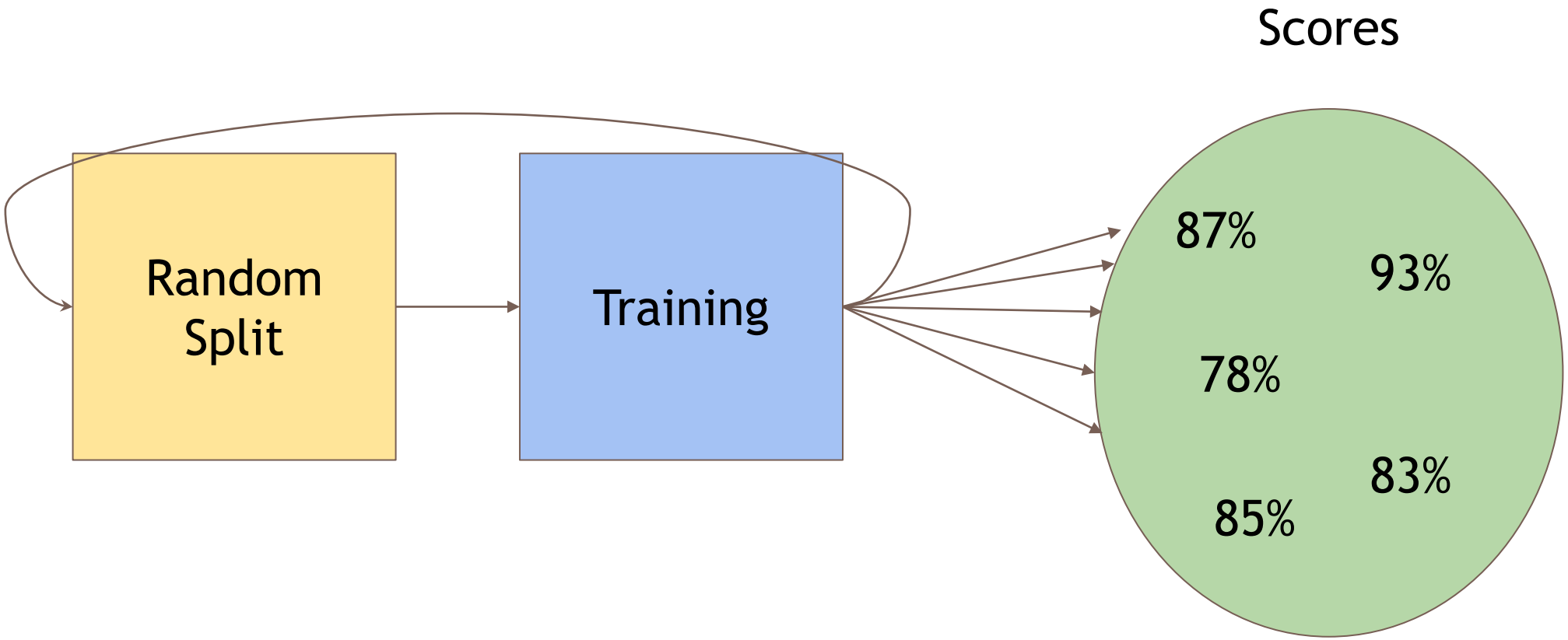


Overfitting and Underfitting

Overfitting and Underfitting



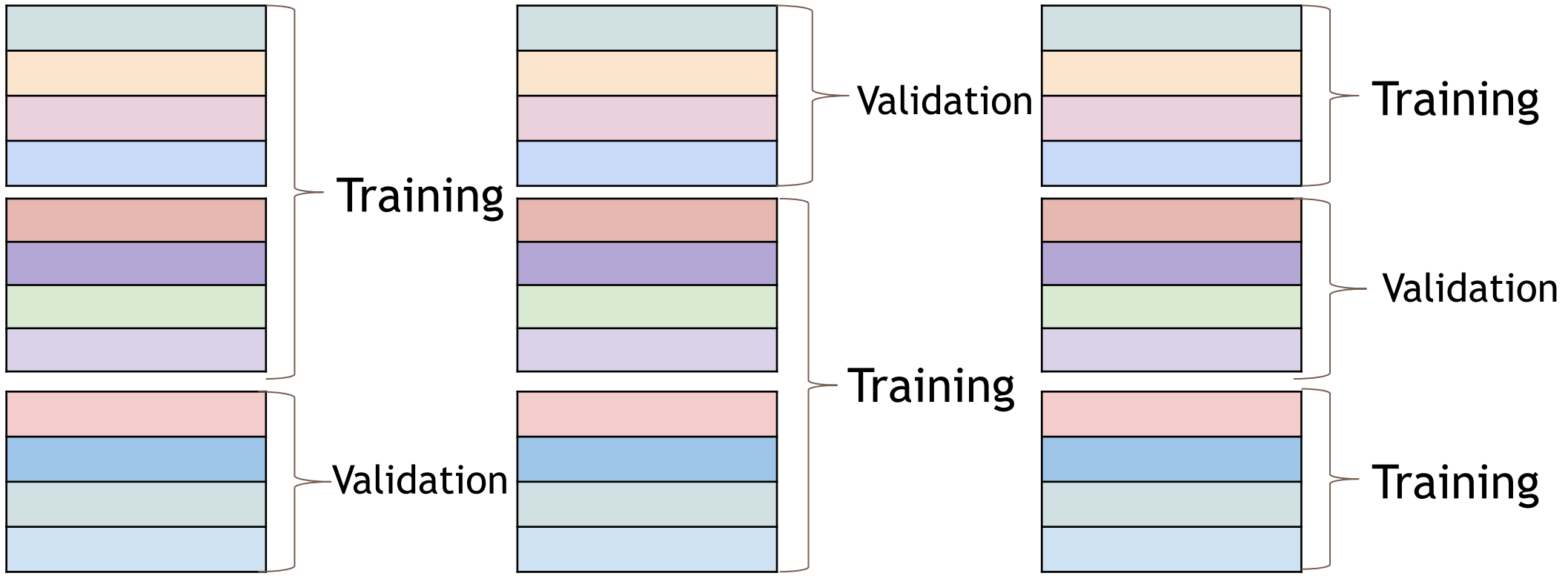
Cross Validation - Several Runs



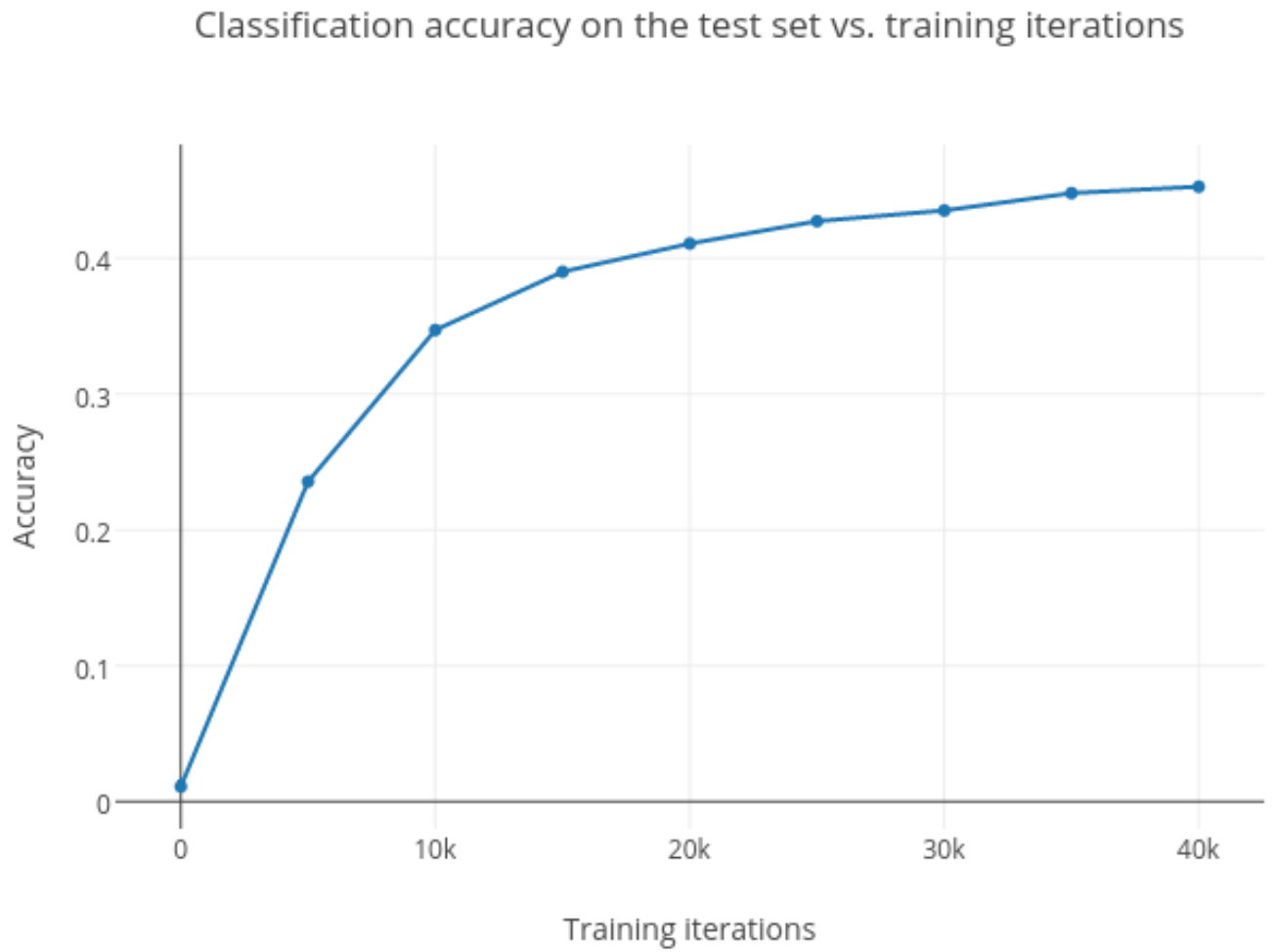
Average: 85.2
