```
#MAJOR PROJECT 1 -Choose any dataset of ur choice and apply suitable REGRESSION/CLASSIFIER
#Dataset - '/content/Asia_cup_1984_to_2018.csv'
```

```
#1.Take a dataset and create dataframe
import pandas as pd
df = pd.read_csv("/content/Asia_cup_1984_to_2018.csv")
df
```

	Match id	Team_1	Team_2	Format	Ground	Year	Toss	Selection
0	1	Pakistan	Sri Lanka	ODI	Sharjah	1984	Sri Lanka	Bowling
1	2	India	Sri Lanka	ODI	Sharjah	1984	India	Bowling
2	3	India	Pakistan	ODI	Sharjah	1984	India	Batting
3	4	Sri Lanka	Pakistan	ODI	Colombo(PSS)	1986	Sri Lanka	Bowling
4	5	Bangladesh	Pakistan	ODI	Moratuwa	1986	Pakistan	Bowling
...	...	...	...	...	...	...	...	...
109	110	India	Pakistan	ODI	Dubai(DSC)	2018	Pakistan	Batting
110	111	Afghanistan	Bangladesh	ODI	Abu Dhabi	2018	Bangladesh	Batting
111	112	Afghanistan	India	ODI	Dubai(DSC)	2018	Afghanistan	Batting
112	113	Bangladesh	Pakistan	ODI	Abu Dhabi	2018	Bangladesh	Batting
113	114	Bangladesh	India	ODI	Dubai(DSC)	2018	India	Bowling

114 rows × 28 columns

```
#To display the information present in the table
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 114 entries, 0 to 113
Data columns (total 28 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   Match id            114 non-null    int64
 1   Team_1              114 non-null    object
 2   Team_2              114 non-null    object
 3   Format              114 non-null    object
 4   Ground              114 non-null    object
 5   Year                114 non-null    int64
 6   Toss                114 non-null    object
 7   Selection           114 non-null    object
 8   fi_score            114 non-null    float64
 9   fi_wickets          114 non-null    float64
 10  fi_4s               114 non-null    float64
```

```
 11  fi_6s                  114 non-null    float64
 12  fi_extra               114 non-null    float64
 13  fi_run_rate            114 non-null    float64
 14  fi_avg_str_rate        114 non-null    float64
 15  fi_max_score           114 non-null    float64
 16  fi_max_indv_wickets    114 non-null    float64
 17  Player Of The Match    113 non-null    object
 18  Result                 114 non-null    object
 19  si_score               114 non-null    float64
 20  si_wickets             114 non-null    float64
 21  si_4s                  114 non-null    float64
 22  si_6s                  114 non-null    float64
 23  si_extras              114 non-null    float64
 24  si_run_rate            114 non-null    float64
 25  si_avg_str_rate        114 non-null    float64
 26  si_max_indv_wickets    114 non-null    float64
 27  si_max_indv_wickets.1  114 non-null    float64
dtypes: float64(18), int64(2), object(8)
memory usage: 25.1+ KB
```

```
df.shape #114 rows and 28 columns
```

```
(114, 28)
```

```
df.size #total no of elements
```

```
3192
```

```
#To check the number to null values present
df.isnull()
```

	Match id	Team_1	Team_2	Format	Ground	Year	Toss	Selection	fi_score	fi_wicl
0	False	False	False	False	False	False	False	False	False	F
1	False	False	False	False	False	False	False	False	False	F
2	False	False	False	False	False	False	False	False	False	F
3	False	False	False	False	False	False	False	False	False	F
4	False	False	False	False	False	False	False	False	False	F
...	...	...	...	...	...	...	...	...	...	
109	False	False	False	False	False	False	False	False	False	F
110	False	False	False	False	False	False	False	False	False	F
111	False	False	False	False	False	False	False	False	False	F
112	False	False	False	False	False	False	False	False	False	F
113	False	False	False	False	False	False	False	False	False	F

