Vol. 06, No. 4 (2024) 1523-1530, doi: 10.24874/PES06.04.011

Proceedings on Engineering Sciences

www.pesjournal.net

MARKET 4.0: EXPLORING MARKET BASKET ANALYSIS (MBA) ALGORITHMS FOR CO-MARKET INTELLIGENT APPLICATION

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Received 12.03.2024.
Received in revised form 09.07.2024.
Accepted 31.07.2024.
UDC – 004.021:339.13

Keywords:

Intelligent Application, MBA (Market Basket Analysis), Apriori Algorithm, FP-Growth Algorithm, Association Rule Mining

A B S T R A C T

This study was initiated with thorough investigation to determine the optimal Market Basket Analysis (MBA) algorithms for the Co-Market Intelligent Application using Association Rule Mining (ARM). An exploration evaluation was conducted to assess their suitability for integration into the Co-Market Intelligent application framework, focusing on three product categories: coconut non-food products, coconut food products, and sarakat products. Employing a model for Apriori with a minimum support of 0.2 and minimum confidence of 0.5 yielded remarkably high accuracies of 140% for coconut non-food and 72% for sarakat products while a model with minimum support of 0.2 and minimum confidence of 0.7 yielded 92% lift ratio for food products. For FP-Growth, a model with minimum support of 0.1 and minimum confidence of 0.5 demonstrated the best performance, achieving accuracies of 92% and 42% for coconut non-food and food products respectively. The findings of this study suggest that the selection of either the Apriori or FP-Growth algorithm, or a combination of both, tailored to the specific product categories, can significantly enhance the efficiency and accuracy of Market Basket Analysis in the Co-Market Intelligent Application, providing valuable insights for optimized decision-making and strategic planning in the targeted market sectors.

1. INTRODUCTION

Numerous applications, including online marketing, recommendation systems, information security, etc., use market basket analysis. It has become one of the most popular topics among research groups in recent years since it is commonly used by e-commerce site that makes recommendations for related products or layouts based on regularly purchased items in online store and sets consumer index prices in accordance with customer desires (Khedkar & Kumari, 2021; Tsygankov et al. 2023). By discovering which products consumers frequently purchase together, market may broaden its marketing techniques through examining client purchasing behaviors and patterns (Efrat et al., 2020; Juliandiny et al., 2022; Lekireddy et al., 2023). For every business to survive in the competition of business world, there are various options, including enhancing product quality and introducing new product categories (Idris et al., 2022; Solovyov et al., 2023; Sozinova et al., 2023). There are number of ways to address these goals, one of which is through utilizing Market Basket Analysis to analyze transaction data (Efrat et al., 2020; Idris et al., 2022; Juliandiny et al., 2022; Gamaliel et al., 2023; Konina 2024). But because the customer demands

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vary with regard to seasons and time, market basket analysis is challenging and should be explored rigorously.

According to (Kurniawan et al., 2017), MBA-enabled business entity has the most essential component for selecting the placement of items and creating sales promotions for different consumer categories in order to boost client loyalty and, therefore, more revenue. This is further elaborated on the studies of (Lekireddy et al., 2023) and (A Zamil et al., 2020), that integrating market basket analysis approaches either in physical or online stores are the secrets that encourage consumers to purchase. This has grown to be a thriving component for a sector of the economy that employs market-based analysis patterns to explore data for consumer insights and to boost brand performance. Considering these thoughtful insights, our research intends to investigate several MBA Algorithms and evaluate their applicability and effectiveness within the constraints of Co-Market App, an intelligent application for coconut and sarakat products.

The performance, functionality, and usability of any AI-Driven application in marketing are significantly impacted by the choice of the best Market Basket Analysis (MBA) algorithms that fit to an application considering the type of retail store and the transactional data. The right decision to fill in the gap is to consider not only on the technical feature but the potential of an intelligent application embedded with MBA to evolve, adjust, and deliver correct insights from the transaction data that will be collected.

This study reinforces the Co-Market Intelligent App, aiming to enhance the market viability and marketing strategies for coconut and sarakat products from Northwestern Cagayan, Philippines, supporting the economic growth of coconut farmers and women sarakat weavers. The optimized intelligent web app, incorporating tailored Market Basket Analysis algorithms, is poised to advise on effective marketing techniques and optimal production timing, empowering farmers and weavers to proactively sustain economic stability. By leveraging machine learning in marketing, this initiative not only boosts the efficiency and sustainability of coconut and sarakat production but also fosters the promotion of local quality products, contributing to consumer welfare and the sustainable development of small and medium-sized businesses in this crucial industry globally.

