

## Model Performance Test

Date	10 November 2022
Team ID	PNT2022TMID16214
Project Name	Efficient Water Quality Analysis and Prediction using Machine Learning
Maximum Marks	10 Marks

### Model Performance Testing:

S.No.	Parameter	Values	Screenshot
1.	Metrics	<b>Regression Model:</b> MAE - , MSE - , RMSE - , R2 score -	<p><b>Model Evaluation</b></p> <pre>In [37]: from sklearn import metrics print('MAE:', metrics.mean_absolute_error(y_test, y_pred)) print('MSE:', metrics.mean_squared_error(y_test, y_pred)) print('RMSE:', np.sqrt(metrics.mean_squared_error(y_test, y_pred)))</pre> <p>MAE: 0.4550025062656734 MSE: 2.5859671077694255 RMSE: 1.6080942471663238</p> <pre>In [38]: metrics.r2_score(y_test, y_pred)</pre> <p>Out[38]: 0.9759652869193766</p>

2.	Tune the Model	Hyperparameter Tuning - Validation Method -	<div><p><b>Hyperparameter Tuning</b></p><pre>In [ ]: from sklearn.model_selection import cross_val_score, GridSearchCV</pre><pre>In [ ]: param_grid = { 'bootstrap': [True], 'max_depth': [5, 10, None], 'max_features': ['auto', 'log2'], 'n_estimators': [5, 6, 7, 8, 9, 10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100, 120, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2200, 2400, 2600, 2800, 3000, 3200, 3400, 3600, 3800, 4000, 4200, 4400, 4600, 4800, 5000, 5200, 5400, 5600, 5800, 6000, 6200, 6400, 6600, 6800, 7000, 7200, 7400, 7600, 7800, 8000, 8200, 8400, 8600, 8800, 9000, 9200, 9400, 9600, 9800, 10000]</pre><pre>In [ ]: rfr = RandomForestRegressor(random_state = 1) g_search = GridSearchCV(estimator = rfr, param_grid = param_grid,                         cv = 3, n_jobs = 1, verbose = 0, return_train_score=True)</pre><pre>In [ ]: g_search.fit(x_train, y_train) print(g_search.best_params_)</pre><pre>{'bootstrap': True, 'max_depth': 10, 'max_features': 'auto', 'n_estimators': 15}</pre><p><b>Validation Method Cross validation</b></p><pre>In [ ]: scores = cross_val_score(regressor, y_test, y_pred, cv=10, scoring='neg_mean_absolute_error') print(scores)</pre><pre>[-0.88937508 -0.2277642  -0.62957576 -0.28678912 -0.52877112 -0.33818409  -0.59450265 -0.16186615 -0.17046191 -1.16749981]</pre></div>
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