Model Evaluation

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VALIDATION

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- 1. Want to estimate the generalization performance, the predictive performance of our model on future (unseen) data.

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Main points why we evaluate the predictive performance of a model:

- 1. Want to estimate the generalization performance, the predictive performance of our model on future (unseen) data.
- 2. Want to increase the predictive performance by tweaking the learning algorithm and selecting the best performing model from a given hypothesis space.
- 3. Want to identify the ML algorithm that is best-suited for the problem at hand; thus, we want to compare different algorithms, selecting the best-performing one as well as the best performing model from the algorithm's hypothesis space

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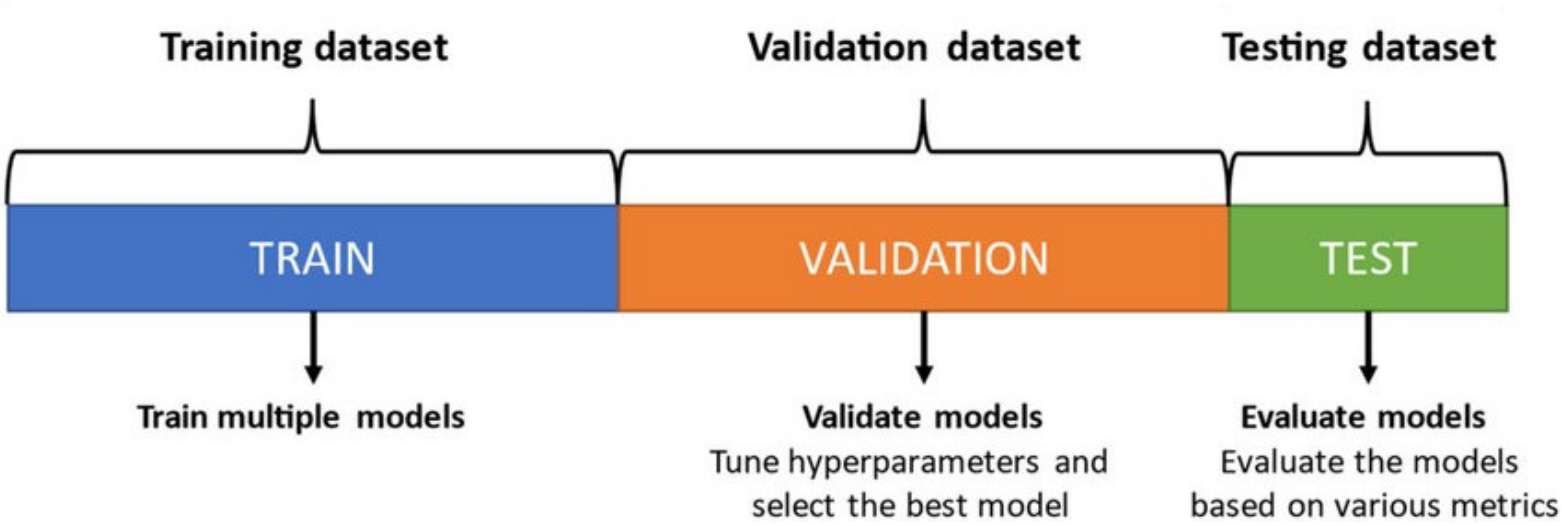
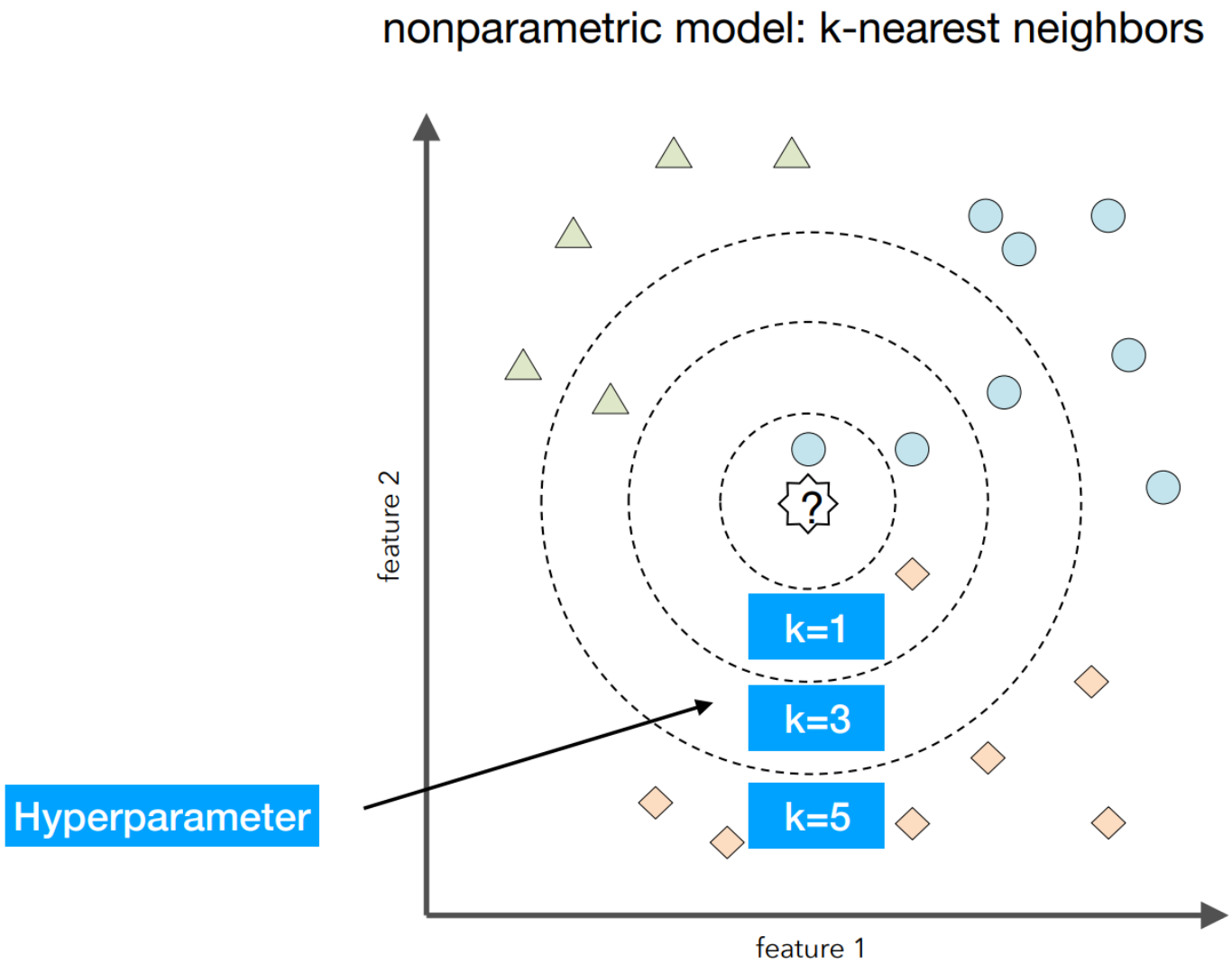
- (in practice, it is actually pessimistically biased; why?)

