Neural Network Analysis in Weka

Setup

nominaltoBinaryFilter is False; normalizeAttributes & normalizeNumericClass is True.

	No. of Hidden Layers	Learning Rate	Momentum	Training Time	Correctly Classified (%)	Incorrectly Classified (%)
1	1	0.3	0.2	500	53.5294	46.4706
2	2	0.3	0.2	500	68.2353	31.7647
3	3	0.3	0.2	500	79.1176	20.8824
4	4	0.3	0.2	500	79.2647	20.7353
5	5	0.3	0.2	500	77.9412	22.0588
6	a	0.3	0.2	500	77.0588	22.9412

Increasing number of hidden layers improves the accuracy of learning/prediction but starts to fall on higher number of hidden layers.

	No. of Hidden Layers	Learning Rate	Momentum	Training Time	Correctly Classified (%)	Incorrectly Classified (%)
1	a	0.3	0.2	500	77.0588	22.9412
2	a	0.3	0.2	1000	77.2059	22.7941
3	a	0.3	0.2	2000	76.7647	23.2353

The training time improves the accuracy of correct cassification to some degree and after a certain level produces lesser accurate classification on same network.

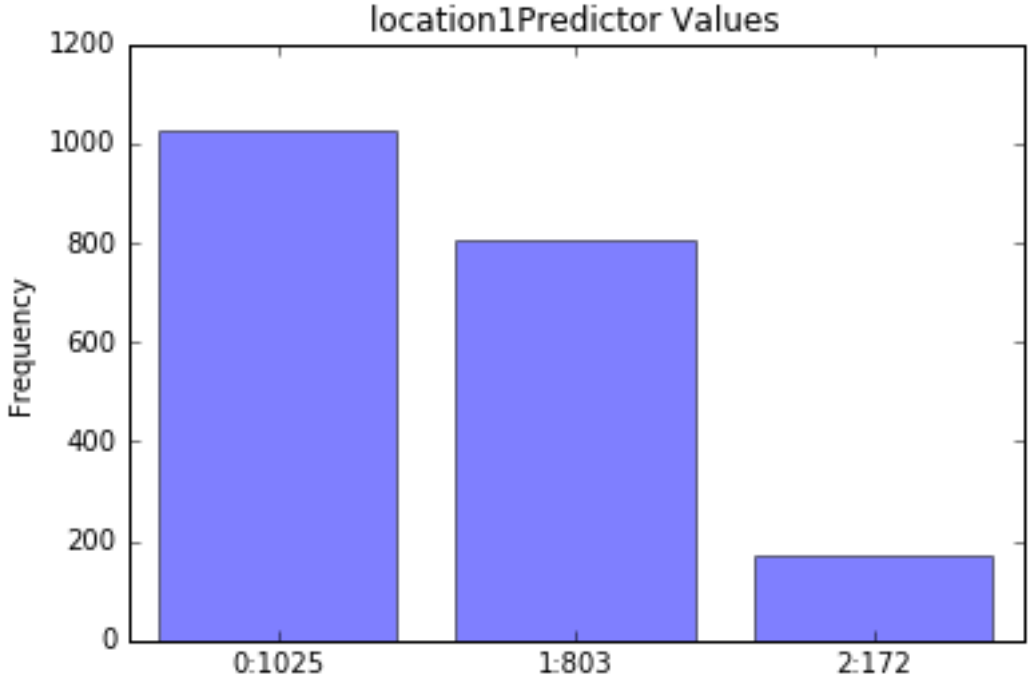
	No. of Hidden Layers	Learning Rate	Momentum	Training Time	Correctly Classified (%)	Incorrectly Classified (%)
1	a	0.5	0.2	500	77.6471	22.3529
2	a	0.5	0.5	500	78.2353	21.7647
3	a	0.9	0.2	500	79.8529	20.1471
4	a	0.9	0.5	500	80.0000	20.0000
5	a	0.9	0.9	500	79.5588	20.4412