Standard Deviation: 5.495

Cross Validation - K-Fold Validation

K-Split

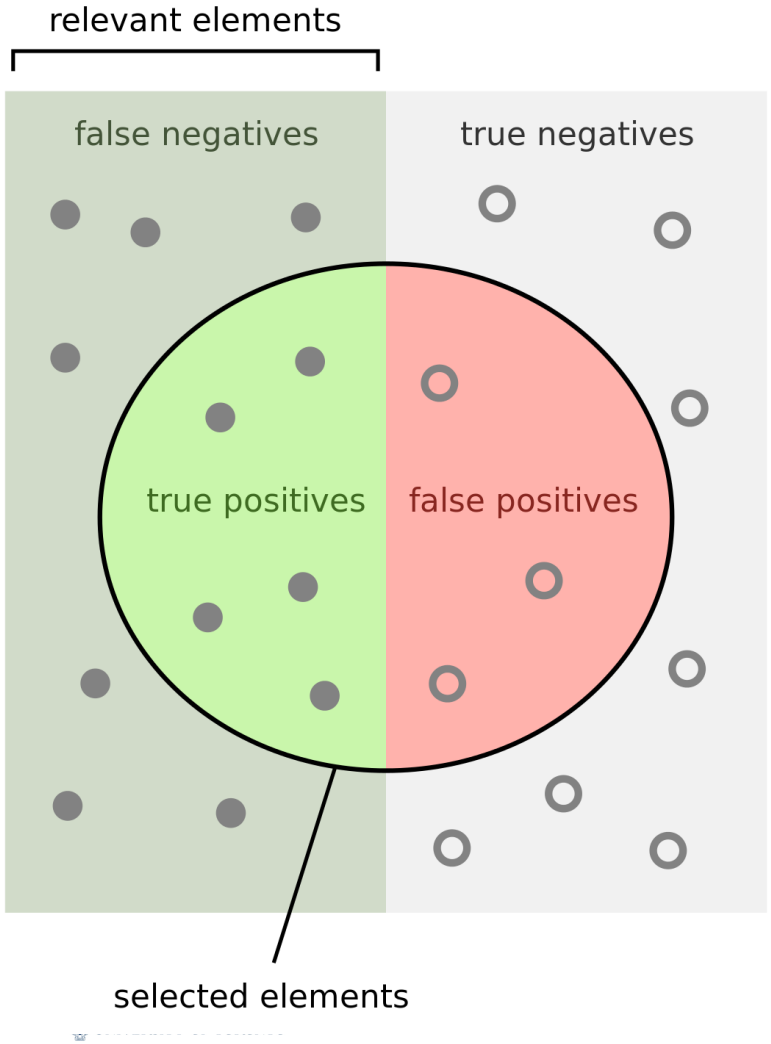


Evaluation Metrics - Classification



Accuracy:
Correct classifications/
Total Classifications

Evaluation Metrics - Classification