Validation

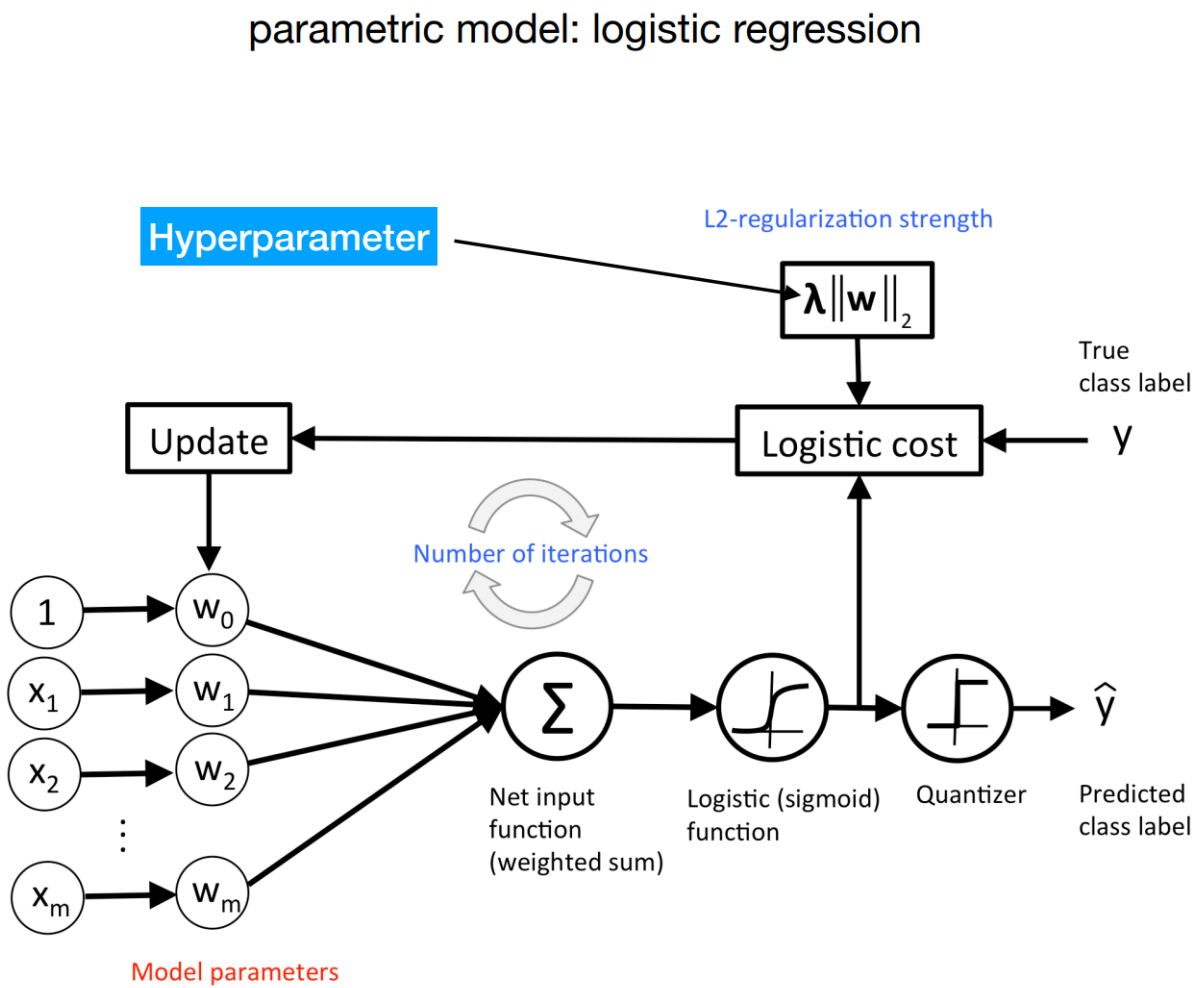

Training dataset
Validation dataset
Testing dataset
TRAIN
VALIDATION
TEST
Train multiple models
Validate models
Tune hyperparameters and select the best model
Evaluate models
Evaluate the models based on various metrics

