





Response Surface Regression: % Feature Compression ... reshold, KNN

Analysis of Variance

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | DF | Adj SS | Adj MS | F-Value | P-Value |
| Model | 14 | 19746.0 | 1410.43 | 438.95 | 0.000 |
| Linear | 4 | 18041.9 | 4510.48 | 1403.75 | 0.000 |
| Dummy Feats | 1 | 2780.1 | 2780.06 | 865.21 | 0.000 |
| Cut OFf | 1 | 9073.0 | 9072.99 | 2823.69 | 0.000 |
| Threshold | 1 | 6138.2 | 6138.19 | 1910.32 | 0.000 |
| KNN | 1 | 50.7 | 50.67 | 15.77 | 0.000 |
| Square | 4 | 754.0 | 188.49 | 58.66 | 0.000 |
| Dummy Feats\*Dummy Feats | 1 | 118.6 | 118.59 | 36.91 | 0.000 |
| Cut OFf\*Cut OFf | 1 | 332.2 | 332.20 | 103.39 | 0.000 |
| Threshold\*Threshold | 1 | 276.8 | 276.79 | 86.14 | 0.000 |
| KNN\*KNN | 1 | 26.4 | 26.40 | 8.22 | 0.004 |
| 2-Way Interaction | 6 | 92.1 | 15.36 | 4.78 | 0.000 |
| Dummy Feats\*Cut OFf | 1 | 1.7 | 1.69 | 0.53 | 0.469 |
| Dummy Feats\*Threshold | 1 | 2.0 | 1.96 | 0.61 | 0.435 |
| Dummy Feats\*KNN | 1 | 23.6 | 23.56 | 7.33 | 0.007 |
| Cut OFf\*Threshold | 1 | 34.4 | 34.42 | 10.71 | 0.001 |
| Cut OFf\*KNN | 1 | 29.8 | 29.79 | 9.27 | 0.002 |
| Threshold\*KNN | 1 | 0.7 | 0.73 | 0.23 | 0.634 |
| Error | 1137 | 3653.4 | 3.21 |  |  |
| Lack-of-Fit | 561 | 1526.2 | 2.72 | 0.74 | 1.000 |
| Pure Error | 576 | 2127.2 | 3.69 |  |  |
| Total | 1151 | 23399.4 |  |  |  |

Model Summary

|  |  |  |  |
| --- | --- | --- | --- |
| S | R-sq | R-sq(adj) | R-sq(pred) |
| 1.79253 | 84.39% | 84.19% | 83.95% |

Coded Coefficients

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Term | Coef | SE Coef | T-Value | P-Value | VIF |
| Constant | 81.514 | 0.237 | 343.35 | 0.000 |  |
| Dummy Feats | -2.3529 | 0.0800 | -29.41 | 0.000 | 1.07 |
| Cut OFf | 3.4371 | 0.0647 | 53.14 | 0.000 | 1.16 |
| Threshold | -3.6483 | 0.0835 | -43.71 | 0.000 | 1.07 |
| KNN | 0.2911 | 0.0733 | 3.97 | 0.000 | 1.07 |
| Dummy Feats\*Dummy Feats | 0.804 | 0.132 | 6.08 | 0.000 | 1.00 |
| Cut OFf\*Cut OFf | 2.424 | 0.238 | 10.17 | 0.000 | 1.16 |
| Threshold\*Threshold | 1.310 | 0.141 | 9.28 | 0.000 | 1.00 |
| KNN\*KNN | -0.341 | 0.119 | -2.87 | 0.004 | 1.00 |
| Dummy Feats\*Cut OFf | 0.0636 | 0.0877 | 0.72 | 0.469 | 1.07 |
| Dummy Feats\*Threshold | 0.092 | 0.118 | 0.78 | 0.435 | 1.00 |
| Dummy Feats\*KNN | 0.281 | 0.104 | 2.71 | 0.007 | 1.00 |
| Cut OFf\*Threshold | -0.2997 | 0.0916 | -3.27 | 0.001 | 1.07 |
| Cut OFf\*KNN | -0.2449 | 0.0804 | -3.04 | 0.002 | 1.07 |
| Threshold\*KNN | -0.052 | 0.108 | -0.48 | 0.634 | 1.00 |

Regression Equation in Uncoded Units

|  |  |  |
| --- | --- | --- |
| % Feature Compression | = | 4075 - 0.0318 Dummy Feats - 8362 Cut OFf + 0.00607 Threshold + 3.83 KNN + 0.000013 Dummy Feats\*Dummy Feats + 4390 Cut OFf\*Cut OFf + 0.000003 Threshold\*Threshold - 0.0378 KNN\*KNN + 0.0108 Dummy Feats\*Cut OFf + 0.000001 Dummy Feats\*Threshold + 0.000375 Dummy Feats\*KNN - 0.01822 Cut OFf\*Threshold - 3.47 Cut OFf\*KNN - 0.000025 Threshold\*KNN |