Thus, the desire to integrate AI-Driven methodologies into the Co-Market Intelligent App served as the driving force for this study. Finding the appropriate MBA algorithm for Co-Market App presents a significant research opportunity because there are so many different MBA algorithms accessible, each with different strengths, shortcomings, and utilization. This investigation will not only strengthen the efficacy and performance of the Co-Market Intelligent App, but also contribute substantial improvements to the wider implementation of MBA algorithms in marketing field.
Finding the best Market Basket Analysis algorithm(s) for an intelligent software to advertise and market coconut and sarakat products is the research challenge at hand. The comprehensive investigation, assessment, and comprehension of the application of various MBA Algorithms in the context of Co-Market Intelligent App are necessary to address this particular problem. As proven by (Adi Bhat, 2019), a systematic review and exploration of AI-Driven approaches in marketing proves that AI has significant impact for entrepreneurship, and that it particularly benefits entrepreneurs in four (4) areas: performance, decision-making, opportunity, and lastly, education and research.

The main purpose of this study is to identify the market basket analysis (MBA) algorithm(s) that are most suited to the exceptional features and aims of the intelligent application. In particular, it seeks to gather and preprocess transaction data from coconut farmers and women sarakat weavers' enterprises for MBA algorithm evaluation; assess and contrast the performance of various MBA algorithms; and make an excellent data-driven conclusion based on evaluation of results of this exploration.

2. METHODOLOGY

The methodology used in this study is organized around a comprehensive five-part process, with each stage carefully planned to guarantee a systematic and thorough inquiry. These steps, which make use of a variety of data gathering and analysis approaches, have been carefully selected to offer a comprehensive knowledge of the research topic at hand. This study intends to uncover detailed insights by seamlessly integrating these five essential stages as shown in Figure 1, significantly adding to the body of information already known in marketing coconut and sarakat products. Each phase will be explained in more detail in the sections that follow, with an emphasis on how each one contributes to attaining the goals of this study.

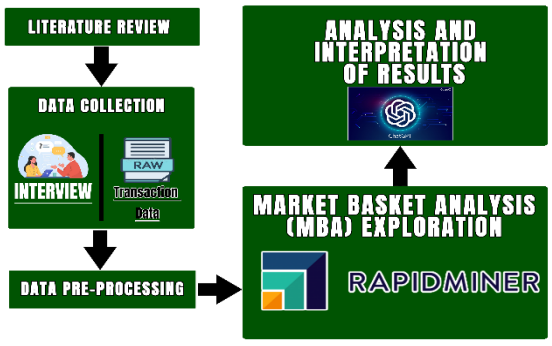

Figure 1. Exploration of MBA Algorithms for Co-Market Intelligent Application

2.1 Comprehensive Literature Review

In order to better comprehend Market Basket Analysis (MBA) applications in the context of intelligent web application, particularly with regard to advertising and marketing coconut and sarakat products, the research started with an extensive literature analysis. This study focused on several MBA algorithms' applications in AI and offered a thorough evaluation of the articles already published as shown in Table 1.

The main objective of the systematic study was to determine the prevalence and effectiveness of various MBA algorithms, as outlined in the scientific literature. The final selection of MBA algorithms for deeper investigation was influenced by two factors: the frequency of their application across various research (as seen by the multiple times they were mentioned in scholarly papers), as well as their proven correctness in pertinent AI-driven marketing situations.

2.2 Data Collection

Data collection is an essential step to gather accurate data in the research process using an established procedure (Adi Bhat, 2019). In this study, the researchers obtained transaction data of selling coconut and sarakat products to the selected coconut farmers, coconut by-products producers and women sarakat weavers. At the same time, comprehensive evidences and information about several Market Basket Analysis (MBA) algorithms were also gathered from publish researches with a focus on their specific requirements, benefits and potential drawbacks. As shown in Figure 2, sample transaction data collected ready for preprocessing.

