**Linear Regression – Red Wines**

**R-Squared of Red Wines:** 0.987

**Coeff:**

fixed acidity: 0.0042

volatile acidity: -1.0997

citric acid: -0.1841

residual sugar: 0.0071

chlorides: -1.9114

free sulfur dioxide: 0.0045

total sulfur dioxide: -0.0033

density: 4.5291

pH: -0.5229

sulphates: 0.8871

alcohol: 0.2970

**Linear Regression – White Wines**

**R-Squared of White Wines:** 0.987

**Coeff:**

fixed acidity: 0.0042

volatile acidity: -1.0997

citric acid: -0.1841

residual sugar: 0.0071

chlorides: -1.9114

free sulfur dioxide: 0.0045

total sulfur dioxide: -0.0033

density: 4.5291

pH: -0.5229

sulphates: 0.8871

alcohol: 0.2970

**White Wine OLS Regression Results**

==============================================================================

Dep. Variable: quality R-squared: 0.987

Model: OLS Adj. R-squared: 0.987

Method: Least Squares F-statistic: 2694.

Date: Thu, 12 Apr 2018 Prob (F-statistic): 0.00

Time: 00:16:00 Log-Likelihood: -394.81

No. Observations: 400 AIC: 811.6

Df Residuals: 389 BIC: 855.5

Df Model: 11

Covariance Type: nonrobust

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coef std err t P>|t| [0.025 0.975]

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fixed acidity 0.0136 0.033 0.412 0.681 -0.051 0.079

volatile acidity -0.8466 0.236 -3.593 0.000 -1.310 -0.383

citric acid -0.3849 0.285 -1.351 0.178 -0.945 0.175

residual sugar -0.0073 0.022 -0.327 0.744 -0.051 0.037

chlorides -2.9426 0.832 -3.536 0.000 -4.579 -1.307

free sulfur dioxide 0.0126 0.004 2.822 0.005 0.004 0.021

total sulfur dioxide -0.0046 0.001 -3.352 0.001 -0.007 -0.002

density 5.0347 1.254 4.015 0.000 2.569 7.500

pH -0.7784 0.326 -2.385 0.018 -1.420 -0.137

sulphates 0.9430 0.222 4.256 0.000 0.507 1.379

alcohol 0.3188 0.034 9.286 0.000 0.251 0.386

==============================================================================

Omnibus: 14.736 Durbin-Watson: 2.019

Prob(Omnibus): 0.001 Jarque-Bera (JB): 23.757

Skew: -0.252 Prob(JB): 6.94e-06

Kurtosis: 4.082 Cond. No. 2.51e+03

==============================================================================

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

[2] The condition number is large, 2.51e+03. This might indicate that there are

strong multicollinearity or other numerical problems.

**Red Wine OLS Regression Results**

==============================================================================

Dep. Variable: quality R-squared: 0.988

Model: OLS Adj. R-squared: 0.988

Method: Least Squares F-statistic: 3026.

Date: Thu, 12 Apr 2018 Prob (F-statistic): 0.00

Time: 00:09:42 Log-Likelihood: -377.61

No. Observations: 400 AIC: 777.2

Df Residuals: 389 BIC: 821.1

Df Model: 11

Covariance Type: nonrobust

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coef std err t P>|t| [0.025 0.975]

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fixed acidity 0.0353 0.032 1.121 0.263 -0.027 0.097

volatile acidity -0.9646 0.251 -3.840 0.000 -1.458 -0.471

citric acid -0.3964 0.291 -1.360 0.175 -0.969 0.177

residual sugar 0.0324 0.023 1.416 0.158 -0.013 0.077

chlorides -1.9267 0.820 -2.350 0.019 -3.539 -0.315

free sulfur dioxide 0.0034 0.005 0.737 0.462 -0.006 0.012

total sulfur dioxide -0.0051 0.002 -3.154 0.002 -0.008 -0.002

density 4.2511 1.228 3.461 0.001 1.836 6.666

pH -0.4790 0.312 -1.533 0.126 -1.093 0.135

sulphates 0.8365 0.215 3.893 0.000 0.414 1.259

alcohol 0.2991 0.034 8.789 0.000 0.232 0.366

==============================================================================

Omnibus: 5.476 Durbin-Watson: 1.811

Prob(Omnibus): 0.065 Jarque-Bera (JB): 6.074

Skew: -0.169 Prob(JB): 0.0480

Kurtosis: 3.500 Cond. No. 2.42e+03

==============================================================================

Warnings:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

[2] The condition number is large, 2.42e+03. This might indicate that there are

strong multicollinearity or other numerical problems.