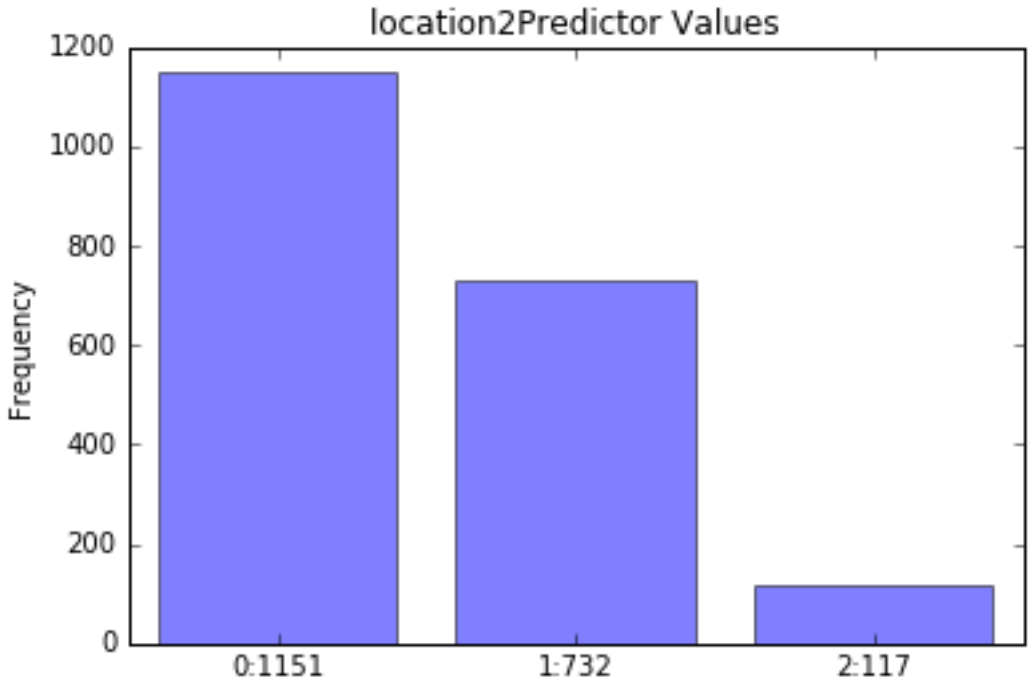
The neural network has more accuracy with a decent amount (.5) Momentum (dependance on previous values) while accuracy drops at higher levels of momentum.

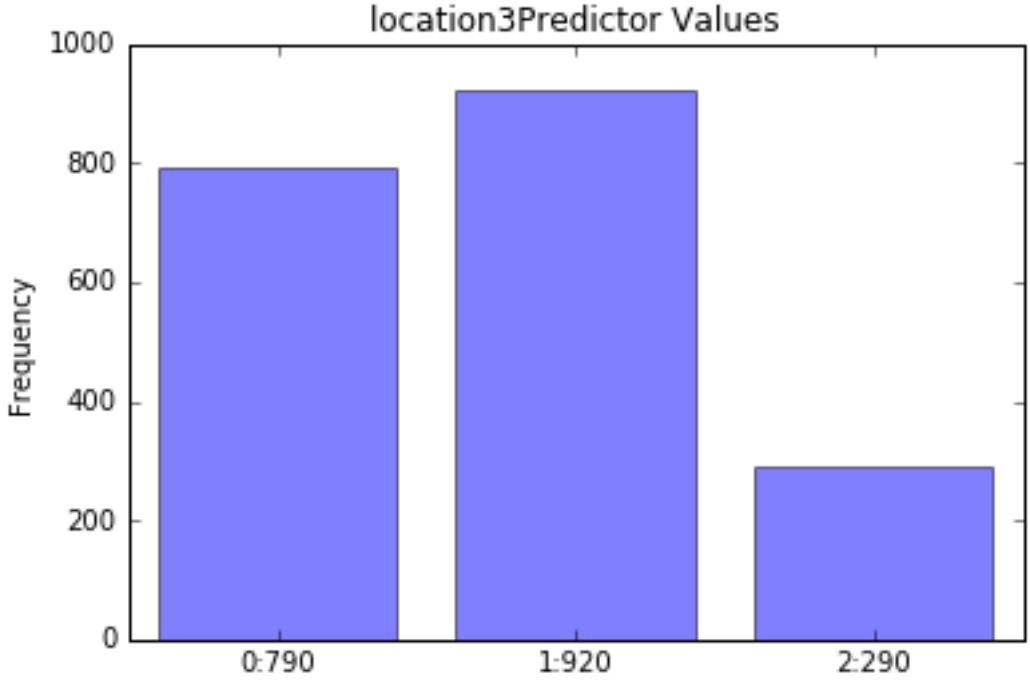
	No. of Hidden Layers	Learning Rate	Momentum	Training Time	Correctly Classified (%)	Incorrectly Classified (%)
1	a	0.3	0.2	500	77.0588	22.9412
2	a	0.5	0.2	500	77.6471	22.3529
3	a	0.9	0.2	500	79.8529	20.1471