	A	B	C	D	E
	Date	TID	Product	Category	Sub Category
	7/10/2023	1	Buko Macarons, Buko Juice, Buko Pie	Coconut Product	Food Product
	7/13/2023	2	Buko Juice, Special Bibingka, Buko Jam	Coconut Product	Food Product
	7/15/2023	3	Nata De Coco, Mature Coconut, Coconut Vinegar	Coconut Product	Food Product
	8/1/2023	4	Coco Lampshade(sm), Chandellier, Soap Dish	Coconut Product	Non-Food Product
	8/5/2023	5	Coco Coin Bank, Coco Ballpen Stand	Coconut Product	Non-Food Product
	8/10/2023	6	Pickled Nata	Coconut Product	Food Product
	9/17/2023	7	Pickled Nata, Young coco fruit, Sweetend Nata	Coconut Product	Food Product
	9/20/2023	8	Coco Vinegar, Coco Jam, Nata De Coco, Buko Juice	Coconut Product	Food Product
	9/27/2023	9	Coconut Seedling	Coconut Product	Non-Food Product
	10/13/2023	10	Sarakat Eco-Bag (small), Sarakat Eco-Bag (medium)	Sarakat Product	Non-Food Product

Figure 2. Sample Transaction Dataset Collected from coconut farmers, producers, and sarakat weavers

2.3 Data Preprocessing

One surprising finding is that, an important portion of the machine learning (ML) process is devoted to gathering and preparing data. In the absence of high-quality data, even the best machine learning algorithms are ineffective (Whang et al., 2023). So, data normalization and data cleaning were done at this stage to ensure a consistent scale and get rid of any errors or discrepancies providing a solid basis for the later stages of the exploration.

2.4 Market Basket Analysis (MBA) Algorithm Exploration

The MBA seeks to identify patterns that co-occur when similar products are purchased at the same time as well as commonalities between those products (Sharma & Babbar, 2023). This phase entailed choosing a various type of MBA algorithms for analysis. The recommended algorithms were put into work on the pre-processed dataset, and their performance was then assessed and compared using the right precision parameters. This procedure helped to identify the best suited MBA algorithm that will be embedded into the Co-Market Intelligent App.

2.5 Analysis and Interpretation of the Results

Upon completion of the MBA Algorithm exploration, the researchers proceeded to analysis and interpretation. This section highlights the analysis and understanding of the data we acquired from our research stages. The data, which has undergone meticulous gathering and processing, is subjected to a number of analytical techniques with the goal of revealing patterns, trends, and underlying linkages. These results are then interpreted in light of our research goals, offering vital details on marketing coconut and sarakat products.

3. RESULTS AND DISCUSSIONS

An extensive point of view on the use of Market Basket Analysis (MBA) algorithms in the field of marketing for recommender system, was obtained from the systematic literature review. The ten (10) researches that were considered as the subject of the review provided unique perspectives on the issue at hand, demonstrating the broad range and potential of MBA algorithms used in this context.

It is very clear on Table 1 that FP-Growth and Apriori Algorithms are the two most widely used MBA algorithms in the field of marketing. This conclusion is based on a systematic review of ten (10) research articles.

The findings revealed that researchers have an excellent level of confidence in the ability of these algorithms to perform jobs pertaining to marketing applications. FP-Growth have showed very excellent performance in tasks linked to determination of customer purchasing pattern, as proven in the articles under evaluation. In this regard, an FP-Growth and Apriori were used and compared in the study by (Aldino, Pratiwi, et al., 2021)to discover more information helping business to grow and making good decisions, with an outstanding level of accuracy of 217%. Similar to this, other research comparing FP-Growth and Apiori algorithm, like the one conducted by (Riyadi et al., 2019), having both 120.63% and 130.75% level of accuracy, respectively. These results urged the researchers to explore more on these two (2) algorithms.

