04/08/2023 (BOOK-13)

In [110]: import numpy as np
 import pandas as pd
 import matplotlib.pyplot as plt
 import seaborn as sns
 from sklearn.linear_model import LogisticRegression
 from sklearn.preprocessing import StandardScaler
 import re
 from sklearn.datasets import load_digits
 from sklearn.model_selection import train_test_split

Out[111]:

index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	oc.
2622	MADHYA MAHARASHTRA	1901	18.8	0.6	7.7	36.6	30.4	107.7	215.9	194.1	83.7	68.
2623	MADHYA MAHARASHTRA	1902	7.8	0.0	0.1	5.0	9.8	102.6	210.9	114.5	169.5	60.4
2624	MADHYA MAHARASHTRA	1903	7.6	0.0	0.0	3.2	77.2	86.3	281.8	155.5	142.3	74.:
2625	MADHYA MAHARASHTRA	1904	0.4	4.7	1.7	3.0	18.7	114.6	126.5	59.5	183.0	91.
2626	MADHYA MAHARASHTRA	1905	0.0	1.2	0.0	2.3	23.6	65.0	252.8	79.0	52.6	52.
2732	MADHYA MAHARASHTRA	2011	0.0	0.3	0.3	5.0	2.9	133.3	261.4	238.1	148.4	62.
2733	MADHYA MAHARASHTRA	2012	0.0	0.0	0.0	3.0	1.4	67.9	203.0	187.8	129.5	95.1
2734	MADHYA MAHARASHTRA	2013	0.1	5.3	8.0	5.7	6.0	212.4	311.8	147.0	210.3	57.
2735	MADHYA MAHARASHTRA	2014	3.1	6.2	24.4	7.5	29.8	44.0	277.9	240.3	120.4	38.
2736	MADHYA MAHARASHTRA	2015	1.4	0.8	41.2	9.6	24.4	177.0	111.7	67.2	146.6	48.
	2622 2623 2624 2625 2626 2732 2733 2734 2735	2622 MADHYA MAHARASHTRA 2623 MADHYA MAHARASHTRA 2624 MADHYA MADHYA MAHARASHTRA 2625 MADHYA MAHARASHTRA 2626 MADHYA MAHARASHTRA 2732 MADHYA MAHARASHTRA 2733 MADHYA MAHARASHTRA 2734 MAHARASHTRA 2734 MAHARASHTRA 2735 MADHYA MAHARASHTRA 2736 MADHYA MAHARASHTRA	2622 MAHARASHTRA 1901 2623 MAHARASHTRA 1902 2624 MAHARASHTRA 1903 2625 MAHARASHTRA 1904 2626 MAHARASHTRA 1904 2626 MAHARASHTRA 1905 2732 MADHYA MAHARASHTRA 2011 2733 MAHARASHTRA 2012 2734 MAHARASHTRA 2013 2735 MADHYA MAHARASHTRA 2013	2622 MAHARASHTRA 1901 18.8 2623 MAHARASHTRA 1902 7.8 2624 MAHARASHTRA 1903 7.6 2625 MAHARASHTRA 1904 0.4 2626 MAHARASHTRA 1905 0.0 2732 MAHARASHTRA 2011 0.0 2733 MAHARASHTRA 2012 0.0 2734 MAHARASHTRA 2013 0.1 2735 MAHARASHTRA 2014 3.1	2622 MAHARASHTRA 1901 18.8 0.6 2623 MAHARASHTRA 1902 7.8 0.0 2624 MAHARASHTRA 1903 7.6 0.0 2625 MAHARASHTRA 1904 0.4 4.7 2626 MAHARASHTRA 1905 0.0 1.2 2732 MADHYA MADHYA 1905 0.0 0.3 2733 MAHARASHTRA 2011 0.0 0.3 2734 MAHARASHTRA 2012 0.0 0.0 2734 MAHARASHTRA 2013 0.1 5.3 2735 MAHARASHTRA 2014 3.1 6.2	2622 MAHARASHTRA 1901 18.8 0.6 7.7 2623 MAHARASHTRA 1902 7.8 0.0 0.1 2624 MAHARASHTRA 1903 7.6 0.0 0.0 2625 MAHARASHTRA 1904 0.4 4.7 1.7 2626 MAHARASHTRA 1905 0.0 1.2 0.0 2732 MADHYA MADHYA 2011 0.0 0.3 0.3 2733 MAHARASHTRA 2012 0.0 0.0 0.0 2734 MAHARASHTRA 2013 0.1 5.3 0.8 2735 MADHYA 2014 3.1 6.2 24.4	2622 MADHYA MADHYA 1901 18.8 0.6 7.7 36.6 2623 MADHYA MAHARASHTRA 1902 7.8 0.0 0.1 5.0 2624 MAHARASHTRA 1903 7.6 0.0 0.0 3.2 2625 MAHARASHTRA 1904 0.4 4.7 1.7 3.0 2626 MAHARASHTRA 1905 0.0 1.2 0.0 2.3	2622 MADHYA MAHARASHTRA 1901 18.8 0.6 7.7 36.6 30.4 2623 MAHARASHTRA 1902 7.8 0.0 0.1 5.0 9.8 2624 MAHARASHTRA 1903 7.6 0.0 0.0 3.2 77.2 2625 MAHARASHTRA 1904 0.4 4.7 1.7 3.0 18.7 2626 MAHARASHTRA 1905 0.0 1.2 0.0 2.3 23.6	2622 MAHARASHTRA 1901 18.8 0.6 7.7 36.6 30.4 107.7 2623 MAHARASHTRA 1902 7.8 0.0 0.1 5.0 9.8 102.6 2624 MAHARASHTRA 1903 7.6 0.0 0.0 3.2 77.2 86.3 2625 MAHARASHTRA 1904 0.4 4.7 1.7 3.0 18.7 114.6 2626 MAHARASHTRA 1905 0.0 1.2 0.0 2.3 23.6 65.0 .	2622 MADHYA MADHYA 1901 18.8 0.6 7.7 36.6 30.4 107.7 215.9 2623 MAHARASHTRA 1902 7.8 0.0 0.1 5.0 9.8 102.6 210.9 2624 MAHARASHTRA 1903 7.6 0.0 0.0 3.2 77.2 86.3 281.8 2625 MADHYA 1904 0.4 4.7 1.7 3.0 18.7 114.6 126.5 2626 MAHARASHTRA 1905 0.0 1.2 0.0 2.3 23.6 65.0 252.8	2622 MADHYA MAHARASHTRA 1901 18.8 0.6 7.7 36.6 30.4 107.7 215.9 194.1 2623 MAHARASHTRA 1902 7.8 0.0 0.1 5.0 9.8 102.6 210.9 114.5 2624 MAHARASHTRA 1903 7.6 0.0 0.0 3.2 77.2 86.3 281.8 155.5 2625 MAHARASHTRA 1904 0.4 4.7 1.7 3.0 18.7 114.6 126.5 59.5 2626 MAHARASHTRA 1905 0.0 1.2 0.0 2.3 23.6 65.0 252.8 79.0	2622 MADHYA 1901 18.8 0.6 7.7 36.6 30.4 107.7 215.9 194.1 83.7 2623 MADHYA 1902 7.8 0.0 0.1 5.0 9.8 102.6 210.9 114.5 169.5 2624 MAHARASHTRA 1903 7.6 0.0 0.0 3.2 77.2 86.3 281.8 155.5 142.3 2625 MADHYA 1904 0.4 4.7 1.7 3.0 18.7 114.6 126.5 59.5 183.0 2626 MAHARASHTRA 1905 0.0 1.2 0.0 2.3 23.6 65.0 252.8 79.0 52.6

