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19MIC0053

LAB - FAT

FP Growth

Compressing the banking database to locate frequent itemsets in a frequent pattern growth algorithm to mine association rules. Assume the items located in a banking database are savings account, personnel loan, credit card, home loan, etc.

In [ ]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as p1
```

In [ ]:

```
bank=pd.read_csv("/Users/aravinth/Desktop/Data Warehousing/FAT/Banking.csv'
print(bank)
```

```
  Bank_Name  Saving_Account  Personal_Loan  Credit Card  Home_Loan
0       SBI             120             17          120         16
1       CUB             150             15          140         11
2       IOB             134             10          130         10
3       KVB             125             12          120          8
4       PNB             130             17          130         12
5        AB             120             15          110         15
6       RBI             150             10          140          7
7        IB             134             12          120         14
8        AB             125             17          120         13
```

In [ ]:

```
print(bank.iloc[5])
```

```
Bank_Name          AB
Saving_Account    120
Personal_Loan      15
Credit Card       110
Home_Loan          15
Name: 5, dtype: object
```

In [ ]:

```
print(bank.iloc[1:10])
```

```
  Bank_Name  Saving_Account  Personal_Loan  Credit Card  Home_Loan
1       CUB             150             15          140         11
2       IOB             134             10          130         10
3       KVB             125             12          120          8
4       PNB             130             17          130         12
5        AB             120             15          110         15
6       RBI             150             10          140          7
7        IB             134             12          120         14
8        AB             125             17          120         13
```

In [ ]:

```python
print(bank.iloc[:,0:4])
```

```
  Bank_Name  Saving_Account  Personal_Loan  Credit Card
0       SBI             120             17          120
1       CUB             150             15          140
2       IOB             134             10          130
3       KVB             125             12          120
4       PNB             130             17          130
5        AB             120             15          110
6       RBI             150             10          140
7        IB             134             12          120
8        AB             125             17          120
```

In [ ]:

```python
print(bank.iloc[:,1])
```

```
0    120
1    150
2    134
3    125
4    130
5    120
6    150
7    134
8    125
Name: Saving_Account, dtype: int64
```

In [ ]:

```python
import pandas as pd
from mlxtend.preprocessing import TransactionEncoder
bank=pd.read_csv("/Users/aravinth/Desktop/Data Warehousing/FAT/Banking.csv
list1=[]
for i in range (0,9):
    list1.append([str(bank.values[i,j]) for j in range (0,5)])
print(list1)
trans=TransactionEncoder()
trans_ary=trans.fit(list1).transform(list1)
data=pd.DataFrame(trans_ary,columns=trans.columns_)
data
```

```
[['SBI', '120', '17', '120', '16'], ['CUB', '150', '15', '140', '11'], ['IO
B', '134', '10', '130', '10'], ['KVB', '125', '12', '120', '8'], ['PNB', '1
30', '17', '130', '12'], ['AB', '120', '15', '110', '15'], ['RBI', '150', '
10', '140', '7'], ['IB', '134', '12', '120', '14'], ['AB', '125', '17', '12
0', '13']]
```

Out[ ]:

	10	11	110	12	120	125	13	130	134	14	...	7	8	AB	(
0	False	False	False	False	True	False	False	False	False	False	...	False	False	False	F
1	False	True	False	False	False	False	False	False	False	False	...	False	False	False	
2	True	False	False	False	False	False	False	True	True	False	...	False	False	False	F
3	False	False	False	True	True	True	False	False	False	False	...	False	True	False	F
4	False	False	False	True	False	False	False	True	False	False	...	False	False	False	F
5	False	False	True	False	True	False	False	False	False	False	...	False	False	True	F
6	True	False	False	False	False	False	False	False	False	False	...	True	False	False	F
7	False	False	False	True	True	False	False	False	True	True	...	False	False	False	F
8	False	False	False	False	True	True	True	False	False	False	...	False	False	True	F

9 rows × 25 columns

In [ ]:

```
from mlxtend.frequent_patterns import fpgrowth
fpgrowth(data,min_support=0.2)
```

Out[ ]:

	support	itemsets
0	0.555556	(4)
1	0.333333	(14)
2	0.222222	(12)
3	0.222222	(11)
4	0.222222	(10)
5	0.222222	(8)
6	0.222222	(7)
7	0.222222	(0)
8	0.333333	(3)
9	0.222222	(5)
10	0.222222	(17)
11	0.222222	(4, 14)
12	0.222222	(10, 12)
13	0.222222	(3, 4)
14	0.222222	(4, 5)
15	0.222222	(17, 4)

In [ ]:

```
frequent_item=fpgrowth(data,min_support=0.2,use_colnames=True)
print(frequent_item)
```

```
     support     itemsets
0   0.555556        (120)
1   0.333333         (17)
2   0.222222        (150)
3   0.222222         (15)
4   0.222222        (140)
5   0.222222        (134)
6   0.222222        (130)
7   0.222222         (10)
8   0.333333         (12)
9   0.222222        (125)
10  0.222222         (AB)
11  0.222222    (17, 120)
12  0.222222   (140, 150)
13  0.222222    (120, 12)
14  0.222222   (120, 125)
15  0.222222    (120, AB)
```

In [ ]:

```
from mlxtend.frequent_patterns import association_rules
rules=association_rules(frequent_item,metric='confidence',min_threshold=0.
rules
```

Out[ ]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
0	(17)	(120)	0.333333	0.555556	0.222222	0.666667	1.2	0.037037
1	(140)	(150)	0.222222	0.222222	0.222222	1.000000	4.5	0.172840
2	(150)	(140)	0.222222	0.222222	0.222222	1.000000	4.5	0.172840
3	(12)	(120)	0.333333	0.555556	0.222222	0.666667	1.2	0.037037
4	(125)	(120)	0.222222	0.555556	0.222222	1.000000	1.8	0.098765
5	(AB)	(120)	0.222222	0.555556	0.222222	1.000000	1.8	0.098765

Implement Association RuleMining using FP Growth by assuming own inputs for showing monthly sales from thetextile shop.

In [ ]:

```
import pandas as pd
from mlxtend.preprocessing import TransactionEncoder
textile=pd.read_csv("/Users/aravinth/Desktop/Data Warehousing/FAT/Textile.c
list1=[]
for i in range (0,14):
    list1.append([str(textile.values[i,j]) for j in range (0,5)])
print(list1)
trans=TransactionEncoder()
trans_ary=trans.fit(list1).transform(list1)
data=pd.DataFrame(trans_ary,columns=trans.columns_)
data
```

```
[['1', 'Formal', 'Low', '4', 'M'], ['2', 'Casual', 'Low', '5', 'L'], ['3',
'Vintage', 'High', '4', 'L'], ['4', 'Brief', 'Average', '3', 'XL'], ['5', '
Cute', 'Low', '2', 'M'], ['6', 'Formal', 'Low', '5', 'L'], ['7', 'Casual',
'Low', '4', 'M'], ['8', 'Vintage', 'High', '4', 'S'], ['9', 'Brief', 'Avera
ge', '5', 'M'], ['10', 'Cute', 'Low', '4', 'L'], ['11', 'Formal', 'Low', '3
', 'L'], ['12', 'Casual', 'Low', '2', 'XL'], ['13', 'Vintage', 'High', '5',
'M'], ['14', 'Brief', 'Average', '4', 'L']]
```

Out[ ]:

	1	10	11	12	13	14	2	3	4	5	...	Casual	Cute	Form
0	True	False	False	False	False	False	False	False	True	False	...	False	False	Tr
1	False	False	False	False	False	False	True	False	False	True	...	True	False	Fal
2	False	False	False	False	False	False	False	True	True	False	...	False	False	Fal
3	False	False	False	False	False	False	False	True	True	False	...	False	False	Fal
4	False	False	False	False	False	False	True	False	False	True	...	False	True	Fal
5	False	False	False	False	False	False	False	False	False	True	...	False	False	Tr
6	False	False	False	False	False	False	False	False	True	False	...	True	False	Fal
7	False	False	False	False	False	False	False	False	True	False	...	False	False	Fal
8	False	False	False	False	False	False	False	False	False	True	...	False	False	Fal
9	False	True	False	False	False	False	False	False	True	False	...	False	True	Fal
10	False	False	True	False	False	False	False	True	False	False	...	False	False	Tr
11	False	False	False	True	False	False	True	False	False	False	...	True	False	Fal
12	False	False	False	False	True	False	False	False	False	True	...	False	False	Fal
13	False	False	False	False	False	True	False	False	True	False	...	False	False	Fal

14 rows × 26 columns

In [ ]:

```
from mlxtend.frequent_patterns import fpgrowth
fpgrowth(data,min_support=0.2)
```

Out[ ]:

	support	itemsets
0	0.571429	(21)
1	0.500000	(8)
2	0.357143	(22)
3	0.214286	(18)
4	0.428571	(20)
5	0.357143	(9)
6	0.214286	(16)
7	0.214286	(6)
8	0.214286	(24)
9	0.214286	(19)
10	0.214286	(7)
11	0.214286	(15)
12	0.214286	(14)
13	0.214286	(8, 21)
14	0.214286	(21, 22)
15	0.214286	(18, 21)
16	0.285714	(20, 21)
17	0.214286	(8, 20)
18	0.214286	(9, 21)
19	0.214286	(9, 22)
20	0.214286	(16, 21)
21	0.214286	(21, 6)
22	0.214286	(24, 19)
23	0.214286	(14, 15)

In [ ]:

```
frequent_item=fpgrowth(data,min_support=0.2,use_colnames=True)
print(frequent_item)
```

```
     support           itemsets
0   0.571429              (Low)
1   0.500000                (4)
2   0.357143                (M)
3   0.214286           (Formal)
4   0.428571                (L)
5   0.357143                (5)
6   0.214286           (Casual)
7   0.214286                (2)
8   0.214286          (Vintage)
9   0.214286             (High)
10  0.214286                (3)
11  0.214286            (Brief)
12  0.214286          (Average)
13  0.214286           (4, Low)
14  0.214286           (M, Low)
15  0.214286      (Formal, Low)
16  0.285714           (L, Low)
17  0.214286             (L, 4)
18  0.214286           (5, Low)
19  0.214286             (5, M)
20  0.214286      (Casual, Low)
21  0.214286           (2, Low)
22  0.214286    (Vintage, High)
23  0.214286  (Brief, Average)
```

Association Rule

In [ ]:

```
from mlxtend.frequent_patterns import association_rules
rules=association_rules(frequent_item,metric='confidence',min_threshold=0.5
rules
```

Out[ ]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	l
0	(M)	(Low)	0.357143	0.571429	0.214286	0.600000	1.050000	C
1	(Formal)	(Low)	0.214286	0.571429	0.214286	1.000000	1.750000	C
2	(L)	(Low)	0.428571	0.571429	0.285714	0.666667	1.166667	C
3	(Low)	(L)	0.571429	0.428571	0.285714	0.500000	1.166667	C
4	(L)	(4)	0.428571	0.500000	0.214286	0.500000	1.000000	0
5	(5)	(Low)	0.357143	0.571429	0.214286	0.600000	1.050000	C
6	(5)	(M)	0.357143	0.357143	0.214286	0.600000	1.680000	0
7	(M)	(5)	0.357143	0.357143	0.214286	0.600000	1.680000	0
8	(Casual)	(Low)	0.214286	0.571429	0.214286	1.000000	1.750000	C
9	(2)	(Low)	0.214286	0.571429	0.214286	1.000000	1.750000	C
10	(Vintage)	(High)	0.214286	0.214286	0.214286	1.000000	4.666667	C
11	(High)	(Vintage)	0.214286	0.214286	0.214286	1.000000	4.666667	C
12	(Brief)	(Average)	0.214286	0.214286	0.214286	1.000000	4.666667	C
13	(Average)	(Brief)	0.214286	0.214286	0.214286	1.000000	4.666667	C

Prepare and present various data presentation to project COVID cases from 2021 January to 2021 may. Use suitable data and chart.

In [ ]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as p1
from sklearn import linear_model
```

In [ ]:

```
data=pd.read_csv("/Users/aravinth/Desktop/Data Warehousing/FAT/CovidActive(

#reference = https://www.worldometers.info/coronavirus/country/india/
```