$$precision = \frac{TP}{TP + FP}$$

$$recall = \frac{TP}{TP + FN}$$

$$F1 = \frac{2 \times precision \times recall}{precision + recall}$$

$$accuracy = \frac{TP + TN}{TP + FN + TN + FP}$$

$$specificity = \frac{TN}{TN + FP}$$

For every class

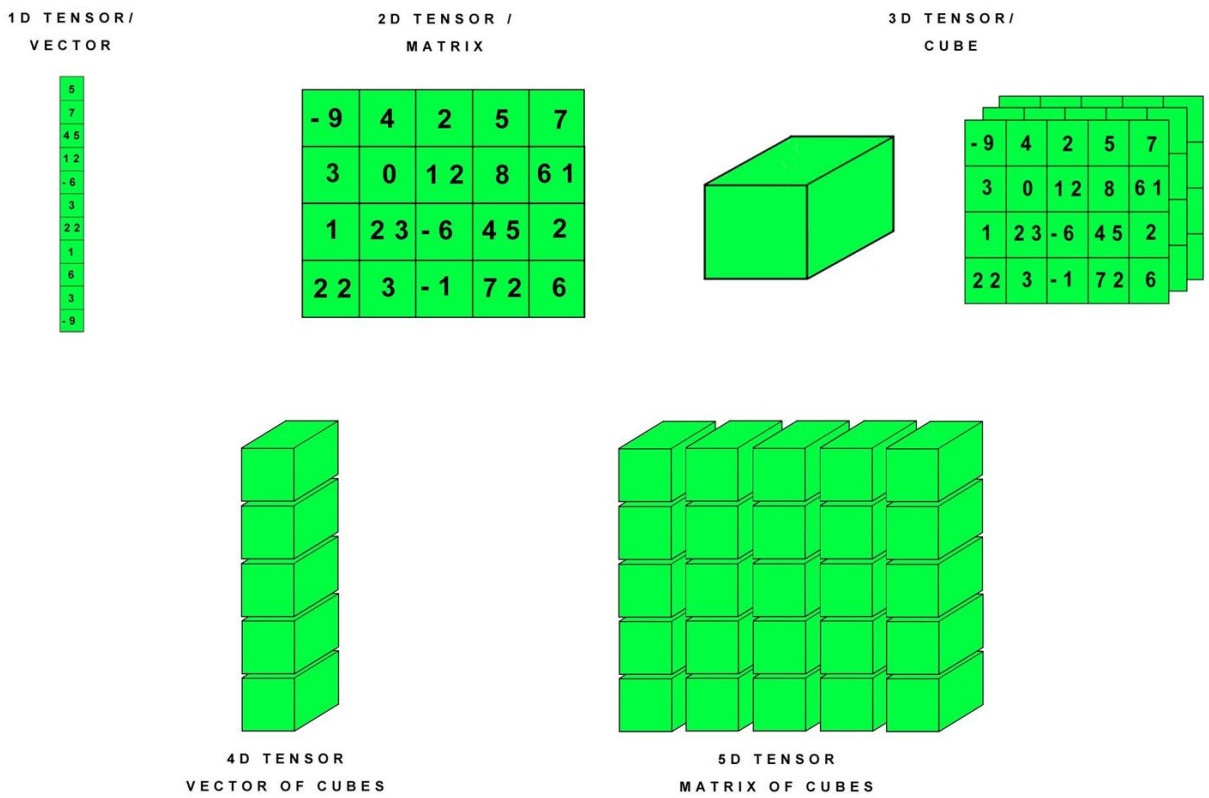
Evaluation Metrics - Regression

- ❑ Mean Squared Error: More penalization to outliers
- ❑ Mean Absolute Error: More robust to outliers
- ❑ Root Mean Squared Error: Same units as target

