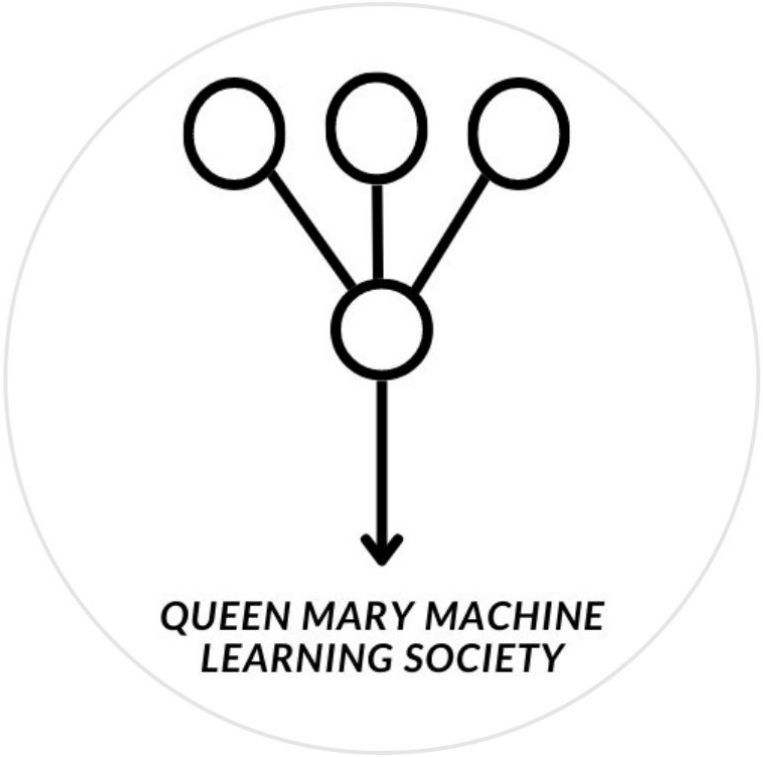
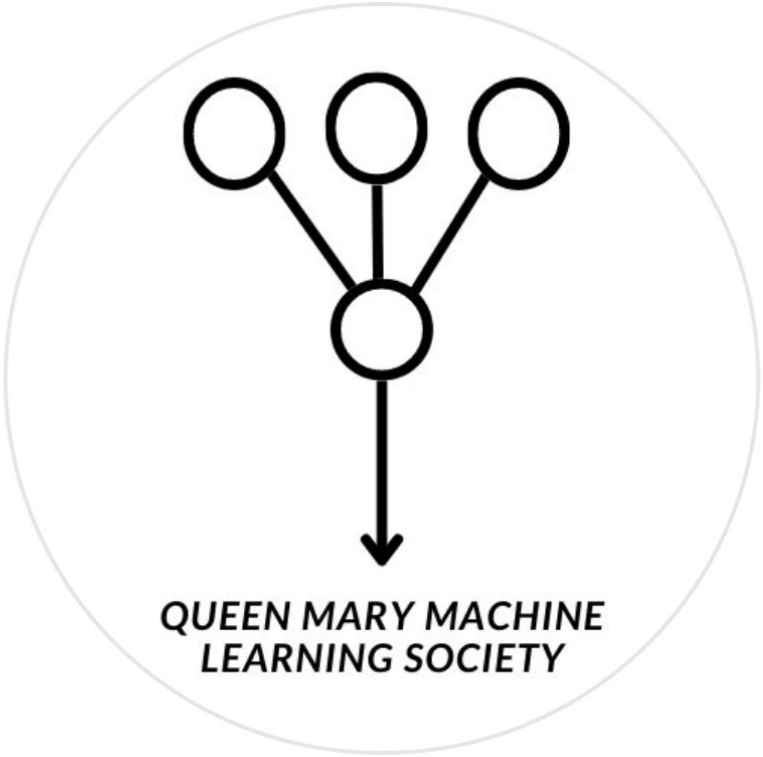
Kaggle Seasons #09



