

```
In [2]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from mlxtend.frequent_patterns import apriori, association_rules
import warnings
warnings.filterwarnings('ignore')
```

```
In [3]: data = pd.read_csv('my_movies.csv')
data
```

```
Out[3]:
```

	V1	V2	V3	V4	V5	Sixth Sense	Gladiator	LOTR1	Harry Potter1	Patriot	LOTR2	Ha Pott
0	Sixth Sense	LOTR1	Harry Potter1	Green Mile	LOTR2	1	0	1	1	0	1	
1	Gladiator	Patriot	Braveheart	NaN	NaN	0	1	0	0	1	0	
2	LOTR1	LOTR2	NaN	NaN	NaN	0	0	1	0	0	1	
3	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	0	
4	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	0	
5	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	0	
6	Harry Potter1	Harry Potter2	NaN	NaN	NaN	0	0	0	1	0	0	
7	Gladiator	Patriot	NaN	NaN	NaN	0	1	0	0	1	0	
8	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	0	
9	Sixth Sense	LOTR	Gladiator	Green Mile	NaN	1	1	0	0	0	0	

```
In [4]: data.shape
```

```
Out[4]: (10, 15)
```

```
In [5]: data.isna().sum()
```

```
Out[5]: V1      0
V2      0
V3      3
V4      8
V5      9
Sixth Sense  0
Gladiator  0
LOTR1      0
Harry Potter1  0
```

```

Patriot      0
LOTR2        0
Harry Potter2 0
LOTR         0
Braveheart   0
Green Mile   0
dtype: int64

```

In [7]: `data.dtypes`

```

Out[7]: V1      object
V2      object
V3      object
V4      object
V5      object
Sixth Sense  int64
Gladiator   int64
LOTR1       int64
Harry Potter1 int64
Patriot     int64
LOTR2       int64
Harry Potter2 int64
LOTR        int64
Braveheart  int64
Green Mile  int64
dtype: object

```

In [8]:

```

data.drop(["V1"],inplace=True,axis = 1)
data.drop(["V2"],inplace=True,axis = 1)
data.drop(["V3"],inplace=True,axis = 1)
data.drop(["V4"],inplace=True,axis = 1)
data.drop(["V5"],inplace=True,axis = 1)

```

In [9]: `data.describe(include=('all'))`

Out[9]:

	Sixth Sense	Gladiator	LOTR1	Harry Potter1	Patriot	LOTR2	Harry Potter2	LOTR	Braveheart
<b>count</b>	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000	10.000000
<b>mean</b>	0.600000	0.700000	0.200000	0.200000	0.600000	0.200000	0.100000	0.100000	0.100000
<b>std</b>	0.516398	0.483046	0.421637	0.421637	0.516398	0.421637	0.316228	0.316228	0.316228
<b>min</b>	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
<b>25%</b>	0.000000	0.250000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
<b>50%</b>	1.000000	1.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000
<b>75%</b>	1.000000	1.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000
<b>max</b>	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000

In [11]:

```

frequent_itemsets = apriori(data,min_support=0.005,use_colnames=True)
frequent_itemsets

```

Out[11]:

	support	itemsets
<b>0</b>	0.6	(Sixth Sense)
<b>1</b>	0.7	(Gladiator)
<b>2</b>	0.2	(LOTR1)
<b>3</b>	0.2	(Harry Potter1)
<b>4</b>	0.6	(Patriot)
<b>5</b>	0.2	(LOTR2)
<b>6</b>	0.1	(Harry Potter2)
<b>7</b>	0.1	(LOTR)
<b>8</b>	0.1	(Braveheart)
<b>9</b>	0.2	(Green Mile)
<b>10</b>	0.5	(Gladiator, Sixth Sense)
<b>11</b>	0.1	(LOTR1, Sixth Sense)
<b>12</b>	0.1	(Harry Potter1, Sixth Sense)
<b>13</b>	0.4	(Sixth Sense, Patriot)
<b>14</b>	0.1	(Sixth Sense, LOTR2)
<b>15</b>	0.1	(Sixth Sense, LOTR)
<b>16</b>	0.2	(Sixth Sense, Green Mile)
<b>17</b>	0.6	(Gladiator, Patriot)
<b>18</b>	0.1	(Gladiator, LOTR)
<b>19</b>	0.1	(Gladiator, Braveheart)
<b>20</b>	0.1	(Gladiator, Green Mile)
<b>21</b>	0.1	(LOTR1, Harry Potter1)
<b>22</b>	0.2	(LOTR1, LOTR2)
<b>23</b>	0.1	(LOTR1, Green Mile)
<b>24</b>	0.1	(Harry Potter1, LOTR2)
<b>25</b>	0.1	(Harry Potter1, Harry Potter2)
<b>26</b>	0.1	(Harry Potter1, Green Mile)
<b>27</b>	0.1	(Braveheart, Patriot)
<b>28</b>	0.1	(Green Mile, LOTR2)
<b>29</b>	0.1	(Green Mile, LOTR)
<b>30</b>	0.4	(Gladiator, Sixth Sense, Patriot)
<b>31</b>	0.1	(Gladiator, Sixth Sense, LOTR)
<b>32</b>	0.1	(Gladiator, Sixth Sense, Green Mile)

	support	itemsets
33	0.1	(LOTR1, Sixth Sense, Harry Potter1)
34	0.1	(LOTR1, Sixth Sense, LOTR2)
35	0.1	(LOTR1, Sixth Sense, Green Mile)
36	0.1	(Harry Potter1, Sixth Sense, LOTR2)
37	0.1	(Harry Potter1, Sixth Sense, Green Mile)
38	0.1	(Sixth Sense, Green Mile, LOTR2)
39	0.1	(Sixth Sense, Green Mile, LOTR)
40	0.1	(Gladiator, Braveheart, Patriot)
41	0.1	(Gladiator, Green Mile, LOTR)
42	0.1	(LOTR1, Harry Potter1, LOTR2)
43	0.1	(LOTR1, Harry Potter1, Green Mile)
44	0.1	(LOTR1, Green Mile, LOTR2)
45	0.1	(Harry Potter1, Green Mile, LOTR2)
46	0.1	(Gladiator, Sixth Sense, Green Mile, LOTR)
47	0.1	(LOTR1, Sixth Sense, Harry Potter1, LOTR2)
48	0.1	(LOTR1, Sixth Sense, Harry Potter1, Green Mile)
49	0.1	(LOTR1, Sixth Sense, Green Mile, LOTR2)
50	0.1	(Harry Potter1, Sixth Sense, Green Mile, LOTR2)
51	0.1	(LOTR1, Harry Potter1, Green Mile, LOTR2)
52	0.1	(LOTR1, LOTR2, Harry Potter1, Sixth Sense, Gre...

In [12]:

```
rules=association_rules(frequent_itemsets,metric='lift',min_threshold=1)
rules.head()
```

Out[12]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	convict
0	(Gladiator)	(Sixth Sense)	0.7	0.6	0.5	0.714286	1.190476	0.08	1
1	(Sixth Sense)	(Gladiator)	0.6	0.7	0.5	0.833333	1.190476	0.08	1
2	(Sixth Sense)	(Patriot)	0.6	0.6	0.4	0.666667	1.111111	0.04	1
3	(Patriot)	(Sixth Sense)	0.6	0.6	0.4	0.666667	1.111111	0.04	1
4	(Sixth Sense)	(LOTR)	0.6	0.1	0.1	0.166667	1.666667	0.04	1