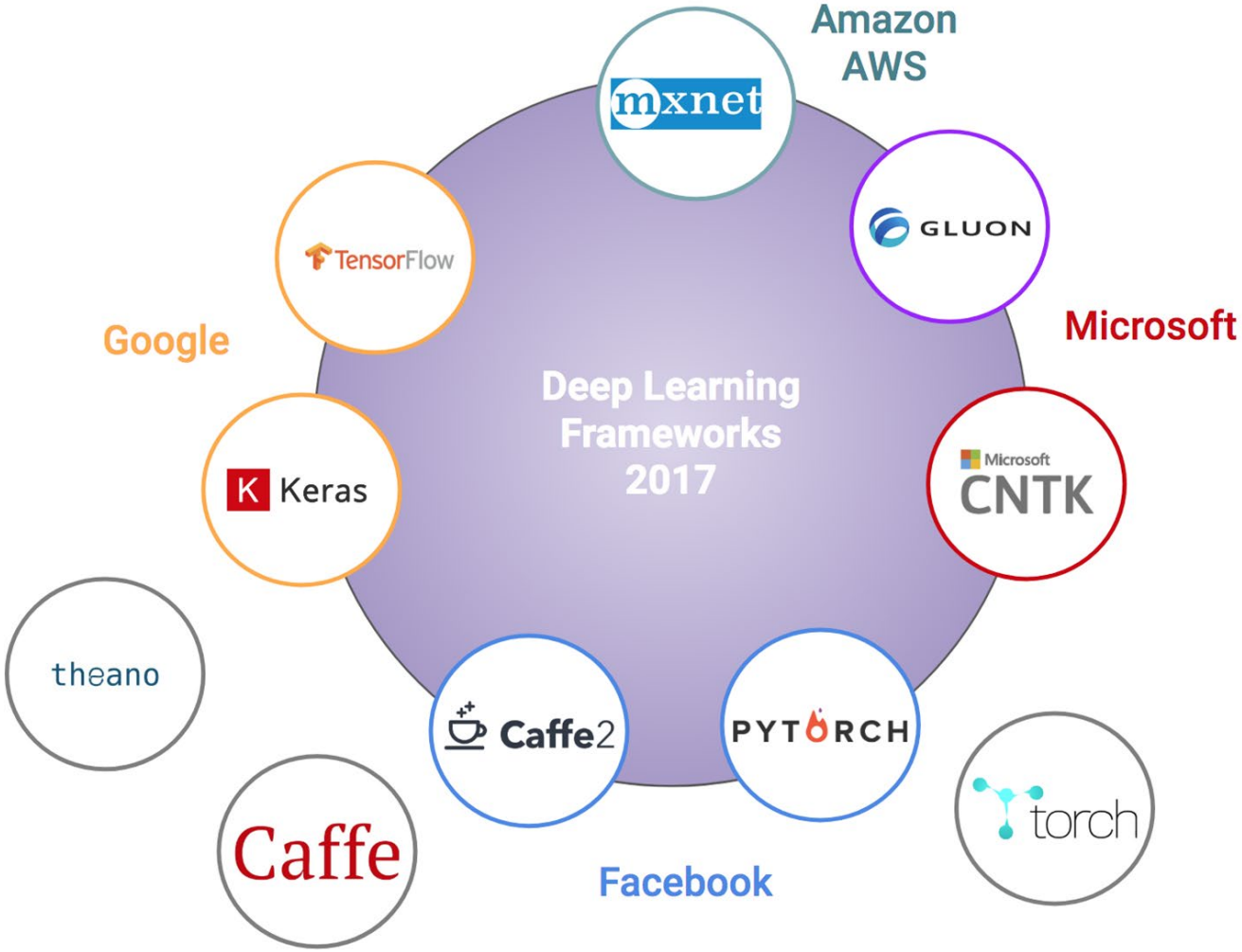
What is a framework?

A library (compilation of functions) that forces the user to write code in a certain way.

To use DL Frameworks we have to transform our data into Tensors (matrix of matrices).



