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Difference between loc() and iloc() in Pandas DataFrame

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Pandas library of Python is very useful for the manipulation of mathematical data and is widely used in the field of machine learning. It comprises many methods for its proper functioning. [loc\(\)](#) and [iloc\(\)](#) are one of those methods. These are used in slicing data from the [Pandas DataFrame](#). They help in the convenient selection of data from the DataFrame in [Python](#). They are used in filtering the data according to some conditions.

Difference between loc() and iloc() in Pandas DataFrame

Here, we will see the difference between loc() and iloc() Function in Pandas DataFrame. To see and compare the difference between these two, we will create a sample Dataframe that we will use in the whole paragraph. The working of both of these methods is explained in the sample dataset of cars.

python3

```
# importing the module
import pandas as pd

# creating a sample dataframe
data = pd.DataFrame({'Brand': ['Maruti', 'Hyundai', 'Tata',
                               'Mahindra', 'Maruti', 'Hyundai',
                               'Renault', 'Tata', 'Maruti'],
                      'Year': [2012, 2014, 2011, 2015, 2012,
                               2016, 2014, 2018, 2019],
                      'Kms Driven': [50000, 30000, 60000,
                                      25000, 10000, 45000,
                                      31000, 40000],
                      'City': ['Gurgaon', 'Delhi', 'Mumbai',
                               'Delhi', 'Mumbai',
                               'Mumbai', 'Chennai'],
                      'Mileage': [28, 27, 29,
                                  26, 29, 28,
                                  29, 24, 25]})
```



```
# displaying the DataFrame  
display(data)
```

Output

	Brand	Year	Kms Driven	City	Mileage
0	Maruti	2012	50000	Gurgaon	28
1	Hyundai	2014	30000	Delhi	27
2	Tata	2011	60000	Mumbai	25
3	Mahindra	2015	25000	Delhi	26
4	Maruti	2012	10000	Mumbai	28
5	Hyundai	2016	46000	Delhi	29
6	Renault	2014	31000	Mumbai	24
7	Tata	2018	15000	Chennai	21
8	Maruti	2019	12000	Ghaziabad	24

Python loc() function

The [loc\(\) function](#) is label based data selecting method which means that we have to pass the name of the row or column which we want to select. This method includes the last element of the range passed in it, unlike iloc(). loc() can accept the boolean data unlike iloc(). Many operations can be performed using the loc() method like



Example 1: Selecting Data According to Some Conditions

In this example, the code uses the `loc` function to select and display rows from the DataFrame where the brand is 'Maruti' and the mileage is greater than 25, showing relevant information about Maruti cars with high mileage.

python3

```
# selecting cars with brand 'Maruti' and Mileage > 25
display(data.loc[(data.Brand == 'Maruti') & (data.Mileage > 25)])
```

Output

	Brand	Year	Kms Driven	City	Mileage
0	Maruti	2012	50000	Gurgaon	28
4	Maruti	2012	10000	Mumbai	28

Example 2: Selecting a Range of Rows From the DataFrame

In this example, the code utilizes the `loc` function to extract and display rows with indices ranging from 2 to 5 (inclusive) from the DataFrame, providing information about a specific range of cars in the dataset.



python3

```
# selecting range of rows from 2 to 5  
display(data.loc[2: 5])
```

Output

	Brand	Year	Kms Driven	City	Mileage
2	Tata	2011	60000	Mumbai	25
3	Mahindra	2015	25000	Delhi	26
4	Maruti	2012	10000	Mumbai	28
5	Hyundai	2016	46000	Delhi	29

Example 3: Updating the Value of Any Column

In this example, the code uses the `loc` function to update the 'Mileage' values to 22 for cars in the DataFrame where the manufacturing year is before 2015. The modified DataFrame is then displayed, reflecting the changes made to the Mileage column.

python3

```
# updating values of Mileage if Year < 2015  
data.loc[(data.Year < 2015), ['Mileage']] = 22  
display(data)
```

Output

	Brand	Year	Kms Driven	City	Mileage
0	Maruti	2012	50000	Gurgaon	22
1	Hyundai	2014	30000	Delhi	22
2	Tata	2011	60000	Mumbai	22
3	Mahindra	2015	25000	Delhi	26
4	Maruti	2012	10000	Mumbai	22
5	Hyundai	2016	46000	Delhi	22



6	Renault	2014	31000	Mumbai	22
7	Tata	2018	15000	Chennai	22
8	Maruti	2019	12000	Ghaziabad	22

Python iloc() function

The [iloc\(\) function](#) is an indexed-based selecting method which means that we have to pass an integer index in the method to select a specific row/column. This method does not include the last element of the range passed in it unlike loc(). iloc() does not accept the boolean data unlike loc(). Operations performed using iloc() are:

Example 1: Selecting Rows Using Integer Indices

In this example, the code employs the iloc function to extract and display specific rows with indices 0, 2, 4, and 7 from the DataFrame, showcasing information about selected cars in the dataset.

python3

```
# selecting 0th, 2nd, 4th, and 7th index rows
display(data.iloc[[0, 2, 4, 7]])
```

Output

	Brand	Year	Kms Driven	City	Mileage
0	Maruti	2012	50000	Gurgaon	28
2	Tata	2011	60000	Mumbai	25
4	Maruti	2012	10000	Mumbai	28
7	Tata	2018	15000	Chennai	21

Example 2: Selecting a Range of Columns and Rows

In this example, the code utilizes the iloc function to select a specific subset of the DataFrame, including rows 1 to 4 and columns 1 to 3. This provides information about a specific range of data.



attributes in the dataset.

python3

```
# selecting rows from 1 to 4 and columns from 2 to 4  
display(data.iloc[1: 5, 2: 5])
```

Output

	Kms Driven	City	Mileage
1	30000	Delhi	27
2	60000	Mumbai	25
3	25000	Delhi	26
4	10000	Mumbai	28

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