Table 1. Detailed Summary of the Ten (10) Published Articles

NO.	AUTHOR(S)	TITLE OF THE ARTICLE	MBA ALGORITHM USED	PERFORMANCE EVALUATION METRICS	
				COMPUTE TIME (S)	LIFT RATIO
1	(Aldino, Pratiwi, et al., 2021)	Comparison of Market Basket Analysis to Determine Consumer Purchasing Patterns Using Fp-Growth and Apriori Algorithm	Apriori FP-Growth	30 6	46% 217%
2	(Nurmayanti et al., 2021)	Market Basket Analysis with Apriori Algorithm and Frequent Pattern Growth (Fp-Growth) on Outdoor Product Sales Data	Apriori FP-Growth		77.4% 75%
3	(Sani et al., 2022)	Data Mining on Sales Transaction Data Using the Association Method with Apriori Algorithm	Apriori		83.3%
4	Santoso, M. H. (2021).	Application of Association Rule Method Using Apriori Algorithm to Find Sales Patterns Case Study of Indomaret Tanjung Anom	Apriori		80%
5	(Shambharkar et al., 2019)	Study on Market Basket Analysis using Apriori and Classification Rule Based Association Algorithm	Apriori CRBA		70% 80%
6	(Hidayat et al., 2019)	Implementation and comparison analysis of apriori and fpgrowth algorithm performance to determine market basket analysis in Breiliant shop	Apriori FP-Growth	3634 36	
7	(Gayathri, 2017)	Performance Comparison OF Apriori, ECLAT and FP-Growth Algorithm for Association Rule Learning	Apriori FP-Growth ECLAT	90 86 62.5	
8	(Of et al., 2010)	Efficiency Comparison on Eclat, FP-Tree, and Top-Down Algorithms in Search L-Itemsets	ECLAT FP-Tree Top-Down	14 48 280	
9	(Aldino, Rahma, et al., 2021)	Comparative Analysis of Apriori Algorithm and Hash-Based Algorithm in Market Basket Analysis	Apriori Hash-Based		92.80% 107.76%
10	(Riyadi et al., 2019)	Analysis of Customers Purchase Patterns of E-Commerce Transactions Using Apriori Algorithm and Sales Forecasting Analysis with Weighted Moving Average (WMA) Method	Apriori FP-Growth		130.75% 120.63%

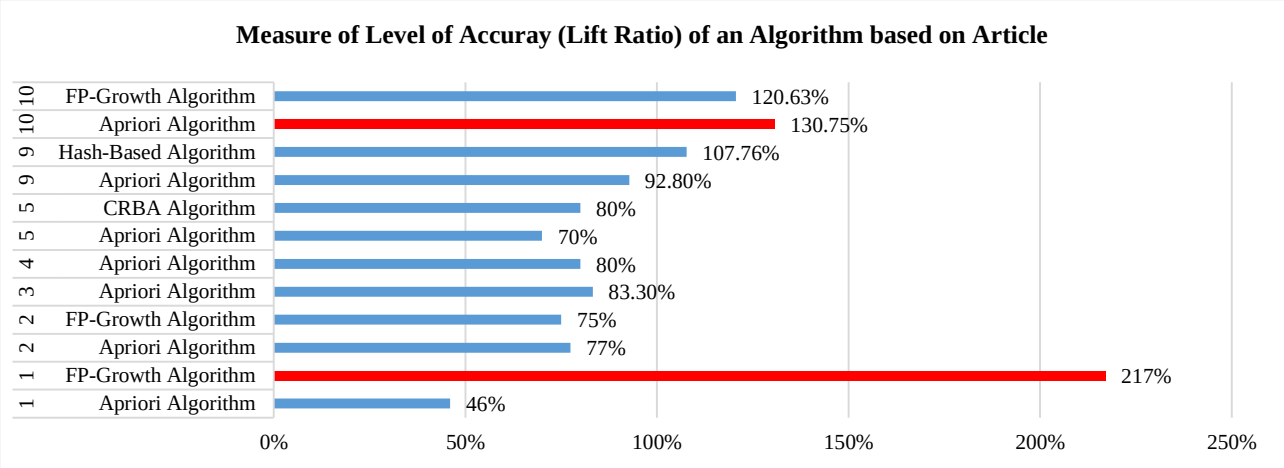

Figure 3. Measure of Accuracy by an MBA Algorithm as concluded by author(s) of an article

Both Apriori and FP-Growth were then considered possible algorithm options for the exploration analysis that was initially to be performed and then applied to CO-MARKET Application. Then, the best choice was based on additional validation experiments utilizing the collected and preprocessed dataset meant for the CO-MARKET application. The strategy for the development of the said application was subsequently offered based on which one eventually produced the highest level of accuracy in this exploration.

3.1 MBA Algorithm Exploration

The collected customer transaction data from coconut farmers, coconut by product producers and women sarakat weavers totaled to 1,451 transactions for the period of January 2023 – October 2023. It was filtered to 3 categories namely: Coconut Non-Food Products, Coconut Food Products and Sarakat Products. Out of 1,027 transactions, it was filtered and preprocess to 451 customer transactions for Coconut Non-Food Products, 501 customer transactions for Coconut Food Products and 499 customer transactions for Sarakat Products. These 3 preprocessed datasets were explored with Apriori Algorithm and FP-Growth Algorithm using RapidMiner as shown on the Figures 4 and 5 below.

