Train In Data

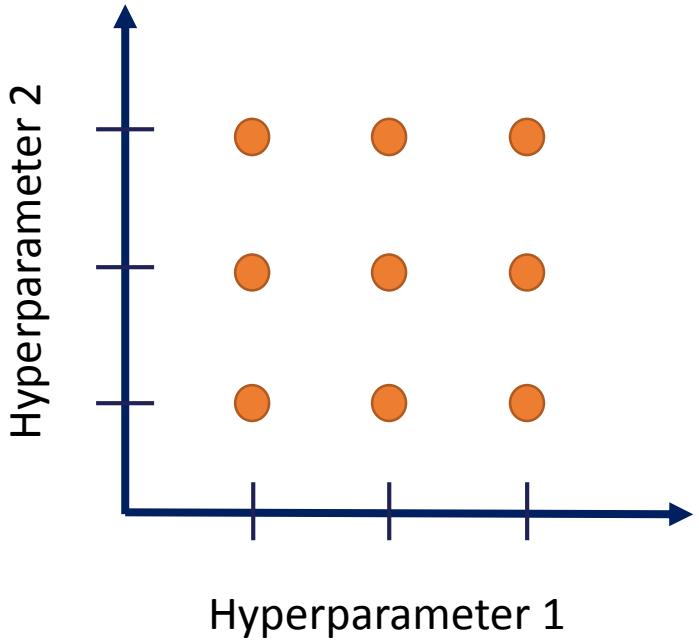
Random Search

Random Search

- Hyperparameter values are selected by independent (random) draws from a uniform distribution of the hyperparameter space.

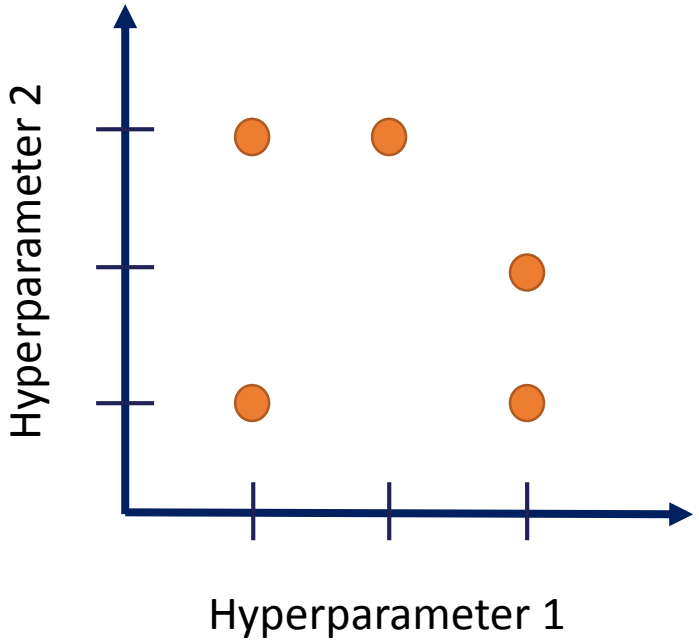
- In plain English, Random Search selects the combinations of hyperparameter values at random from all the possible combinations given a hyperparameter space.

Grid Search of Hyperparameters



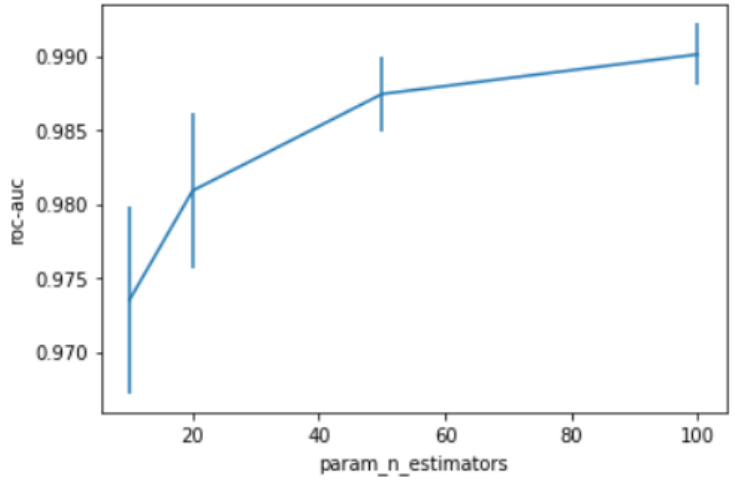
- Examines **all possible combinations** of the specified hyperparameters.

