



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai



Build an Entrepreneurial Mindset Through Our Design Thinking FrameWork

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

23AMB201 - MACHINE LEARNING

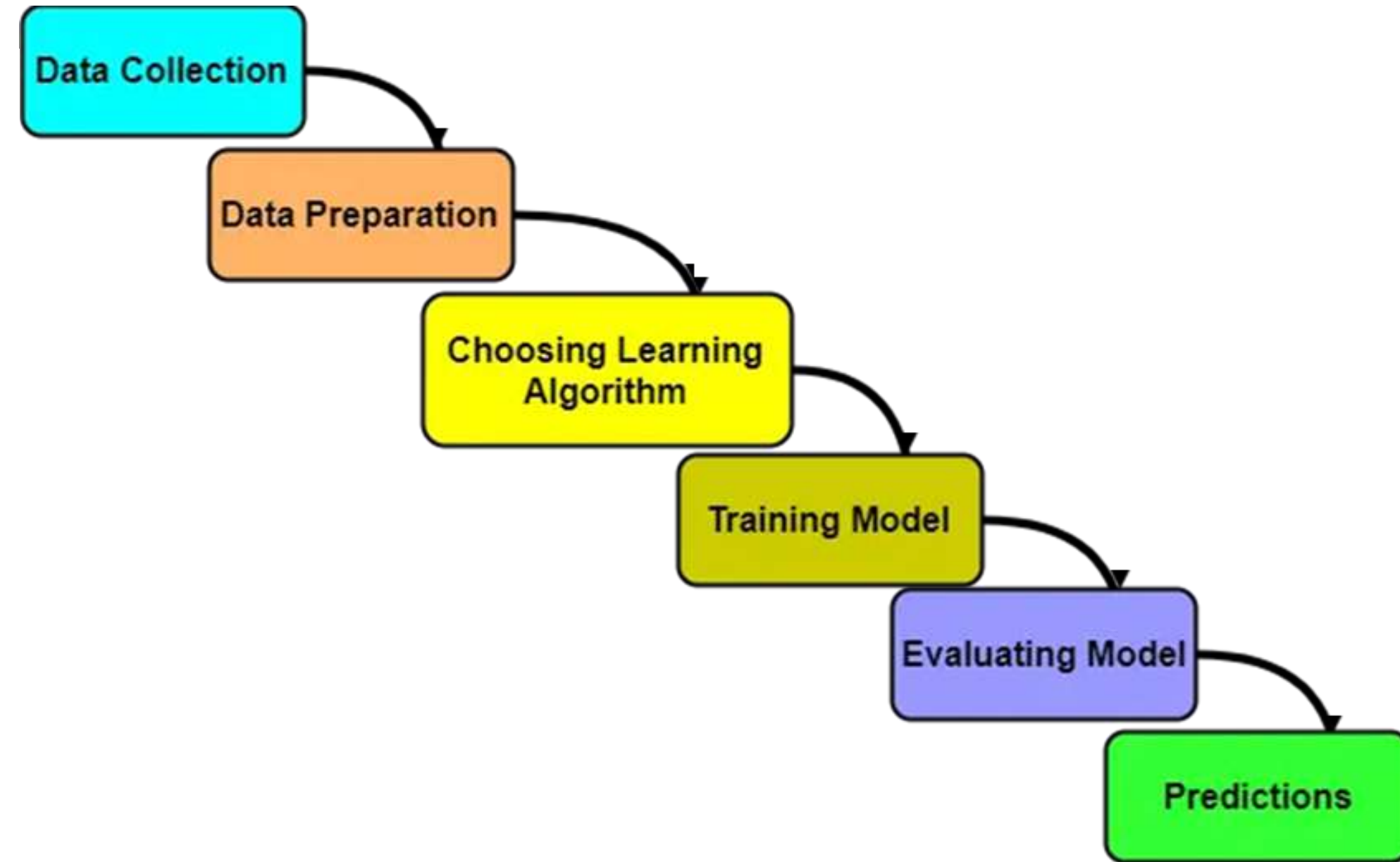
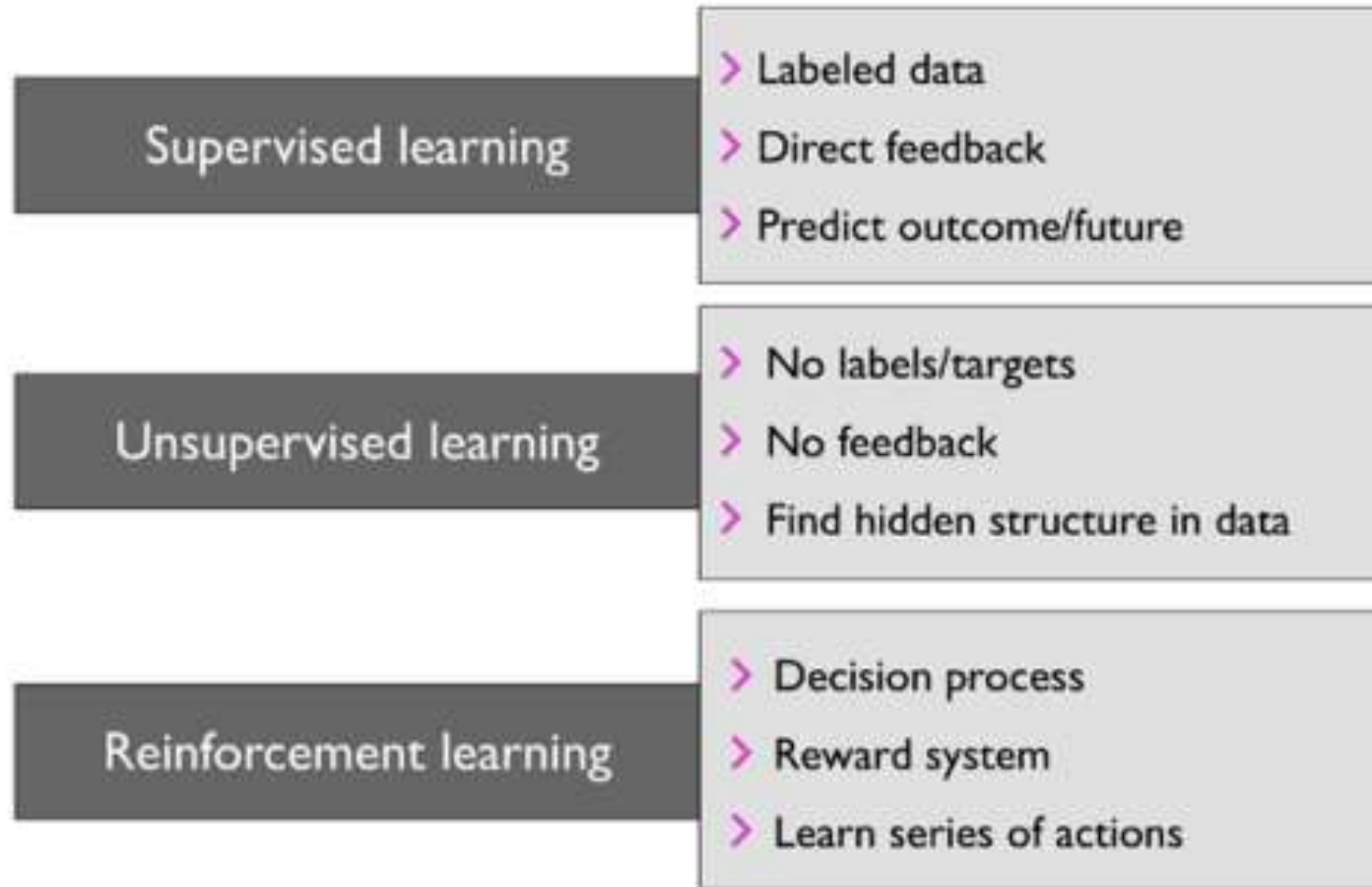
II YEAR IV SEM

