

# Understanding the data in datasets/classification/wine/wine.csv

The PDF report provides a comprehensive analysis of tabular data, focusing on various characteristics such as data types, number of rows, and number of columns. By examining these attributes, the report offers effective understanding of the dataset, enabling data analysts to gain insights and make informed decisions.

In addition to descriptive statistics, the PDF report utilizes graphical representations to visualize the distribution of numerical data and explores feature correlations. Through correlation plots, the relationships between different features are analyzed, revealing potential associations and dependencies within the dataset. These insights further enhance the understanding of the data and help identify key variables that may influence the target outcome.

The PDF report also investigates the distribution of categories for string features and provides class imbalance measures for classification scenarios. By assessing the balance of classes within the dataset, it highlights potential challenges in training models and making accurate predictions. This analysis is particularly valuable in machine learning tasks, as it helps to identify strategies for handling class imbalances and improving the performance of classification algorithms.

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# Chapter 1 - Dataset Characteristics

In this section we report basic cardinality of the dataset like number of rows and number of columns. We report the data types of the columns in the dataset. Some columns are numeric, representing either integers or floating-point values. Other columns are categorical, containing string or object values. Additionally, there may be datetime columns capturing specific timestamps or dates.

We also report whether any column in the dataset has missing values. These missing values indicate instances where data is not available or was not recorded for certain records. Identifying and handling these missing values appropriately is crucial to ensure accurate analysis.

Furthermore, the nature of the target variable in the dataset is essential to determine the objective of analysis. If the target variable is categorical, it implies a classification problem, where the goal is to assign instances to specific categories or classes. On the other hand, if the target variable is numeric or continuous, it signifies a regression problem, where the focus lies in predicting a numeric value based on other variables.

Understanding these various aspects of the dataset lays the foundation for further exploration, analysis, and modeling tasks.

The number of rows in the dataset are: 89

The number of columns in the dataset are: 14

The name of the target column is: target

The machine learning task based on your target column looks like: Classification

No columns were found to have missing values

The table of data type for each column is below:-

Column	Type
alcohol	float64
malic_acid	float64

Column	Type
ash	float64
alcalinity_of_ash	float64
magnesium	float64
total_phenols	float64
flavanoids	float64
nonflavanoid_phenols	float64
proanthocyanins	float64
color_intensity	float64
hue	float64
od280/od315_of_diluted_wines	float64
proline	float64
target	int64

## Chapter 2 - Visualize distributions of the dataset

This section have different graphs using which you can visualize distibutions of different features in your dataset, visualize the distibution of various categories for categorical features, visualize the histogram distribution of numerical features and visualize the box plot distribution between categories in categorical columns and numerical columns.

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## Categorical feature distribution