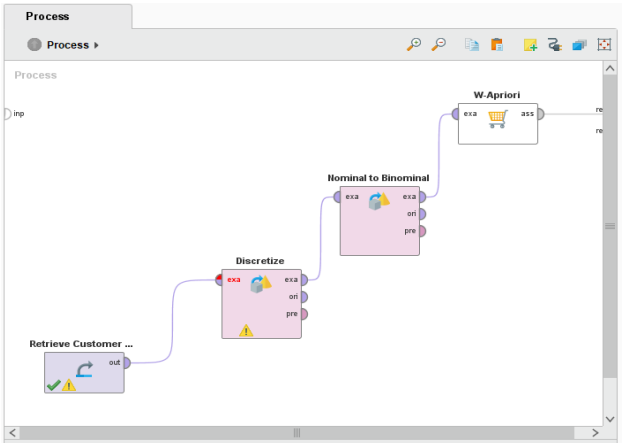

Figure 4. Apriori Algorithm execution in RapidMiner

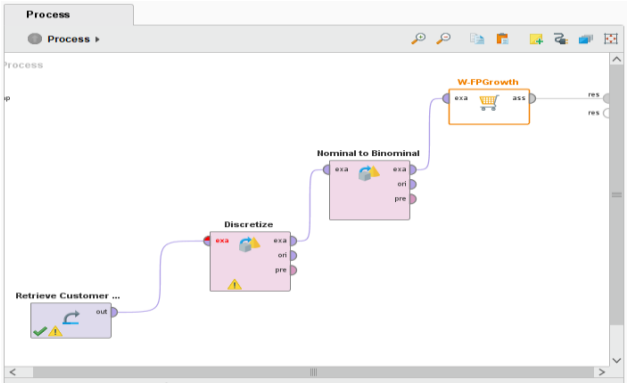

Figure 5. FP-Growth Execution in RapidMiner

As shown in Table 2, the researchers explored the Apriori algorithm in the context of Market Basket Analysis using Association Rule Mining (ARM) to determine the frequent itemset purchased intended for the development of CO-MARKET App. Considering the preprocessed datasets categorized in 3 products namely Coconut Non-Food Products, Coconut Food Products and Sarakat Products, three (3) models were employed in each category having set of parameters like minimum support and minimum confidence as the most relevant parameters in Association Rule Mining. Results were also presented as basis in selecting the best fitted model in each category. In this regard, for the Coconut Non-Food Products category, the best model selected by the researchers is a model having 104% level of accuracy (lift ratio) of the top association rule and having 6 association rules. Moreover, for the Coconut Food Products category, the best model has 93% level of accuracy and produce 92 association rules. Lastly, for the category of Sarakat Products, a model with 72% level of accuracy and 82 association rules has been considered.

Support is a metric for how frequently a dataset contains an itemset (a collection of items). Additionally, confidence expresses the probability that an association rule will hold true. It is determined by how frequently the rule has been proven to be accurate in the data. As shown in Figure 6, with the minimum support of 20% and minimum confidence of 50%, for an item set to be deemed common in this dataset, there must be at least 90 instances (transactions) of that item set and the algorithm is only considering a rule(s) with at least 50% likely to be true, respectively.

3.2 APRIORI Algorithm Exploration

Table 2. Apriori Algorithm exploration using 3 different models

Products Category	Model No.	Performance Evaluation Metrics Parameters			No. of Association Rules
		Minimum Support	Minimum Confidence	Level of Accuracy (Lift Ratio) of top rule	
Coconut Non-Food Products	1	0.2	0.5	140%	6
	2	0.2	0.6	140%	1
	3	0.2	0.7	0	0
Coconut Food Products	1	0.2	0.5	60%	227
	2	0.2	0.6	60%	159
	3	0.2	0.7	93%	92
Sarakat Products	1	0.2	0.5	72%	82
	2	0.2	0.6	72%	12
	3	0.2	0.7	72%	1

In simple terms, as shown in Figure 6, the model is looking for frequent product pairings that individuals make purchases of. It looks for combinations where there is a minimum 50% chance that one item will be purchased if another is purchased and takes into account combinations that occur in at least 20% of shopping visits. According to the most accurate rule it discovered, customers who purchase a "Coco Soap Dish" are quite likely to also purchase a "Coco Coin Bank."

W-Apriori (Coconut Non-Food Products)

```
Apriori
=======
Minimum support: 0.2 (90 instances)
Minimum metric <confidence>: 0.5
Best rules found:
 1. Coco Soap Dish=TRUE 145 ==> Coco Coin
Bank=TRUE 90    conf:(0.62)
 2. Coco Ballpen Stand=TRUE 160 ==> Coco
Lampshade=TRUE 92    conf:(0.57)
 3. Coco Coir=TRUE 183 ==> Coco Lampshade=TRUE 99
conf:(0.54)
```

Figure 6. Result of the best model for Coconut Non-Food Products using Apriori Algorithm

Similarly, for coconut food products category model as figured out in Figure 7, there must be at least 100 transactions for an item set to be deemed common and at least 70% likely to be true. Hence, the model shows the top association rule, which implies that there is a very high probability (96%) that a buyer also purchased Coconut Vinegar if they also purchased Nata De Coco, Pickled Nata, and Coconut Syrup. This means that these products have a significant connection with consumer purchasing.

In this category, there is 70% confidence that if a customer bought a Sarakat Star Bag, they will also include Sarakat Solehiya Bag in the basket. This conclusion is evident on the result of the model shown in Figure 8.

W-Apriori (Coconut Food Products)

```
Apriori
=======
Minimum support: 0.2 (100 instances)
Minimum metric <confidence>: 0.7

Best rules found:
 1. Nata De Coco=TRUE Pickled Nata=TRUE Coconut
Syrup=TRUE 112 ==> Coconut Vinegar=TRUE 107
conf:(0.96)
 2. Coconut Vinegar=TRUE Sweetend Nata=TRUE
Coconut Syrup=TRUE 108 ==> Pickled Nata=TRUE 103
conf:(0.95)
 3. Nata De Coco=TRUE Coconut Vinegar=TRUE
Sweetend Nata=TRUE 111 ==> Pickled Nata=TRUE 104
conf:(0.94)
```

Figure 7. Result of the best model for Coconut Food Products using Apriori

W-Apriori (Sarakat Products)

```
Apriori
=======
Minimum support: 0.2 (100 instances)
Minimum metric <confidence>: 0.5
Best rules found:

 1. Star Bag=TRUE 196 ==> Solehiya Bag=TRUE 138
conf:(0.7)
 2. Solehiya Bag=TRUE 202 ==> Star Bag=TRUE 138
conf:(0.68)
 3. Lunch Bag Double=TRUE 181 ==> Lunch Bag
Tripple=TRUE 116    conf:(0.64)
```

Figure 8. Result of the best model for Sarakat Products using Apriori Algorithm

3.3 FP-GROWTH Algorithm Exploration

On the other hand, the researchers also implemented FP-Growth algorithm using the same preprocessed dataset categorized in three (3) main products for later comparison. In Table 3, it shows the best model in each product category. For coconut non-food products, the best model uses minimum support of 0.1, minimum confidence of 0.5 as parameters relevant on the subject matter at hand resulted to 42% level of accuracy with 12 association rules. Similarly, for coconut food products, same parameters resulted a higher level of accuracy (92%) and produces 11 association rules was considered to be the best model by the researchers. Lastly, for sarakat products, model 3 with minimum support of 0.1 and minimum confidence of 0.7 was on top with a surprising 114% level of accuracy (lift ratio) with 27 association rules in total. Detailed discussions come next.

W-FPGrowth (Coconut Non-Food Products)

```
FPGrowth found 12 rules (displaying top 3)

 1. [Coco Soap Dish=TRUE, Coco Chandellier =
TRUE=true]: 63 ==> [Coco Coin Bank=TRUE]: 50
<conf:(0.79)> lift:(2.1) lev:(0.06) conv:(2.8)
 2. [Coco Coir=TRUE, Coco Soap Dish=TRUE]: 71 ==>
[Coco Coin Bank=TRUE]: 49   <conf:(0.69)>
lift:(1.83) lev:(0.05) conv:(1.92)
 3. [Coco Coin Bank=TRUE, Coco Chandellier =
TRUE=true]: 75 ==> [Coco Soap Dish=TRUE]: 50
<conf:(0.67)> lift:(2.07) lev:(0.06) conv:(1.96)
```

Figure 9. Result of the best model for Coconut Non-Food Products using FP-Growth Algorithm

In its simplest form for Figure 9, the association rule (top 1) indicates that there is a high likelihood (79%) that a consumer will also purchase "Coco Coin Bank" if they purchase both "Coco Soap Dish and Coco Chandellier". Additionally, the lift value of 2.1 shows that when "Coco Coin Bank" is present in addition to "Coco Soap Dish" and "Coco Chandellier", its combined occurrence is around 2.1 times more common than when it isn't. This implies a favorable relationship between these things. The observed frequency of these events occurring together is 0.06 more frequently than would be anticipated if they were independent, according to the leverage value of 0.06.