UNIT I – INTRODUCTION

TOPIC 3– Testing Machine Learning algorithms

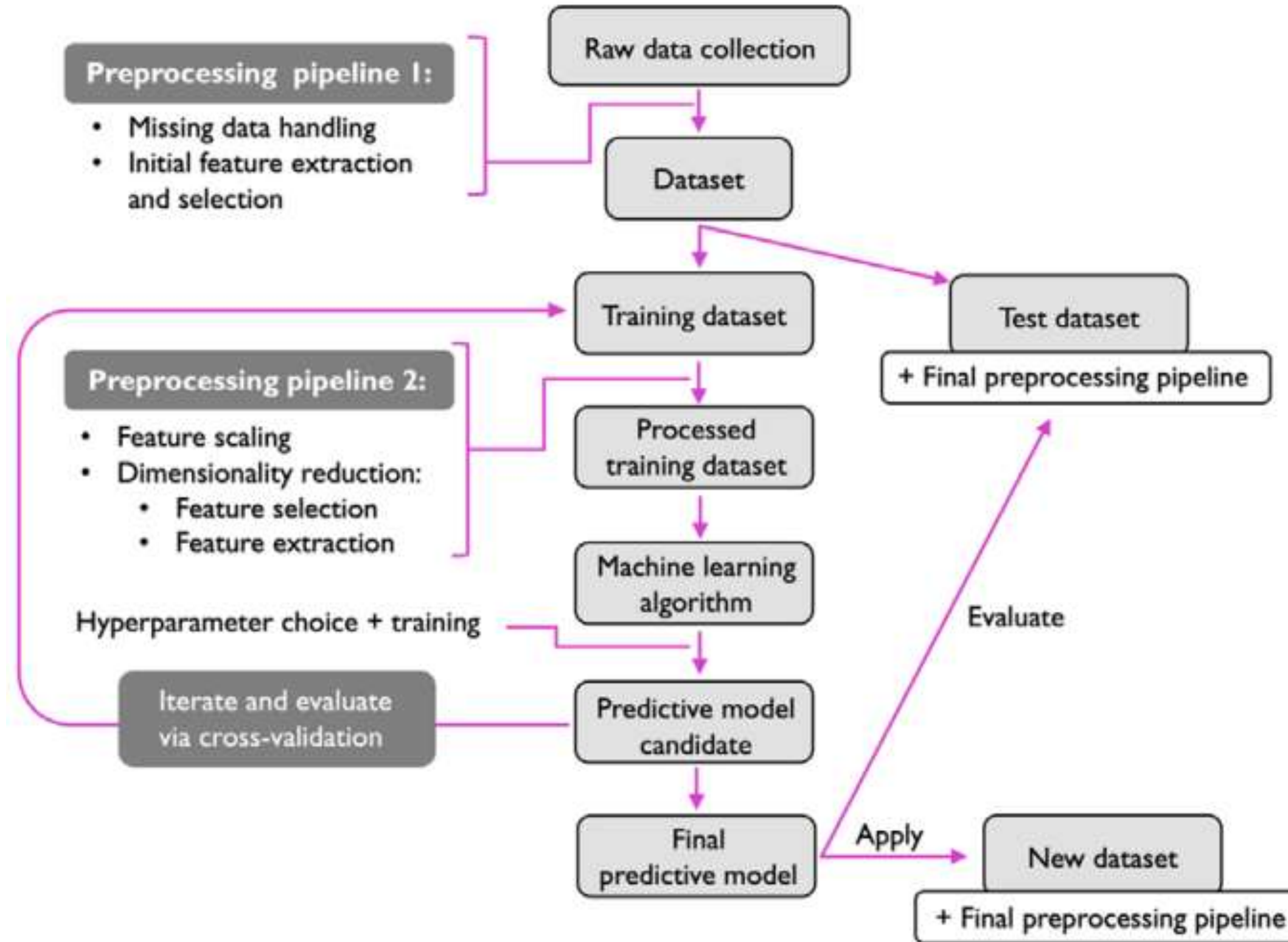


Recall: Machine Learning types and Process





Roadmap for building Machine Learning System





Why? Testing ML algorithms

1. **Quality assurance** is required to make sure that the system works according to the requirements.
2. Split the database into three non-overlapping sets.
 1. Training set
 2. Validation set
 3. Testing set