Hyperparameters

Hyperparameters



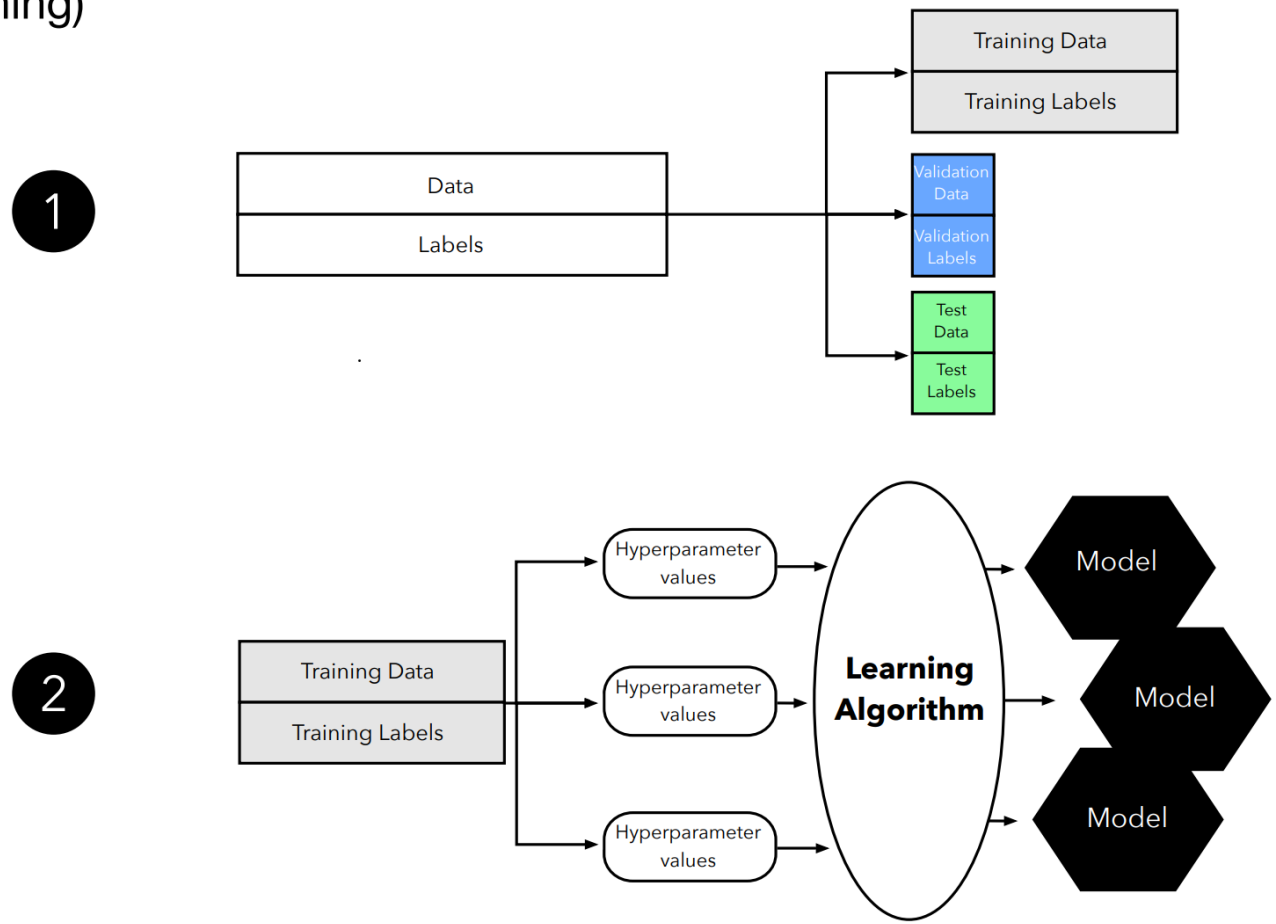
Hyperparameters



Holdout Validation

Holdout Validation

Holdout validation
(hyperparam. tuning)