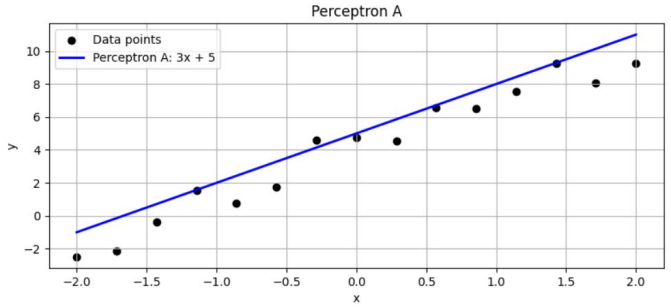
Ensemble Learning

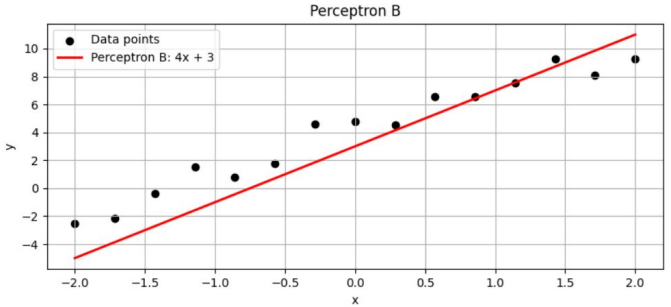


What is Ensemble Learning?

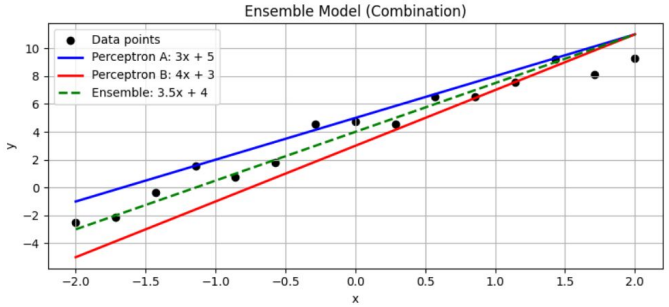
- Combining multiple model outputs
- Most simple example (perceptron models)
  - Perceptron A: 3x + 5
  - Perceptron B: 4x + 3
  - Ensemble model: (A + B) / 2 = 3.5x + 4
- This is called **Ensemble Averaging**