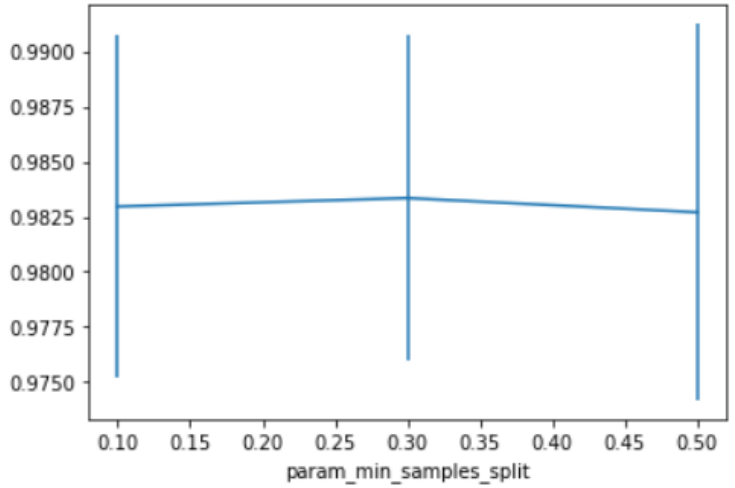
Random Search of Hyperparameters



- Examines **some combinations** of the specified hyperparameters, selected at random.
- User determines the number of combinations to examine.