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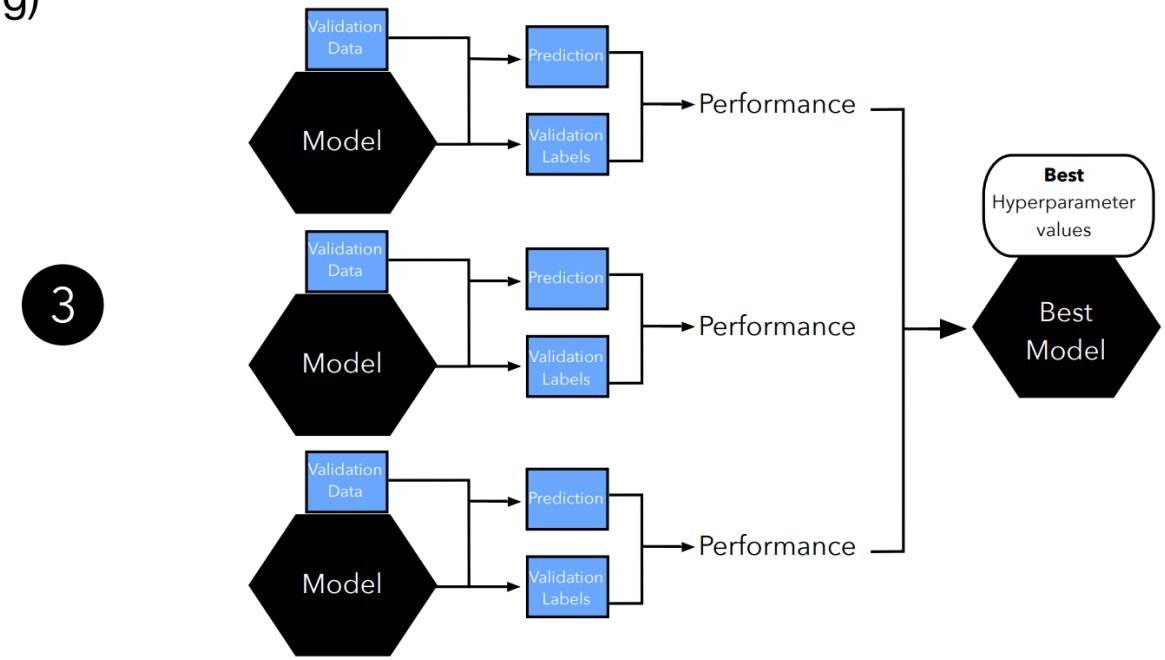

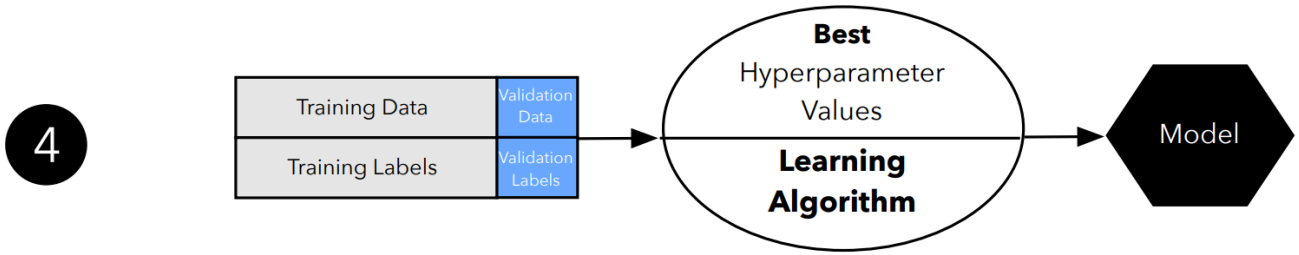

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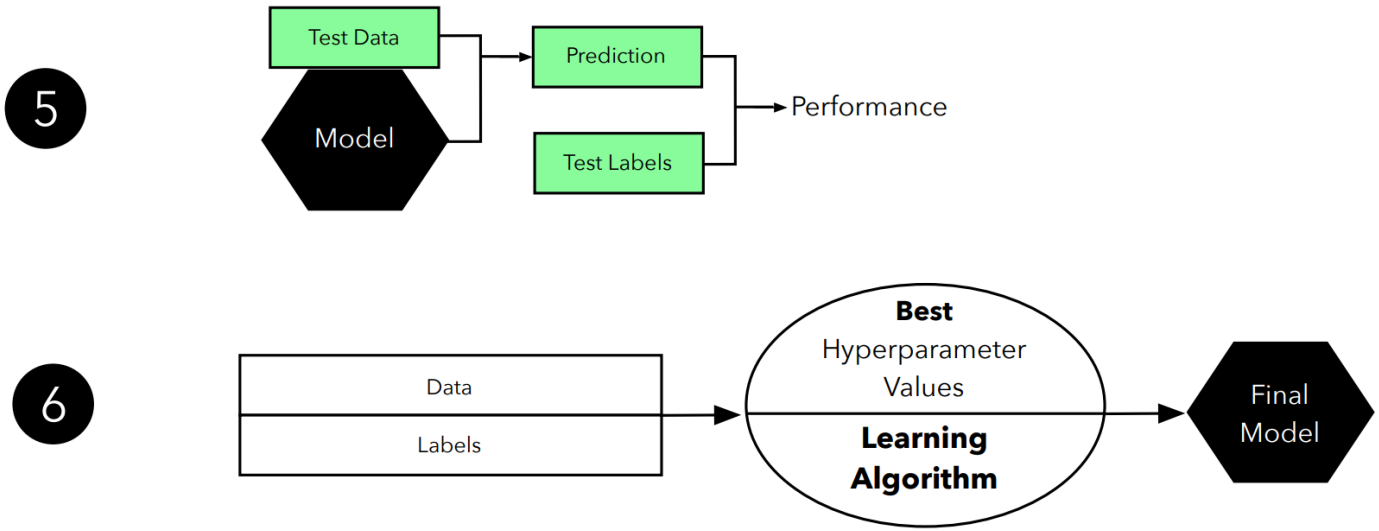