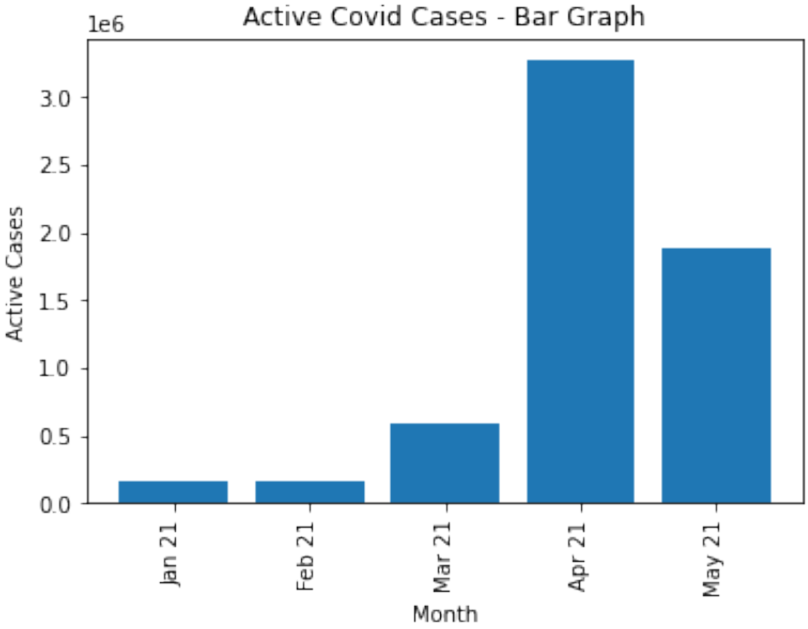
In [ ]:

```
print(data)
```

```
   Number   Month  ActiveCases
0       1  Jan 21       169112
1       2  Feb 21       169172
2       3  Mar 21       584067
3       4  Apr 21      3270089
4       5  May 21      1885874
```

In [ ]:

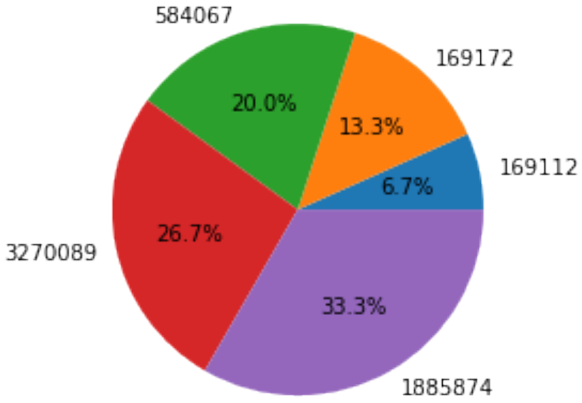
```
x=data.Month
y=data.ActiveCases
p1.title('Active Covid Cases - Bar Graph')
p1.xlabel('Month')
p1.ylabel('Active Cases')
x1 = np.arange(len(x))
p1.bar(x1,y)
p1.xticks(x1,x,color='Black',rotation=90)
p1.show()
```



In [ ]:

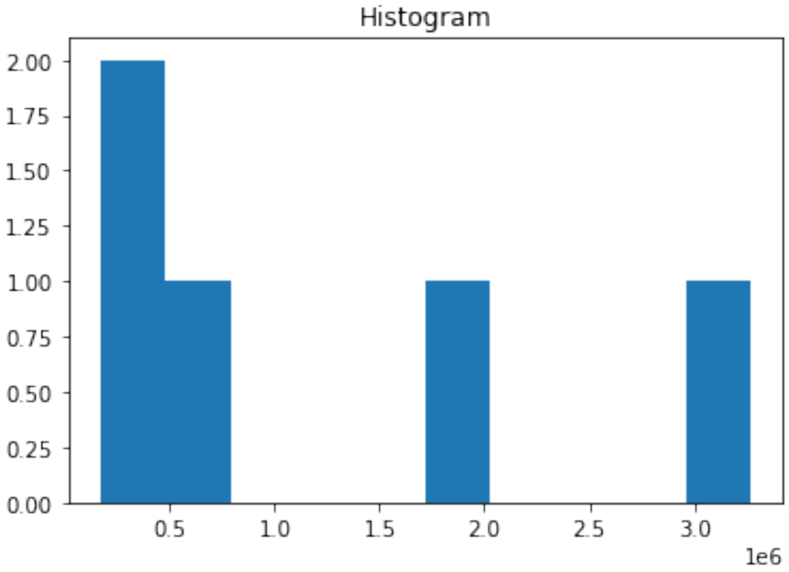
```
print("Pie chart")
x1=data.Number
y1=data.ActiveCases
p1.pie(x1,labels=y1,autopct='%1.1f%%')
p1.show()
```

```
Pie chart
```



In [ ]:

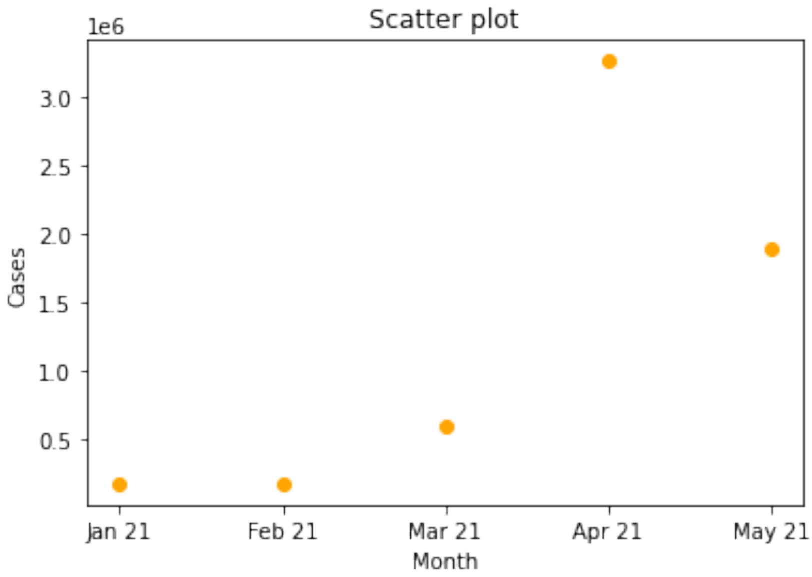
```
p1.title('Histogram')
y=(data.ActiveCases)
p1.hist(y)
p1.show()
```



In [ ]:

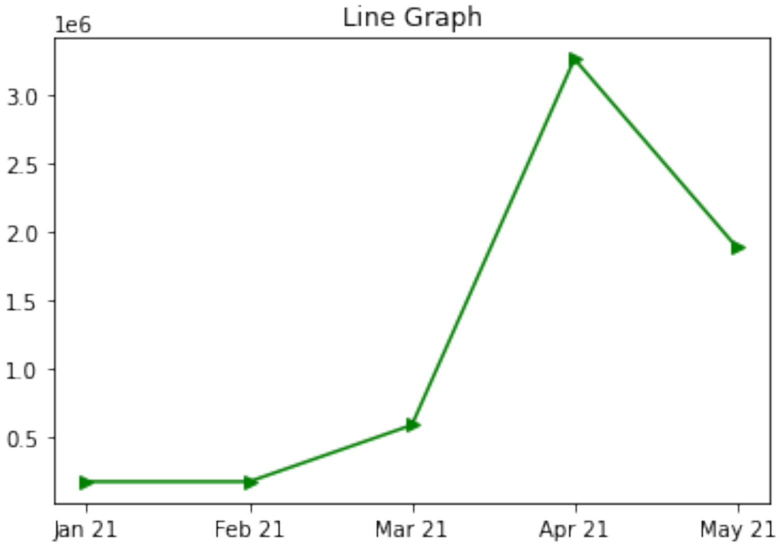
```
p1.title('Scatter plot')

p1.xlabel('Month')
p1.ylabel('Cases')
y=(data.ActiveCases)
x=(data.Month)
p1.scatter(x,y,color='orange',linestyle='solid')
p1.show()
```



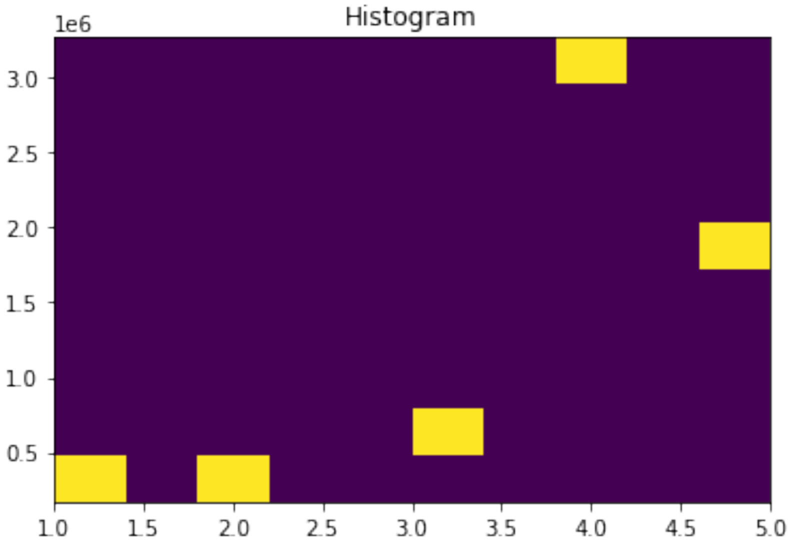
In [ ]:

```
p1.title('Line Graph')
p1.plot(x,y,color='g',linestyle='solid',marker=">")
p1.show()
```



In [ ]:

```
p1.title('Histogram')
p1.hist2d(data.Number,data.ActiveCases)
p1.show()
```


Histogram
1e6