ÖZYEĞİN UNIVERSITY

CS 454
Introduction to Machine Learning and
Artificial Neural Networks

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Project Proposal
Wine Quality Prediction

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1. Short Description of the Problem to Be Solved

Nowadays, people resort to alcohol for reasons such as escaping from the stresses of daily life and keeping up with the showoff culture. Wine, as one of the most popular types of alcohol, has an important place in people's lives. Compared to other alcoholic beverages, wine has developed its own culture over the years.

The different features created by the diversity in the winemaking process have a great effect on the formation of this culture. Therefore, it is critical to assess the quality of wine before consuming it. We will use physicochemical features such as pH, density, citric acid, and etc. in order to estimate the quality of the wine.

As a result, this study represents a step toward predicting wine quality based on its numerous physicochemical characteristics.

2. Approach to Tackle the Problem

Information will be extracted from tracks available in the Wine Quality dataset. Principal Component Analysis (PCA) will be used to extract the most useful features that are to be used in classification. Finally, selected features will be provided to each of the three algorithms, namely, Logistic Regression and Linear Regression, Multilayer Perceptron, and K-Nearest Neighbor for both classification and regression. Classifications will be compared to the ground truth, then, confusion matrices and accuracies will be calculated. Results will be compared to those of the previous work.

3. The Dataset

1. [Wine Quality](#)

4. The Algorithms Planned to Be Used

1. Logistic Regression and Linear Regression
2. Multilayer Perceptron (MLP) (Classification/Regression) - (Three different structure)
3. K-Nearest Neighbor (Classification/Regression)

5. References to Related Work

[1] Wine Quality Detection Through Machine Learning Algorithms. IEEE Xplore. (n.d.). Retrieved April 2, 2022, from https://ieeexplore.ieee.org/abstract/document/9009111?casa_token=36FgX0ticLYAAAAA%3A7gBkjw30td8As9C8gccVAqRiBFJ9MLyGbC60CvZaeb1R8hF1NjD61_nFM9vzp0sW_-7voqkeM3Y

[2] Red Wine Quality Prediction using Machine Learning Techniques. IEEE Xplore. (n.d.). Retrieved April 3, 2022, from

https://ieeexplore.ieee.org/abstract/document/9104095?casa_token=7mnlC0t4fqQAAAAA%3A630nSaK9vZDI_8x5veG9nPdqLFOeybxWzO3fr7RVRe95dRN4_DSDt00ddozhyhp0lomijqzOhqk

[3] Agrawal, G. K. (n.d.). Wine Quality Classification with Multilayer Perceptron. International Journal of Internet, Broadcasting and Communication. Retrieved April 12, 2022, from https://www.koreascience.or.kr/article/JAKO201832073079660.page