k-Fold Cross-Validation

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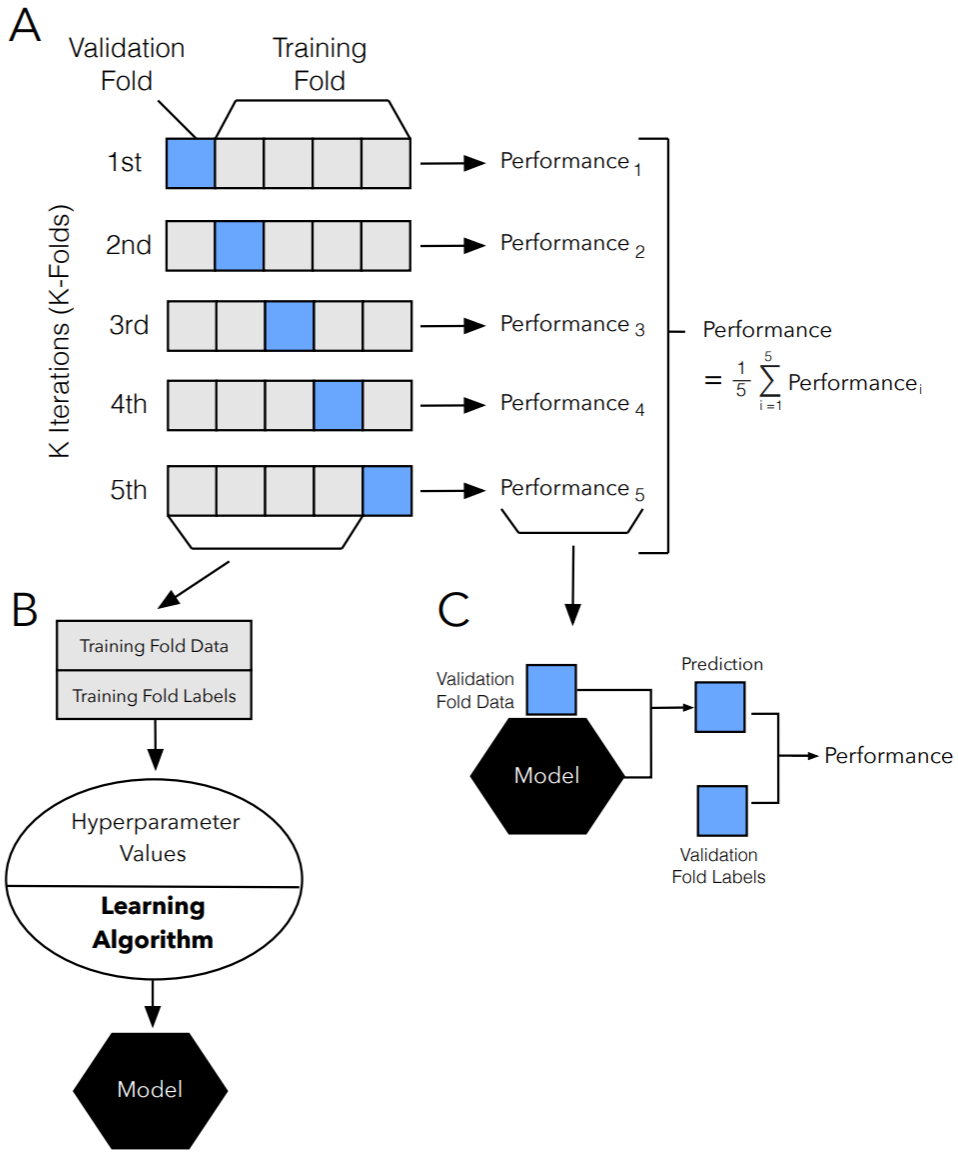
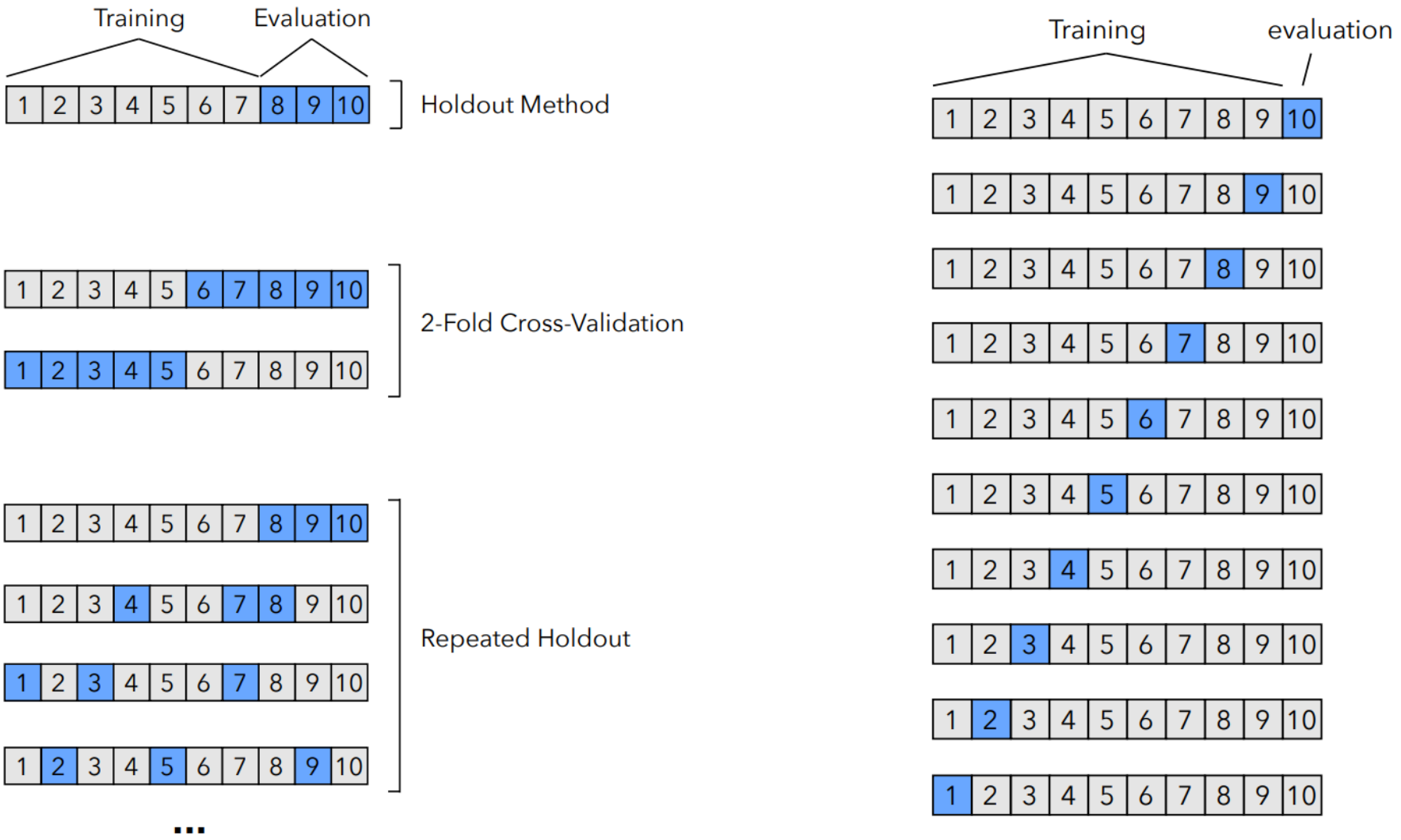