DL Frameworks available

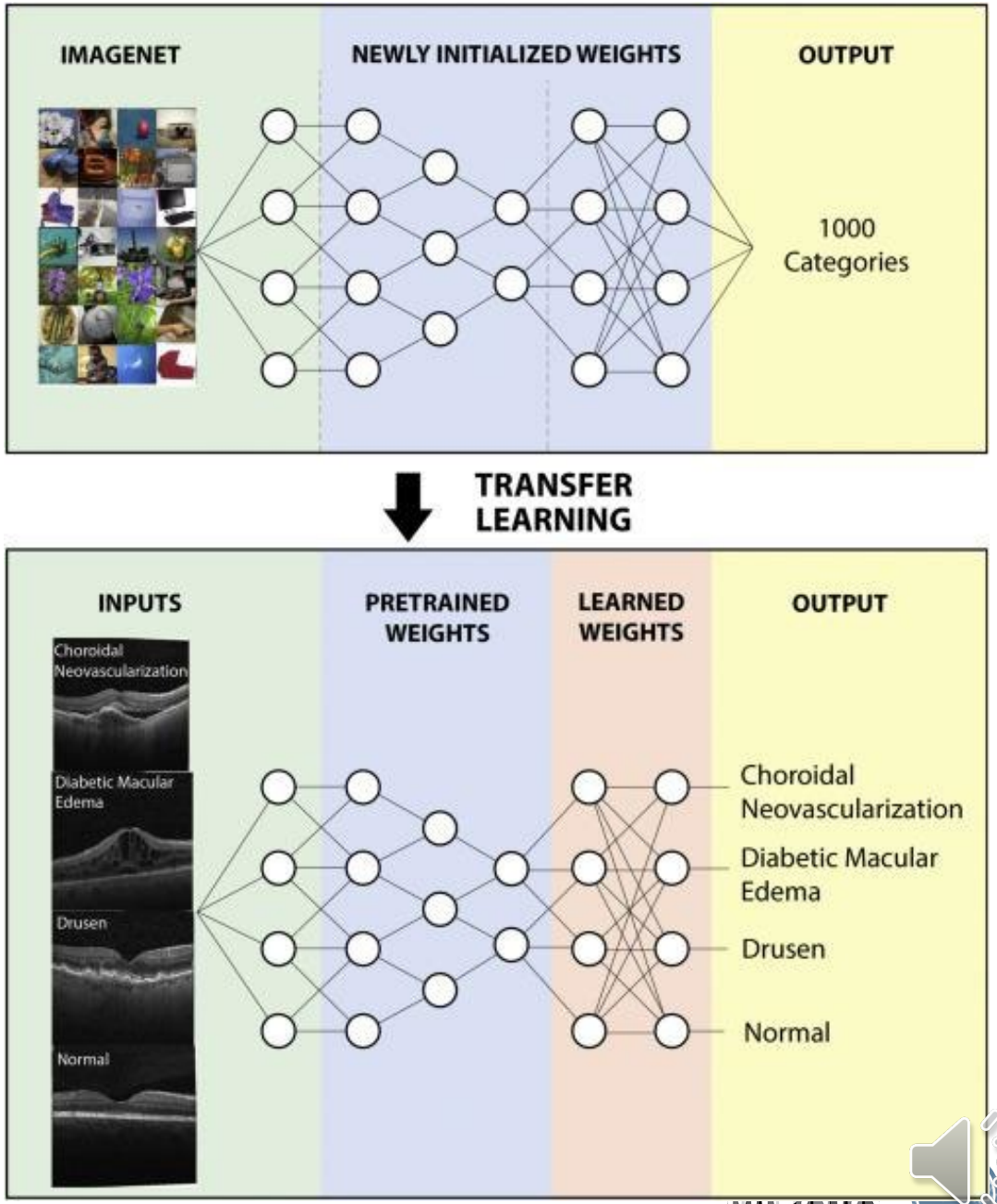


What is Transfer Learning?

Use an already trained model as base for your dataset.

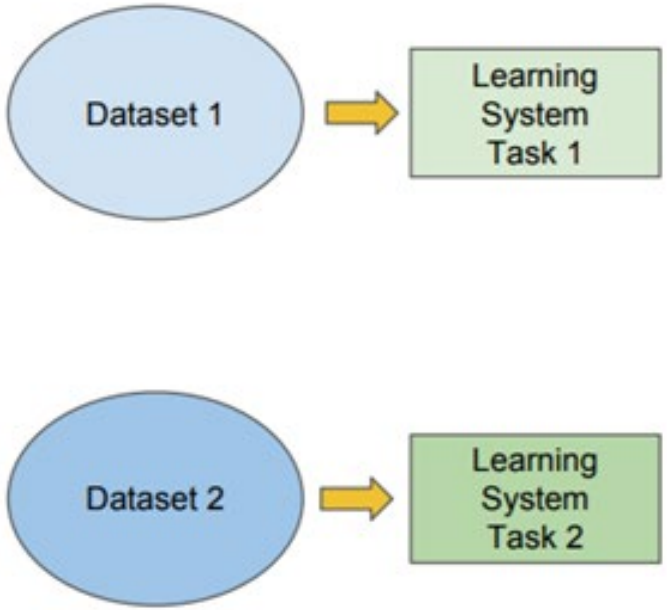
Reduce overfitting on small datasets.