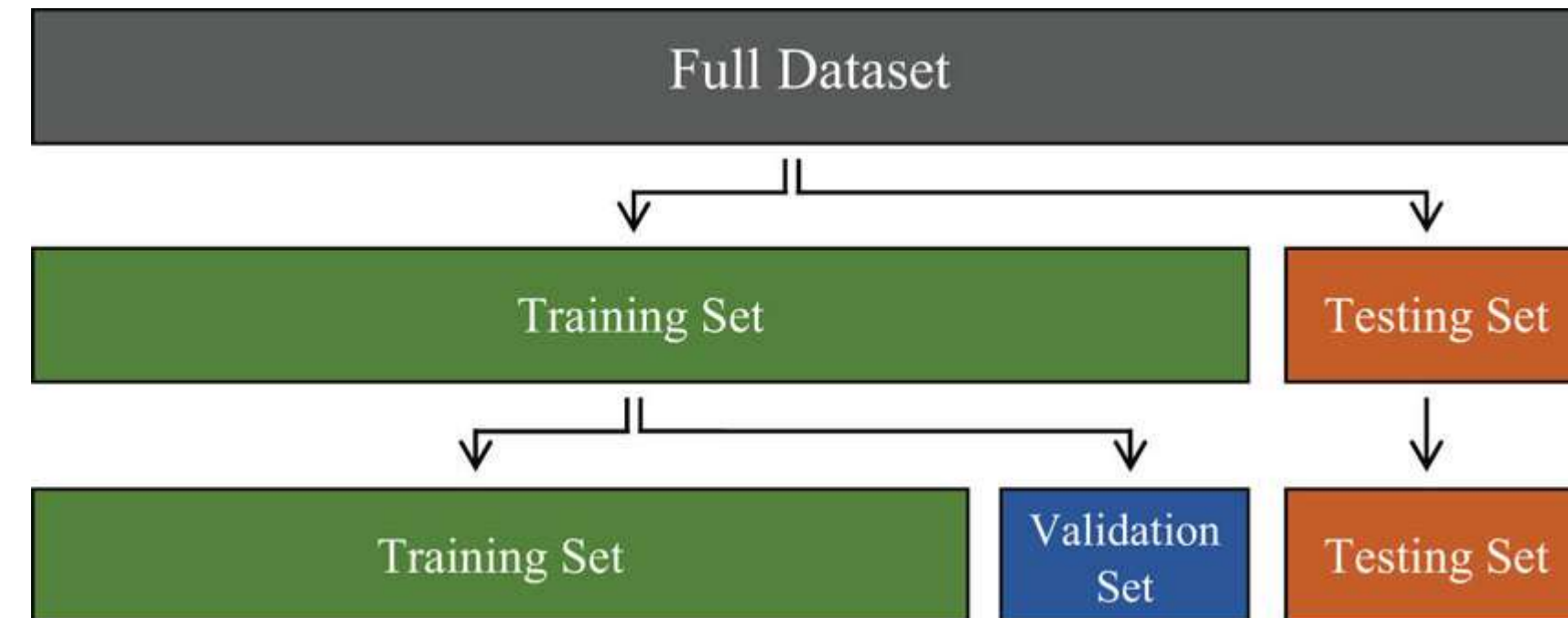
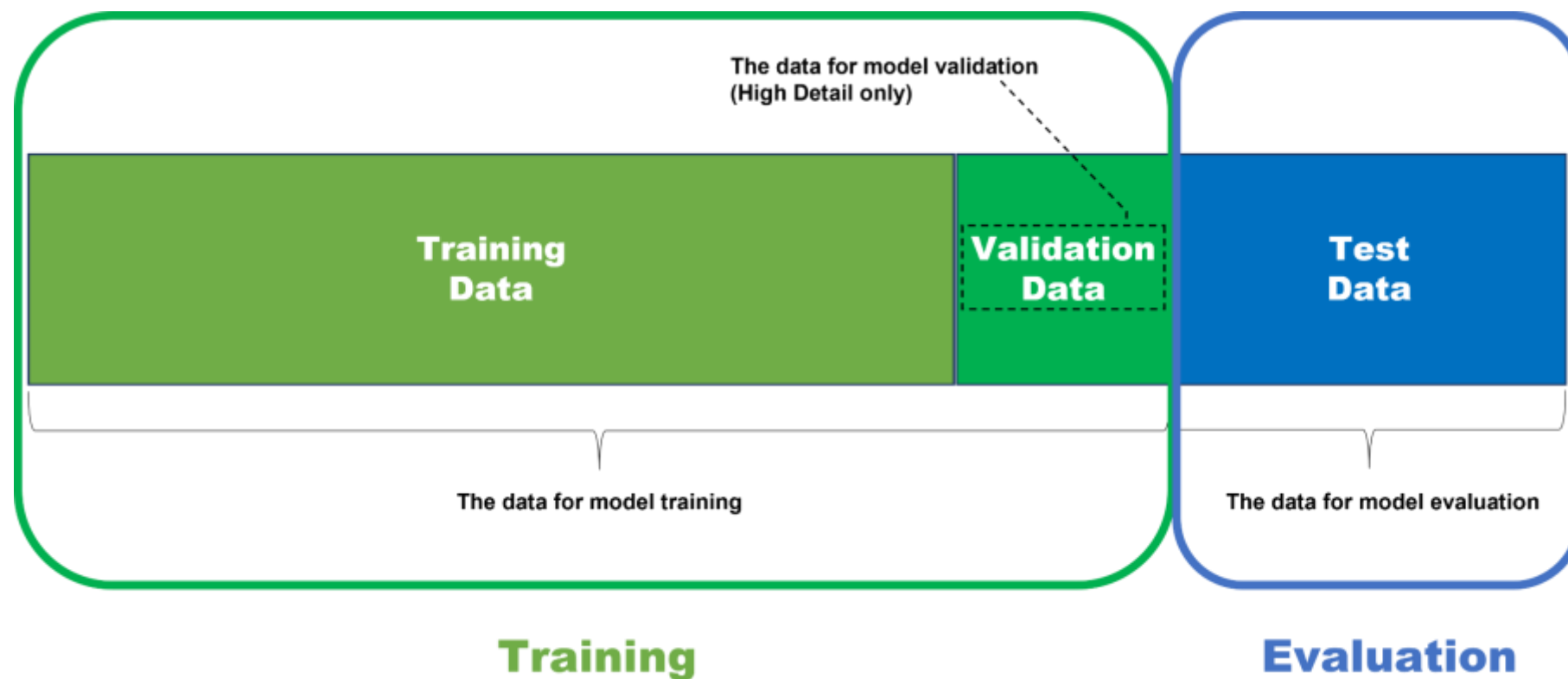




Testing Machine Learning algorithms

TRAINING SET
The subset of data used to train a machine learning model

VALIDATION SET
The intermediary subset of data used during the model development process to fine-tune hyperparameters



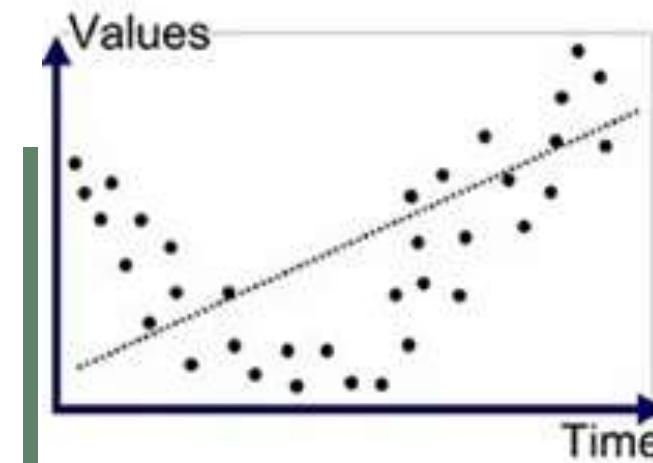
TEST SET
The subset of data used to evaluate the performance of a trained machine learning model on unseen examples, simulating real-world data