Types of validation



Model Selection

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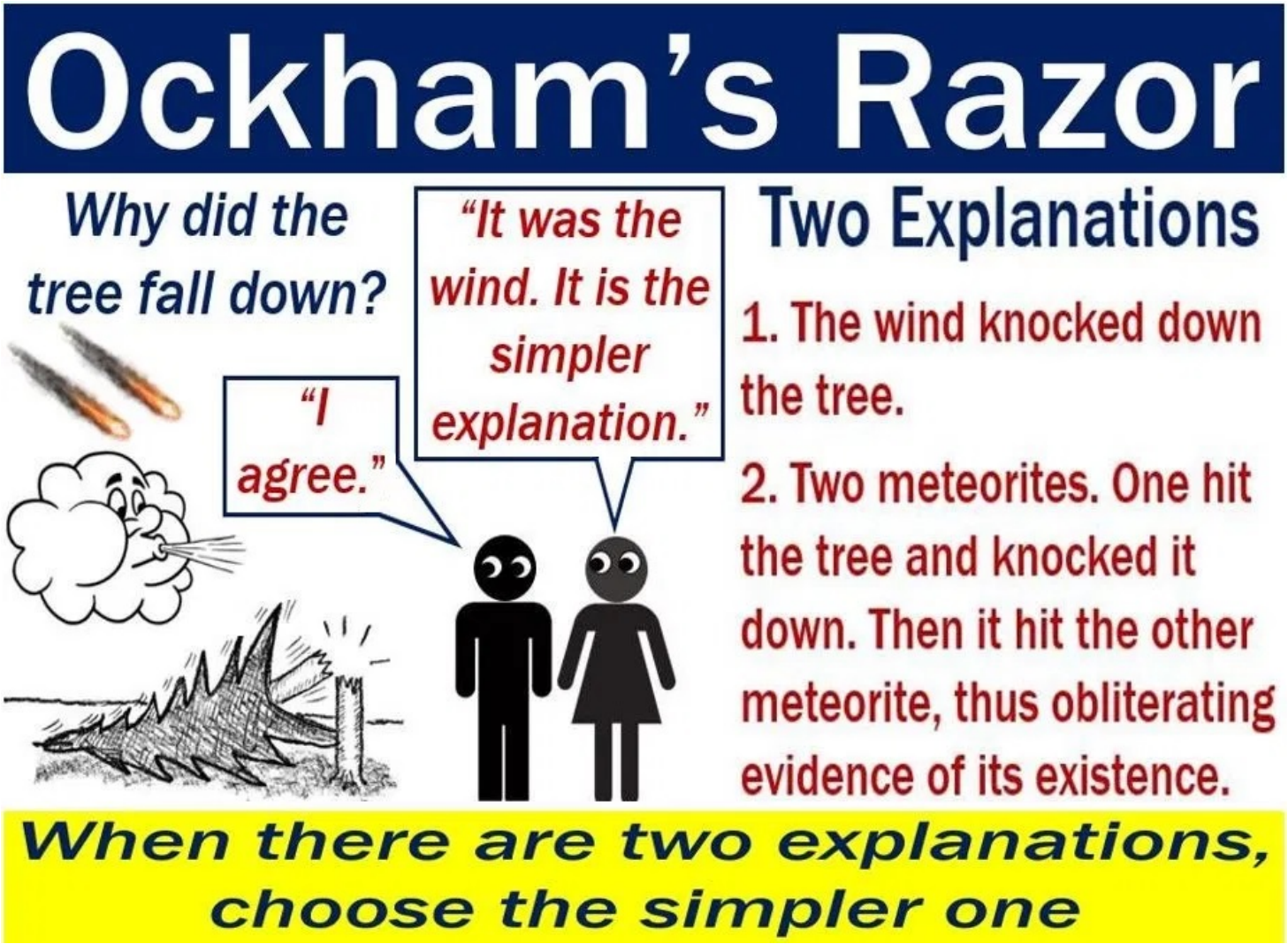

Thank You!

Any Question?