CEDB1160 Project

Name	Date
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Resources

- Python script for your analysis: WhiteWine_Analysis.py
- Results figure/saved file:
    - Images\ correlation-winequality-white
    - Images\ whiteWineQuality
    - Distribution for Quality Differences(real-predicted)
    - V2 Distribution for Quality Differences(real-predicted)
- Dockerfile for your experiment: I will provide it by next week

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Research Question

My approach for data analysis is focusing on enhancing the white wine quality based on the existing testing results for the below features

Fixedacidity	volatileacidity

citricacid	residualsugar
chlorides	totalsulfurdioxide
freesulfurdioxide	Density
pH	sulphates
alcohol	quality

Abstract

- **opportunity**: we have a 4,898 physical tests on white wine for all mentioned features
- **action**: increase Alcohol feature by 1% from the mean and apply machine learning to predict the quality, and finally compare the difference disruption for both schemes
- **resolution**: quality enhancement by increasing the wine alcohol feature

Introduction

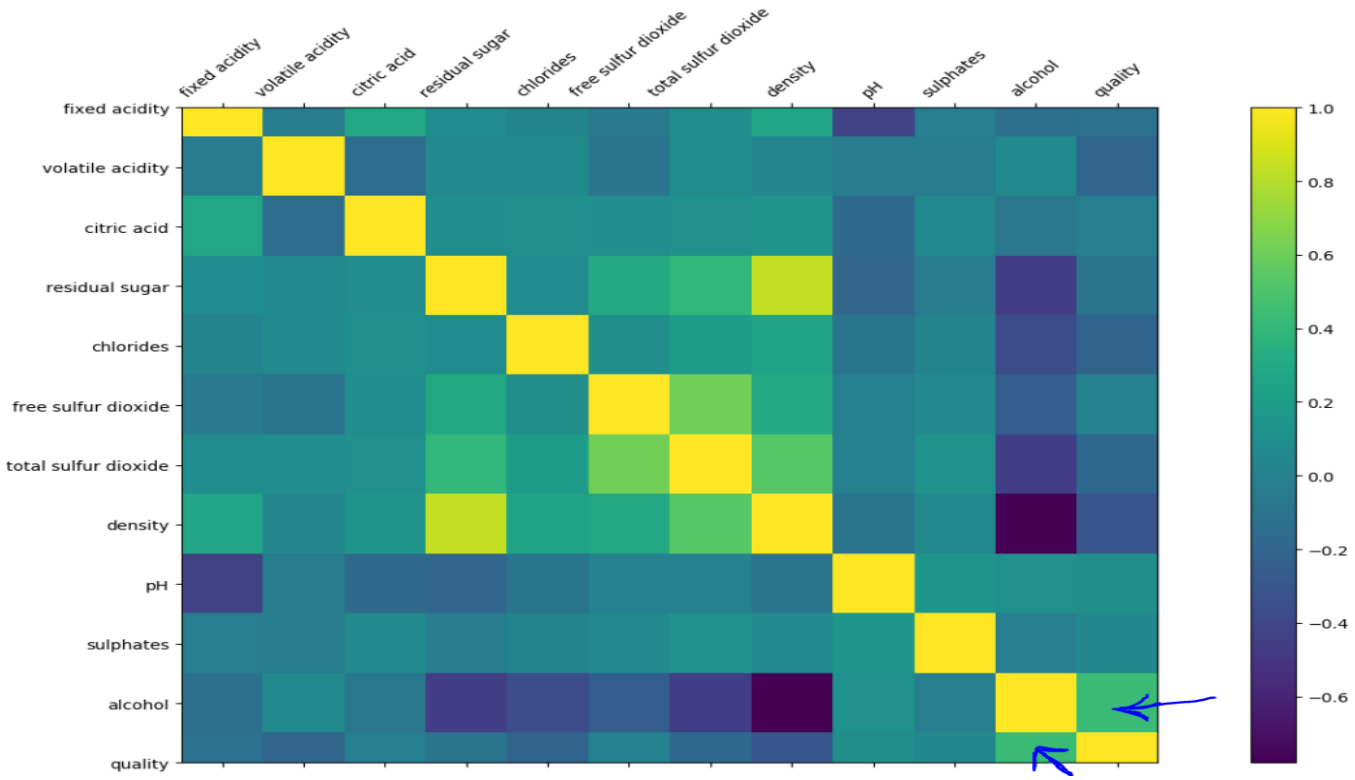
The white wine dataset is related to white vinho verde wine samples, from the north of Portugal. The goal is to model wine quality based on physicochemical tests

