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 and Random Forest. Random Forest 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'} 0.9
868421052631579

```python
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} 0.98
66666666666667

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]