In [13]:

```
rules[(rules['lift']>= 6) & (rules['confidence'] >= 0.8)]
```

Out[13]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	convictio
94	(Gladiator, Green Mile)	(LOTR)	0.1	0.1	0.1	1.0	10.0	0.09	ir
99	(LOTR)	(Gladiator, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir
124	(Gladiator, Sixth Sense, Green Mile)	(LOTR)	0.1	0.1	0.1	1.0	10.0	0.09	ir
129	(Gladiator, Green Mile)	(Sixth Sense, LOTR)	0.1	0.1	0.1	1.0	10.0	0.09	ir
132	(Sixth Sense, LOTR)	(Gladiator, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir
137	(LOTR)	(Gladiator, Sixth Sense, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir
142	(LOTR1, Sixth Sense)	(Harry Potter1, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
143	(LOTR1, Harry Potter1)	(Sixth Sense, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
146	(Sixth Sense, LOTR2)	(LOTR1, Harry Potter1)	0.1	0.1	0.1	1.0	10.0	0.09	ir
147	(Harry Potter1, LOTR2)	(LOTR1, Sixth Sense)	0.1	0.1	0.1	1.0	10.0	0.09	ir
156	(LOTR1, Sixth Sense)	(Harry Potter1, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir
158	(LOTR1, Green Mile)	(Harry Potter1, Sixth Sense)	0.1	0.1	0.1	1.0	10.0	0.09	ir
159	(Harry Potter1, Sixth Sense)	(LOTR1, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir
161	(Harry Potter1, Green Mile)	(LOTR1, Sixth Sense)	0.1	0.1	0.1	1.0	10.0	0.09	ir
170	(LOTR1, Sixth Sense)	(Green Mile, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
171	(LOTR1, Green Mile)	(Sixth Sense, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
174	(Sixth Sense, LOTR2)	(LOTR1, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	conviction
<b>175</b>	(Green Mile, LOTR2)	(LOTR1, Sixth Sense)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>184</b>	(Harry Potter1, Sixth Sense)	(Green Mile, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>185</b>	(Harry Potter1, Green Mile)	(Sixth Sense, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>188</b>	(Sixth Sense, LOTR2)	(Harry Potter1, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>189</b>	(Green Mile, LOTR2)	(Harry Potter1, Sixth Sense)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>198</b>	(LOTR1, Harry Potter1)	(Green Mile, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>199</b>	(LOTR1, Green Mile)	(Harry Potter1, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>202</b>	(Harry Potter1, LOTR2)	(LOTR1, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>203</b>	(Green Mile, LOTR2)	(LOTR1, Harry Potter1)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>214</b>	(LOTR1, Sixth Sense, LOTR2)	(Harry Potter1, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>215</b>	(LOTR1, Green Mile, LOTR2)	(Harry Potter1, Sixth Sense)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>216</b>	(LOTR1, Sixth Sense, Harry Potter1)	(Green Mile, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>217</b>	(LOTR1, Harry Potter1, Green Mile)	(Sixth Sense, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>218</b>	(LOTR1, Sixth Sense, Green Mile)	(Harry Potter1, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
<b>219</b>	(Harry Potter1, Sixth Sense, LOTR2)	(LOTR1, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	conviction
220	(Harry Potter1, Green Mile, LOTR2)	(LOTR1, Sixth Sense)	0.1	0.1	0.1	1.0	10.0	0.09	ir
221	(Sixth Sense, Green Mile, LOTR2)	(LOTR1, Harry Potter1)	0.1	0.1	0.1	1.0	10.0	0.09	ir
224	(LOTR1, Harry Potter1)	(Sixth Sense, Green Mile, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
225	(LOTR1, Sixth Sense)	(Harry Potter1, Green Mile, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
226	(LOTR1, Green Mile)	(Harry Potter1, Sixth Sense, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
227	(Harry Potter1, LOTR2)	(LOTR1, Sixth Sense, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir
228	(Sixth Sense, LOTR2)	(LOTR1, Harry Potter1, Green Mile)	0.1	0.1	0.1	1.0	10.0	0.09	ir
229	(Green Mile, LOTR2)	(LOTR1, Sixth Sense, Harry Potter1)	0.1	0.1	0.1	1.0	10.0	0.09	ir
230	(Harry Potter1, Sixth Sense)	(LOTR1, Green Mile, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir
231	(Harry Potter1, Green Mile)	(LOTR1, Sixth Sense, LOTR2)	0.1	0.1	0.1	1.0	10.0	0.09	ir

◀

▶

In [ ]: