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## Wine Quality Data Set

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**Abstract:** Two datasets are included, related to red and white vinho verde wine samples, from the north of Portugal. The goal is to model wine quality based on physicochemical tests (see [Cortez et al., 2009], [\[Web Link\]](#)).



<b>Data Set Characteristics:</b>	Multivariate	<b>Number of Instances:</b>	4898	<b>Area:</b>	Business
<b>Attribute Characteristics:</b>	Real	<b>Number of Attributes:</b>	12	<b>Date Donated</b>	2009-10-07
<b>Associated Tasks:</b>	Classification, Regression	<b>Missing Values?</b>	N/A	<b>Number of Web Hits:</b>	590023

### Source:

Paulo Cortez, University of Minho, Guimarães, Portugal, <http://www3.dsi.uminho.pt/pcortez>  
 A. Cerdeira, F. Almeida, T. Matos and J. Reis, Viticulture Commission of the Vinho Verde Region(CVRVV), Porto, Portugal  
 @2009

### Data Set Information:

The two datasets are related to red and white variants of the Portuguese "Vinho Verde" wine. For more details, consult: [\[Web Link\]](#) or the reference [Cortez et al., 2009]. Due to privacy and logistic issues, only physicochemical (inputs) and sensory (the output) variables are available (e.g. there is no data about grape types, wine brand, wine selling price, etc.).

These datasets can be viewed as classification or regression tasks. The classes are ordered and not balanced (e.g. there are much more normal wines than excellent or poor ones). Outlier detection algorithms could be used to detect the few excellent or poor wines. Also, we are not sure if all input variables are relevant. So it could be interesting to test feature selection methods.

### Attribute Information:

For more information, read [Cortez et al., 2009].  
 Input variables (based on physicochemical tests):  
 1 - fixed acidity  
 2 - volatile acidity

3 - citric acid  
4 - residual sugar  
5 - chlorides  
6 - free sulfur dioxide  
7 - total sulfur dioxide  
8 - density  
9 - pH  
10 - sulphates  
11 - alcohol  
Output variable (based on sensory data):  
12 - quality (score between 0 and 10)

## Relevant Papers:

P. Cortez, A. Cerdeira, F. Almeida, T. Matos and J. Reis. Modeling wine preferences by data mining from physicochemical properties.  
In Decision Support Systems, Elsevier, 47(4):547-553, 2009.

Available at: [\[Web Link\]](#)

## Citation Request:

Please include this citation if you plan to use this database:

P. Cortez, A. Cerdeira, F. Almeida, T. Matos and J. Reis.  
Modeling wine preferences by data mining from physicochemical properties. In Decision Support Systems, Elsevier, 47(4):547-553, 2009.

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