Fits and Diagnostics for Unusual Observations

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Obs | % Feature Compression | Fit | Resid | Std Resid |  |
| 1 | 94.976 | 90.960 | 4.016 | 2.26 | R |
| 6 | 82.496 | 86.763 | -4.267 | -2.39 | R |
| 13 | 91.896 | 87.264 | 4.633 | 2.60 | R |
| 18 | 78.768 | 82.788 | -4.020 | -2.26 | R |
| 120 | 84.927 | 80.697 | 4.230 | 2.37 | R |
| 134 | 82.496 | 86.800 | -4.304 | -2.43 | R |
| 193 | 86.386 | 82.721 | 3.665 | 2.06 | R |
| 211 | 92.382 | 87.797 | 4.586 | 2.58 | R |
| 270 | 85.089 | 89.561 | -4.472 | -2.50 | R |
| 272 | 95.138 | 91.339 | 3.799 | 2.13 | R |
| 293 | 81.848 | 85.438 | -3.590 | -2.01 | R |
| 326 | 80.389 | 88.439 | -8.050 | -4.57 | R |
| 354 | 85.575 | 80.215 | 5.361 | 3.01 | R |
| 356 | 76.985 | 80.689 | -3.704 | -2.09 | R |
| 382 | 88.493 | 84.439 | 4.054 | 2.28 | R |
| 445 | 82.982 | 88.538 | -5.556 | -3.14 | R |
| 458 | 80.065 | 75.837 | 4.228 | 2.40 | R |
| 476 | 93.193 | 89.478 | 3.715 | 2.08 | R |
| 501 | 90.600 | 86.713 | 3.886 | 2.19 | R |
| 510 | 86.062 | 81.914 | 4.147 | 2.34 | R |
| 523 | 83.144 | 87.826 | -4.682 | -2.66 | R |
| 532 | 89.465 | 85.435 | 4.030 | 2.26 | R |
| 536 | 91.896 | 87.188 | 4.709 | 2.65 | R |
| 541 | 94.976 | 89.765 | 5.211 | 2.92 | R |
| 579 | 95.462 | 91.321 | 4.141 | 2.32 | R |
| 585 | 85.251 | 89.412 | -4.161 | -2.33 | R |
| 620 | 89.141 | 85.247 | 3.895 | 2.18 | R |
| 659 | 79.092 | 83.128 | -4.036 | -2.28 | R |
| 678 | 84.279 | 80.038 | 4.241 | 2.37 | R |
| 688 | 92.545 | 88.640 | 3.905 | 2.19 | R |
| 694 | 93.679 | 89.026 | 4.653 | 2.61 | R |
| 721 | 94.003 | 90.178 | 3.826 | 2.14 | R |
| 741 | 90.276 | 84.706 | 5.569 | 3.13 | R |
| 866 | 86.224 | 82.591 | 3.632 | 2.03 | R |
| 881 | 87.034 | 83.301 | 3.733 | 2.09 | R |
| 885 | 95.138 | 91.321 | 3.817 | 2.14 | R |
| 906 | 83.468 | 87.716 | -4.247 | -2.38 | R |
| 934 | 89.141 | 85.496 | 3.645 | 2.04 | R |
| 935 | 91.734 | 88.121 | 3.613 | 2.02 | R |
| 1009 | 76.823 | 80.958 | -4.134 | -2.33 | R |
| 1028 | 84.603 | 88.242 | -3.639 | -2.04 | R |
| 1029 | 91.734 | 85.834 | 5.900 | 3.31 | R |
| 1032 | 89.627 | 84.931 | 4.697 | 2.64 | R |
| 1060 | 90.438 | 86.319 | 4.119 | 2.31 | R |
| 1072 | 90.924 | 86.110 | 4.814 | 2.70 | R |
| 1073 | 87.682 | 84.078 | 3.605 | 2.02 | R |
| 1085 | 87.358 | 83.233 | 4.125 | 2.32 | R |
| 1090 | 88.169 | 92.312 | -4.143 | -2.33 | R |
| 1113 | 89.951 | 85.222 | 4.729 | 2.65 | R |
| 1129 | 76.013 | 80.215 | -4.202 | -2.36 | R |
| 1149 | 82.496 | 86.778 | -4.282 | -2.41 | R |

*R  Large residual*



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