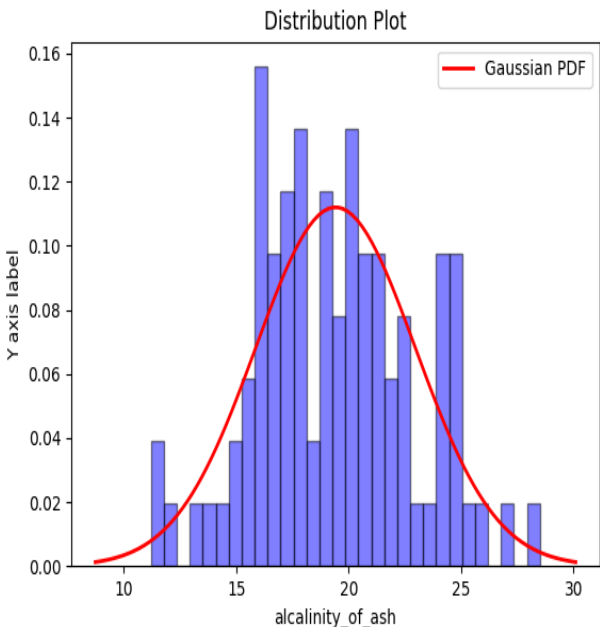
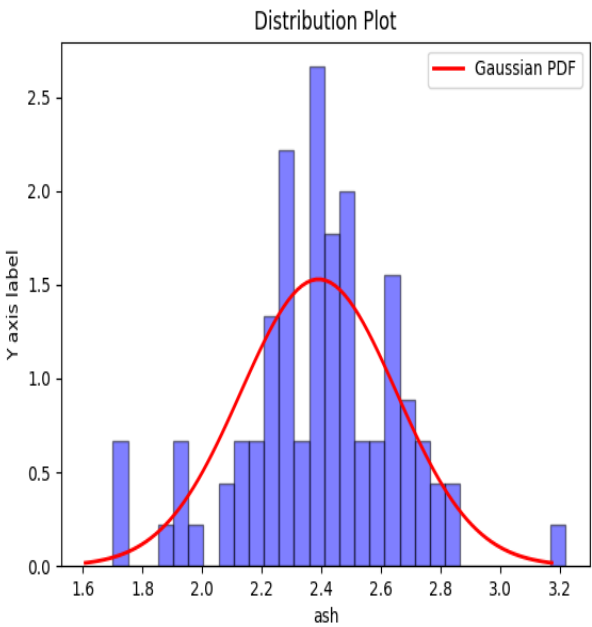
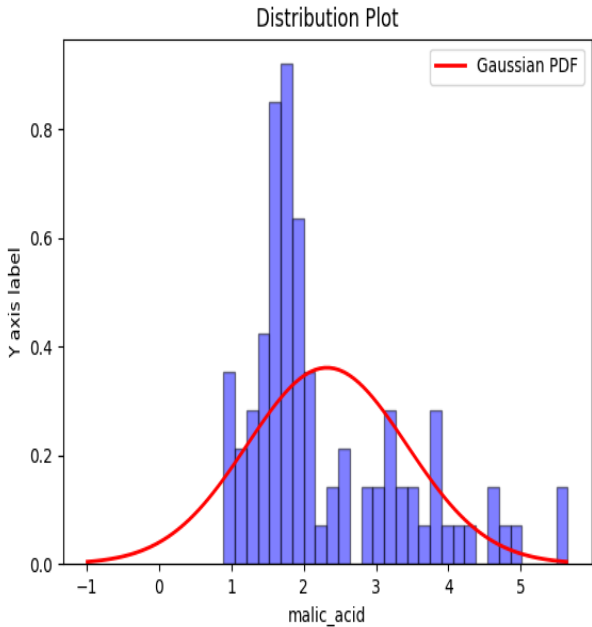
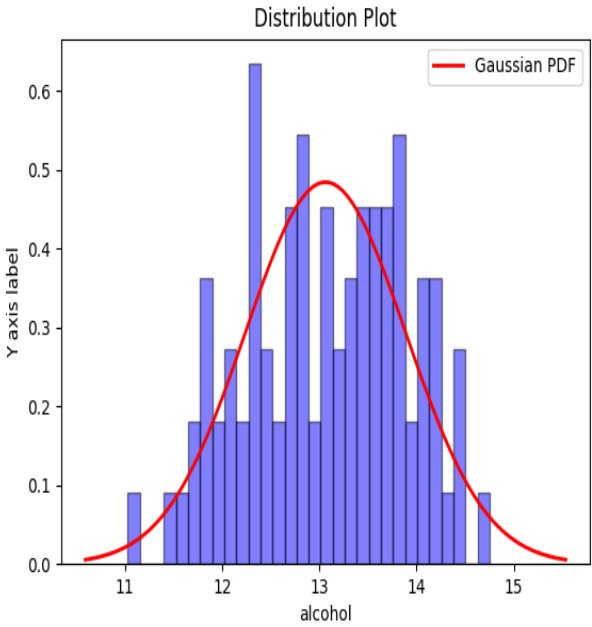
The section shows the distribution of individual categories in a given categorical column. The distribution helps to understand which categories in a given column are most/least prevalent in your dataset.

