In [1]:

```
get_ipython().system('pip install mlxtend')
```

```
Requirement already satisfied: mlxtend in c:\users\rohit\anaconda3\lib\site-packages (0.
23.1)
Requirement already satisfied: joblib>=0.13.2 in c:\users\rohit\anaconda3\lib\site-packa
ges (from mlxtend) (1.1.0)
Requirement already satisfied: matplotlib>=3.0.0 in c:\users\rohit\anaconda3\lib\site-pa
ckages (from mlxtend) (3.5.2)
Requirement already satisfied: scipy>=1.2.1 in c:\users\rohit\anaconda3\lib\site-package
s (from mlxtend) (1.9.1)
Requirement already satisfied: pandas>=0.24.2 in c:\users\rohit\anaconda3\lib\site-packa
ges (from mlxtend) (1.4.4)
Requirement already satisfied: scikit-learn>=1.0.2 in c:\users\rohit\anaconda3\lib\site-
packages (from mlxtend) (1.0.2)
Requirement already satisfied: numpy>=1.16.2 in c:\users\rohit\anaconda3\lib\site-packag
es (from mlxtend) (1.21.5)
Requirement already satisfied: cycler>=0.10 in c:\users\rohit\anaconda3\lib\site-package
s (from matplotlib>=3.0.0->mlxtend) (0.11.0)
Requirement already satisfied: packaging>=20.0 in c:\users\rohit\anaconda3\lib\site-pack
ages (from matplotlib>=3.0.0->mlxtend) (21.3)
Requirement already satisfied: pyparsing>=2.2.1 in c:\users\rohit\anaconda3\lib\site-pac
kages (from matplotlib>=3.0.0->mlxtend) (3.0.9)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\rohit\anaconda3\lib\site-pa
ckages (from matplotlib>=3.0.0->mlxtend) (4.25.0)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\rohit\anaconda3\lib\site
-packages (from matplotlib>=3.0.0->mlxtend) (2.8.2)
Requirement already satisfied: pillow>=6.2.0 in c:\users\rohit\anaconda3\lib\site-packag
es (from matplotlib>=3.0.0->mlxtend) (9.2.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\rohit\anaconda3\lib\site-pa
ckages (from matplotlib>=3.0.0->mlxtend) (1.4.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\rohit\anaconda3\lib\site-package
s (from pandas>=0.24.2->mlxtend) (2022.1)
Requirement already satisfied: threadpoolctl>=2.0.0 in c:\users\rohit\anaconda3\lib\site
-packages (from scikit-learn>=1.0.2->mlxtend) (2.2.0)
Requirement already satisfied: six>=1.5 in c:\users\rohit\anaconda3\lib\site-packages (f
rom python-dateutil>=2.7->matplotlib>=3.0.0->mlxtend) (1.16.0)
```

In [2]:

```
import pandas as pd
from mlxtend.frequent_patterns import apriori,association_rules
import matplotlib.pyplot as plt
```

In [3]:

```
movie=pd.read_csv('my_movies.csv')
movie.head()
```

Out[3]:

| | V1 | V2 | V3 | V4 | V5 | Sixth Sense | Gladiator | LOTR1 | Harry Potter1 | Patriot | LOTR2 | Harry Potter2 | LOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | Sixth Sense | LOTR1 | Harry Potter1 | Green Mile | LOTR2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | |
| **1** | Gladiator | Patriot | Braveheart | NaN | NaN | 0 | 1 | 0 | 0 | 1 | 0 | 0 | |
| **2** | LOTR1 | LOTR2 | NaN | NaN | NaN | 0 | 0 | 1 | 0 | 0 | 1 | 0 | |
| **3** | Gladiator | Patriot | Sixth Sense | NaN | NaN | 1 | 1 | 0 | 0 | 1 | 0 | 0 | |
| **4** | Gladiator | Patriot | Sixth Sense | NaN | NaN | 1 | 1 | 0 | 0 | 1 | 0 | 0 | |

