Hyperparameter tuning (model selection)

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Parameters - internal variables of a model that are learned from the data during the training process. They define the model's representation of the underlying patterns in the data.

The goal of the training process is to find the optimal values for these parameters, which minimize the discrepancy b/w the model's predictions & the actual outcomes.

Hyperparameters - Whose values are set bf the learning process begins. These parameters are nst learned from the data & must be predefined. They help in controlling the learning process & can significantly influence the performance of the model.

Found through trail & error

GridSearchCV - performs an exhaustive search over a specified grid of hyperparameters, using cross-validation to determine which hyperparameter combination gives the best model performance.

HP2 \ HP1	3	5	7
L1	1	2	3
L2	4	5	6
L3	7	8	9

Parameter space ←

→ Total 9 combinations

→ For each combination apply CV & choose combination with best performance. Retrain with best combination.

9 combinations → 9 models → m1, m2, m3, m4, m5 → average metric

Total 45 models

→ Brute force on all possible Hyperparameter combinations
→ Computationally expensive
→ Time
→ Enough time → Best solution

Randomized SearchCV - Randomly try X possibilities & choose the best out of the X possibilities. Other working similar to GridSearchCV.

→ Sub-optimal solution [Best of the lot]

→ NOT totally Random [Research]