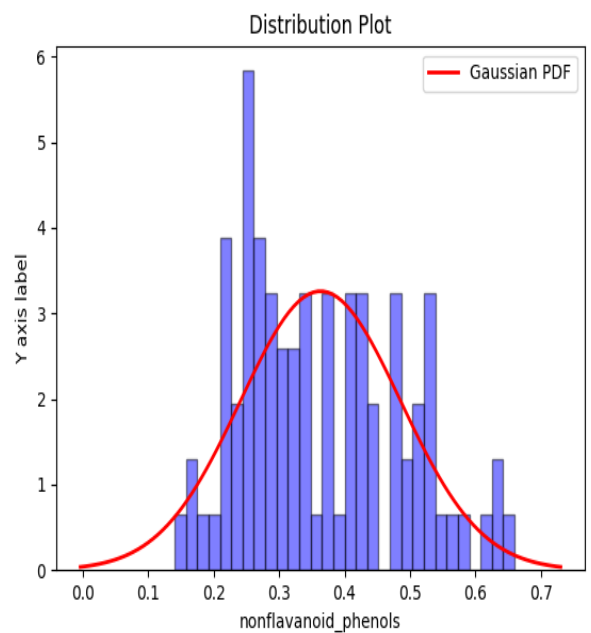
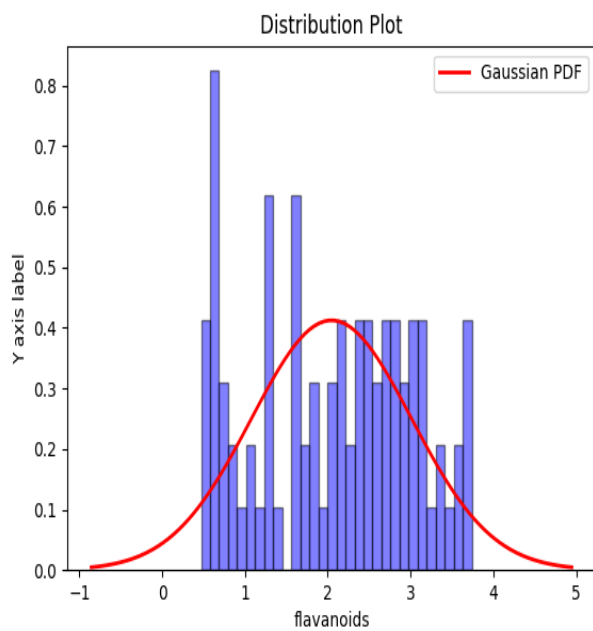
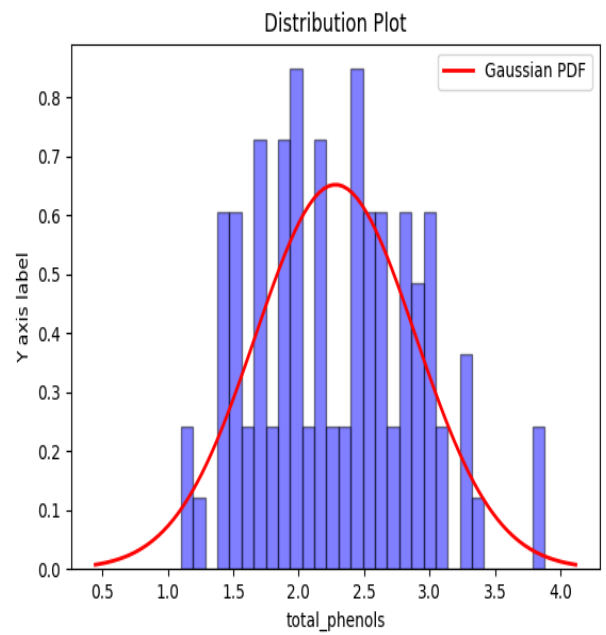
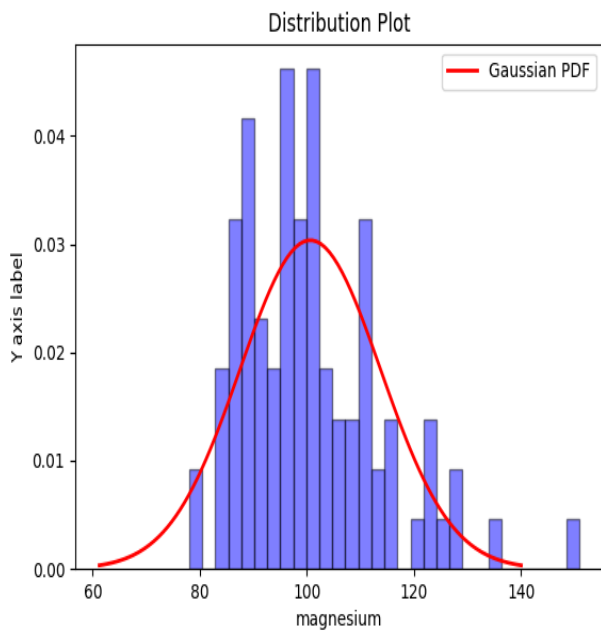
No categorical features exist in the dataset.