In [4]:

```
movie=movie.drop(['V1','V2','V3','V4','V5'], axis=1)
movie
```

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Out[4]:

| | Sixth Sense | Gladiator | LOTR1 | Harry Potter1 | Patriot | LOTR2 | Harry Potter2 | LOTR | Braveheart | Green Mile |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| **1** | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| **2** | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| **3** | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **4** | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **5** | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **6** | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| **7** | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **8** | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **9** | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |

In [5]:

```
movie.shape
```

Out[5]:

```
(10, 10)
```

In [6]:

```
frequent_itemsets = apriori(movie, min_support=0.2, use_colnames=True)
frequent_itemsets
```

```
C:\Users\ROHIT\anaconda3\lib\site-packages\mlxtend\frequent_patterns\fpcommon.py:109: De
precationWarning: DataFrames with non-bool types result in worse computationalperformanc
e and their support might be discontinued in the future.Please use a DataFrame with bool
type
  warnings.warn(
```

Out[6]:

| | support | itemsets |
|---|---|---|
| **0** | 0.6 | (Sixth Sense) |
| **1** | 0.7 | (Gladiator) |
| **2** | 0.2 | (LOTR1) |
| **3** | 0.2 | (Harry Potter1) |
| **4** | 0.6 | (Patriot) |
| **5** | 0.2 | (LOTR2) |
| **6** | 0.2 | (Green Mile) |
| **7** | 0.5 | (Sixth Sense, Gladiator) |
| **8** | 0.4 | (Sixth Sense, Patriot) |
| **9** | 0.2 | (Green Mile, Sixth Sense) |
| **10** | 0.6 | (Gladiator, Patriot) |
| **11** | 0.2 | (LOTR2, LOTR1) |
| **12** | 0.4 | (Sixth Sense, Gladiator, Patriot) |

In [7]:

```
rules = association_rules(frequent_itemsets, metric="lift", min_threshold=0.6)
rules
rules.sort_values('lift',ascending = False)
```

Out[7]:

| | antecedents | consequents | antecedent support | consequent support | support | confidence | lift | leverage | conviction | zh |
|---|---|---|---|---|---|---|---|---|---|---|
| **8** | (LOTR2) | (LOTR1) | 0.2 | 0.2 | 0.2 | 1.000000 | 5.000000 | 0.16 | inf | |
| **9** | (LOTR1) | (LOTR2) | 0.2 | 0.2 | 0.2 | 1.000000 | 5.000000 | 0.16 | inf | |
| **4** | (Green Mile) | (Sixth Sense) | 0.2 | 0.6 | 0.2 | 1.000000 | 1.666667 | 0.08 | inf | |
| **5** | (Sixth Sense) | (Green Mile) | 0.6 | 0.2 | 0.2 | 0.333333 | 1.666667 | 0.08 | 1.2 | |
| **6** | (Gladiator) | (Patriot) | 0.7 | 0.6 | 0.6 | 0.857143 | 1.428571 | 0.18 | 2.8 | |
| **7** | (Patriot) | (Gladiator) | 0.6 | 0.7 | 0.6 | 1.000000 | 1.428571 | 0.18 | inf | |
| **11** | (Sixth Sense, Patriot) | (Gladiator) | 0.4 | 0.7 | 0.4 | 1.000000 | 1.428571 | 0.12 | inf | |
| **14** | (Gladiator) | (Sixth Sense, Patriot) | 0.7 | 0.4 | 0.4 | 0.571429 | 1.428571 | 0.12 | 1.4 | |
| **10** | (Sixth Sense, Gladiator) | (Patriot) | 0.5 | 0.6 | 0.4 | 0.800000 | 1.333333 | 0.10 | 2.0 | |
| **15** | (Patriot) | (Sixth Sense, Gladiator) | 0.6 | 0.5 | 0.4 | 0.666667 | 1.333333 | 0.10 | 1.5 | |
| **0** | (Sixth Sense) | (Gladiator) | 0.6 | 0.7 | 0.5 | 0.833333 | 1.190476 | 0.08 | 1.8 | |
| **1** | (Gladiator) | (Sixth Sense) | 0.7 | 0.6 | 0.5 | 0.714286 | 1.190476 | 0.08 | 1.4 | |
| **2** | (Sixth Sense) | (Patriot) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |
| **3** | (Patriot) | (Sixth Sense) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |
| **12** | (Gladiator, Patriot) | (Sixth Sense) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |
| **13** | (Sixth Sense) | (Gladiator, Patriot) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |

In [8]:

```
rules[rules.lift>1]
```

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Out[8]:

| | antecedents | consequents | antecedent support | consequent support | support | confidence | lift | leverage | conviction | zh |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | (Sixth Sense) | (Gladiator) | 0.6 | 0.7 | 0.5 | 0.833333 | 1.190476 | 0.08 | 1.8 | |
| **1** | (Gladiator) | (Sixth Sense) | 0.7 | 0.6 | 0.5 | 0.714286 | 1.190476 | 0.08 | 1.4 | |
| **2** | (Sixth Sense) | (Patriot) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |
| **3** | (Patriot) | (Sixth Sense) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |
| **4** | (Green Mile) | (Sixth Sense) | 0.2 | 0.6 | 0.2 | 1.000000 | 1.666667 | 0.08 | inf | |
| **5** | (Sixth Sense) | (Green Mile) | 0.6 | 0.2 | 0.2 | 0.333333 | 1.666667 | 0.08 | 1.2 | |
| **6** | (Gladiator) | (Patriot) | 0.7 | 0.6 | 0.6 | 0.857143 | 1.428571 | 0.18 | 2.8 | |
| **7** | (Patriot) | (Gladiator) | 0.6 | 0.7 | 0.6 | 1.000000 | 1.428571 | 0.18 | inf | |
| **8** | (LOTR2) | (LOTR1) | 0.2 | 0.2 | 0.2 | 1.000000 | 5.000000 | 0.16 | inf | |
| **9** | (LOTR1) | (LOTR2) | 0.2 | 0.2 | 0.2 | 1.000000 | 5.000000 | 0.16 | inf | |
| **10** | (Sixth Sense, Gladiator) | (Patriot) | 0.5 | 0.6 | 0.4 | 0.800000 | 1.333333 | 0.10 | 2.0 | |
| **11** | (Sixth Sense, Patriot) | (Gladiator) | 0.4 | 0.7 | 0.4 | 1.000000 | 1.428571 | 0.12 | inf | |
| **12** | (Gladiator, Patriot) | (Sixth Sense) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |
| **13** | (Sixth Sense) | (Gladiator, Patriot) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |
| **14** | (Gladiator) | (Sixth Sense, Patriot) | 0.7 | 0.4 | 0.4 | 0.571429 | 1.428571 | 0.12 | 1.4 | |
| **15** | (Patriot) | (Sixth Sense, Gladiator) | 0.6 | 0.5 | 0.4 | 0.666667 | 1.333333 | 0.10 | 1.5 | |

In [9]:

```
rules.sort_values('lift',ascending = False)
```

Out[9]:

| | antecedents | consequents | antecedent support | consequent support | support | confidence | lift | leverage | conviction | zh |
|---|---|---|---|---|---|---|---|---|---|---|
| **8** | (LOTR2) | (LOTR1) | 0.2 | 0.2 | 0.2 | 1.000000 | 5.000000 | 0.16 | inf | |
| **9** | (LOTR1) | (LOTR2) | 0.2 | 0.2 | 0.2 | 1.000000 | 5.000000 | 0.16 | inf | |
| **4** | (Green Mile) | (Sixth Sense) | 0.2 | 0.6 | 0.2 | 1.000000 | 1.666667 | 0.08 | inf | |
| **5** | (Sixth Sense) | (Green Mile) | 0.6 | 0.2 | 0.2 | 0.333333 | 1.666667 | 0.08 | 1.2 | |
| **6** | (Gladiator) | (Patriot) | 0.7 | 0.6 | 0.6 | 0.857143 | 1.428571 | 0.18 | 2.8 | |
| **7** | (Patriot) | (Gladiator) | 0.6 | 0.7 | 0.6 | 1.000000 | 1.428571 | 0.18 | inf | |
| **11** | (Sixth Sense, Patriot) | (Gladiator) | 0.4 | 0.7 | 0.4 | 1.000000 | 1.428571 | 0.12 | inf | |
| **14** | (Gladiator) | (Sixth Sense, Patriot) | 0.7 | 0.4 | 0.4 | 0.571429 | 1.428571 | 0.12 | 1.4 | |
| **10** | (Sixth Sense, Gladiator) | (Patriot) | 0.5 | 0.6 | 0.4 | 0.800000 | 1.333333 | 0.10 | 2.0 | |
| **15** | (Patriot) | (Sixth Sense, Gladiator) | 0.6 | 0.5 | 0.4 | 0.666667 | 1.333333 | 0.10 | 1.5 | |
| **0** | (Sixth Sense) | (Gladiator) | 0.6 | 0.7 | 0.5 | 0.833333 | 1.190476 | 0.08 | 1.8 | |
| **1** | (Gladiator) | (Sixth Sense) | 0.7 | 0.6 | 0.5 | 0.714286 | 1.190476 | 0.08 | 1.4 | |
| **2** | (Sixth Sense) | (Patriot) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |
| **3** | (Patriot) | (Sixth Sense) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |
| **12** | (Gladiator, Patriot) | (Sixth Sense) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |
| **13** | (Sixth Sense) | (Gladiator, Patriot) | 0.6 | 0.6 | 0.4 | 0.666667 | 1.111111 | 0.04 | 1.2 | |

In [10]:

```
plt.scatter('support','confidence',data=rules)
```

Out[10]:

```
<matplotlib.collections.PathCollection at 0x25e8e9d4a30>
```

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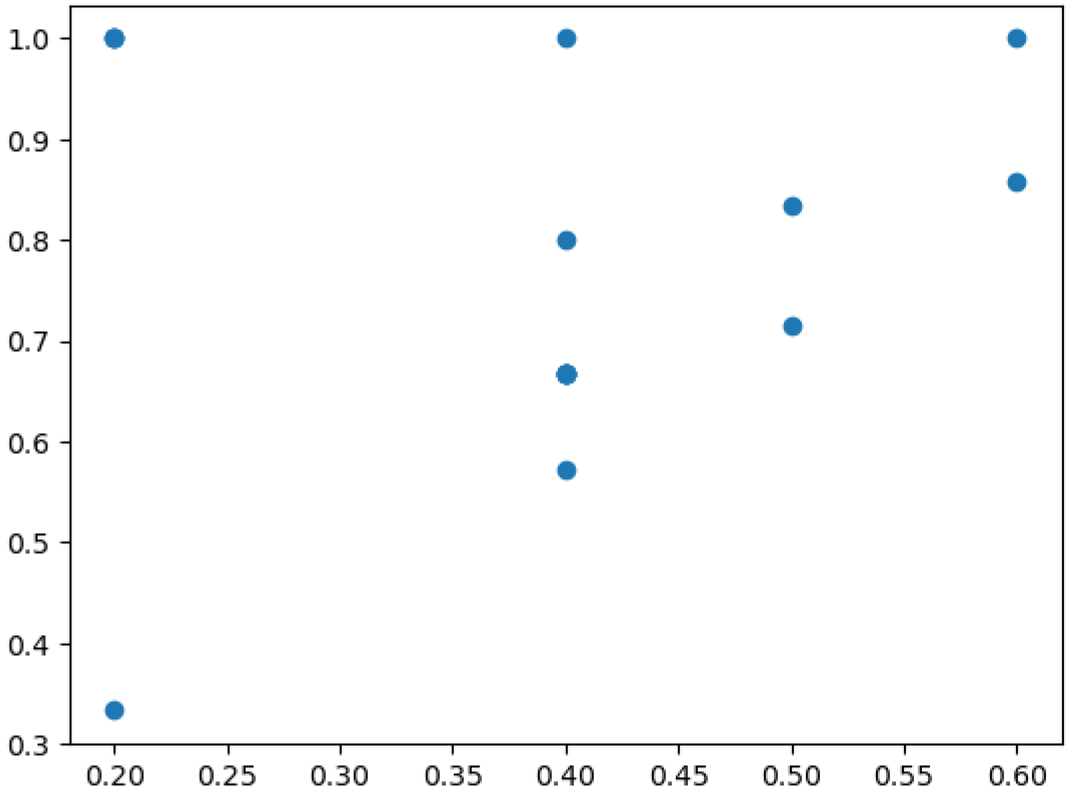

