Gradient Boosting Process

1 We have a Data

Experience	Degree	Salary
2	BE	50000
3	MASTERS	70000
5	MASTERS	80000
6	PHD	100000

2 Computing base learner

Base Learner Model 

50000+70000+80000+100000 / 4 = 75000

3 Prediction from base learner

Experience	Degree	Salary	Pred from Base Learner
2	BE	50000	75000
3	MASTERS	70000	75000
5	MASTERS	80000	75000
6	PHD	100000	75000

4 Computing Loss Function

Actual - Predicted

Experience	Degree	Salary	Pred from Base Learner	Residual 1
2	BE	50000	75000	-25000
3	MASTERS	70000	75000	-5000
5	MASTERS	80000	75000	5000
6	PHD	100000	75000	25000

5 Adding decision tree sequentially

6 Predicting residual on decision tree where Experience & Degree will be independent va
R1 will be a dependent variable
Predicting Salary = Prediction of Base Learner + Learning Rate(Prediction of Decisio

Data			Iteration 1	
Experience	Degree	Salary	Pred from Base Learner	Residual 1
2	BE	50000	75000	-25000
3	MASTERS	70000	75000	-5000
5	MASTERS	80000	75000	5000
6	PHD	100000	75000	25000

Iteration 2		
Predicted Residual 2	Pred from Base Learner & Pred Residua	Residual 2
-23000	72700	-22700
-3000	74700	-4700
3000	75300	4700
20000	77000	23000

8 Predicting residual on decision tree where Experience & Degree will be independent variables

R1 will be a dependent variable

Predicting Salary = Prediction of Base Learner + Learning Rate(Prediction of Decisio

Data			Iteration 1	
Experience	**Degree**	**Salary**	**Pred from Base Learner**	**Residual 1**
2	BE	50000	75000	-25000
3	MASTERS	70000	75000	-5000
5	MASTERS	80000	75000	5000
6	PHD	100000	75000	25000

Iteration 2		
Predicted Residual 2	**Pred from Base Learner & Pred Residua**	**Residual 2**
-23000	72700	-22700
-3000	74700	-4700
3000	75300	4700
20000	77000	23000

Iteration 3		
Predicted Residual 3	**Pred from Base Learner & Pred Residua**	**Residual 3**
-20000	70700	-20700
-2500	74450	-4450
2500	75550	4450
15000	78500	21500

9 Iteration is running till the errors are minimize at the end

Data			Iteration 1	
Experience	**Degree**	**Salary**	**Pred from Base Learner**	**Residual 1**
2	BE	50000	75000	-25000
3	MASTERS	70000	75000	-5000
5	MASTERS	80000	75000	5000
6	PHD	100000	75000	25000

Iteration 2		
Predicted Residual 2	**Pred from Base Learner & Pred Residua**	**Residual 2**
-23000	72700	-22700
-3000	74700	-4700
3000	75300	4700
20000	77000	23000

Iteration 3		
Predicted Residual 3	**Pred from Base Learner & Pred Residua**	**Residual 3**
-20000	70700	-20700
-2500	74450	-4450
2500	75550	4450
15000	78500	21500

Iteration N		
Predicted Residual N	**Pred from Base Learner & Pred Residua1 to Pred Redual---N**	**Residual N**
-20000	68700	-91700
-2500	74200	-77200
2500	75800	-72800
15000	80000	-60000

10 Prediction on new data

Base Learner Model	+	Decision Tree 1	+	Decision Tree 2	+	Decision Tree N

Experience	**Degree**	**Prediction**	
10	BE	80000	Final Output