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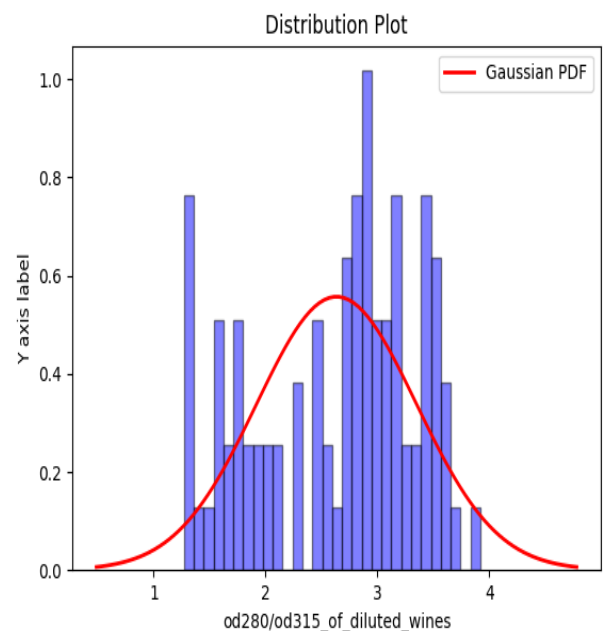
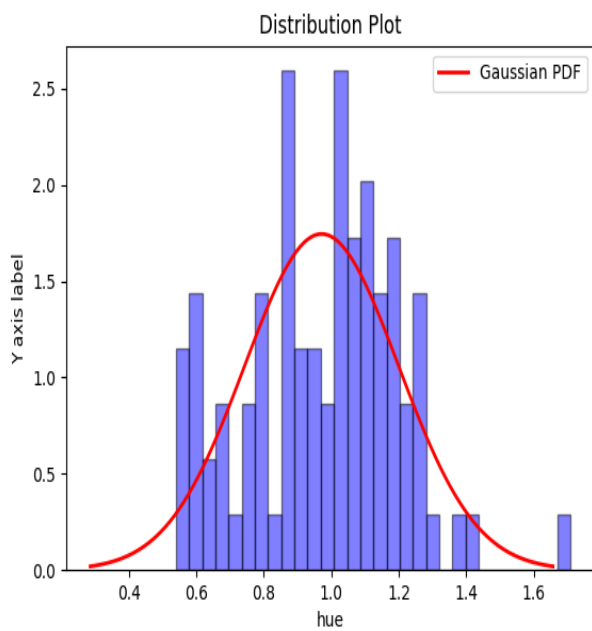
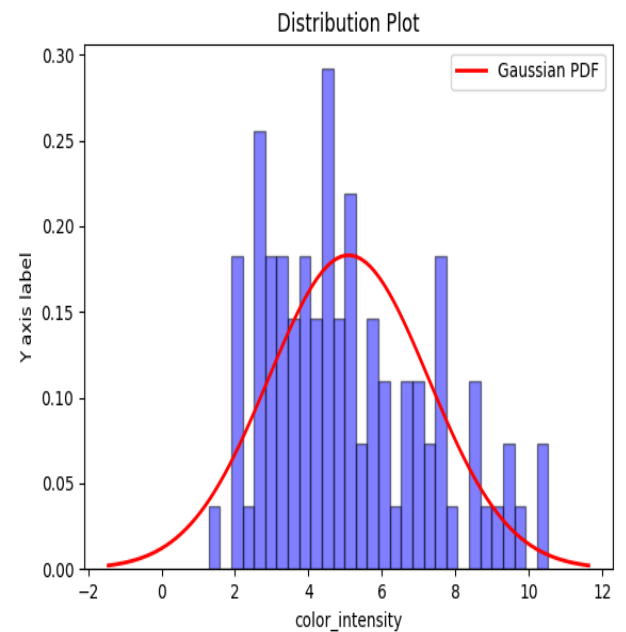
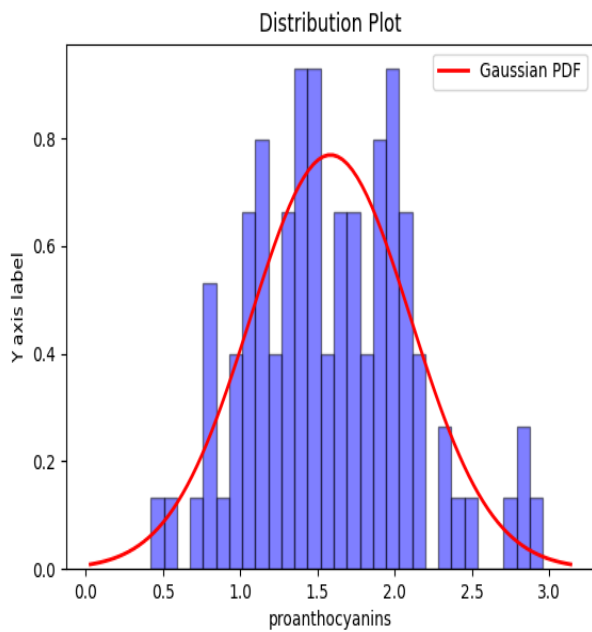
# Numerical value distribution

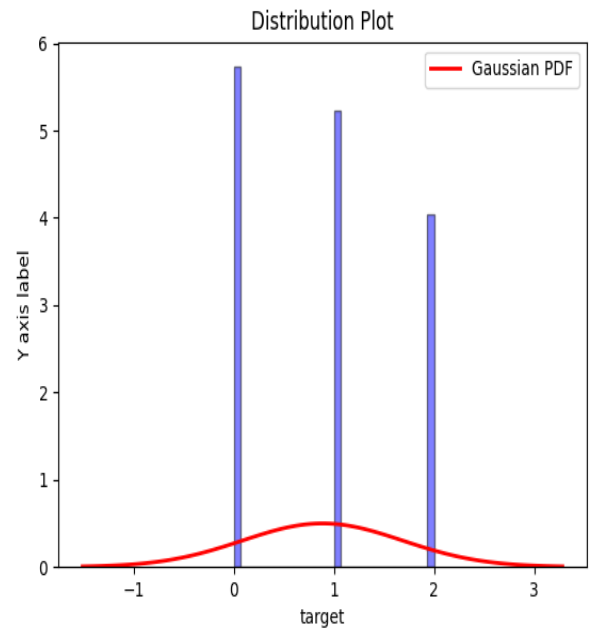
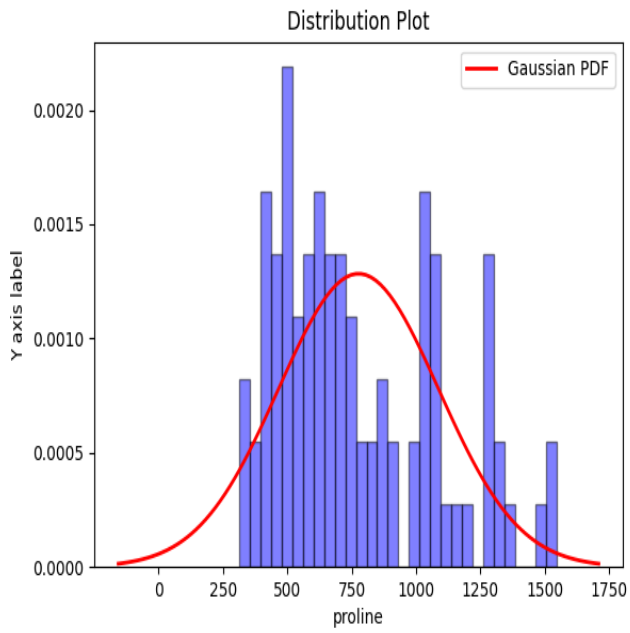
The section shows the histogram distribution of various numerical features in your dataset. The graphs also show a line chart which helps understand how the normal distribution will look if the numerical values in the distribution were normally distributed. These graphs also help gauge if the distribution of data in a particular column is skewed in any direction.