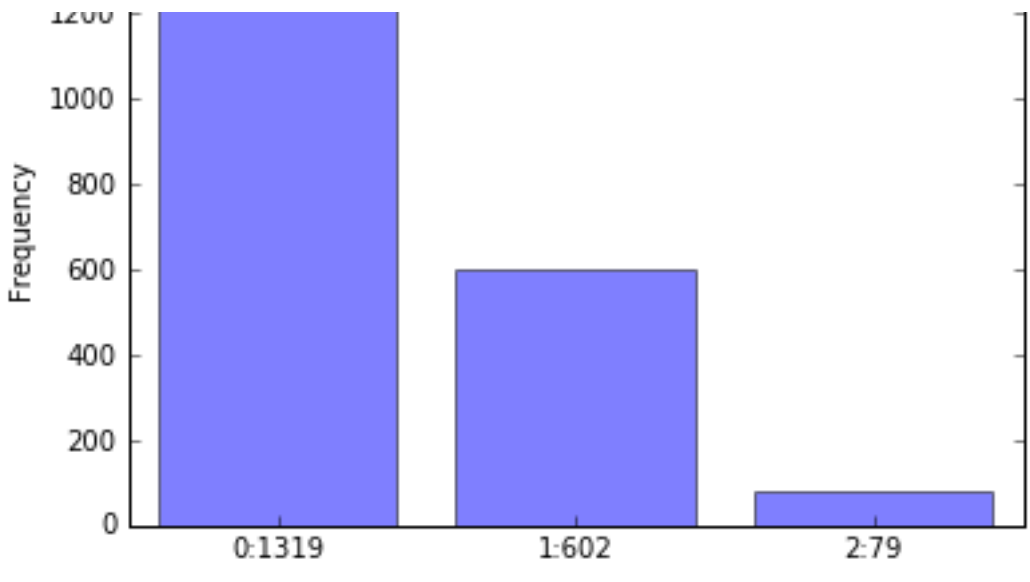
Increasing the learning rate (the weight change with which the neural network learns), the classification increases in accuracy.