Ensemble Averaging Visualization





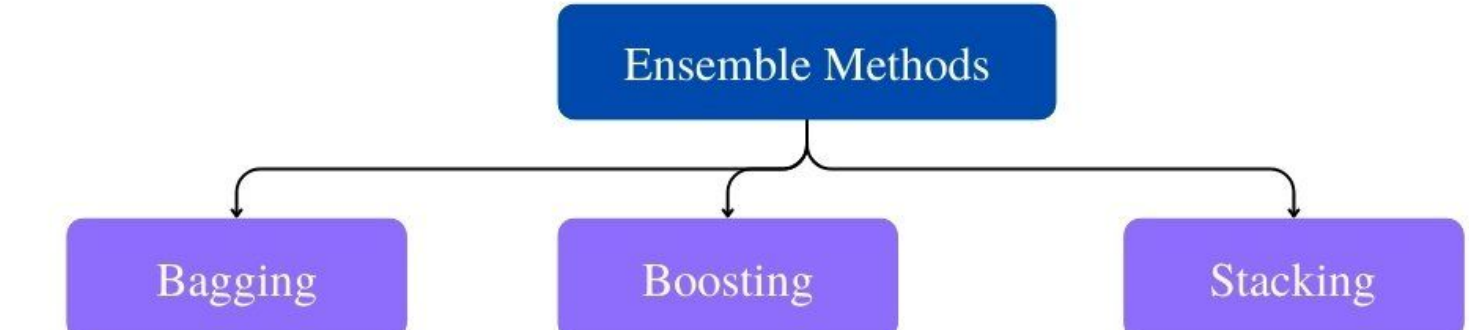
Ensemble Averaging

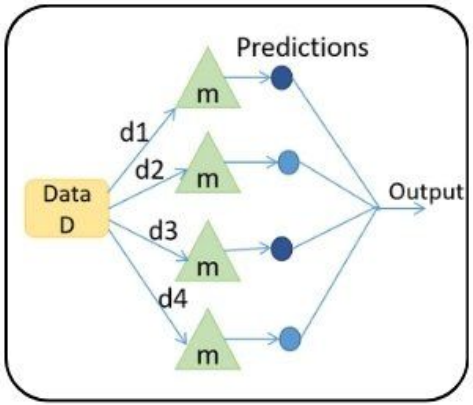


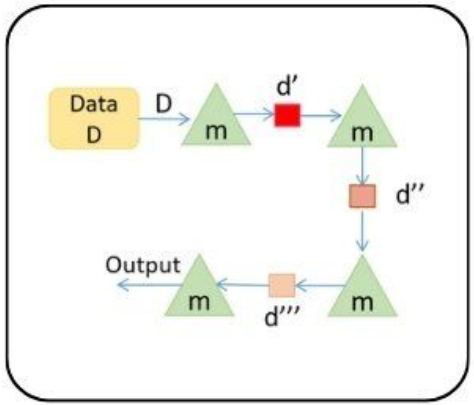
kaggle

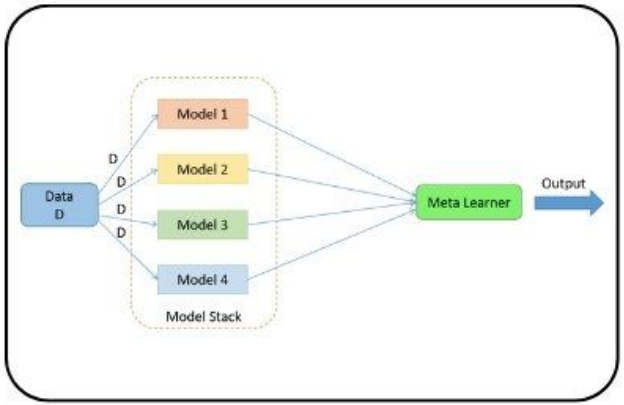
Source: viso.ai

Best Ensemble Learning Methods







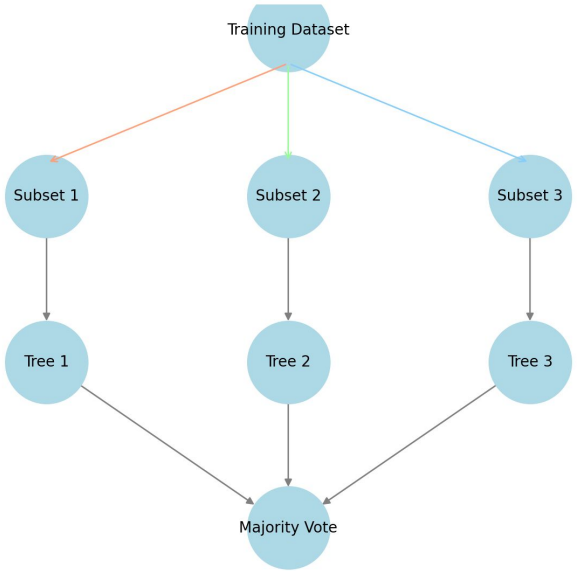


Source: viso.ai

Bagging model training

Training Dataset

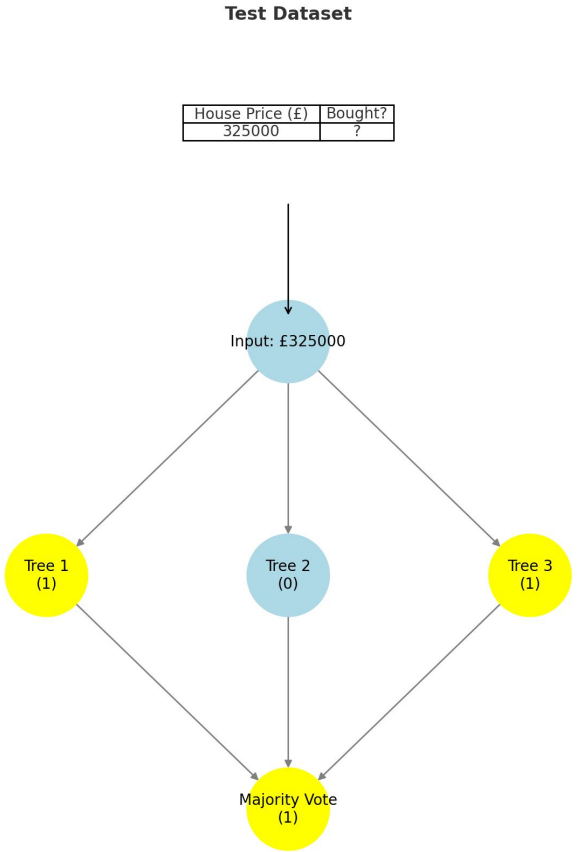
House Price (£)	Bought?
220000	1
250000	1
275000	1
300000	0
320000	1
350000	1
375000	0
400000	0
425000	0