https://archive.ics.uci.edu/ml/datasets/Wine+Quality

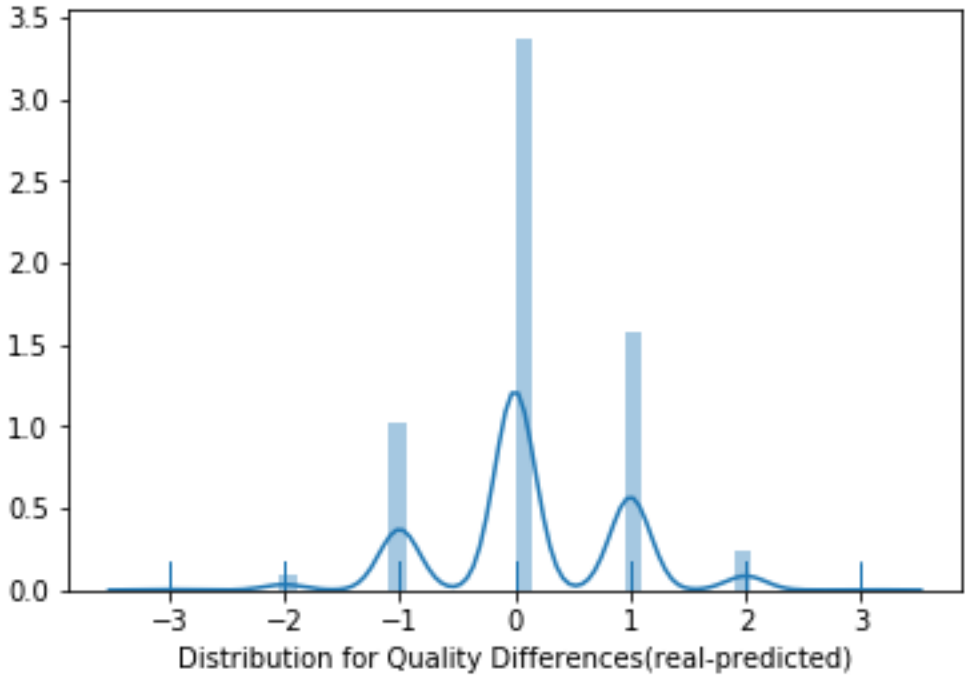
Methods

- conduct a correlation exercise and highlight the high correlated features with the quality one
- we have high correlation between Quality & Alcohol as below

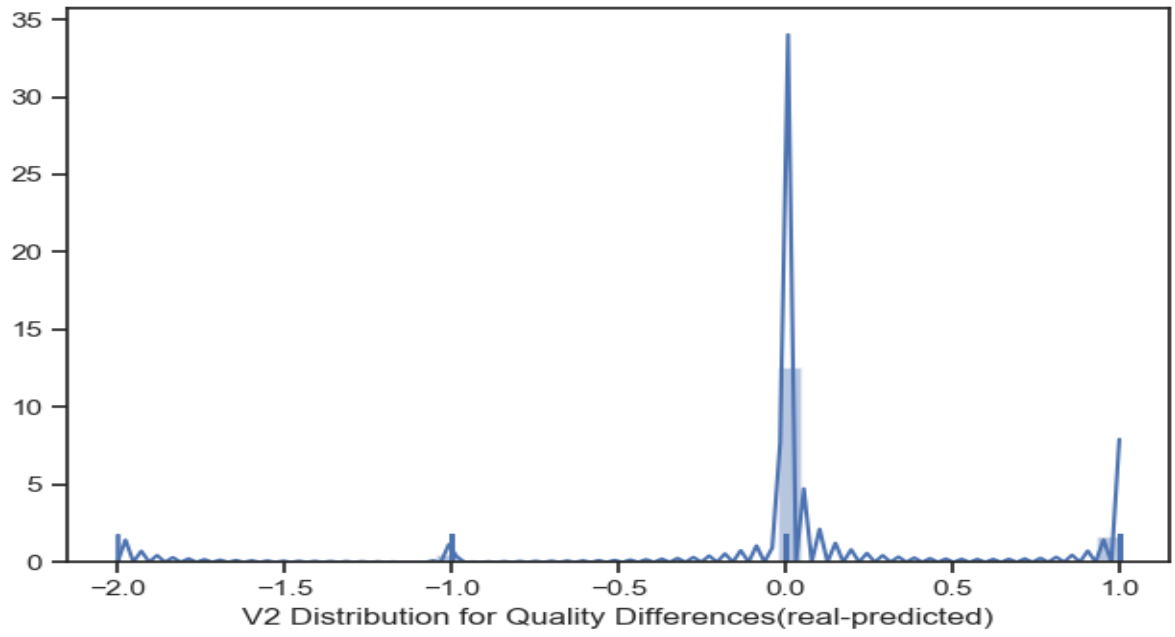
Features	alcohol	quality
fixed acidity	-0.120881123	-0.113662831
volatile acidity	0.067717943	-0.194722969
citric acid	-0.07572873	-0.009209091
residual sugar	-0.450631222	-0.097576829
chlorides	-0.360188712	-0.209934411
free sulfur dioxide	-0.250103941	0.008158067
total sulfur dioxide	-0.448892102	-0.174737218
density	-0.780137621	-0.307123313
pH	0.121432099	0.099427246
sulphates	-0.017432772	0.053677877
alcohol	1	0.435574715
quality	0.435574715	1