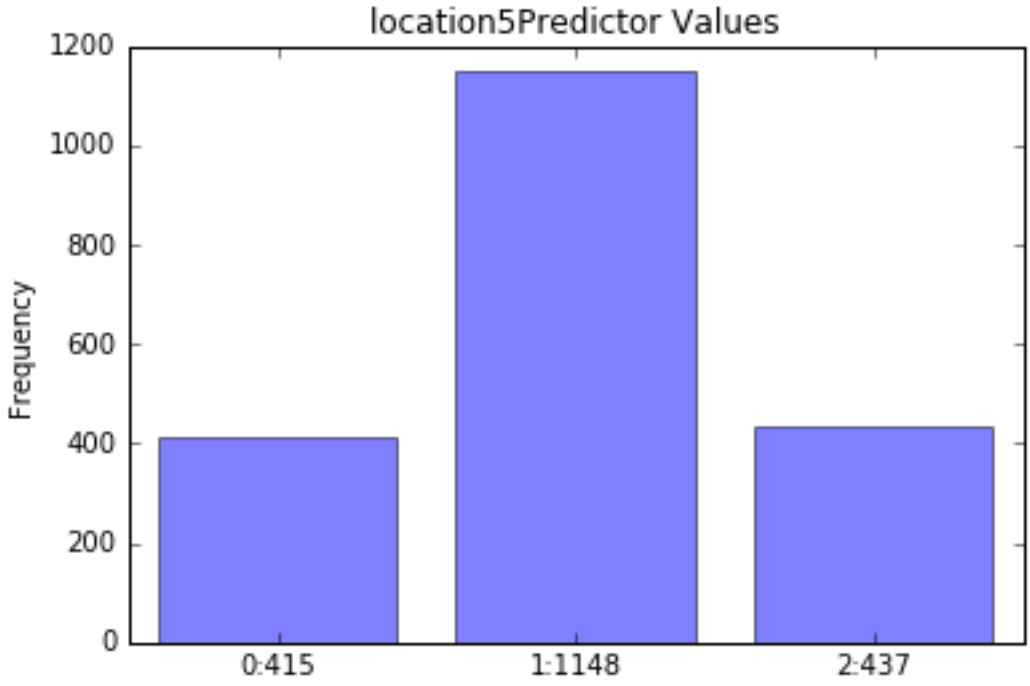
Python Analysis on given Dataset

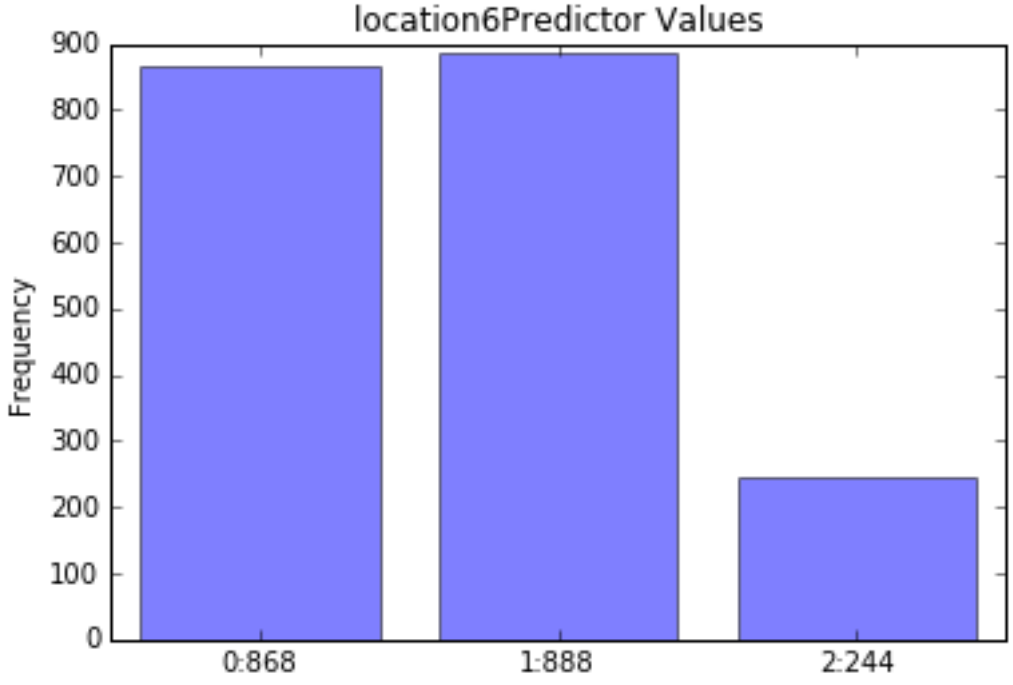


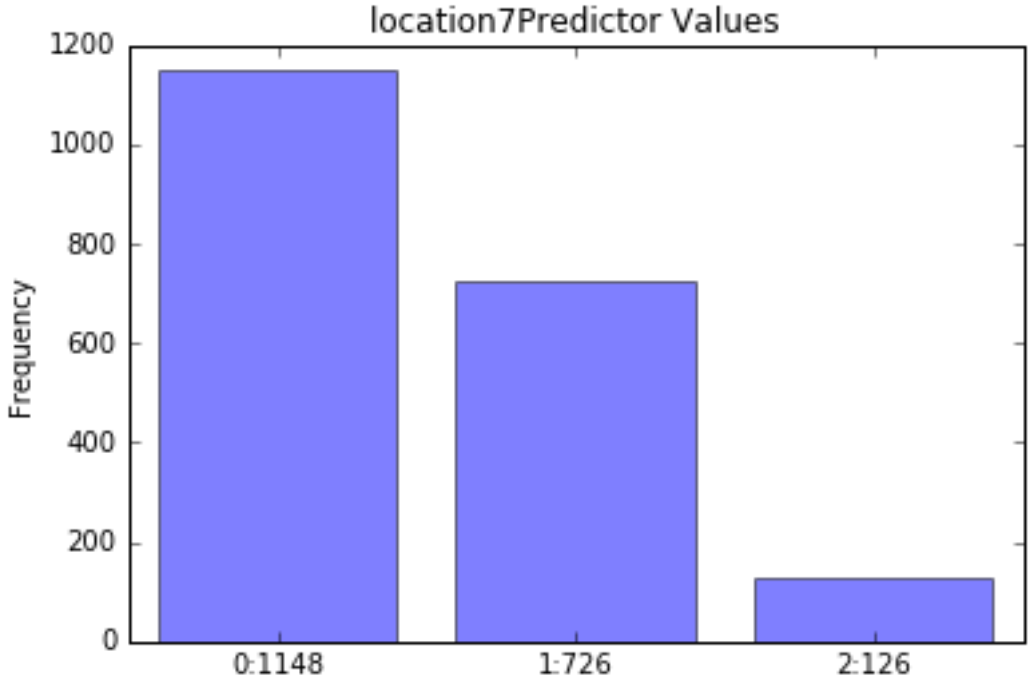

location2Predictor Values
Frequency
1200
1000
800
600
400
200
0
0:1151
1:732
2:117

