**UNIVERSITY OF GHANA**



**DEPARTMENT OF COMPUTER SCIENCE**

**CSCD 312** ARTIFICIAL INTELLIGENCE

**STUDENT ID:** 10666676

**EXPLORING THE PHYSIOCHEMICAL FEATURES TO DETERMINE THE QUALITY OF WINE**

**MODEL PERFORMANCE RESULTS**

This work was aimed at exploring the physiochemical features that will help us determine the quality of wine.The physiochemical tests that were factored are in this preceding order:

* Fixed Acidity
* Volatile Acidity
* Citric Acid
* Residual Sugar
* Chlorides
* Free sulphur dioxide
* Total sulphur dioxide
* Density
* pH Level
* Sulphates
* Alcohol
* Quality

During this work, five machine learning techniques were employed:

* Decision Tree
* Random Forest
* Logistic Regression
* Linear Regression
* Support Vector Machine (SVM)

**RESULTS**

|  |  |  |
| --- | --- | --- |
| **TRAINING MODEL** | **TIME USED** | **ACCURACY SCORE** |
| DECISION TREE | 0.06496334075927734 | 0.5782312925170068 |
| RANDOM FOREST | 0.18189573287963867 | 0.6319727891156462 |
| LOGISTIC REGRESSION | 0.16490602493286133 | 0.5265306122448979 |
| LINEAR REGRESSION | 0.12692761421203613 | 0.46462585034013604 |
| SUPPORT VECTOR MACHINE(SVM) | 1.1673409938812256 | 0.5517006802721088 |

From the above table, we notice that (SVM) training model consume much time but produced a good accuracy score while linear regression used a little amount of time but it’s accuracy wasn’t up to the rest.But looking at random forest and decision tree, these two training models made a remarkable accuracy score within their time frame.

From all the algorithms used, it was obvious from the dataset and the table, Random Forest and Decision Tree gave the best model and accuracy using the wine’s chemical properties to determine or predict the quality.Consequently, it would be recommended that Random Forest and Decision Tree algorithms be used when determining the quality of wines using it’s chemical properties.