

Statistical Machine Learning Approaches to Liver Disease Prediction

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Checking for null values and Handling Null Values:

This method commonly used to handle the null values. Here, we either delete a particular row if it has a null value for a particular feature and a particular column if it has more than 70-75% of missing values. This method is advised only when there are enough samples in the data set. Missing values can be handled by deleting the rows or columns having null values. If columns have more than half of the rows as null then the entire column can be dropped. The rows which are having one or more columns values as null can also be dropped

We will be using `isnull().any()` method to see which column has missing values.

- This `isnull().any()` method return two values, False and True.
- False return that Column has No Null Values.
- True return that Column has Null values.

```
data.isnull().any()
```

Age	False
Gender	False
Total_Bilirubin	False
Direct_Bilirubin	False
Alkaline_Phosphotase	False
Alamine_Aminotransferase	False
Aspartate_Aminotransferase	False
Total_Protiens	False
Albumin	False
Albumin_and_Globulin_Ratio	True
Dataset	False
dtype: bool	

Let us check how many numbers of null records present in the Closing Value column using sum() function.

```
#checking for missing data
```

```
data.isnull().sum()
```

```
Age                0
Gender             0
Total_Bilirubin    0
Direct_Bilirubin   0
Alkaline_Phosphatase 0
Alamine_Aminotransferase 0
Aspartate_Aminotransferase 0
Total_Protiens     0
Albumin            0
Albumin_and_Globulin_Ratio 4
Dataset            0
dtype: int64
```

We can notice that, there are 4 null values are there in the column Albumin_and_Globulin_Ratio. Now will handle or fill that null values with the help of fillna() method.

```
#checking for the missing data after cleaning data
```

```
data['Albumin_and_Globulin_Ratio'] = data.fillna(data['Albumin_and_Globulin_Ratio'].mode()[0])
```

```
data.isnull().sum()
```

```
Age                0
Gender             0
Total_Bilirubin    0
Direct_Bilirubin   0
Alkaline_Phosphatase 0
Alamine_Aminotransferase 0
Aspartate_Aminotransferase 0
Total_Protiens     0
Albumin            0
Albumin_and_Globulin_Ratio 0
Dataset            0
dtype: int64
```

In real world data, there are some instances where a particular element is absent because of various reasons, such as, corrupt data, failure to load the information, or incomplete extraction. Handling the missing values is one of the greatest challenges faced by analysts, because making the right decision on how to handle it generates robust data models. Let us look at different ways of imputing the missing values.