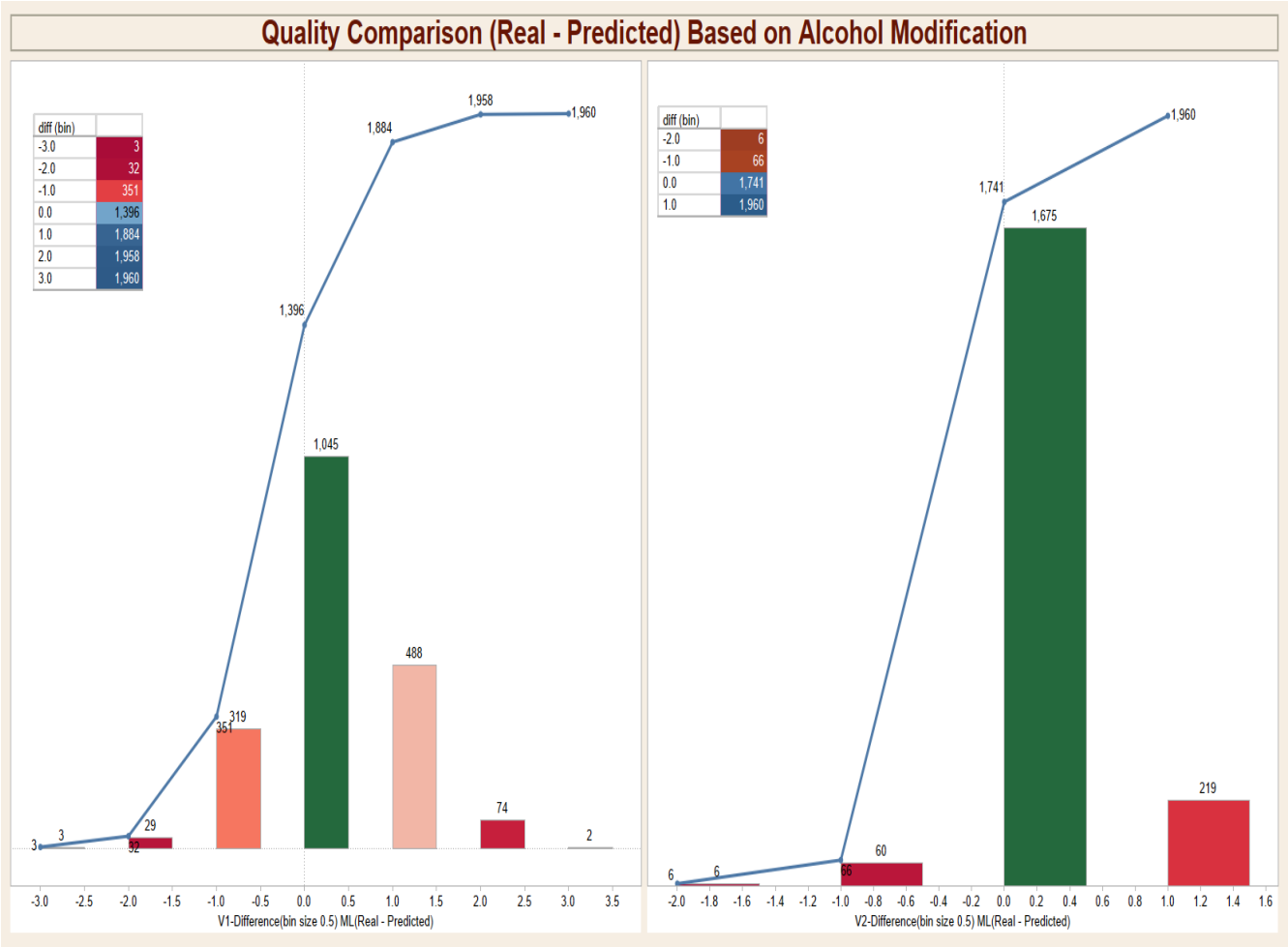
- apply machine learning and predicted the quality as a target and plot the distribution value for differences between real and predicated one