Base models are known as back models.

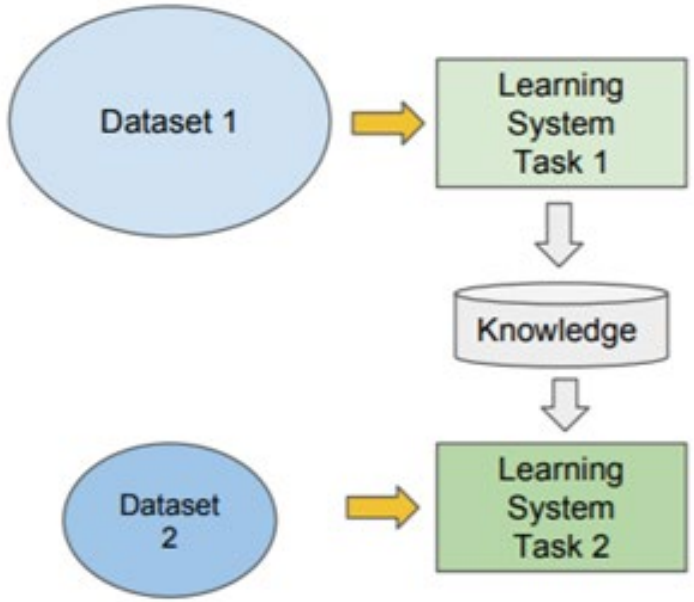


Traditional ML vs Transfer Learning

- Isolated, single task learning:
  - Knowledge is not retained or accumulated. Learning is performed w.o. considering past learned knowledge in other tasks



- Learning of a new tasks relies on the previous learned tasks:
  - Learning process can be faster, more accurate and/or need less training data



