Prediction of Wine by its range

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**Wine** is an [alcoholic drink](https://en.m.wikipedia.org/wiki/Alcoholic_drink) made from [fermented](https://en.m.wikipedia.org/wiki/Fermentation_in_winemaking) [fruit.](https://en.m.wikipedia.org/wiki/Fruit) [Yeast](https://en.m.wikipedia.org/wiki/Yeast_in_winemaking) consumes the [sugar](https://en.m.wikipedia.org/wiki/Sugar) in the fruits and converts it to [ethanol](https://en.m.wikipedia.org/wiki/Ethanol) and [carbon dioxide,](https://en.m.wikipedia.org/wiki/Carbon_dioxide) releasing [heat](https://en.m.wikipedia.org/wiki/Heat) in the process. Though wine [can be made from a variety of fruit crops](https://en.m.wikipedia.org/wiki/Fruit_wine) such as [plum,](https://en.m.wikipedia.org/wiki/Plum) [cherry,](https://en.m.wikipedia.org/wiki/Cherry) [pomegranate,](https://en.m.wikipedia.org/wiki/Pomegranate) [blueberry,](https://en.m.wikipedia.org/wiki/Blueberry) [currant](https://en.m.wikipedia.org/wiki/Ribes) and [elderberry,](https://en.m.wikipedia.org/wiki/Sambucus) it is most often made from [grapes,](https://en.m.wikipedia.org/wiki/Grape) and the term "wine" generally refers to grape wine when used without a qualifier.

our application’s prediction, provide ideal solutions for the analysis of wine, which will make this whole process efficient and cheaper with less human interaction.

# Objective

* Our Main objective is to predict the wine quality using machine learning through Python programming language
* A large dataset is considered and wine quality is modelled to analyse the quality of wine through different parameters like fixed acidity, volatile acidity etc.
* All these parameters will be analysed through Machine Learning algorithms like random forest classifier algorithm which will helps to rate the wine on scale 1 - 10 or bad - good.
* Output obtained would further be checked for correctness and model will be optimized accordingly.
* It can support the wine expert evaluations and ultimately improve the Production.

Coding :

|  |
| --- |
| library('party') library('rpart') library('rpart.plot') library('caret') library('ROCR') library('randomForest') set.seed(46)    wineData<-read.csv('../input/winequalityN.csv',sep=',',stringsAsFactors=F) str(wineData) sum(is.na(wineData))    hist(wineData$quality, main= "Wine Quality", col= "blue") qualityFactor <- ifelse(wineData$quality >= 6, "high", "low") wineData <- data.frame(wineData, qualityFactor) table(wineData$qualityFactor)    index <- sample(2, nrow(wineData), replace=TRUE, prob = c(0.60, 0.40)) trainingData <- wineData[index==1, ] validationData <- wineData[index==2, ]    control <- rpart.control(minsplit = 5L, maxdepth = 5L, minbucket = 5, cp =  0.002, maxsurrogate = 4)  rPartModel <- rpart(qualityFactor~., trainingData, method = "class", contr ol = control)  predict\_rpart <- predict(rPartModel, validationData[, -13], type = "class"  )  prp(rPartModel, type=2, extra=3, tweak=0.8, main = "The Quality of Wine", compress=TRUE) |

Output :

Prediction high low high 1299 380 low 305 595

Accuracy : 0.7344

95% CI : (0.7169, 0.7514)

No Information Rate : 0.6219

P-Value [Acc > NIR] : < 2.2e-16

Kappa : 0.4265

Mcnemar's Test P-Value : 0.004693

Sensitivity : 0.8099

Specificity : 0.6103

Pos Pred Value : 0.7737

Neg Pred Value : 0.6611

Prevalence : 0.6219

Detection Rate : 0.5037

Detection Prevalence : 0.6510

Balanced Accuracy : 0.7101

'Positive' Class : high

# Application

* Itis used by the wine manufacturers to improve the quality of the future wines.
* Certification bodies can also use the result for quality control. • Results can be used to make wine selection guides for wine magazines.
* Results can be used by consumers for wine selection

# Reference

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