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Using Association Rules to Sell PEP

**Executive Summary:**

Understanding your target customer for the new personal equity plans (PEP) can mean more sales for the bank. By generating association rules from previous sales data, we can see what type of person or household is likely to buy a PEP and target them with incentives or advertising. Our a-rules analysis yielded hundreds of rules only the most insightful of which are included in this report. We selected five interesting rules (in the table below) from the sets to help create a detailed profile of our potential customer. The first three rules we used to establish the type of person who bought the PEP previously. From our rules we can see that this type of person is very likely to have one or more children and have an active savings account. Of all these predictors the strongest is the presence of one or more children which is an aspect present in all three of our rules. Additionally, we can see that despite not having a mortgage many people are still planning their future finances with our PEP. Our final two rules describe the customers who did not buy the PEP despite having an active savings account and being married. After looking at those who did not buy the PEP a trend becomes clear: those with children are more likely to buy a PEP. This trend makes sense because as someone becomes a parent they are planning more for the future to secure their family and children’s comfort. Therefor PEP’s should be heavily marketed toward new families or potential new families (married people with or without a mortgage and 0 children). Finally, our fifth rule shows the demographic differences by region: we can see that inner-city couples did not purchase the PEP so perhaps we should lower the fee’s or incentivize the PEP based on where people live to obtain an entirely new set of customers like those living on a fixed income or in the inner city.

**Top Five Interesting Rules:**

1. children='(0.9-1.2]' save\_act=YES current\_act=YES 73 ==> pep=YES 63 conf:(0.86)

**Confidence: (0.86) Lift: (1.16) Minimum Support: (0.1)**

1. children='(0.9-1.2]' mortgage=NO 84 ==> pep=YES 71 conf:(0.85)

**Confidence: (0.85) Lift: (1.18) Minimum Support: (0.1)**

3. married=YES children='(0.9-1.2]' 89 ==> pep=YES 74 conf:(0.83)

**Confidence: (0.58) Lift: (1.20) Minimum Support: (0.1)**

4. married=YES save\_act=YES current\_act=YES 206 ==> pep=NO

**Confidence: (0.44) Lift: (1.27) Minimum Support: (0.1)**

5. sex=FEMALE region=INNER\_CITY married=YES 84 ==> pep=NO 60 conf:(0.71)

**Confidence: (0.71) Lift: (1.40) Minimum Support: (0.1)**

**Methodology:**

**Preprocessing:**

For this analysis we used the Apriori algorithm built into the Weka Explorer application. The first step in conducting our analysis was to preprocess the data using the Weka preprocess function filter ‘Discretize’. Because we cannot use numerical data for association rules mining we must use the discretize filter to help convert numerical data into nominal data.

**Parameters:**

Following the preprocessing steps, we exported our data into Weka’s preferred arff format and loaded it back into a new instance of Weka Explorer. Experimenting with multiple settings our first trial generated a list of the top 10 rules. By lowering our minimum accepted confidence to 0.5 and increasing the total output count to 100 we were able to create a list of 100 rules. From these rules we selected five interesting and strong rules which could help our client to sell more personal equity packages. A screenshot of the parameters used can be seen below.



Figure - Apriori Settings

**Results:**

Analyzing our top a-rules results we can try to identify some trends in those who purchased the PEP and those who did not. As highlighted in the executive summary we were able to better understand reasons why someone chooses to purchase or not purchase a PEP. The major indicators for those who purchased a PEP seem to be the presence of one or more children in the household, this could mean that people are viewing PEPs as a way to plan for their children’s future.

**Conclusion:**

While more than five rules could be analyzed in the future it was a good amount to use to begin to identify unapparent trends. By understanding who bought PEP’s and who didn’t we can decide what characteristics pushed someone to buy a PEP. Using a-rules to realize trends like, people with children are more likely to buy the PEP, allows the bank to incentive and modify the PEP to target both types of customers: those with and without children.