In [11]:

```
frequent_itemsets = apriori(movie, min_support=0.5, use_colnames=True)
frequent_itemsets
```

```
C:\Users\ROHIT\anaconda3\lib\site-packages\mlxtend\frequent_patterns\fpcommon.py:109: De
precationWarning: DataFrames with non-bool types result in worse computationalperformanc
e and their support might be discontinued in the future.Please use a DataFrame with bool
type
  warnings.warn(
```

Out[11]:

| | support | itemsets |
|---|---|---|
| **0** | 0.6 | (Sixth Sense) |
| **1** | 0.7 | (Gladiator) |
| **2** | 0.6 | (Patriot) |
| **3** | 0.5 | (Sixth Sense, Gladiator) |
| **4** | 0.6 | (Gladiator, Patriot) |

In [12]:

```
rules1 = association_rules(frequent_itemsets, metric="lift", min_threshold=1)
rules1
rules1.sort_values('lift',ascending = False)
```

Out[12]:

| | antecedents | consequents | antecedent support | consequent support | support | confidence | lift | leverage | conviction | zha |
|---|---|---|---|---|---|---|---|---|---|---|
| **2** | (Gladiator) | (Patriot) | 0.7 | 0.6 | 0.6 | 0.857143 | 1.428571 | 0.18 | 2.8 | |
| **3** | (Patriot) | (Gladiator) | 0.6 | 0.7 | 0.6 | 1.000000 | 1.428571 | 0.18 | inf | |
| **0** | (Sixth Sense) | (Gladiator) | 0.6 | 0.7 | 0.5 | 0.833333 | 1.190476 | 0.08 | 1.8 | |
| **1** | (Gladiator) | (Sixth Sense) | 0.7 | 0.6 | 0.5 | 0.714286 | 1.190476 | 0.08 | 1.4 | |

In [13]:

```
rules1.sort_values('lift',ascending = False)
```

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Out[13]:

| | antecedents | consequents | antecedent support | consequent support | support | confidence | lift | leverage | conviction | zha |
|---|---|---|---|---|---|---|---|---|---|---|
| **2** | (Gladiator) | (Patriot) | 0.7 | 0.6 | 0.6 | 0.857143 | 1.428571 | 0.18 | 2.8 | |
| **3** | (Patriot) | (Gladiator) | 0.6 | 0.7 | 0.6 | 1.000000 | 1.428571 | 0.18 | inf | |
| **0** | (Sixth Sense) | (Gladiator) | 0.6 | 0.7 | 0.5 | 0.833333 | 1.190476 | 0.08 | 1.8 | |
| **1** | (Gladiator) | (Sixth Sense) | 0.7 | 0.6 | 0.5 | 0.714286 | 1.190476 | 0.08 | 1.4 | |

In [14]:

```
rules1[rules.lift>1]
```

```
C:\Users\ROHIT\AppData\Local\Temp\ipykernel_16808\2275511782.py:1: UserWarning: Boolean
Series key will be reindexed to match DataFrame index.
  rules1[rules.lift>1]
```

