

Problem Statement:

A requirement from the Hospital, Management asked us to create a predictive model which will predict the Chronic Kidney Disease (CKD) based on the several parameters. The Client has provided the dataset of the same.

The client’s requirement is to predict the Chronic Kidney Disease(CKD) and it is a label yes or no so it comes under classification.

The evaluation metrics are being calculated for different models SVM, Decision Tree, Random Forest, KNN, Logistic Regression and Naive Bayes. Logistic Regression model is considered as the best model based on the evaluation metrics.

Support Vector Machine:

The Classification Report is:				
	precision	recall	f1-score	support
0	0.96	1.00	0.98	45
1	1.00	0.97	0.99	75
accuracy			0.98	120
macro avg	0.98	0.99	0.98	120
weighted avg	0.98	0.98	0.98	120

The value of f1_macro for the best parameter is {'C': 10, 'gamma': 'auto', 'kernel': 'sigmoid'} 0.9864864864864865

np.float64(0.9997037037037036)

```

Enter the Age: 14
Enter the BP: 76.45994832041343
Enter the al value: 0
Enter the su value: 0
Enter the bgr value: 192
Enter the bu value: 15
Enter the sc value: 0.8
Enter the sod value: 137
Enter the pot value: 4.2
Enter the hrmo value: 14.3
Enter the pcv value: 40
Enter the wc value: 9500
Enter the rc value: 5.4
Enter the sg_b value: 0
Enter the sg_c value: 0
Enter the sg_d value: 1
Enter the sg_e value: 0
Enter the rbc value: 1
Enter the pc value: 1
Enter the pccc value: 0
Enter the ba value: 0
Enter the htn value: 0
Enter the dm value: 1
Enter the cad value: 0
Enter the appet value: 0
Enter the pe value: 1
Enter the ane value: 0

```

```

[33]: Future_Prediction=grid.predict([[iage,ibp,ial,isu,ibgr,ibu,isc,isod,ipot,ihrmo,ipcv,iwc,irc,isg_b,isg_c,isg_d,isg_e,
print("The Future prediction is:", Future_Prediction)

```

The Future prediction is: [0]

Decision Tree

The Classification Report is:

	precision	recall	f1-score	support
0	1.00	0.96	0.98	45
1	0.97	1.00	0.99	75
accuracy			0.98	120
macro avg	0.99	0.98	0.98	120
weighted avg	0.98	0.98	0.98	120

The value of f1_macro for the best parameter is {'criterion': 'entropy', 'max_features': 'log2', 'splitter': 'random'} 0.9868421052631579

```
roc_auc_score(y_test,grid.predict_proba(x_test)[:,1])
```

```
5]: np.float64(0.9777777777777779)
```

```
Enter the Age: 62
Enter the BP: 80
Enter the al value: 0
Enter the su value: 0
Enter the bgr value: 78
Enter the bu value: 45
Enter the sc value: 0.6
Enter the sod value: 138
Enter the pot value: 3.5
Enter the hrmo value: 16.1
Enter the pcv value: 50
Enter the wc value: 5400
Enter the rc value: 5.7
Enter the sg_b value: 1
Enter the sg_c value: 0
Enter the sg_d value: 0
Enter the sg_e value: 0
Enter the rbc value: 1
Enter the pc value: 1
Enter the pccc value: 0
Enter the ba value: 0
Enter the htn value: 0
Enter the dm value: 0
Enter the cad value: 0
Enter the appet value: 1
Enter the pe value: 0
Enter the ane value: 0
```

The Future prediction is: [1]

Random Forest

The Classification Report is:

	precision	recall	f1-score	support
0	0.98	0.98	0.98	45
1	0.99	0.99	0.99	75
accuracy			0.98	120
macro avg	0.98	0.98	0.98	120
weighted avg	0.98	0.98	0.98	120

The value of f1_macro for the best parameter is {'criterion': 'entropy', 'max_features': 'sqrt', 'n_estimators': 100} 0.9866666666666667

np.float64(0.9997037037037036)

```
Enter the Age: 62
Enter the BP: 80
Enter the al value: 0
Enter the su value: 0
Enter the bgr value: 132
Enter the bu value: 34
Enter the sc value: 0.8
Enter the sod value: 147
Enter the pot value: 3.5
Enter the hrmo value: 17.8
Enter the pcv value: 44
Enter the wc value: 4700
Enter the rc value: 4.5
Enter the sg_b value: 0
Enter the sg_c value: 0
Enter the sg_d value: 0
Enter the sg_e value: 0
Enter the rbc value: 1
Enter the pc value: 1
Enter the pccc value: 0
Enter the ba value: 0
Enter the htn value: 0
Enter the dm value: 0
Enter the cad value: 0
Enter the appet value: 1
Enter the pe value: 0
Enter the ane value: 0
```

The Future prediction is: [1]

KNN

The classification report is:

	precision	recall	f1-score	support
0	0.88	1.00	0.94	45
1	1.00	0.92	0.96	75
accuracy			0.95	120
macro avg	0.94	0.96	0.95	120
weighted avg	0.96	0.95	0.95	120

`np.float64(0.9997037037037038)`

The f1_macro value is:
0.9505208333333334

Logistic Regression

The classification report is:

	precision	recall	f1-score	support
0	0.98	1.00	0.99	45
1	1.00	0.99	0.99	75
accuracy			0.99	120
macro avg	0.99	0.99	0.99	120
weighted avg	0.99	0.99	0.99	120

The value of f1_macro for the best parameter is {'penalty': 'l2', 'solver': 'newton-cg'} 0.9916844900066377

np.float64(1.0)

Naive Bayes

The Classification Report is:/n

	precision	recall	f1-score	support
0	0.96	1.00	0.98	45
1	1.00	0.97	0.99	75
accuracy			0.98	120
macro avg	0.98	0.99	0.98	120
weighted avg	0.98	0.98	0.98	120

Enter the Age: 32
Enter the BP: 90
Enter the al value: 1
Enter the su value: 0
Enter the bgr value: 148.11267605633802
Enter the bu value: 223
Enter the sc value: 18.1
Enter the sod value: 113
Enter the pot value: 6.5
Enter the hrmo value: 5.5
Enter the pcv value: 12
Enter the wc value: 2600
Enter the rc value: 2.8
Enter the sg_b value: 1
Enter the sg_c value: 0
Enter the sg_d value: 0
Enter the sg_e value: 0
Enter the rbc value: 0
Enter the pc value: 0
Enter the pccc value: 0
Enter the ba value: 0
Enter the htn value: 1
Enter the dm value: 1
Enter the cad value: 0
Enter the appet value: 0
Enter the pe value: 1
Enter the ane value: 1

The Future prediction is: [1]