

Homework 6

Criteo Ad Click

Forward Feature Selection

Logistic Regression

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- I choose all features to build my logistic regression forward model. And I work 8 round and my high accuracy is .7462.
- I stop after 8 Round because my accuracy going up but is still in 74%.
- Round 1 my highest accuracy is coming from all features which is .7461. and second highest is $X_2 + X_{11}$ which is 0.7431.
- Round 2 my highest accuracy is coming from 4 different features selection which is .7438 but I choose $X_2 + X_{11} + X_{17}$ for next Round.
- Round 3 my highest accuracy is coming from 4 different features selection which is .7438 but I choose $X_2 + X_{11} + X_{17} + X_{10}$ for next Round.
- Round 4 my highest accuracy is coming from $X_2 + X_{11} + X_{17} + X_{10} + X_{14}$ which is .7439.
- Round 5 my highest accuracy is coming from $X_2 + X_{11} + X_{17} + X_{10} + X_{14} + X_{21}$ which is .7447.
- Round 6 my highest accuracy is coming from $X_2 + X_{11} + X_{17} + X_{10} + X_{14} + X_{21} + X_{18}$ which is .7452.
- Round 7 my highest accuracy is coming from $X_2 + X_{11} + X_{17} + X_{10} + X_{14} + X_{21} + X_{18} + X_{13}$ which is .7454.
- Round 8 my highest accuracy is coming from $X_2 + X_{11} + X_{17} + X_{10} + X_{14} + X_{21} + X_{18} + X_{13} + X_3$ which is .7462.
- Round 9 I did multinomial selection, and my high accuracy is .7466.

ROUND 1 FORWARDING MODEL

Features	LR Accuracies
All Features	0.7461
X2 + X3	0.7425
X2 + X10	0.7425
X2 + X5	0.7425
X2 + X6	0.7425
X2 + X7	0.7426
X2 + X8	0.7424
X2 + X9	0.7425
X2 + X10	0.7425
X2 + X11	0.7431
X2 + X12	0.7421
X2 + X13	0.7427
X2 + X14	0.7426
X2 + X15	0.7425
X2 + X16	0.7425
X2 + X17	0.7426
X2 + X18	0.7425
X2 + X19	0.7425
X2 + X20	0.7425
X2 + X21	0.7425
X2 + X22	0.7425

ROUND 2 FORWARDING MODEL :

In this model the accuracy is going up compare to previous Round

Features	LR Accuracies
All Features	0.7461
X2 + X11 + X3	0.7431
X2 + X11 + X4	0.7431
X2 + X11 + X5	0.7432
X2 + X11 + X6	0.7431
X2 + X11 + X7	0.7431
X2 + X11 + X8	0.7432
X2 + X11 + X9	0.7431
X2 + X11 + X10	0.7431
X2 + X11 + X12	0.7429
X2 + X11 + X13	0.7433
X2 + X11 + X14	0.7432
X2 + X11 + X15	0.7431
X2 + X11 + X16	0.7431
X2 + X11 + X17	0.7438
X2 + X11 + X18	0.743
X2 + X11 + X19	0.7431
X2 + X11 + X20	0.7431
X2 + X11 + X21	0.7431
X2 + X1 + X22	0.7431

ROUND 3 FORWARDING MODEL:

In this Round the accuracy is going up compare to previous Rounds but the high accuracy is same.

Features	LR Accuracies
All Features	0.7461
X2 + X11 + X17 + X3	0.7436
X2 + X11 + X17 + X4	0.7438
X2 + X11 + X17 + X5	0.7437
X2 + X11 + X17 + X6	0.7434
X2 + X11 + X17 + X7	0.7436
X2 + X11 + X17 + X8	0.7436
X2 + X11 + X17 + X9	0.7436
X2 + X11 + X17 + X10	0.7438
X2 + X11 + X17 + X12	0.7433
X2 + X11 + X17 + X13	0.7437
X2 + X11 + X17 + X14	0.7438
X2 + X11 + X17 + X15	0.7438
X2 + X11 + X17 + X16	0.7434
X2 + X11 + X17 + X18	0.7435
X2 + X11 + X17 + X19	0.7436
X2 + X11 + X17 + X20	0.7437
X2 + X11 + X17 + X21	0.7437
X2 + X1 + X17 + X22	0.7437

ROUND 4 FORWARDING MODEL:

In this Round the accuracy is not going up but its stable compare to Round 3

Features	LR Accuracies
All Features	0.7461
X2 + X11 + X17 + X10 + X3	0.7436
X2 + X11 + X17 + X10 + X4	0.7438
X2 + X11 + X17 + X10 + X5	0.7437
X2 + X11 + X17 + X10 + X6	0.7434
X2 + X11 + X17 + X10 + X7	0.7437
X2 + X11 + X17 + X10 + X8	0.7437
X2 + X11 + X17 + X10 + X9	0.7435
X2 + X11 + X17 + X10 + X12	0.7433
X2 + X11 + X17 + X10 + X13	0.7437
X2 + X11 + X17 + X10 + X14	0.7439
X2 + X11 + X17 + X10 + X15	0.7438
X2 + X11 + X17 + X10 + X16	0.7434
X2 + X11 + X17 + X10 + X18	0.7435
X2 + X11 + X17 + X10 + X19	0.7436
X2 + X11 + X17 + X10 + X20	0.7437
X2 + X11 + X17 + X10 + X21	0.7437
X2 + X1 + X17 + X10 + X22	0.7437

ROUND 5 FORWARDING MODEL :

In this Round the accuracy going up compare to previous Rounds

Features	LR Accuracies
All Features	0.7461
X2 + X11 + X17 + X10 + X14 + X3	0.7438
X2 + X11 + X17 + X10 + X14 + X4	0.7439
X2 + X11 + X17 + X10 + X14 + X5	0.7439
X2 + X11 + X17 + X10 + X14 + X6	0.7438
X2 + X11 + X17 + X10 + X14 + X7	0.744
X2 + X11 + X17 + X10 + X14 + X8	0.7439
X2 + X11 + X17 + X10 + X14 + X9	0.7439
X2 + X11 + X17 + X10 + X14 + X12	0.744
X2 + X11 + X17 + X10 + X14 + X13	0.7441
X2 + X11 + X17 + X10 + X14 + X15	0.7439
X2 + X11 + X17 + X10 + X14 + X16	0.7438
X2 + X11 + X17 + X10 + X14 + X18	0.7438
X2 + X11 + X17 + X10 + X14 + X19	0.7439
X2 + X11 + X17 + X10 + X14 + X20	0.7438
X2 + X11 + X17 + X10 + X14 + X21	0.7447
X2 + X1 + X17 + X10 + X14 + X22	0.7439

ROUND 6 FORWARDING MODEL :

In this Round the accuracy going up compare to previous Rounds.

Features	LR Accuracies
All Features	0.7461
X2 + X11 + X17 + X10 + X14 + X21 + X3	0.7446
X2 + X11 + X17 + X10 + X14 + X21 + X4	0.7447
X2 + X11 + X17 + X10 + X14 + X21 + X5	0.7447
X2 + X11 + X17 + X10 + X14 + X21 + X6	0.745
X2 + X11 + X17 + X10 + X14 + X21 + X7	0.7445
X2 + X11 + X17 + X10 + X14 + X21 + X8	0.7444
X2 + X11 + X17 + X10 + X14 + X21 + X9	0.7447
X2 + X11 + X17 + X10 + X14 + X21 + X12	0.7447
X2 + X11 + X17 + X10 + X14 + X21 + X13	0.7449
X2 + X11 + X17 + X10 + X14 + X21 + X15	0.7447
X2 + X11 + X17 + X10 + X14 + X21 + X16	0.745
X2 + X11 + X17 + X10 + X14 + X21 + X18	0.7452
X2 + X11 + X17 + X10 + X14 + X21 + X19	0.745
X2 + X11 + X17 + X10 + X14 + X21 + X20	0.7449
X2 + X1 + X17 + X10 + X14 + X21 + X22	0.7448

ROUND 7 FORWARDING MODEL :

In this Round the accuracy going up compare to previous Rounds.

Features	LR Accuracies
All Features	0.7461
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X3	0.7453
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X4	0.7453
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X5	0.7452
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X6	0.7452
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X7	0.7453
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X8	0.7453
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X9	0.7452
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X12	0.7452
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13	0.7454
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X15	0.7452
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X16	0.7452
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X19	0.7453
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X20	0.7453
X2 + X1 + X17 + X10 + X14 + X21 + X18 + X22	0.7453

ROUND 8 FORWARDING MODEL :

In this Round the accuracy going up compare to previous Rounds.