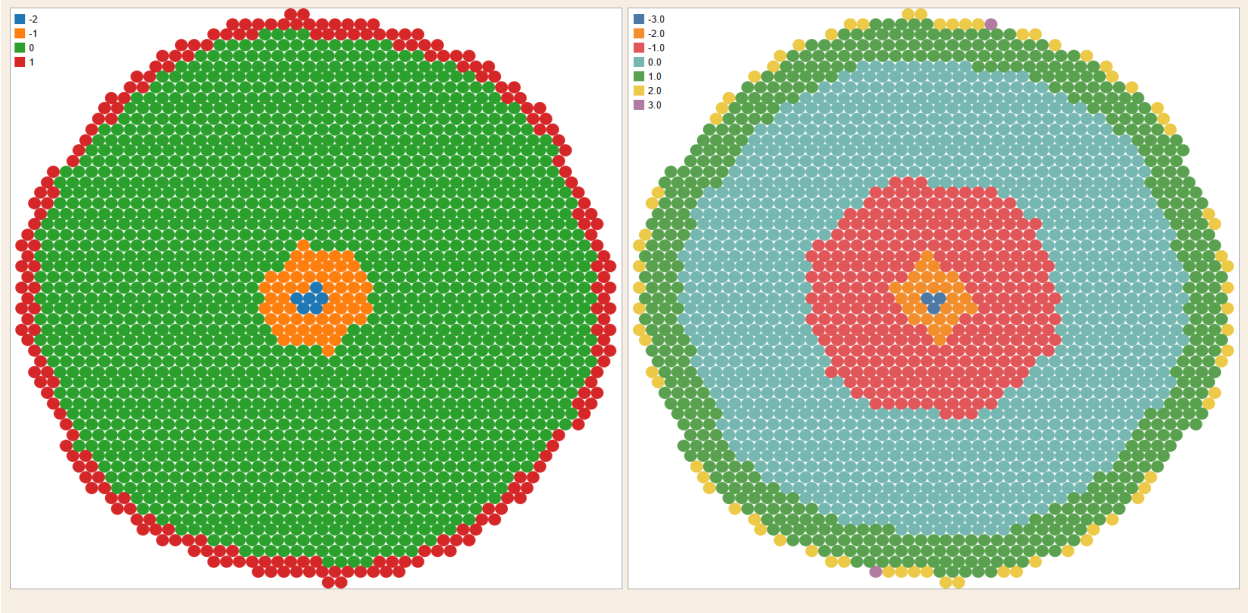


- replace alcohol feature by alcoholplus =alcohol + 1% (alcohol mean) and repeat the previous step
- as a result, the distribution plot became more accurate and less variation



- I have saved the plots-based data and used Tableau BI on the top of them in order to provide more clear insights as below





Results

- The differences variation rate has been enhanced by the assumption of alcohol feature modification
- First scheme distribution rages for differences

diff (bin)	
-2.0	6
-1.0	66
0.0	1,741
1.0	1,960

- Second scheme distribution rages for differences

diff (bin)	
-3.0	3
-2.0	32
-1.0	351
0.0	1,396
1.0	1,884
2.0	1,958
3.0	1,960

- Conclusion: we could have better white wine quality by increasing alcohol %