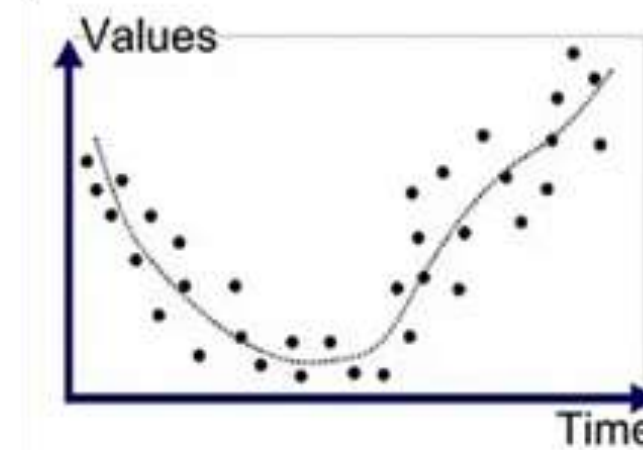
Cross Validation



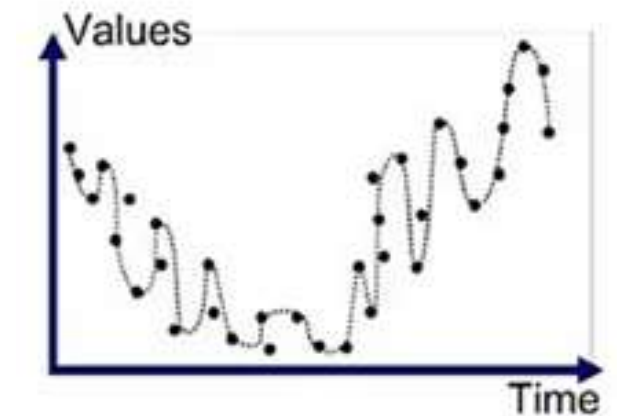
1. Cross-validation is a technique for evaluating a machine learning model and testing its performance.
2. Cross-validation is a technique used to evaluate the performance of a machine learning model by training it on different subsets of the data and testing it on the remaining subset.
3. Methods:
 1. K Fold Cross validation
 2. Leave one out validation
 3. Leave P Out validation



Underfitted



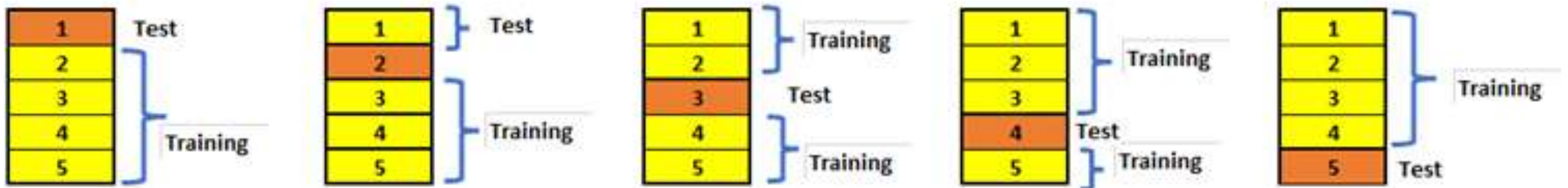
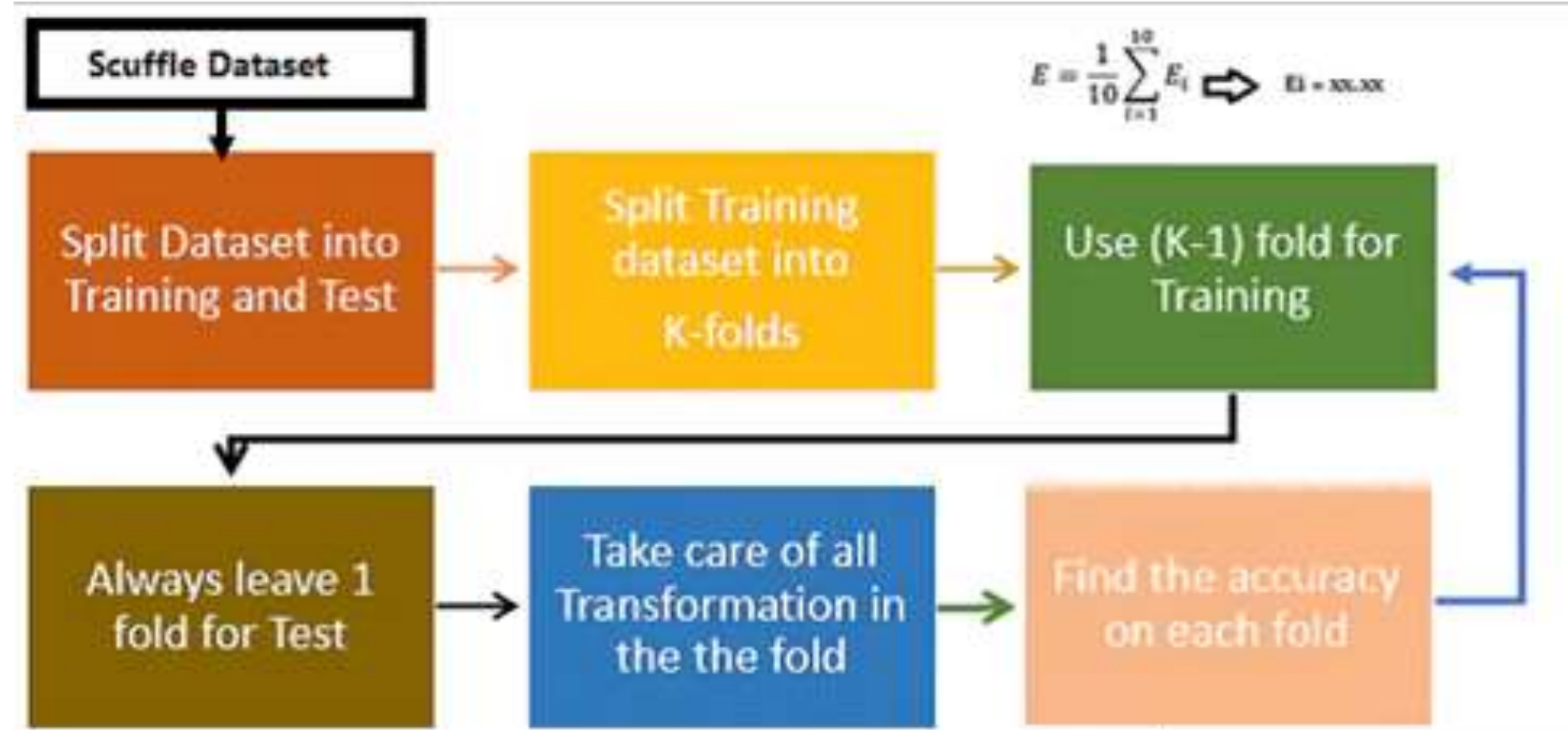
Good Fit/Robust