**WHITE WINE DESCRIPTIONS**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | fixed acidity | volatile acidity | citric acid | residual sugar | chlorides | free sulfur dioxide | total sulfur dioxide | density | pH | sulphates | alcohol | quality |
| Number | 4898 | | | | | | | | | | | | |
| Mean | 6.854788 | 0.278241 | 0.334192 | 6.391415 | 0.045772 | 35.308085 | 138.360657 | 0.994027 | 3.188267 | 0.489847 | 10.514267 | 5.877909 |
| Standard Deviation | 0.843868 | 0.100795 | 0.121020 | 5.072058 | 0.021848 | 17.007137 | 42.498065 | 0.002991 | 0.151001 | 0.114126 | 1.230621 | 0.885639 |
| Minimum | 3.800000 | 0.080000 | 0 | 0.600000 | 0.009000 | 2 | 9 | 0.987110 | 2.72 | 0.220000 | 8 | 3 |
| 25% interval | 6.300000 | 0.210000 | 0.270000 | 1.700000 | 0.036000 | 23 | 108 | 0.991723 | 3.090000 | 0.410000 | 9.500000 | 5 |
| 50% interval | 6.800000 | 0.260000 | 0.320000 | 5.200000 | 0.043000 | 34 | 134 | 0.993740 | 3.180000 | 0.470000 | 10.400000 | 6 |
| 75% interval | 7.300000 | 0.320000 | 0.390000 | 9.900000 | 0.050000 | 46 | 167 | 0.996100 | 3.280000 | 0.550000 | 11.400000 | 6 |
| Maximum interval | 14.200000 | 1.100000 | 1.660000 | 65.800000 | 0.346000 | 289 | 440 | 1.038980 | 3.820000 | 1.080000 | 14.200000 | 9 |

**RED WINE DESCRIPTIONS**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | fixed acidity | volatile acidity | citric acid | residual sugar | chlorides | free sulfur dioxide | total sulfur dioxide | density | pH | sulphates | alcohol | quality |
| Number | 1599 | | | | | | | | | | | | |
| Mean | 8.319637 | 0.527821 | 0.270976 | 2.538806 | 0.087467 | 15.874922 | 46.467792 | 0.996747 | 3.311113 | 0.658149 | 10.422983 | 5.636023 |
| Standard Deviation | 1.741096 | 0.179060 | 0.194801 | 1.409928 | 0.047065 | 10.460157 | 32.895324 | 0.001887 | 0.154386 | 0.169507 | 1.065668 | 0.807569 |
| Minimum | 4.6 | 0.120000 | 0 | 0.9 | 0.012 | 1 | 6 | 0.990070 | 2.72 | 0.33 | 8.4 | 3 |
| 25% interval | 7.1 | 0.390000 | 0.09 | 1.9 | 0.07 | 7 | 22 | 0.995600 | 3.21 | 0.55 | 9.5 | 5 |
| 50% interval | 7.9 | 0.520000 | 0.26 | 2.2 | 0.079 | 14 | 38 | 0.996750 | 3.31 | 0.62 | 10.2 | 6 |
| 75% interval | 9.2 | 0.640000 | 0.45 | 2.6 | 0.09 | 21 | 62 | 0.997835 | 3.40 | 0.73 | 11.1 | 6 |
| Maximum interval | 15.9 | 1.58 | 1 | 15.5 | 0.611000 | 72 | 289 | 1.003690 | 4.01 | 2 | 14.9 | 8 |