**Performance Assessment: Task 3**

**A1. Proposal of Question**

My research question for this performance assessment is, “Can market basket analysis be applied to our medical data set to determine which medications are most often prescribed together?”

**A2. Defined Goal**

The goal of this analysis is to use market basket analysis to determine the top three medication pairings based on the lift value of the computed association rules table.

**B1. Explanation of Market Basket**

For the selected medical data set, market basket analysis is a data mining technique which examines medications that are prescribed together. This is accomplished by first converting the data into a Boolean list via transaction encoding. Then, the Apriori algorithm identifies frequent pairings in the data set. An association rules table classifies the pairings based on different metrics such as lift, support, and confidence. These metrics can help medical companies understand patterns in the types of medications patients are prescribed.

**B2. Transaction Example**

Each row in the original data set represents a transaction. For example, Row 4 of the original data set shows that the patient was prescribed Citalopram, Benicar, and Amphetamine Sale Combo XR.

**B3. Market Basket Assumption**

One assumption of market basket analysis is that every transaction is independent and does not correlate with other transactions.

**C1. Transforming the Data Set**

See ‘D212\_T3\_MV\_MBA\_clean.csv’ file for copy of cleaned data set. See below for data transformation code:

A screen shot of a computer program

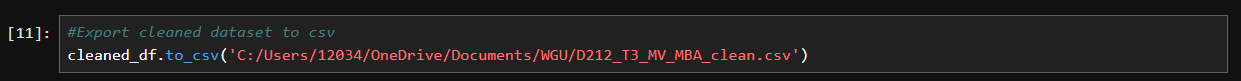
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Description automatically generatedC2. Code Execution**

See below for Apriori algorithm code:

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Description automatically generated**C3. Association Rules Table**

See below for support, life, and confidence values of the association rules table:

A screenshot of a computer program

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**C4. Top Three Rules**

For this market basket analysis, the top three rules generated by the Apriori algorithm based on the lift value are shown below:

A screenshot of a computer program

Description automatically generated These can be explained as follows:

1. Patients prescribed Carvedilol were 2.29 times more likely to also be prescribed Lisinopril
2. Patients prescribed Lisinopril were 2.29 times more likely to also be prescribed Carvedilol
3. Patients prescribed Glipizide were 2.00 times more likely to also be prescribed Carvedilol

**D1. Significance of Support, Lift, and Confidence Summary**

Support is significant because it provides the percentage of transactions that occurred with the antecedents and consequents. According to our results, 5.97% of all transactions included both Abilify and Carvedilol. Lift is significant because it provides that likelihood of two medications being prescribed together. According to our results, patients prescribed Carvedilol were 2.29 times more likely to also be prescribed Lisinopril. Confidence is significant because it provides the percentage of transactions with the antecedents that also included the consequents. According to our results, 45.6% of transactions with Metformin also included Abilify.

**D2. Practical Significance of Findings**

Based on the findings from the analysis, there are medication pairings with a strong likelihood of being prescribed together. These findings are significant because it can allow medical providers to see the co-occurring conditions of their patients. Since medications can also interact with one another, it may also highlight pairings that work well together.

**D3. Course of Action**

Based on the results of this analysis, we can see that patients prescribed Carvedilol were 2.29 times more likely to also be prescribed Lisinopril. I recommend that the hospital examines the outcomes of its patients that are prescribed these two medications. If this group of patients is seeing better outcomes than other patients receiving treatment for similar conditions, it could lead to a change in treatment plans for future patients, and better outcomes for all patients.

**E. Panopto Video of Code/Programs**

See ‘D212 Task 3- Vicente Panopto’ for link to Panopto video recording.

**F. Sources for Third-Party Code**

Kamara, Kesselly. *D212 Task 3 Overview & Tutorial.* Retrieved December 7, 2024.

**G. Sources**

Kamara, Kesselly. *D212 Task 3 Overview & Tutorial.* Retrieved December 7, 2024.