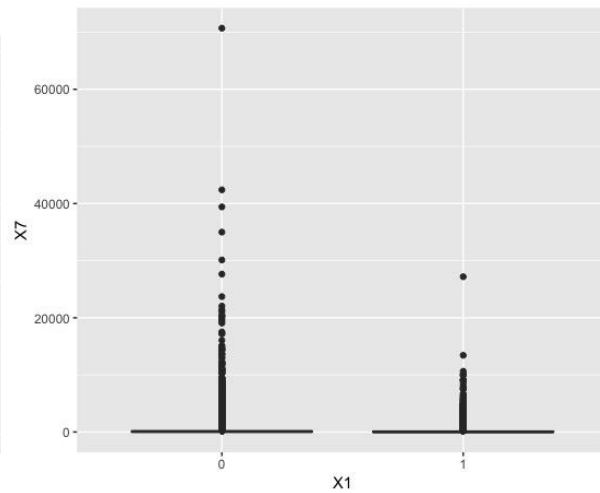
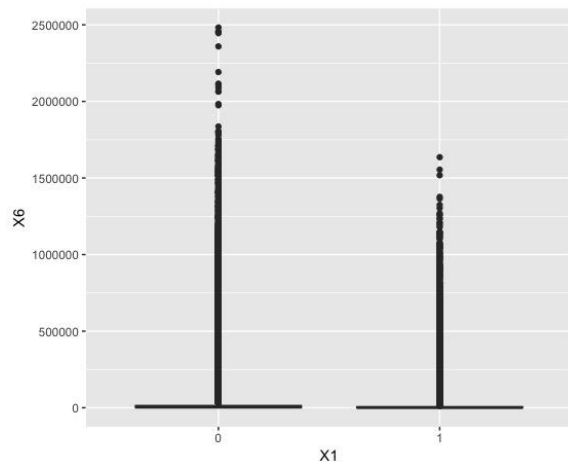
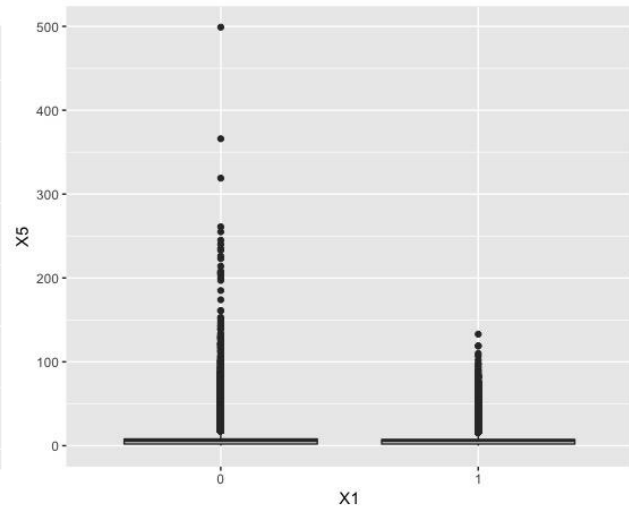
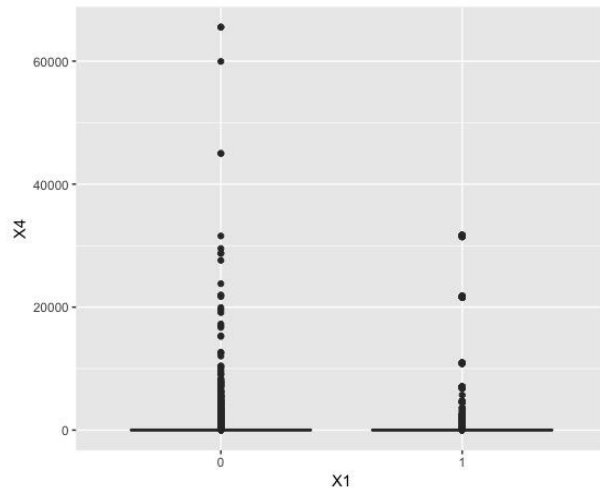
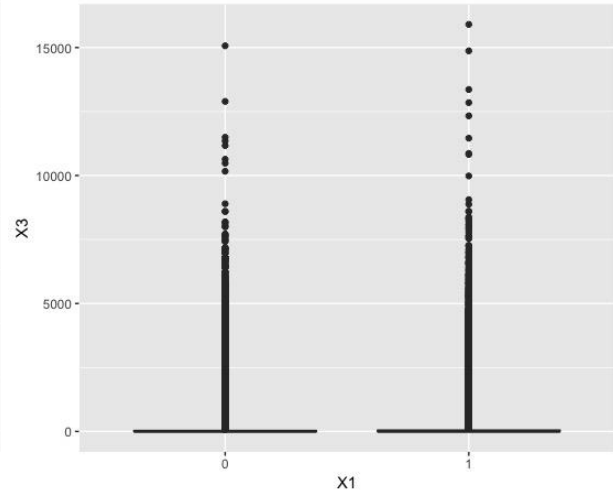
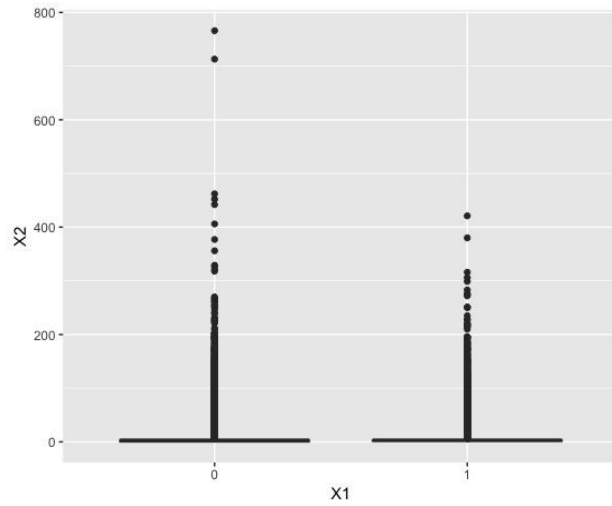
Features	LR Accuracies
All Features	0.7461
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X3	0.7462
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X4	0.746
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X5	0.746
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X6	0.7461
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X7	0.7461
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X8	0.746
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X9	0.746
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X12	0.746
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X15	0.7461
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X16	0.7461
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X19	0.7462
X2 + X11 + X17 + X10 + X14 + X21 + X18 + X13 + X20	0.7461
X2 + X1 + X17 + X10 + X14 + X21 + X18 + X13 + X22	0.7461