## Box plot distribution

The section shows the box plot distribution of between the categories in categorical columns and numerical values in a numerical column. These graphs help in uncovering patterns that exist between various categories in a categorical column with the values in the numerical columns.

No categorical features exists in the dataset.

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## Chapter 3 - Feature correlations between numerical features

This section shows the numerical feature pairs having positive and negative correlation. The correlation have been computed using Pearson correlation coefficient. Examination of feature correlation can help find if the data has [leaky features]([https://en.wikipedia.org/wiki/Leakage\\_\(machine\\_learning\)](https://en.wikipedia.org/wiki/Leakage_(machine_learning))).

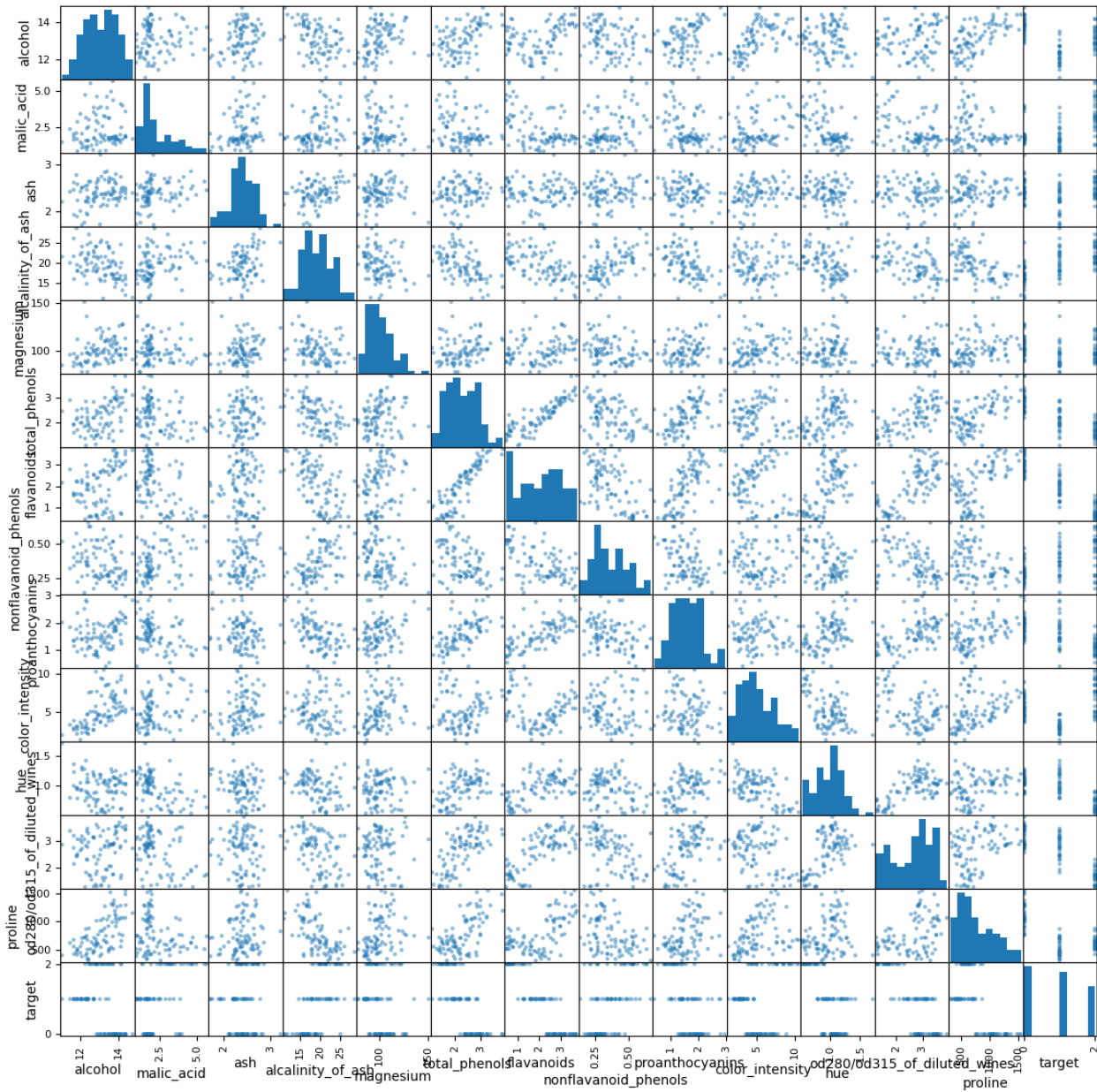
Top five positive feature correlations

feature1	feature2	correlation
flavanoids	total_phenols	0.8722918652963901
flavanoids	od280/od315_of_diluted_wines	0.7631700889393166
od280/od315_of_diluted_wines	total_phenols	0.6972477930680269
flavanoids	proanthocyanins	0.6903048541622896
alcohol	proline	0.6607583006587602

Top five negative feature correlations

feature1	feature2	correlation
flavanoids	target	-0.903977934973561
od280/od315_of_diluted_wines	target	-0.8220419409327074
target	total_phenols	-0.7770464143157801
proline	target	-0.6864585776719077
hue	target	-0.6263510075969553

Feature correlation graph showing the scatter plot between any two numerical features. This graph helps to understand if there are any correlation between numerical features.



## Chapter 4 - Class Imbalance

In this section we show statistics to bring out the imbalance between the different classes in the target column for a classification problem. This will help you learn if you need to address the issue of class imbalance in your dataset.

The summary of number of instances of each class is below

- The number of instances of class 0 are: 34
- The number of instances of class 1 are: 31
- The number of instances of class 2 are: 24

The majority class is: 0

- The ratio of number of instances of majority class 0 to class 1 is: 1.096774193548387
- The ratio of number of instances of majority class 0 to class 2 is: 1.4166666666666667

# References

You can visit the following links for further exploration:-

- [data.understand](#)

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