114 rows × 28 columns

```
# To display 1st 5 rows indexes
df.head()
```

	Match id	Team_1	Team_2	Format	Ground	Year	Toss	Selection	fi_scc
0	1	Pakistan	Sri Lanka	ODI	Sharjah	1984	Sri Lanka	Bowling	18
1	2	India	Sri Lanka	ODI	Sharjah	1984	India	Bowling	9
2	3	India	Pakistan	ODI	Sharjah	1984	India	Batting	18
3	4	Sri Lanka	Pakistan	ODI	Colombo(PSS)	1986	Sri Lanka	Bowling	11
4	5	Bangladesh	Pakistan	ODI	Moratuwa	1986	Pakistan	Bowling	9

5 rows × 28 columns

```
#To display last 5 row indexes
df.tail()
```

	Match id	Team_1	Team_2	Format	Ground	Year	Toss	Selection	f
109	110	India	Pakistan	ODI	Dubai(DSC)	2018	Pakistan	Batting	
110	111	Afghanistan	Bangladesh	ODI	Abu Dhabi	2018	Bangladesh	Batting	
111	112	Afghanistan	India	ODI	Dubai(DSC)	2018	Afghanistan	Batting	
112	113	Bangladesh	Pakistan	ODI	Abu Dhabi	2018	Bangladesh	Batting	
113	114	Bangladesh	India	ODI	Dubai(DSC)	2018	India	Bowling	

5 rows × 28 columns

```
#2.preprocessing - Filtering of Data(to remove Format columns)
df_numeric = df_numeric.drop(['Match id'],axis =1)#axis = 1 -column,axis = 0 -row
df_numeric
```

	Year	fi_score	fi_wickets	fi_4s	fi_6s	fi_extra	fi_run_rate	fi_avg_str_rat
0	1984	187.0	9.0	9.0	3.0	21.0	4.06	52.0
1	1984	97.0	0.0	9.0	0.0	14.0	4.47	60.4
2	1984	188.0	4.0	13.0	3.0	17.0	4.08	60.2
3	1986	116.0	10.0	10.0	0.0	14.0	3.42	37.8
4	1986	94.0	10.0	0.0	0.0	9.0	2.64	24.6
...	...	...	...	...	...	...	...	..
109	2018	238.0	1.0	24.0	6.0	1.0	6.02	91.3
110	2018	246.0	7.0	20.0	3.0	8.0	4.92	76.1
111	2018	252.0	8.0	17.0	11.0	7.0	5.04	54.1
112	2018	239.0	10.0	17.0	1.0	9.0	4.89	73.2
113	2018	222.0	10.0	17.0	4.0	7.0	4.57	49.9

114 rows × 19 columns

```
#We want to consider only the numeric data
#so we will create a new dataframe with only numeric data
df_numeric = df.select_dtypes(include = ['float64','int64'])
df_numeric
```

	Match id	Year	fi_score	fi_wickets	fi_4s	fi_6s	fi_extra	fi_run_rate	fi_avg_
0	1	1984	187.0	9.0	9.0	3.0	21.0	4.06	
1	2	1984	97.0	0.0	9.0	0.0	14.0	4.47	
2	3	1984	188.0	4.0	13.0	3.0	17.0	4.08	
3	4	1986	116.0	10.0	10.0	0.0	14.0	3.42	
4	5	1986	94.0	10.0	0.0	0.0	9.0	2.64	
...	...	...	...	...	...	...	...	...	
109	110	2018	238.0	1.0	24.0	6.0	1.0	6.02	
110	111	2018	246.0	7.0	20.0	3.0	8.0	4.92	
111	112	2018	252.0	8.0	17.0	11.0	7.0	5.04	
112	113	2018	239.0	10.0	17.0	1.0	9.0	4.89	
113	114	2018	222.0	10.0	17.0	4.0	7.0	4.57	