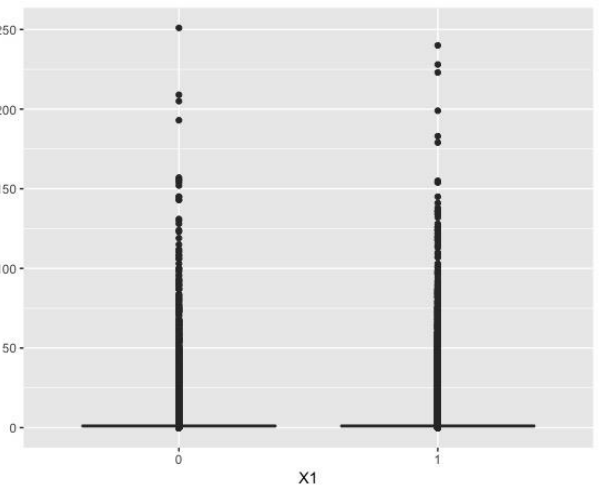
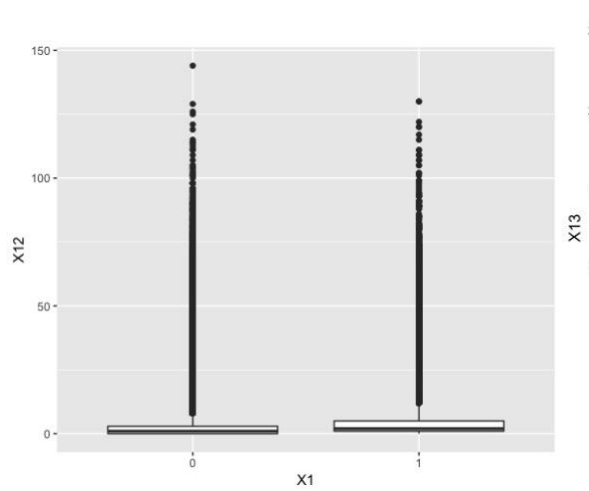
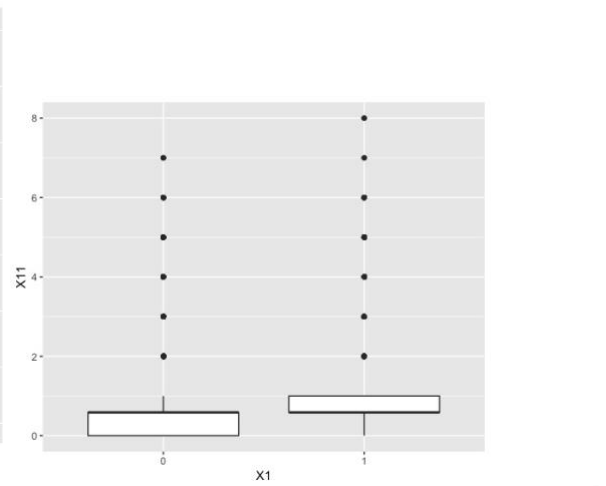
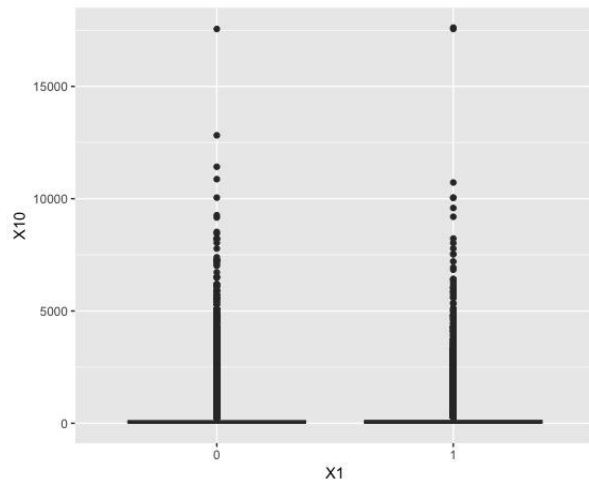
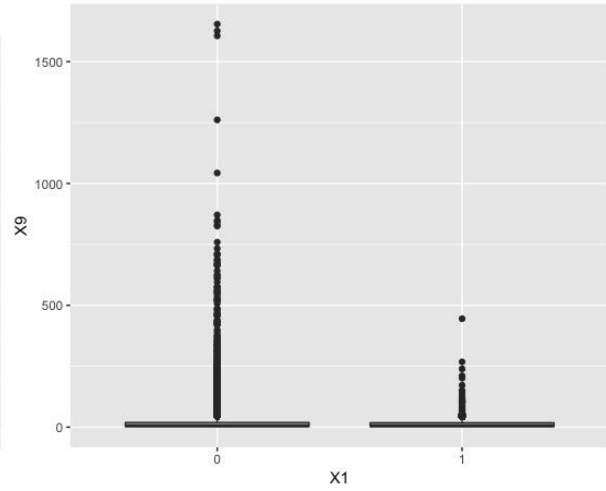
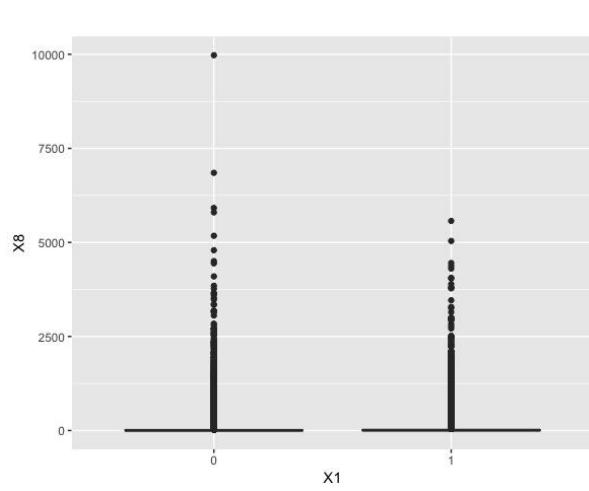
ROUND 9 Multinomial:

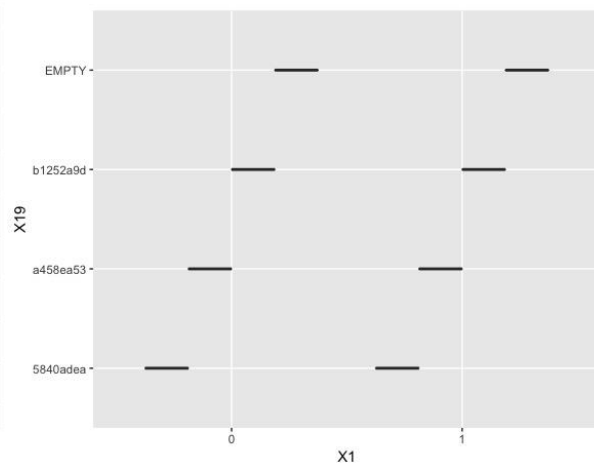
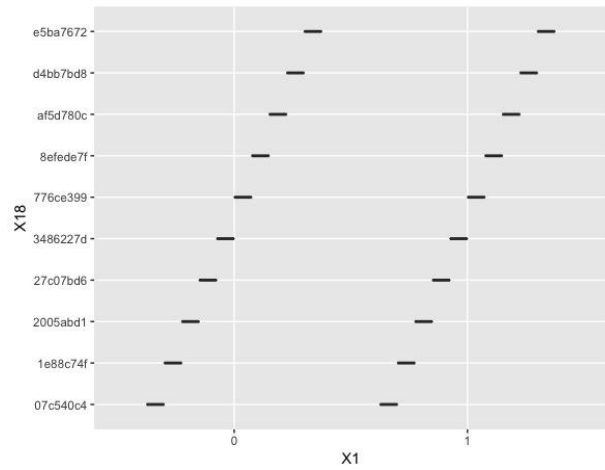
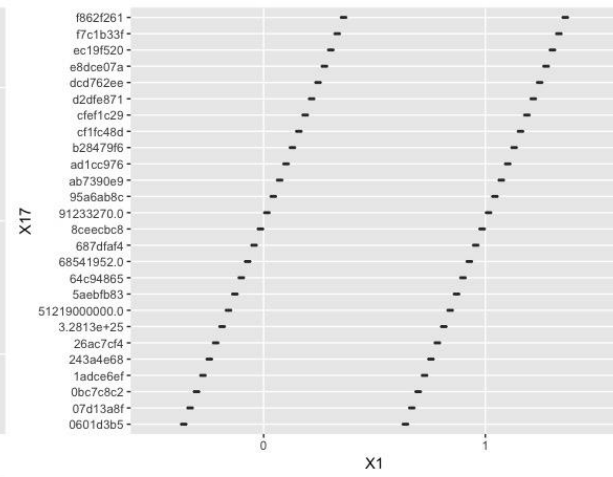
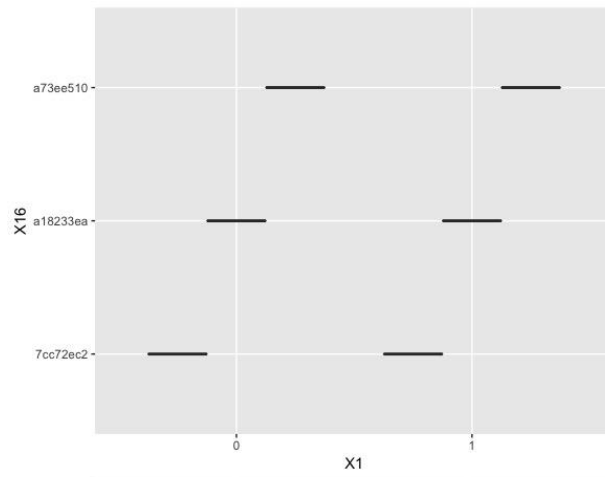
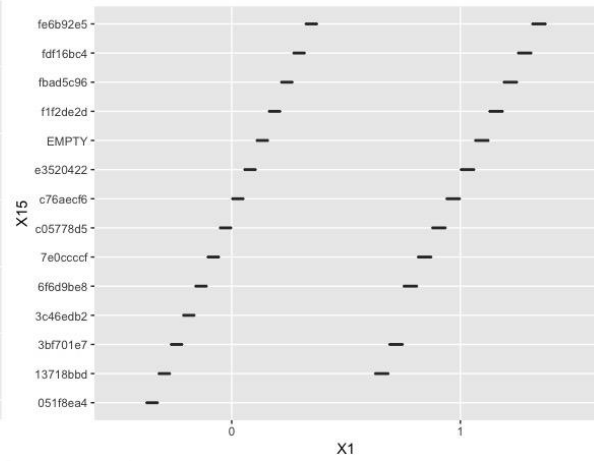
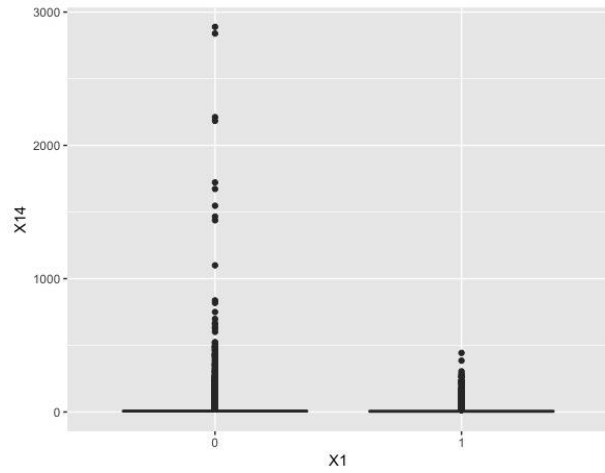
In this multinomial model my high accuracy is 0.7466. its high compare to Forward Selection Model.