Out[14]:

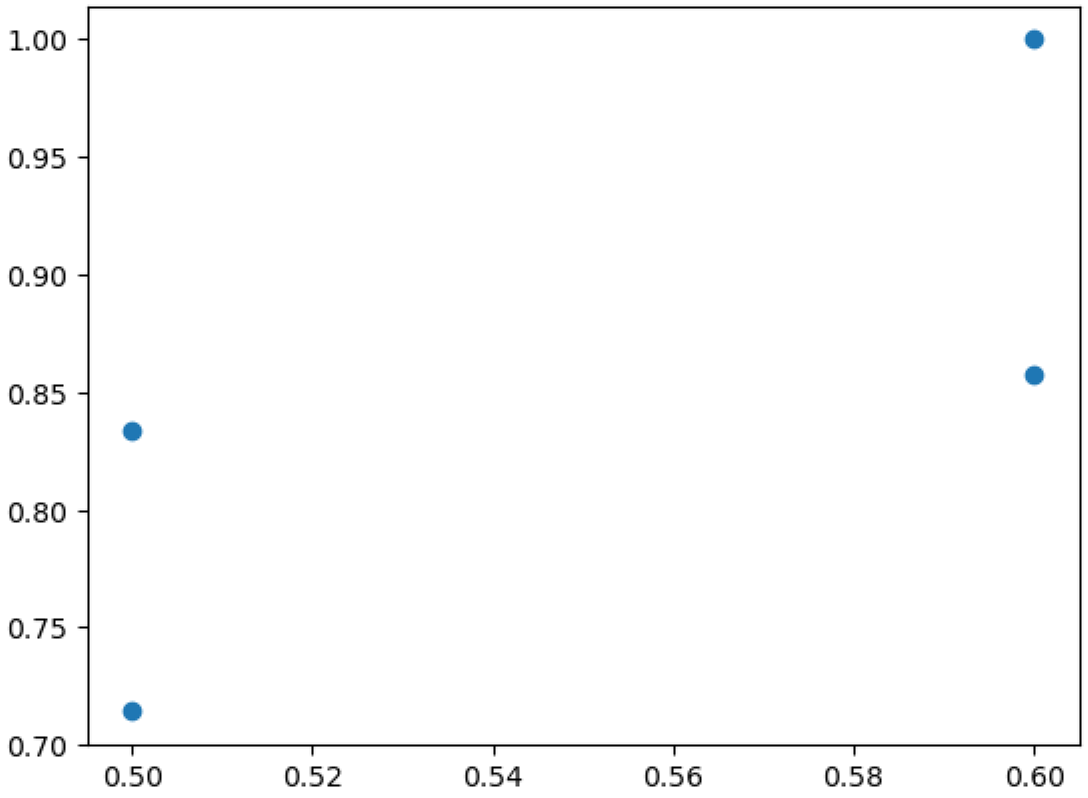
| | antecedents | consequents | antecedent support | consequent support | support | confidence | lift | leverage | conviction | zha |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | (Sixth Sense) | (Gladiator) | 0.6 | 0.7 | 0.5 | 0.833333 | 1.190476 | 0.08 | 1.8 | |
| **1** | (Gladiator) | (Sixth Sense) | 0.7 | 0.6 | 0.5 | 0.714286 | 1.190476 | 0.08 | 1.4 | |
| **2** | (Gladiator) | (Patriot) | 0.7 | 0.6 | 0.6 | 0.857143 | 1.428571 | 0.18 | 2.8 | |
| **3** | (Patriot) | (Gladiator) | 0.6 | 0.7 | 0.6 | 1.000000 | 1.428571 | 0.18 | inf | |

In [15]:

```
plt.scatter('support','confidence',data=rules1)
```

Out[15]:

```
<matplotlib.collections.PathCollection at 0x25e8e26c4c0>
```



In [ ]:

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