K Fold Cross Validation

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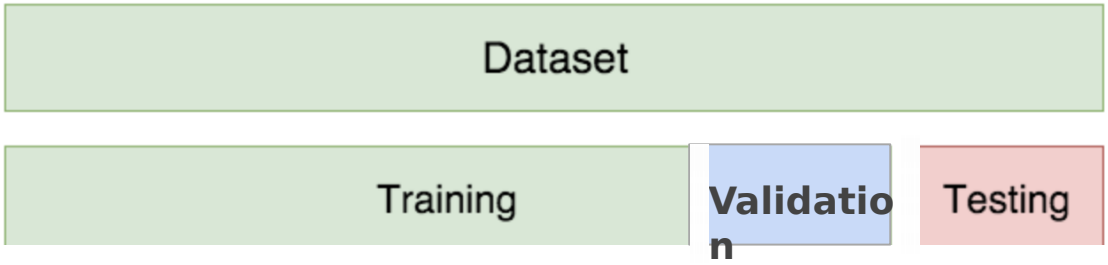

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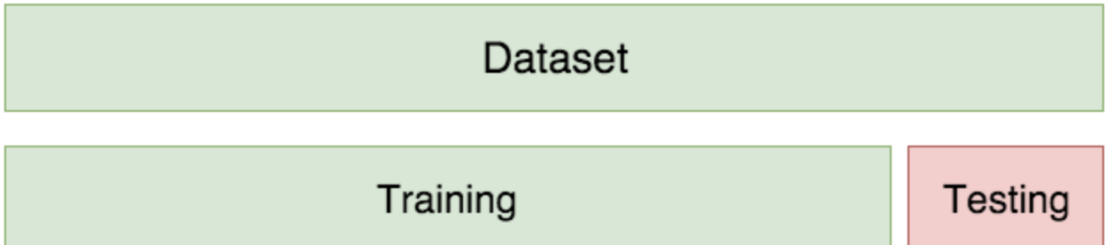

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K Fold Cross Validation : Procedure

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- Shuffle the dataset randomly.

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K Fold Cross Validation : Procedure

- Shuffle the dataset randomly.
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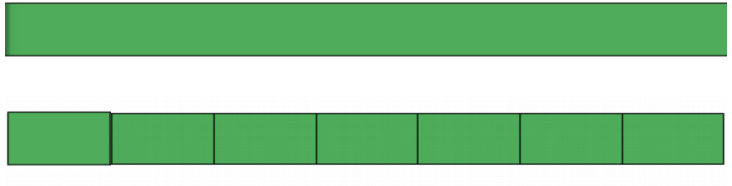
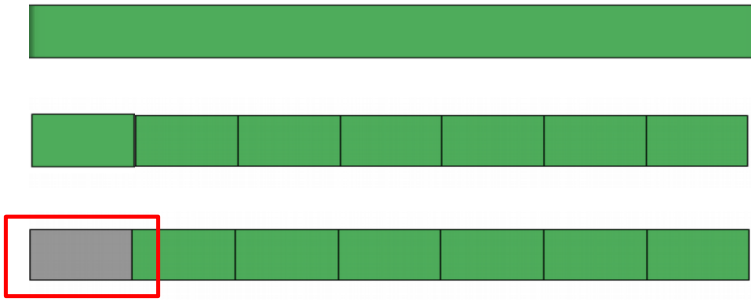


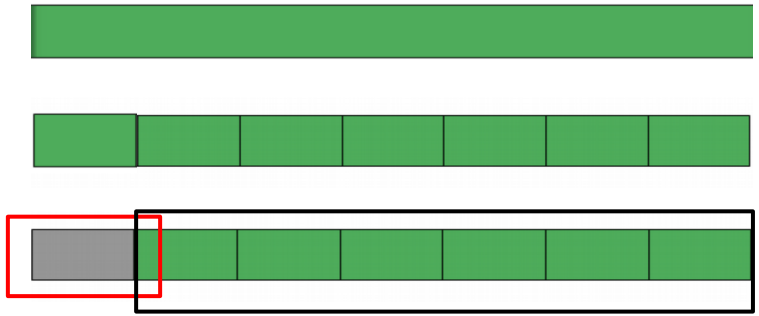
K Fold Cross Validation : Procedure

- Shuffle the dataset randomly.
- Split the dataset into k groups
  - Pick a group as a hold out