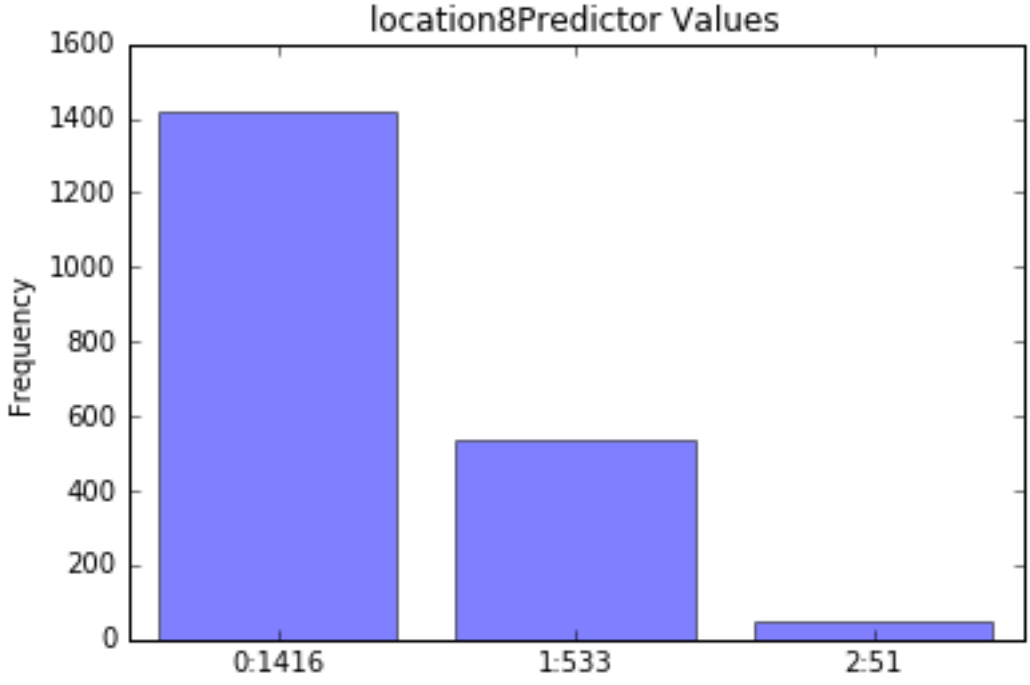

location3Predictor Values
Frequency
1000
800
600
400
200
0
0:790
1:920
2:290

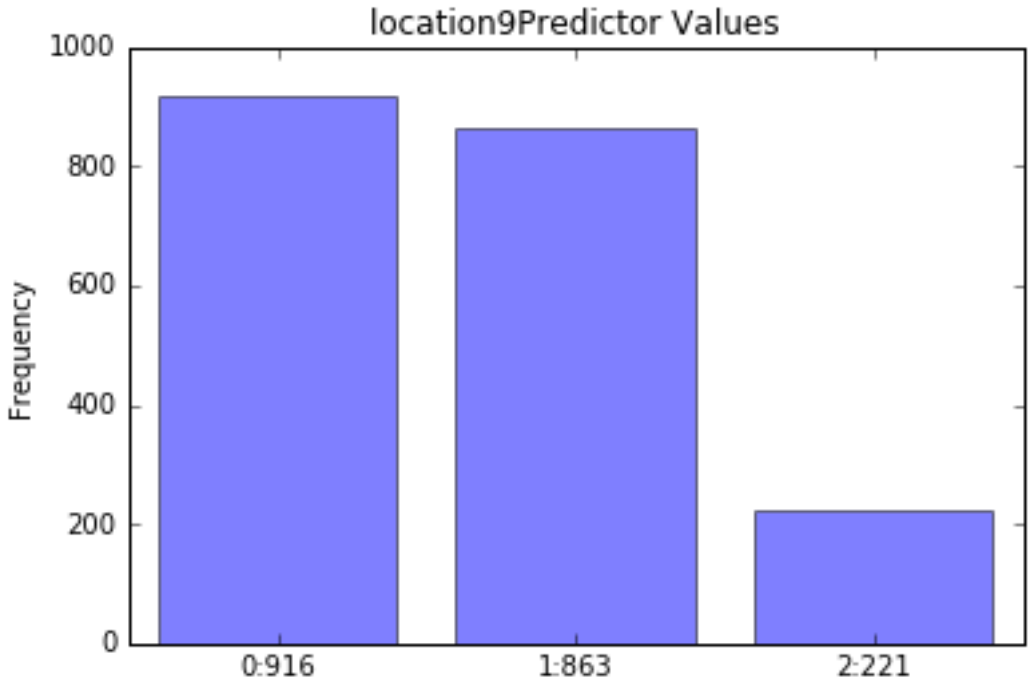

Frequency
1000
800
600
400
200
0
0:1319
1:602
2:79

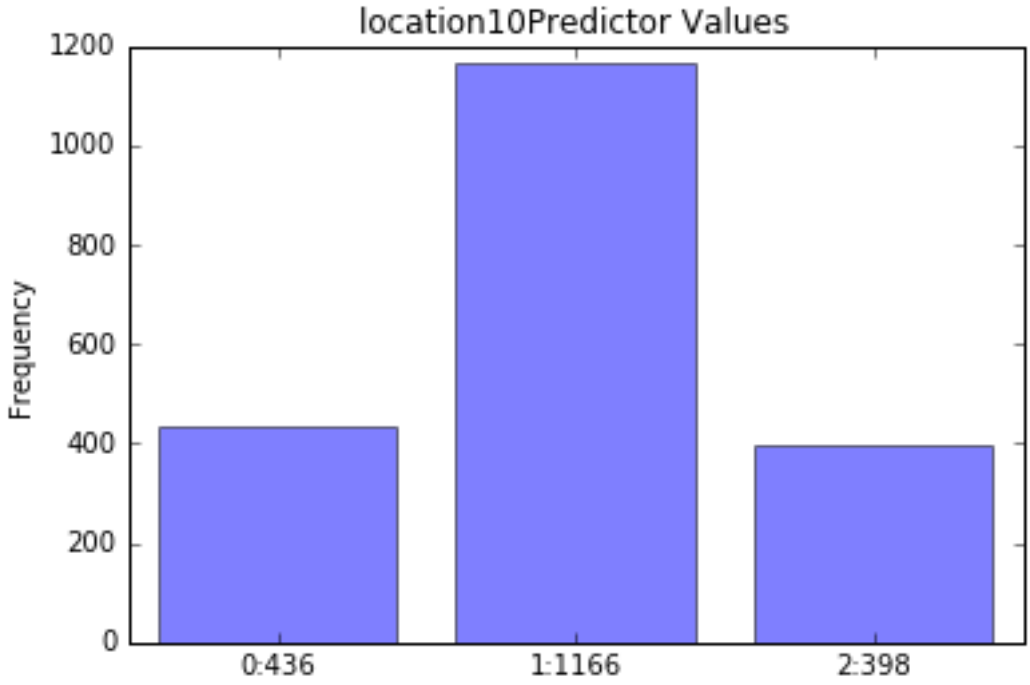

location5Predictor Values
Frequency
1200
1000
800
600
400
200
0
0:415
1:1148
2:437


location6Predictor Values
Frequency
900
800
700
600
500
400
300
200
100
0
0:868
1:888
2:244


location7Predictor Values
Frequency
1200
1000
800
600
400
200
0
0:1148
1:726
2:126


location8Predictor Values
Frequency
1600
1400
1200
1000
800
600
400
200
0
0:1416
1:533
2:51


location9Predictor Values
Frequency
1000
800
600
400
200
0
0:916
1:863
2:221


location10Predictor Values
Frequency
1200
1000
800
600
400
200
0
0:436
1:1166
2:398