Overfitted

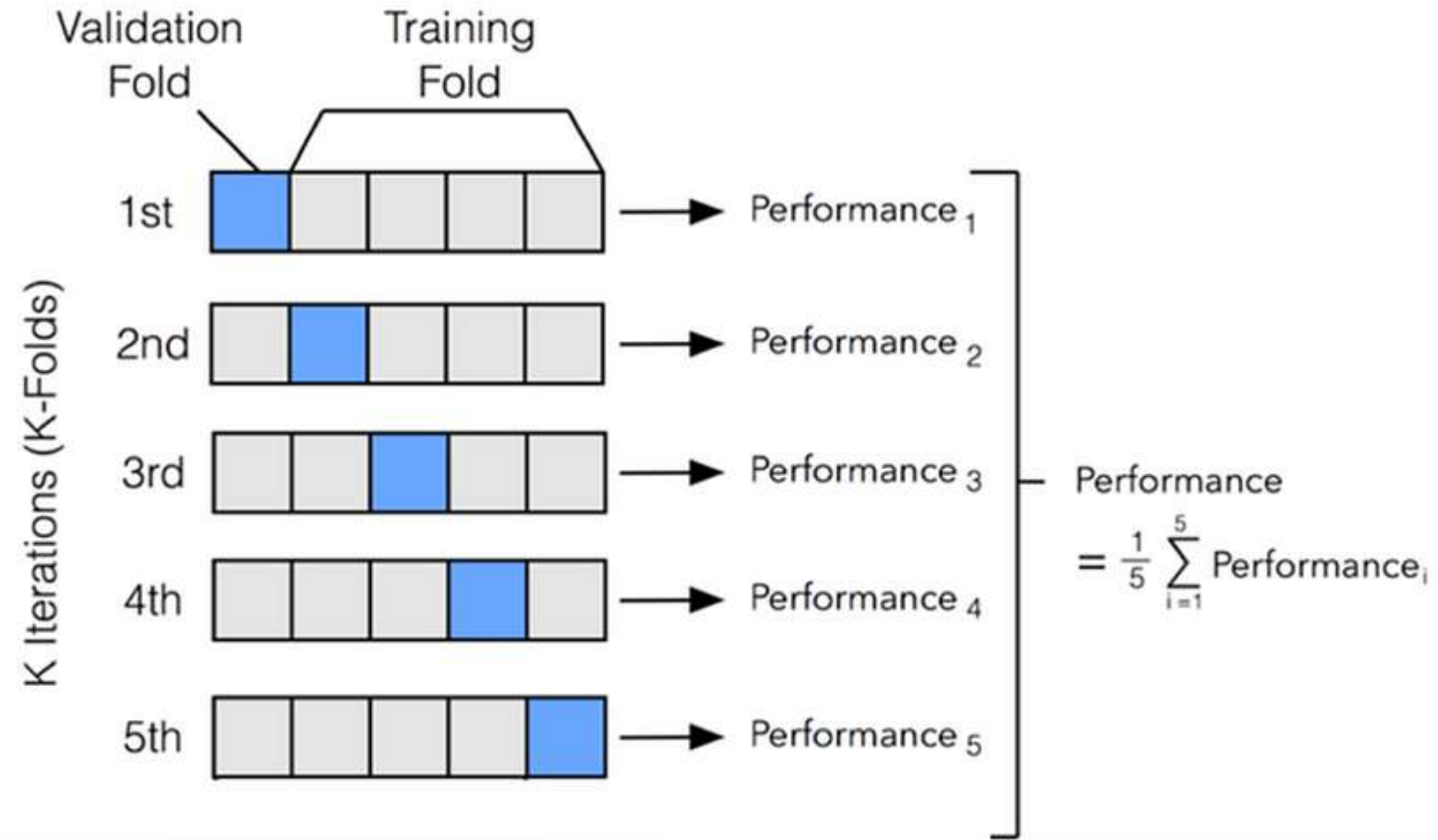


K Fold Cross Validation





K fold cross validation



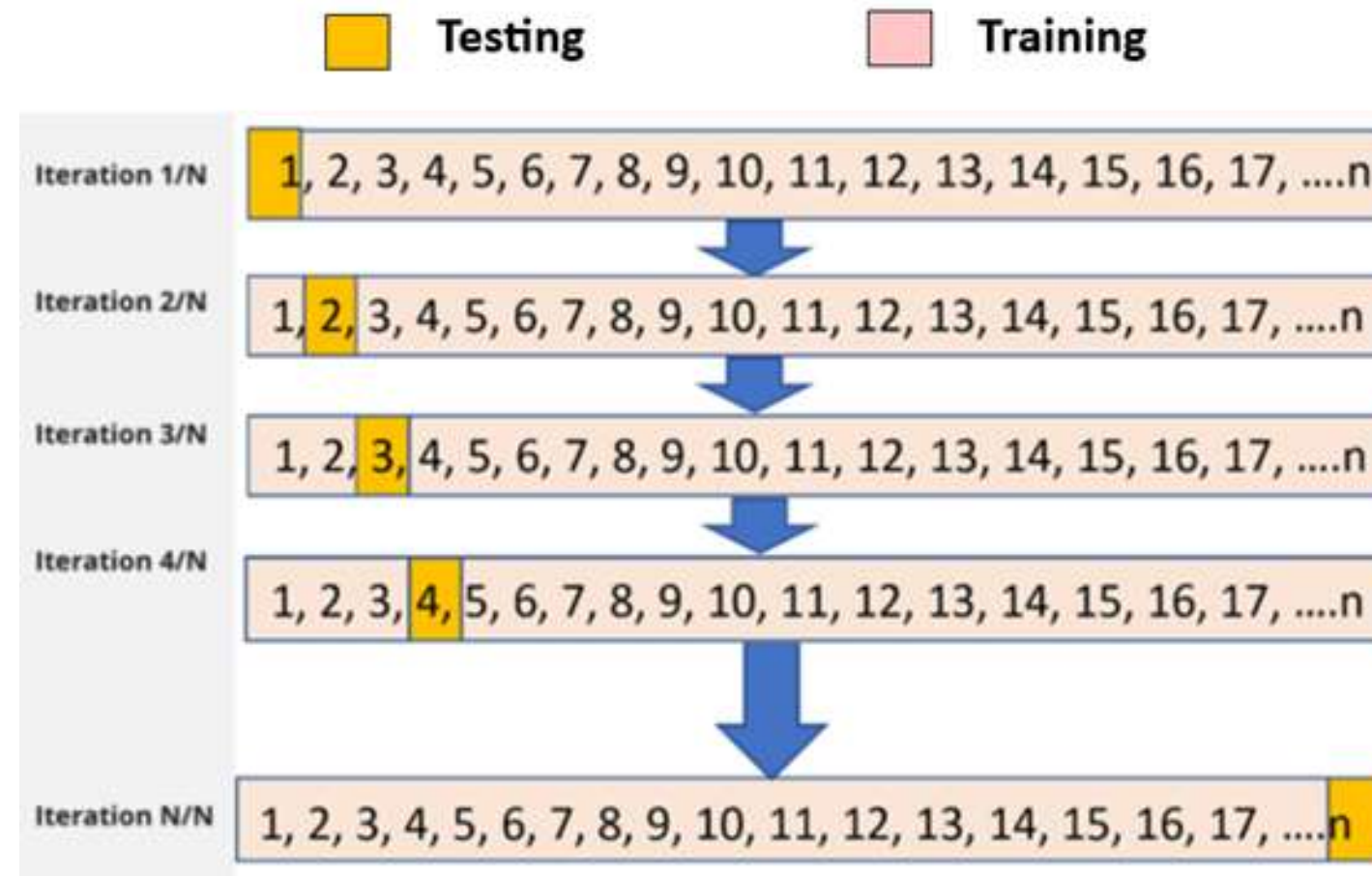


Leave one out cross validation



1. Use $n-1$ samples of the dataset as the training set and 1 sample as the test set.
2. Where n is the total number of samples in the dataset.
3. This process is repeated n times, each time leaving out a different sample as the test set.