Random Search & Low Effective Dimension

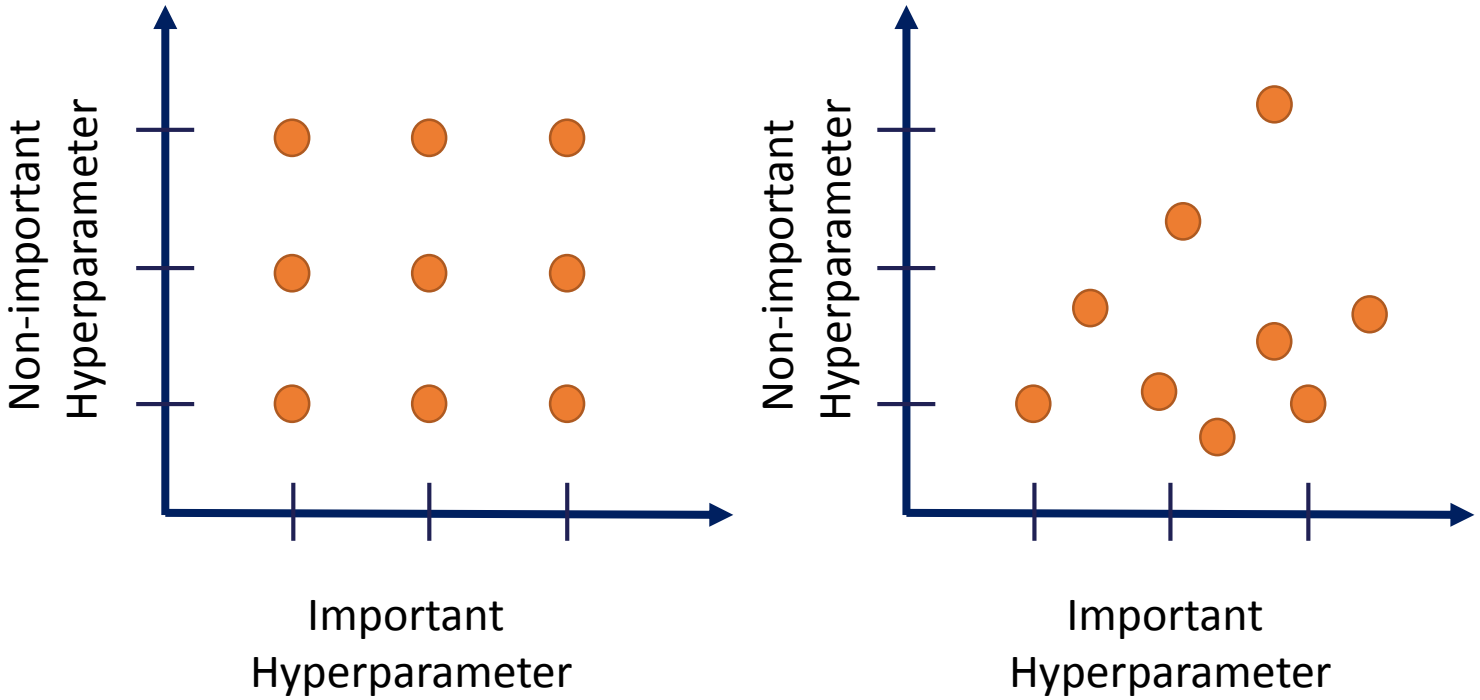




Some parameters affect performance a lot.

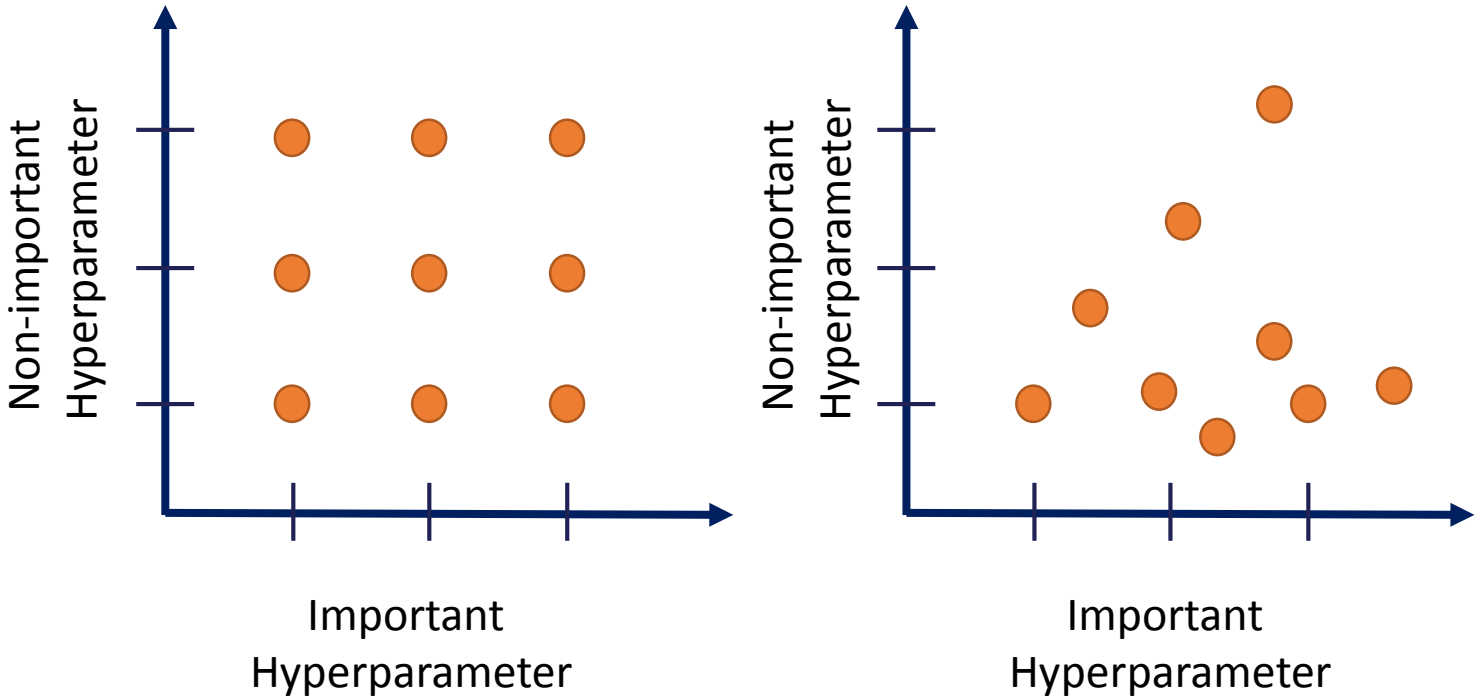
And some others don't.

Grid vs Random Search



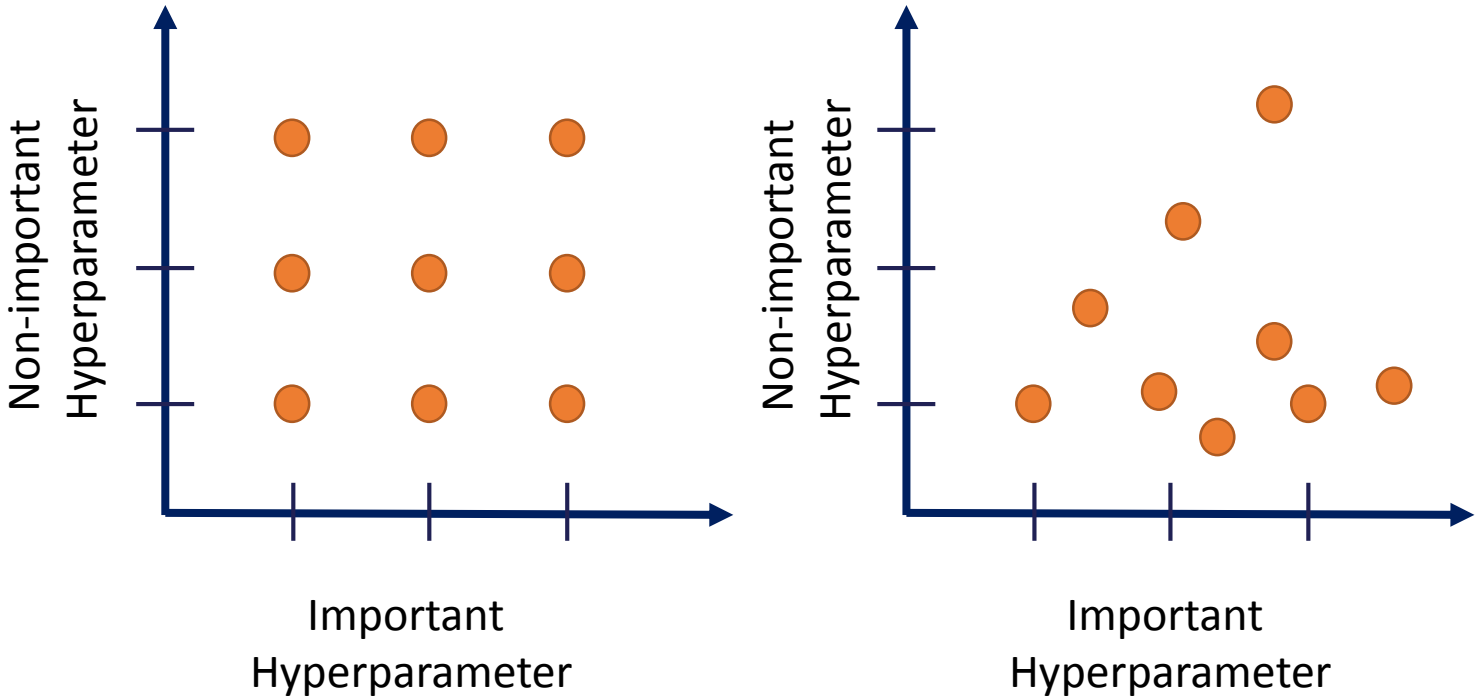
- Random Search allows the exploration of more dimensions of the important parameter
- Grid Search wastes time exploring non-important dimensions

Grid vs Random Search



- Random Search selects values from a distribution of parameter values
- As opposed to Grid Search where parameters are defined manually.

Grid vs Random Search



- Random Search is suitable for continuous hyperparameters

Random Search - Advantages

- It can be parallelized.
- High efficiency in high dimensional spaces.
- Well suited for continuous hyperparameters.

- Small reduction in efficiency in low dimensional spaces

Grid vs Random Search

	Grid Search	Random Search
Parallelize	✓	✓
Effective in high dimension	✗	✓
Effective in low dimension	✓	
Suited for continuous hyperparameters	✗	✓
Hyperparameter values	Manually defined	Drawn from a distribution

Random Search - Considerations

- We choose a (computational) budget independently(ish) of the number of parameters and possible values.
- Adding parameters that do not influence the performance does not decrease efficiency of the search (if enough iterations are allowed).
- Important to specify a continuous distribution of the hyperparameter to take full advantage of the randomization.

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THANK YOU

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