1) The training data is split into random subsets
2) Different models are trained on the different splits
3) This allows the different models to “specialise” on different parts of the data
4) A voting/averaging mechanism is used during inference (next slide)

kaggle

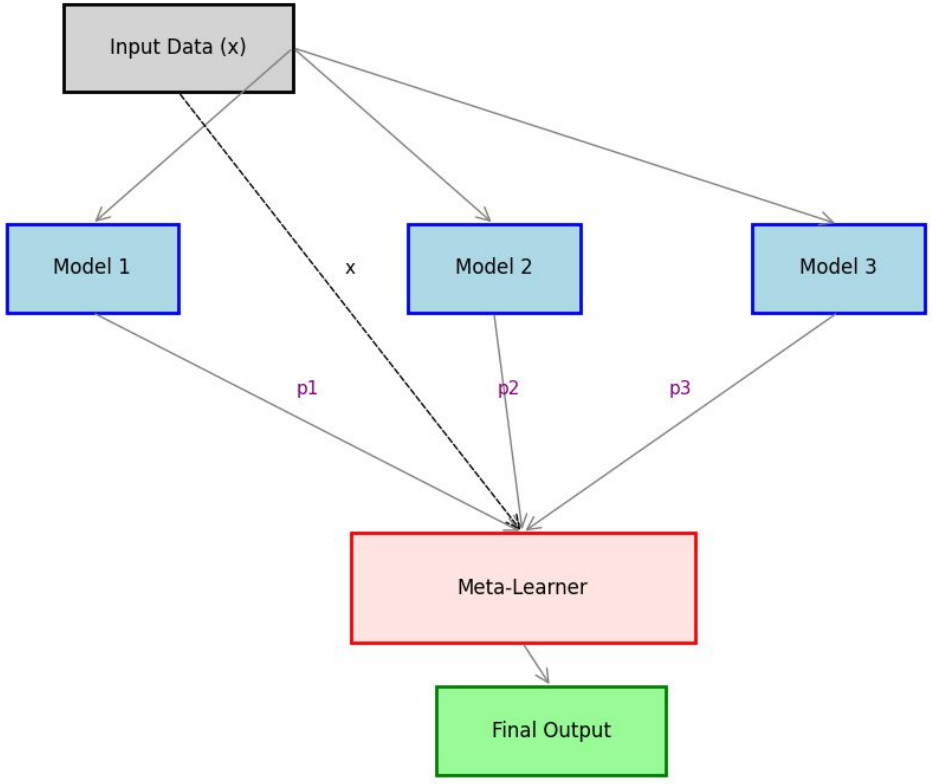
Bagging model inference



1) The same input is passed to all the models
2) The output of all the models is collected
3) The mode (most common output), or the mean (average of all the outputs), is the output of the ensemble

kaggle

Stacking Training & Inference



1) Different “base” models are trained on the same data
2) A “meta-learner” model is trained to combine the predictions of all the models
3) The output of the “meta-learner” is the output of the ensemble

Source: viso.ai

kaggle

Stacking vs blending

Stacking:

- Uses base model predictions during cross-validation

Blending:

- Uses base model predictions on a single validation set

… That's it. Otherwise, these methods are exactly the same.

Source: viso.ai

Thanks for listening!