LOOCV: Leave One Out Cross Validation

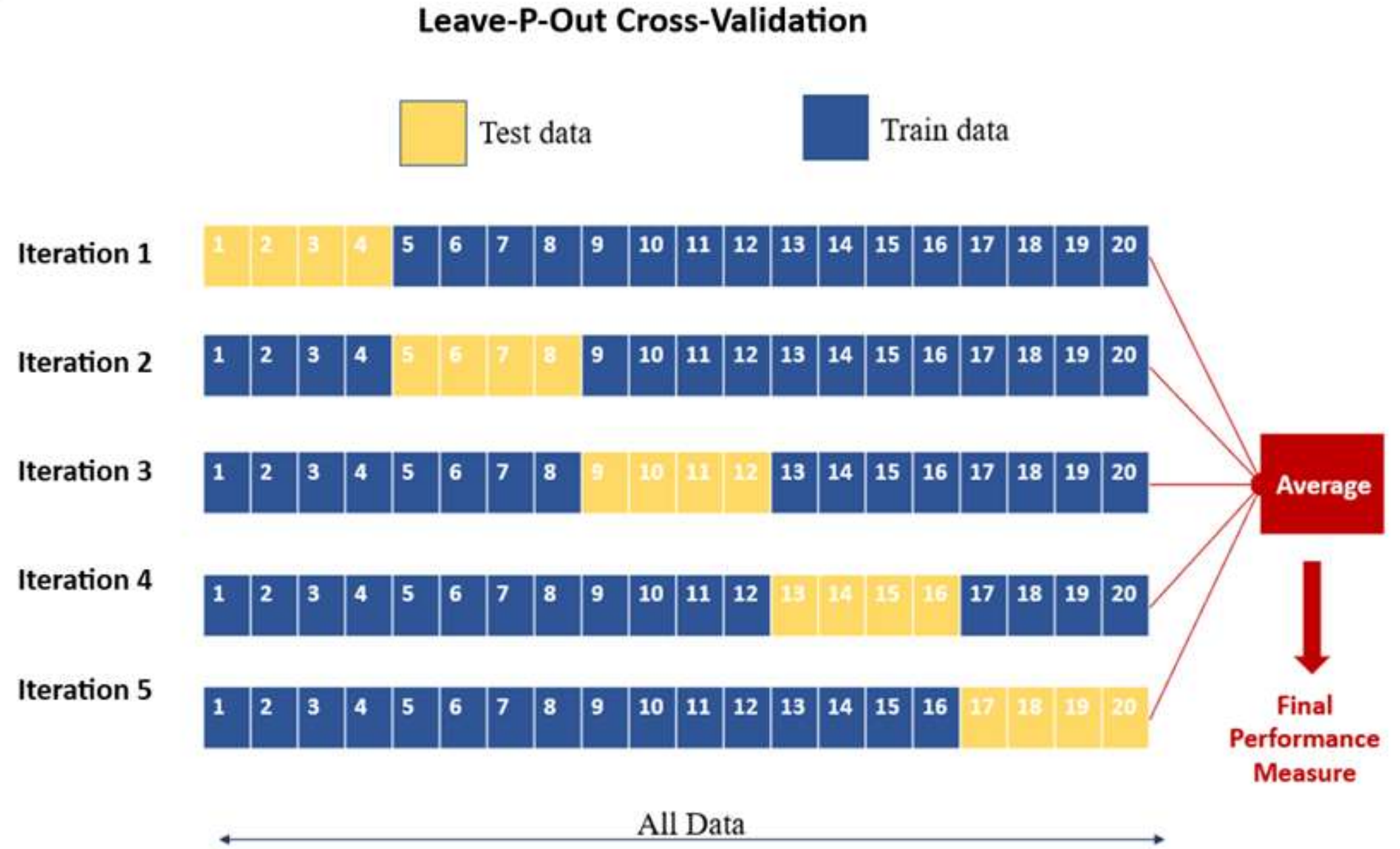




Leave P out validation



Similar to Leave-One-Out (LOO) but instead of leaving out one sample at a time, it leaves out p samples at a time.





What are the best tools for Machine Learning Model Testing?



Manual testing of a tools for machine learning

- WEKA
- PyCharm
- Spyder

Tools which can be for automating testing

- Testim.io
- Appvance
- Test.ai
- Functionize





References

1. Aurélien Géron "Hands-On Machine Learning with Scikit-Learn and TensorFlow" Publisher(s): O'Reilly Media, Inc 2017.
2. <https://medium.com/@ompramod9921/cross-validation-623620ff84c2>
3. <https://serokell.io/blog/machine-learning-testing>

Thank You