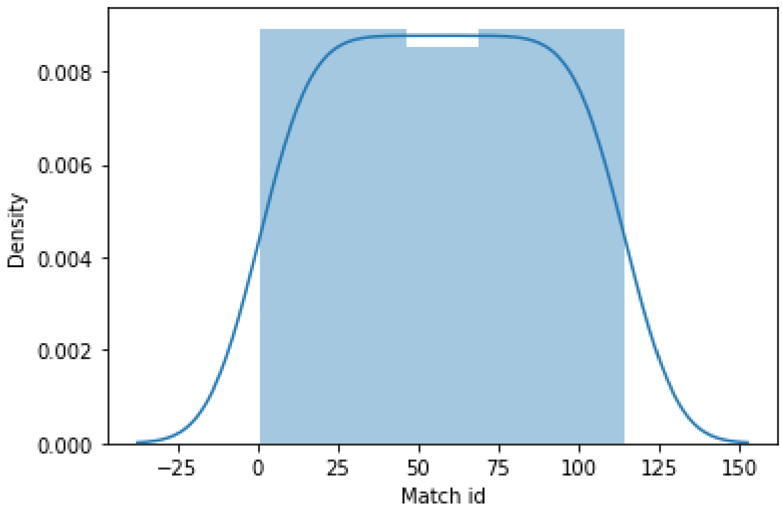
114 rows × 20 columns

```
#To display the table information which contains only numeric data
df_numeric.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 114 entries, 0 to 113
Data columns (total 20 columns):
 #   Column                 Non-Null Count  Dtype  
---  ------                 --------------  -----  
 0   Match id               114 non-null    int64  
 1   Year                   114 non-null    int64  
 2   fi_score               114 non-null    float64
 3   fi_wickets             114 non-null    float64
 4   fi_4s                  114 non-null    float64
 5   fi_6s                  114 non-null    float64
 6   fi_extra               114 non-null    float64
 7   fi_run_rate            114 non-null    float64
 8   fi_avg_str_rate        114 non-null    float64
 9   fi_max_score           114 non-null    float64
 10  fi_max_indv_wickets    114 non-null    float64
 11  si_score               114 non-null    float64
 12  si_wickets             114 non-null    float64
 13  si_4s                  114 non-null    float64
 14  si_6s                  114 non-null    float64
 15  si_extras              114 non-null    float64
 16  si_run_rate            114 non-null    float64
 17  si_avg_str_rate        114 non-null    float64
 18  si_max_indv_wickets    114 non-null    float64
 19  si_max_indv_wickets.1  114 non-null    float64
dtypes: float64(18), int64(2)
memory usage: 17.9 KB
```

```
#VISUALIZATION
import seaborn as sns
sns.distplot(df['Match id'])# # distribution plot
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/distributions.py:2619: FutureWarning:
  warnings.warn(msg, FutureWarning)
<matplotlib.axes._subplots.AxesSubplot at 0x7fe1c9426590>
```




```
#4.divide the data into i/p and o/p
#output - Smog_level
```

```
#input - All the columns except the Smog_level column
x = df_numeric.iloc[:,0:6].values
x
```

```
array([[1.000e+00, 1.984e+03, 1.870e+02, 9.000e+00, 9.000e+00, 3.000e+00],
       [2.000e+00, 1.984e+03, 9.700e+01, 0.000e+00, 9.000e+00, 0.000e+00],
       [3.000e+00, 1.984e+03, 1.880e+02, 4.000e+00, 1.300e+01, 3.000e+00],
       [4.000e+00, 1.986e+03, 1.160e+02, 1.000e+01, 1.000e+01, 0.000e+00],
       [5.000e+00, 1.986e+03, 9.400e+01, 1.000e+01, 0.000e+00, 0.000e+00],
       [6.000e+00, 1.986e+03, 1.320e+02, 3.000e+00, 0.000e+00, 0.000e+00],
       [7.000e+00, 1.986e+03, 1.950e+02, 5.000e+00, 1.500e+01, 1.000e+00],
       [8.000e+00, 1.988e+03, 1.940e+02, 7.000e+00, 5.000e+00, 0.000e+00],
       [9.000e+00, 1.988e+03, 9.900e+01, 8.000e+00, 5.000e+00, 0.000e+00],
       [1.000e+01, 1.988e+03, 2.540e+02, 1.000e+01, 1.400e+01, 4.000e+00],
       [1.100e+01, 1.988e+03, 1.110e+02, 6.000e+00, 0.000e+00, 0.000e+00],
       [1.200e+01, 1.988e+03, 1.430e+02, 6.000e+00, 8.000e+00, 0.000e+00],
       [1.300e+01, 1.988e+03, 1.180e+02, 8.000e+00, 0.000e+00, 0.000e+00],
       [1.400e+01, 1.988e+03, 1.800e+02, 4.000e+00, 1.000e+01, 3.000e+00],