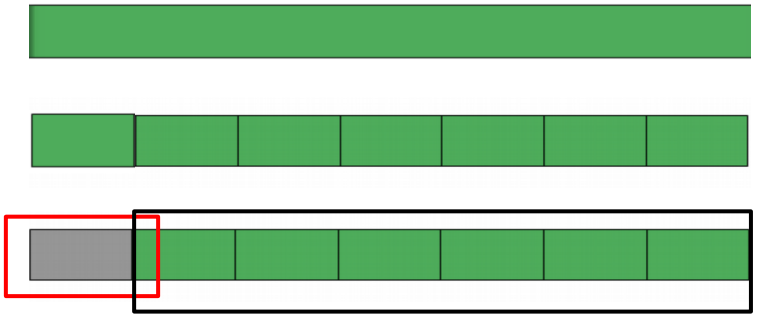
K Fold Cross Validation : Procedure

- Shuffle the dataset randomly.
- Split the dataset into k groups
  - Pick a group as a hold out
  - Take the remaining groups as training and fit a model



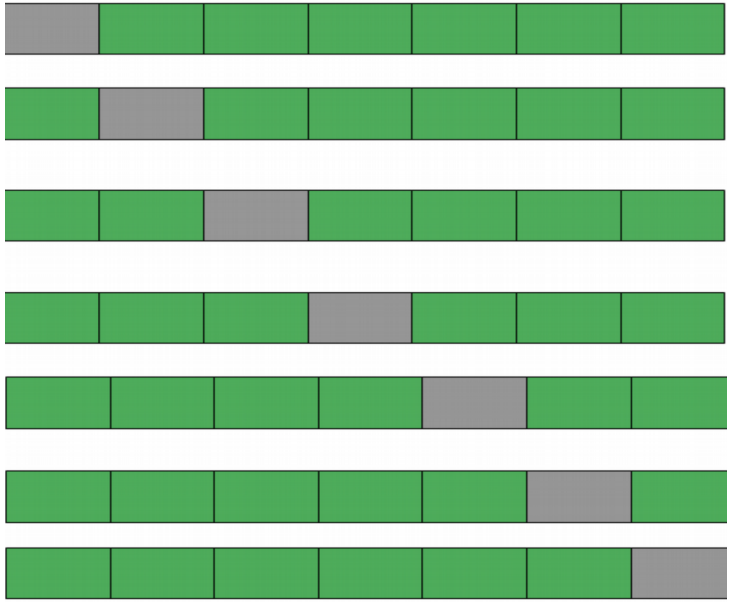
K Fold Cross Validation : Procedure

- Shuffle the dataset randomly.
- Split the dataset into k groups
  - Pick a group as a hold out
  - Take the remaining groups as training and fit a model
  - Predict and evaluate on the hold out



K Fold Cross Validation : Procedure

- Shuffle the dataset randomly.
- Split the dataset into k groups
  - pick a group as a hold out
  - Take the remaining groups as training and fit a model
  - Predict and evaluate on the hold out
- Repeat the above procedure with every group



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K Fold Cross Validation : Advantages

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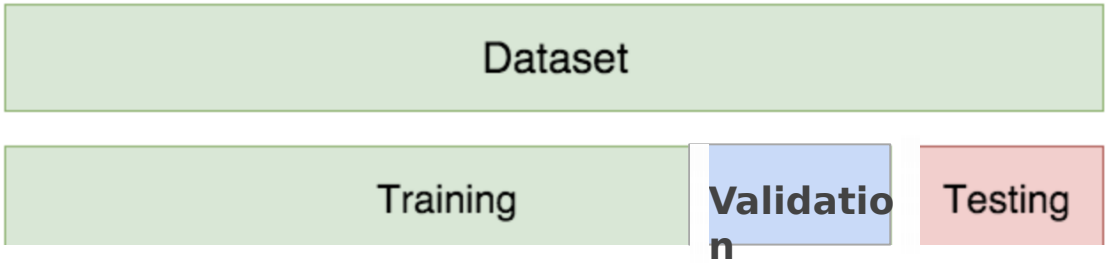

K Fold Cross Validation : Advantages

- Prevents overfitting

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K Fold Cross Validation : Advantages

- Prevents overfitting
- Consistency of model

K Fold Cross Validation : Deciding K

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- Generally: 5 < K < 10

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K Fold Cross Validation : Deciding K

- 5 < K < 10: generally
- Validation size = statistically significant
- K = 2, 50-50 split, high bias
- K > 10 , more data for training. More models

K = 10

K Fold Cross Validation : Deciding K

- 5 < K < 10: generally
- Validation size = statistically significant
- K = 2, 50-50 split, high bias
- K > 10 , more data for training. More models

K = 20

K Fold Cross Validation : Deciding K

- 5 < K < 10: generally
- Validation size = statistically significant
- K = 2, 50-50 split, high bias
- K > 10 , more data for training. More models

K = 30

K Fold Cross Validation : Deciding K

- 5 < K < 10: generally
- Validation size = statistically significant
- K = 2, 50-50 split, high bias
- K > 10 , more data for training. More models
- K = number of observations, extreme case

K = n

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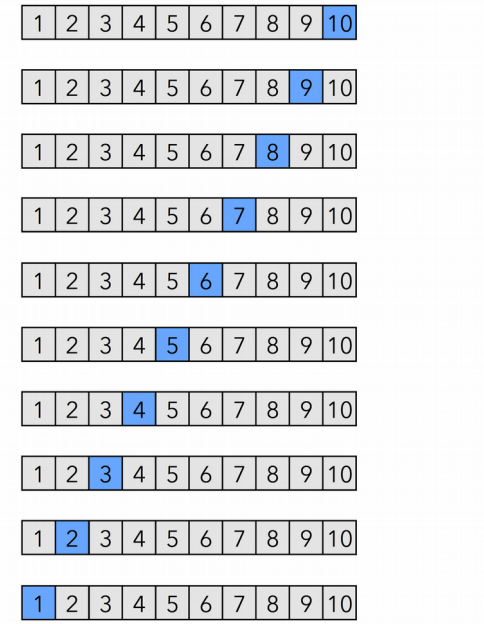
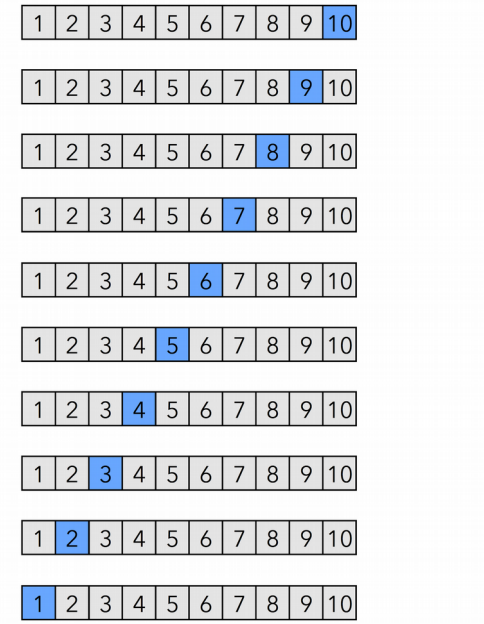
Leave one out Cross Validation

- N instances, n models



Leave one out Cross Validation

- N instances, n models
- not significant when dataset is large



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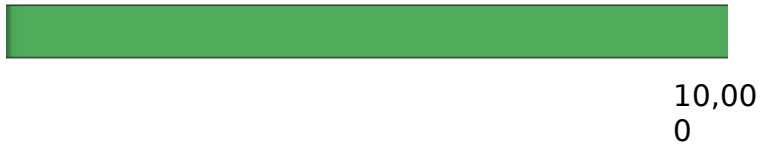
Leave one out Cross Validation

0	1	2	3	4	5	6	7	8	9	10



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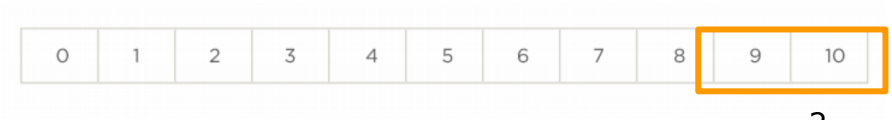

2 instances

2000 instances

K= 5

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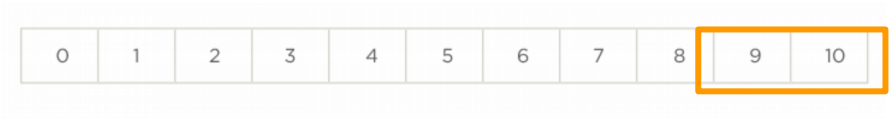
Leave one out Cross Validation



K=5

Very less data to train on

Significant amount of data

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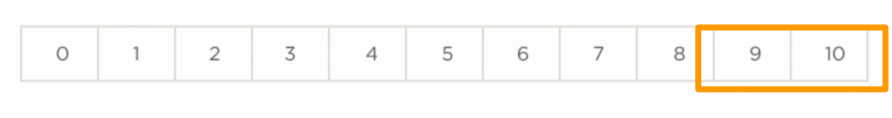
Leave one out Cross Validation



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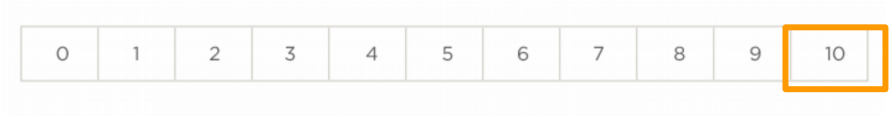
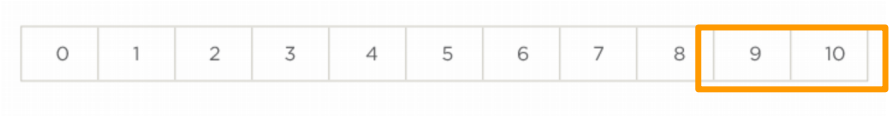


K=10

Leave one out Cross Validation



K=5

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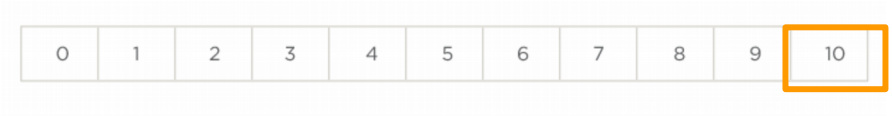

K=10

Increase in training is significant

Insignificant increase in training

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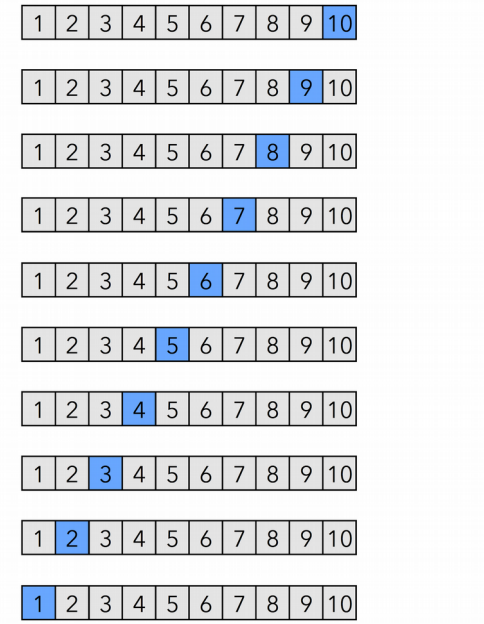
Leave one out Cross Validation

- N instances, n models
- Not significant when dataset is large
- Best practise for small dataset



Leave one out Cross Validation

- N instances, n models
- Not significant when dataset is large
- Best practise for small dataset
- Can use leave ‘p’ out cross validation