Popular Transfer Learning Models

VGG-16

VGG-19

Inception V3

XCeption

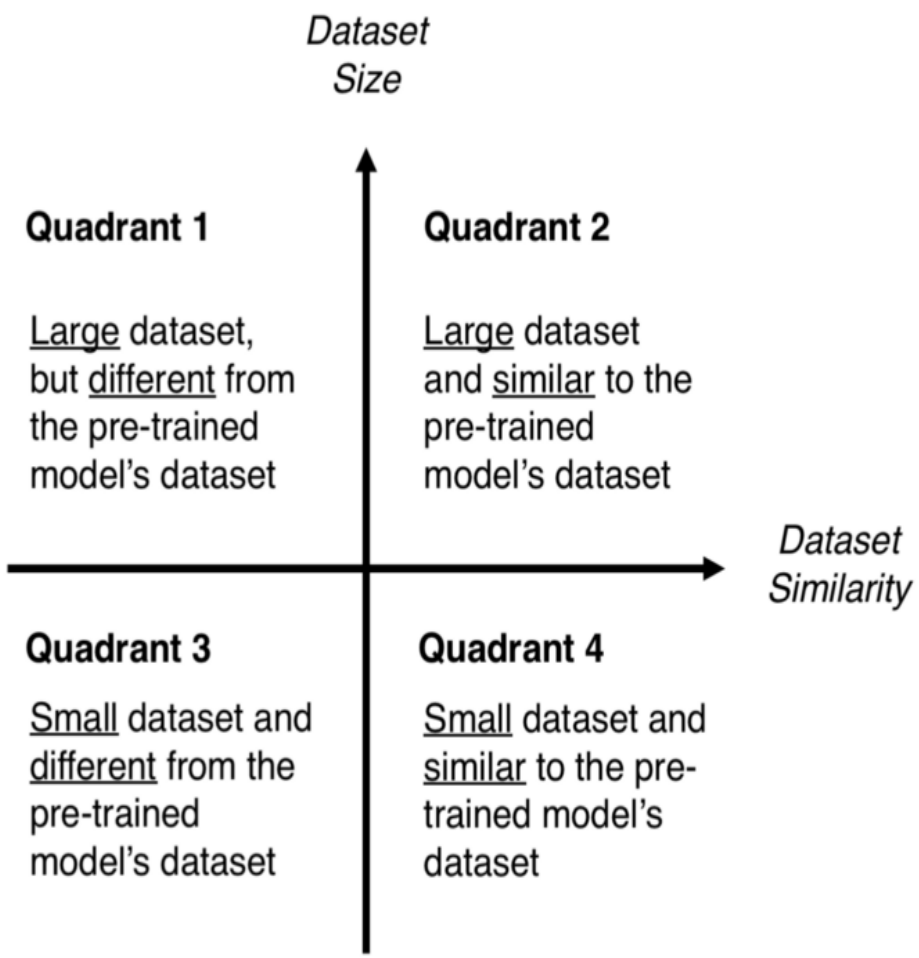
ResNet-50

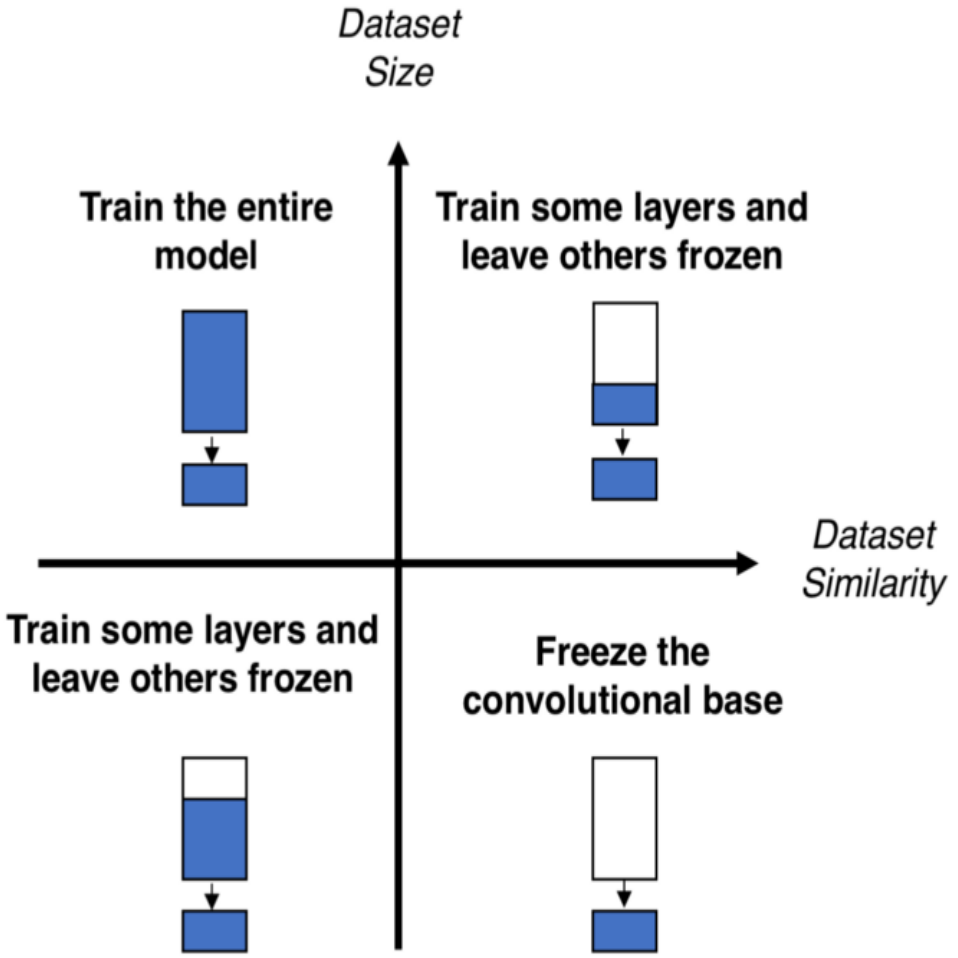
EfficientNet

Vision Transformers

Try different ones. Depending on the problem the models can give the same accuracy.

Transfer Learning





Freeze: Don't change the weights on the layers. Keep the knowledge intact.

End of Lecture 1

Next up Part 4 Lecture 2a:
Critical Review of AI/ML Publications