       [1.500e+01, 1.990e+03, 1.710e+02, 1.000e+00, 1.200e+01, 3.000e+00],
       [1.600e+01, 1.990e+03, 1.780e+02, 1.000e+01, 9.000e+00, 0.000e+00],
       [1.700e+01, 1.990e+03, 1.780e+02, 9.000e+00, 0.000e+00, 0.000e+00],
       [1.800e+01, 1.991e+03, 2.050e+02, 3.000e+00, 7.000e+00, 1.000e+00],
       [1.900e+01, 1.995e+03, 1.630e+02, 1.000e+01, 1.200e+01, 1.000e+00],
       [2.000e+01, 1.995e+03, 1.260e+02, 1.000e+01, 8.000e+00, 0.000e+00],
       [2.100e+01, 1.995e+03, 1.690e+02, 1.000e+01, 1.100e+01, 2.000e+00],
       [2.200e+01, 1.995e+03, 1.510e+02, 8.000e+00, 7.000e+00, 0.000e+00],
       [2.300e+01, 1.995e+03, 2.060e+02, 2.000e+00, 2.400e+01, 1.000e+00],
       [2.400e+01, 1.995e+03, 1.780e+02, 9.000e+00, 5.000e+00, 3.000e+00],
       [2.500e+01, 1.995e+03, 2.330e+02, 2.000e+00, 1.500e+01, 2.000e+00],
       [2.600e+01, 1.997e+03, 2.390e+02, 1.000e+01, 9.000e+00, 1.000e+00],
       [2.700e+01, 1.997e+03, 2.100e+02, 1.000e+01, 1.500e+01, 1.000e+00],
       [2.800e+01, 1.997e+03, 2.310e+02, 4.000e+00, 2.300e+01, 0.000e+00],
       [2.900e+01, 1.997e+03, 0.000e+00, 0.000e+00, 0.000e+00, 0.000e+00],
       [3.000e+01, 1.997e+03, 2.960e+02, 4.000e+00, 3.100e+01, 4.000e+00],
       [3.100e+01, 1.997e+03, 1.300e+02, 8.000e+00, 1.000e+01, 0.000e+00],
       [3.200e+01, 1.997e+03, 2.400e+02, 2.000e+00, 1.900e+01, 6.000e+00],
       [3.300e+01, 2.000e+03, 1.750e+02, 6.000e+00, 8.000e+00, 1.000e+00],
       [3.400e+01, 2.000e+03, 2.490e+02, 6.000e+00, 1.700e+01, 4.000e+00],
       [3.500e+01, 2.000e+03, 2.050e+02, 1.000e+01, 1.800e+01, 2.000e+00],
       [3.600e+01, 2.000e+03, 8.700e+01, 1.000e+01, 7.000e+00, 0.000e+00],
       [3.700e+01, 2.000e+03, 2.510e+02, 1.000e+01, 1.900e+01, 4.000e+00],
       [3.800e+01, 2.000e+03, 1.930e+02, 3.000e+00, 1.400e+01, 3.000e+00],
       [3.900e+01, 2.000e+03, 2.770e+02, 4.000e+00, 1.600e+01, 6.000e+00],
       [4.000e+01, 2.004e+03, 2.210e+02, 9.000e+00, 1.500e+01, 0.000e+00],
       [4.100e+01, 2.004e+03, 2.600e+02, 6.000e+00, 1.700e+01, 1.000e+00],
       [4.200e+01, 2.004e+03, 1.810e+02, 1.000e+01, 1.300e+01, 1.000e+00],
       [4.300e+01, 2.004e+03, 2.390e+02, 1.000e+01, 2.000e+01, 1.000e+00],
       [4.400e+01, 2.004e+03, 1.650e+02, 1.000e+01, 1.700e+01, 1.000e+00],
       [4.500e+01, 2.004e+03, 2.820e+02, 4.000e+00, 1.900e+01, 3.000e+00],
       [4.600e+01, 2.004e+03, 1.770e+02, 1.000e+01, 9.000e+00, 2.000e+00],
       [4.700e+01, 2.004e+03, 1.230e+02, 3.000e+00, 1.000e+01, 0.000e+00],
       [4.800e+01, 2.004e+03, 1.910e+02, 0.000e+00, 1.500e+01, 0.000e+00],
       [4.900e+01, 2.004e+03, 2.410e+02, 8.000e+00, 1.800e+01, 1.000e+00],
       [5.000e+01, 2.004e+03, 2.670e+02, 9.000e+00, 2.000e+01, 3.000e+00],
       [5.100e+01, 2.004e+03, 1.660e+02, 1.000e+01, 1.200e+01, 0.000e+00],
       [5.200e+01, 2.004e+03, 2.280e+02, 9.000e+00, 1.800e+01, 0.000e+00],
       [5.300e+01, 2.008e+03, 3.000e+02, 8.000e+00, 2.200e+01, 1.000e+00],
