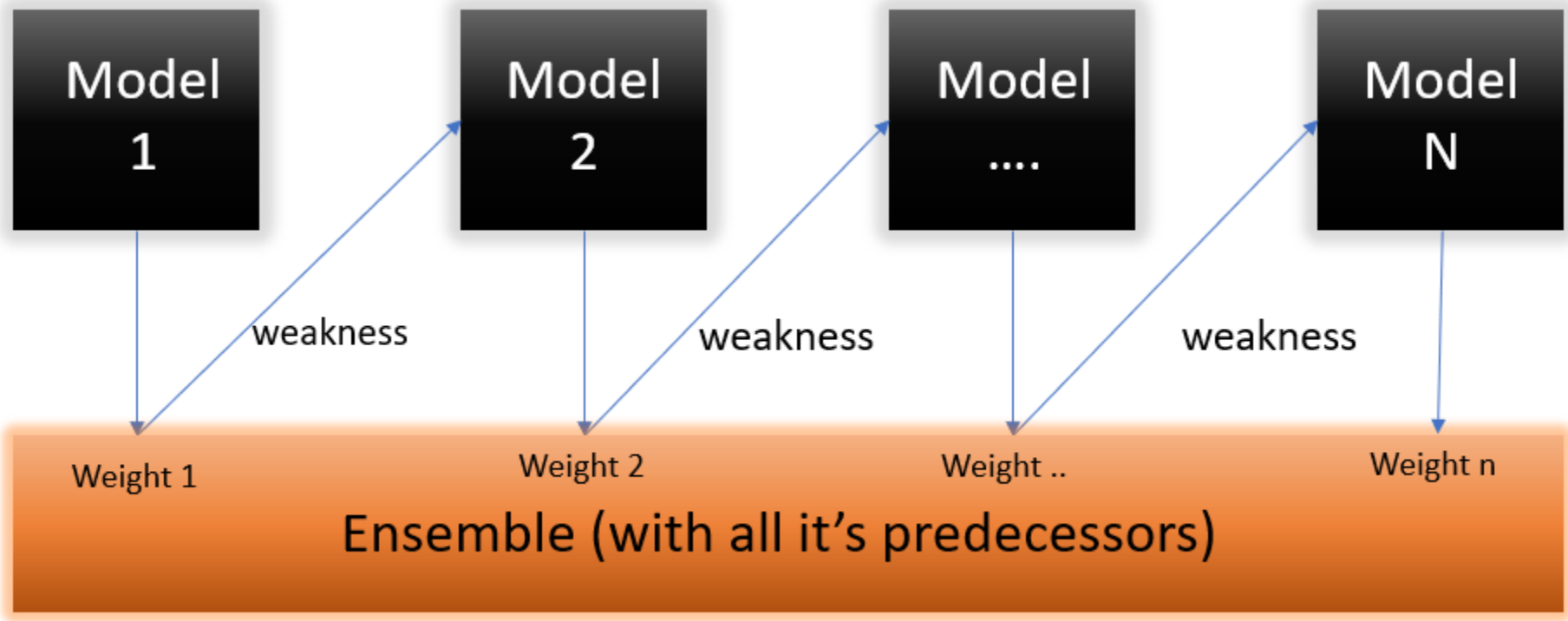
Boosting Algorithm

1.Adaboost Algorithm _Regression

Adaboost Algorithm

- Adaboost regressor is a meta estimator .
- That begins by fitting a regressor on the original dataset and
- Then fits additional copies of the regressor on the same dataset .
- But where the weight of instances are adjusted ,
- According to the error of current prediction .


Model 1
Model 2
Model ....
Model N
weakness
weakness
weakness
Weight 1
Weight 2
Weight ..
Weight n
Ensemble (with all it's predecessors)

- The previous slide said
- This algorithm does is that it builds a model
- And gives equal weights to all the data points.
- It then assigns higher weights to points that are wrongly classified.
- Now all the points which have higher weights are given more importance in the next model.
- It will keep training models until and unless a lowe error is received.

Sample weight calculation

The formula to calculate the sample weights is:

$$w(x_i, y_i) = \frac{1}{N}, \; i = 1, 2, \ldots . n$$

We'll now calculate the "Amount of Say" or "Importance" or "Influence" for this classifier in classifying the datapoints using this formula:

$$\frac{1}{2}\log\frac{1-Total\ Error}{Total\ Error}$$

- After finding the importance of the classifier and total error we need to finally update the weights and for this, we use the following formula:
- The amount of say (alpha) will be *negative* when the sample is correctly classified.
- The amount of say (alpha) will be *positive* when the sample is miss-classified.

$$New\ sample\ weight\ =\ old\ weight\ *\ e^{\pm Amount\ of\ say\ (\alpha)}$$