115 rows × 20 columns

In [112]: a.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 115 entries, 0 to 114
Data columns (total 20 columns):

#	Column	Non-Null Count	Dtype
0	index	115 non-null	int64
1	SUBDIVISION	115 non-null	object
2	YEAR	115 non-null	int64
3	JAN	115 non-null	float64
4	FEB	115 non-null	float64
5	MAR	115 non-null	float64
6	APR	115 non-null	float64
7	MAY	115 non-null	float64
8	JUN	115 non-null	float64
9	JUL	115 non-null	float64
10	AUG	115 non-null	float64
11	SEP	115 non-null	float64
12	OCT	115 non-null	float64
13	NOV	115 non-null	float64
14	DEC	115 non-null	float64
15	ANNUAL	115 non-null	float64
16	Jan-Feb	115 non-null	float64
17	Mar-May	115 non-null	float64
18	Jun-Sep	115 non-null	float64
19	Oct-Dec	115 non-null	float64
dtyp	es: float64(1	7), int64(2), ob	ject(1)

memory usage: 18.1+ KB

```
In [113]: b=a.fillna(method='ffill')
b
```

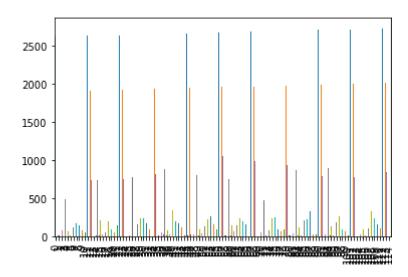
Out[113]:

	index	SUBDIVISION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	oc.
0	2622	MADHYA MAHARASHTRA	1901	18.8	0.6	7.7	36.6	30.4	107.7	215.9	194.1	83.7	68.
1	2623	MADHYA MAHARASHTRA	1902	7.8	0.0	0.1	5.0	9.8	102.6	210.9	114.5	169.5	60.4
2	2624	MADHYA MAHARASHTRA	1903	7.6	0.0	0.0	3.2	77.2	86.3	281.8	155.5	142.3	74.:
3	2625	MADHYA MAHARASHTRA	1904	0.4	4.7	1.7	3.0	18.7	114.6	126.5	59.5	183.0	91
4	2626	MADHYA MAHARASHTRA	1905	0.0	1.2	0.0	2.3	23.6	65.0	252.8	79.0	52.6	52.
													••
110	2732	MADHYA MAHARASHTRA	2011	0.0	0.3	0.3	5.0	2.9	133.3	261.4	238.1	148.4	62.
111	2733	MADHYA MAHARASHTRA	2012	0.0	0.0	0.0	3.0	1.4	67.9	203.0	187.8	129.5	95.;
112	2734	MADHYA MAHARASHTRA	2013	0.1	5.3	8.0	5.7	6.0	212.4	311.8	147.0	210.3	57.
113	2735	MADHYA MAHARASHTRA	2014	3.1	6.2	24.4	7.5	29.8	44.0	277.9	240.3	120.4	38.
114	2736	MADHYA MAHARASHTRA	2015	1.4	0.8	41.2	9.6	24.4	177.0	111.7	67.2	146.6	48.

115 rows × 20 columns

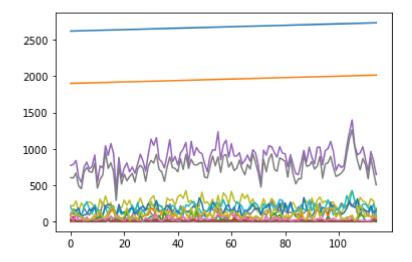
In [114]: b.plot.bar(legend=None)

Out[114]: <AxesSubplot:>



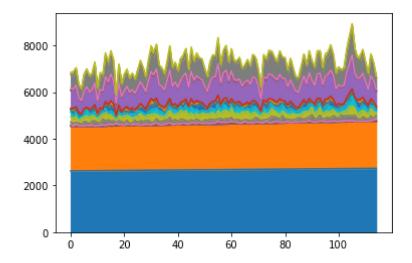
```
In [115]: b.plot.line(legend=None)
```

Out[115]: <AxesSubplot:>



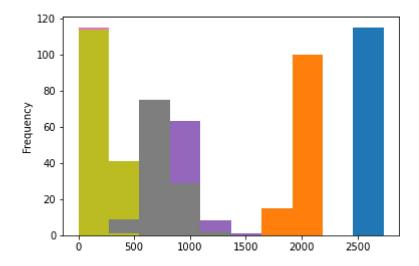
In [116]: b.plot.area(legend=None)

Out[116]: <AxesSubplot:>



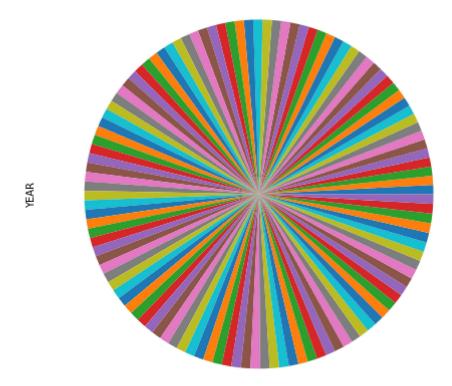
```
In [117]: b.plot.hist(legend=None)
```

Out[117]: <AxesSubplot:ylabel='Frequency'>



In [118]: b.plot.pie(y='YEAR',figsize=(8,8),labels=None,legend=None)

Out[118]: <AxesSubplot:ylabel='YEAR'>



```
In [ ]:
```