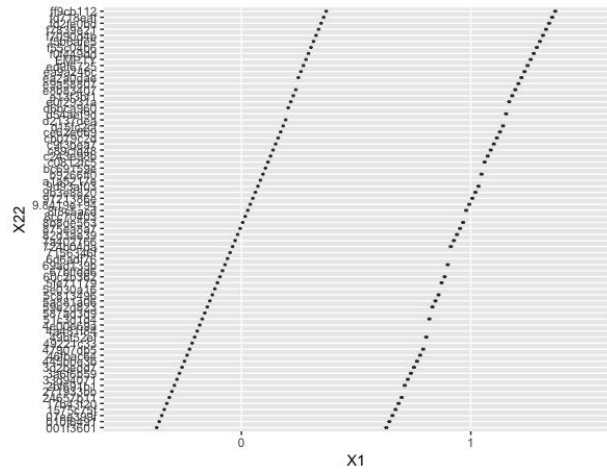
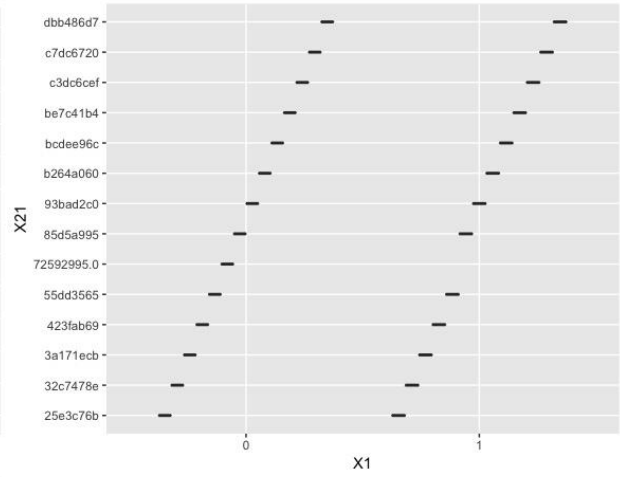
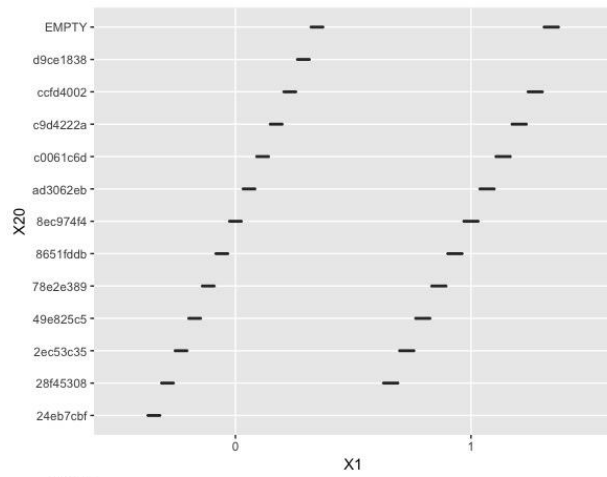
Features	LR Accuracies
All Features	0.7461
- X2 - X3 + X4 : X5	0.7464
- X4 - X5 + X6 : X7	0.7466
- X6 - X7 + X8 : X9	0.7465
- X8 - X9 + X10 : X11	0.7467
- X10 - X11 + X12 : X13	0.7446
- X12 - X13 + X14 : X15	0.7461
- X14 - X15 + X16 : X17	0.7457
- X16 - X17 + X18 : X19	0.746
- X18 - X19 + X20 : X21	0.746

BoxPlot:









Jitter Plot:

