Classification Assignment

Problem Statement or Requirement:

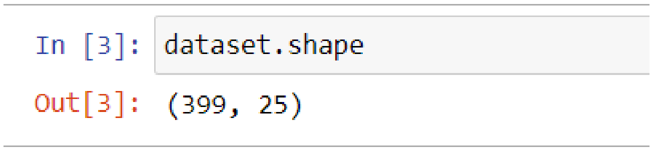
A requirement from the Hospital, Management asked us to create a predictive model which will predict the Chronic Kidney Disease (CKD) based on the several parameters. The Client has provided the dataset of the same.

1.) Identify your problem statement

- The dataset is “**Chronic Kidney Disease**”. By using this data need to predict the Kidney disease based on the record.
- Step 1 – Dataset contains **Numeric data** with ordinal values. So, the domain is **Machine Learning**.
- Step 2 – **Learning** – Here input and output are clearly given so it comes under “**Supervised Learning**”.
- Step 3 – It is Supervised Learning by using the possibility of data in output column (i.e.) classification of disease yes/no so, it is a **classification problem**.

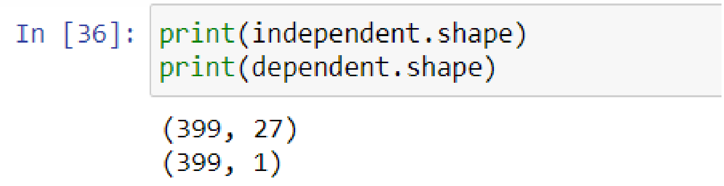
2.) Tell basic info about the dataset (Total number of rows, columns)

- Total number of rows, columns: **399 rows, 28 columns.**



```
In [3]: dataset.shape
Out[3]: (399, 25)
```

- For independent (i.e.) input columns: **399 rows, 27 columns.**
- For dependent (i.e.) input columns: **399 rows, 1 column.**

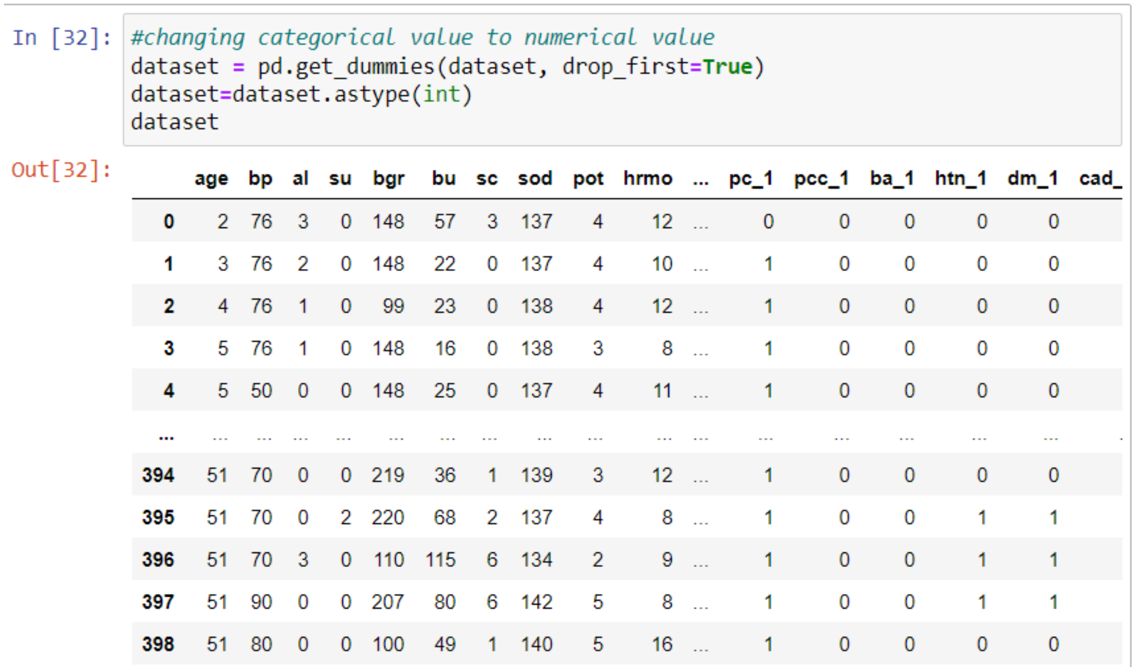


```
In [36]: print(independent.shape)
         print(dependent.shape)

         (399, 27)
         (399, 1)
```

3.) Mention the pre-processing method if you’re doing any (like converting string to number – nominal data)

- In dataset some columns contain **categorical value** so in pre-processing step did **one-hot encoding** using **get_dummies.**



```
In [32]: #changing categorical value to numerical value
         dataset = pd.get_dummies(dataset, drop_first=True)
         dataset=dataset.astype(int)
         dataset

Out[32]:
       age  bp  al  su  bgr   bu  sc  sod  pot  hrmo  ...  pc_1  pcc_1  ba_1  htn_1  dm_1  cad_
    0    2  76   3   0  148   57   3  137    4    12  ...     0      0     0      0     0
    1    3  76   2   0  148   22   0  137    4    10  ...     1      0     0      0     0
    2    4  76   1   0   99   23   0  138    4    12  ...     1      0     0      0     0
    3    5  76   1   0  148   16   0  138    3     8  ...     1      0     0      0     0
    4    5  50   0   0  148   25   0  137    4    11  ...     1      0     0      0     0
  ...  ...  ... ... ...  ...  ...  ...  ...  ...   ...  ...   ...    ...   ...    ...   ...
  394   51  70   0   0  219   36   1  139    3    12  ...     1      0     0      0     0
  395   51  70   0   2  220   68   2  137    4     8  ...     1      0     0      1     1
  396   51  70   3   0  110  115   6  134    2     9  ...     1      0     0      1     1
  397   51  90   0   0  207   80   6  142    5     8  ...     1      0     0      1     1
  398   51  80   0   0  100   49   1  140    5    16  ...     1      0     0      0     0
```

4.) Develop a good model with good evaluation metric. You can use any machine learning algorithm; you can create many models. Finally, you have to come up with final model.

Developed a classification model: -

- Random Forest classifier
- Decision Tree Classifier
- KNN
- SVM
- Naïve Bayes classifier
- Logistic regression

Random Forest and Logistic Regression is giving Higher Accuracy of 99%.

5.) All the research values of each algorithm should be documented. (You can make tabulation or screenshot of the results.)

S. No	Algorithm	Recall Yes-1	Recall No-0	Precision Yes-1	Precision No-0	F1 Score Yes-1	F1 Score No-0	ROC_ AUC	Accuracy
1	Random Forest classifier	0.99	1.00	1.00	0.98	0.99	0.99	0.999	0.99

2	Decision Tree Classifier	0.93	0.98	0.99	0.89	0.96	0.93	0.953	0.95
3	SVM	0.98	1.00	1.00	0.96	0.99	0.98	0.987	0.98
4	Logistic regression	0.99	1.00	1.00	0.98	0.99	0.99	0.993	0.99
5	KNN	0.68	0.84	0.88	0.62	0.77	0.72	0.763	0.74
6	Gaussian NB	0.96	1.00	1.00	0.94	0.98	0.97	0.945	0.98
7	Complement NB	0.73	0.98	0.98	0.69	0.84	0.81	0.856	0.83
8	Multinomial NB	0.73	0.98	0.98	0.69	0.84	0.81	0.856	0.83

6.) Mention your final model, justify why u have chosen the same.

S. No	Algorithm	Recall Yes-1	Recall No-0	Precision Yes-1	Precision No-0	F1 Score Yes-1	F1 Score No-0	ROC_ AUC	Accuracy
1	Random Forest classifier	0.99	1.00	1.00	0.98	0.99	0.99	0.999	0.99
4	Logistic regression	0.99	1.00	1.00	0.98	0.99	0.99	0.993	0.99

- Here Logistic regression and Random Forest Giving better accuracy than other model.
- While comparing random forest and Logistic regression above ROC_AUC is higher in RF than Logistic regression.