       [5.400e+01, 2.008e+03, 2.880e+02, 9.000e+00, 3.000e+01, 1.000e+00],
       [5.500e+01, 2.008e+03, 2.260e+02, 7.000e+00, 1.300e+01, 2.000e+00],
```

```
[5.600e+01, 2.008e+03, 1.180e+02, 1.000e+01, 1.700e+01, 0.000e+00],
[5.700e+01, 2.008e+03, 2.990e+02, 4.000e+00, 3.300e+01, 1.000e+00],
```

```
y = df_numeric.iloc[:,6]
y
```

```
0      21.0
1      14.0
2      17.0
3      14.0
4       9.0
       ...
109     1.0
110     8.0
111     7.0
112     9.0
113     7.0
Name: fi_extra, Length: 114, dtype: float64
```

```
#5.TRAIN AND TEST VARIABLES
#sklearn.model_seletion - package , train_test_split - library
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test = train_test_split(x,y,random_state = 0)
```

```
#whatever data splitting/data allocation happens to the x_train,x_test,y_train,y_test vari
#By default the training variables get 75% and testing variables get 25%
```

```
print(x.shape) #114 rows and 28 columns
print(x_train.shape) #114 rows and columns (75%)
print(y_test.shape) # 114 rows and 28 cos(25%)
```

```
(114, 6)
(85, 6)
(29,)
```

```
print(y.shape) #114 rows and 28 cos
print(y_train.shape) #114 rows and 28 cols (75%)
print(y_test.shape) # 114 rows and 28 cols (25%)
```

```
(114,)
(85,)
(29,)
```

```
#6.SCALING or NORMALISATION -DONE ONLY FOR INPUTS
from sklearn.preprocessing import MinMaxScaler
scaler = MinMaxScaler()
x_train = scaler.fit_transform(x_train)
x_test = scaler.fit_transform(x_test)
```

```
#7.RUN a CLASSIFIER/REGRESSOR/CLUSTER
```

```
from sklearn.linear_model import LinearRegression
model = LinearRegression()
```

```
#8.MODEL FITTING
model.fit(x_train,y_train)
```

```
LinearRegression()
```

```
#9.PREDICT THE OUTPUT
y_pred = model.predict(x_test)# By taking the input testing data, we predict the output
y_pred # PREDICTED VALUES
```

```
array([19.20388763, 11.74969049,  7.97064147, 16.22057976, 14.96798661,
       13.86047521,  4.04739576, 11.35167488,  5.95182177, 11.66279533,
       15.61103646,  9.74944617, 13.46438146, 10.69219968,  2.40998563,
        2.08202763, 17.18781815, 12.18514381, 15.81112326, 11.79051201,
       18.31871304,  4.35290049, 17.39604029, 12.82253352, 15.5967685 ,
       11.23292956, 11.81577119,  4.11380785,  5.55326804])
```

```
y_test # ACTUAL VALUES
```

```
33     17.0
10     15.0
90     10.0
7       7.0
24      9.0
73     14.0
113     7.0
22     17.0
94      4.0
2      17.0
48     38.0
89      6.0
51     32.0
71     18.0
105     4.0
93     14.0
59      3.0
66     21.0
16     20.0
13     12.0
68     24.0
106     7.0
26     18.0
50     37.0
82     11.0
8      13.0
30     19.0
102     4.0
91      5.0
Name: fi_extra, dtype: float64
```

```
print(x_train[10]) # these are scaled/normalised values
```

```
[0.67857143 0.82352941 1.         0.4        0.97142857 0.36363636]
```

```
#INDIVIDUAL PREDICTION
model.predict([x_train[10]])
```

```
array([12.96713636])
```


0s completed at 8:00 PM