W-FPGrowth (Coconut Food Products)

```
FPGrowth found 11 rules (displaying top 3)

 1. [Sweetend Nata=TRUE, Coconut Vinegar=TRUE]: 135
==> [Coconut Syrup=TRUE]: 108   <conf:(0.8)>
lift:(1.72) lev:(0.09) conv:(2.58)
 2. [Coco Vinegar=TRUE, Coconut Vinegar=TRUE]: 144
==> [Sweetend Nata=TRUE]: 108   <conf:(0.75)>
lift:(1.57) lev:(0.08) conv:(2.03)
 3. [Sweetend Nata=TRUE, Coco Vinegar=TRUE]: 157
==> [Coconut Vinegar=TRUE]: 108   <conf:(0.69)>
lift:(1.55) lev:(0.08) conv:(1.75)
```

Figure 10. Result of the best model for Coconut Food Products using FP-Growth Algorithm

For Figure 10, the association rule (top 1) of this model is telling us that if a customer buys both Sweetend Nata and Coconut Vinegar, there's a high likelihood (80%) that they will also buy Coco Vinegar. Additionally, the lift value of 1.72 indicates that the occurrence of Sweetend Nata and Coconut Vinegar together is about 1.72 times more likely when Coco Vinegar is also present compared to when it's not. This suggests a positive association between these items. The leverage value of 0.09 indicates that the observed frequency of these items occurring together is 0.09 higher than what would be expected if they were independent.

W-FPGrowth (Sarakat Products)

```
FPGrowth found 27 rules (displaying top 3)

 1. [Solehiya Bag=TRUE, Lunch Bag Tripple=TRUE]:
111 ==> [Star Bag=TRUE]: 87   <conf:(0.78)>
lift:(2) lev:(0.09) conv:(2.7)
 2. [Star Bag=TRUE, Double Fashion Bag=TRUE]: 98
==> [Solehiya Bag=TRUE]: 75   <conf:(0.77)>
lift:(1.89) lev:(0.07) conv:(2.43)
 3. [Solehiya Bag=TRUE, Double Folder Bag=TRUE]:
102 ==> [Star Bag=TRUE]: 78   <conf:(0.76)>
lift:(1.95) lev:(0.08) conv:(2.48)
```

Figure 11. Result of the best model for Sarakat Products using FP-Growth Algorithm

As figured out in Figure 11, the association rule (top 1) of this best model shows that if a customer buys both Solehiya Bag and Lunch Bag, there's a high confidence of 78% that they also include Star Bag in the shopping cart basket. Moreover, the lift value greater than one (1) means that the items or products in the rule is positively correlated, which in this case the lift is two (2). The conviction value of 2.7 measures a high degree to which the antecedent (Solehiya Bag and Luch Bag) implies the consequent (Star Bag).

Table 3. FP-Growth Algorithm exploration using 3 different models

Products Category	Model No.	Performance Evaluation Metrics Parameters			No. of Association Rules
		Minimum Support	Minimum Confidence	Level of Accuracy (Lift Ratio) of top rule	
Coconut Non-Food Products	1	0.1	0.5	42%	12
	2	0.1	0.6	42%	4
	3	0.1	0.7	42%	1
Coconut Food Products	1	0.1	0.5	92%	11
	2	0.1	0.6	92%	11
	3	0.1	0.7	92%	2
Sarakat Products	1	0.1	0.5	72%	80
	2	0.1	0.6	72%	12
	3	0.1	0.7	114%	27

4. CONCLUSIONS

In summary, systematic review uncovered that Apriori Algorithm and FP-Growth Algorithm stood out as the most commonly utilized MBA algorithms for Association Rule Mining (ARM) in marketing field, determining the frequent items set and frequent buying patterns of customers. Given their notable performance in the studies under review, both of these algorithms merited the researchers for additional scrutiny and experimentation within the framework of Co-Market Intelligent Application for marketing and advertising coconut and sarakat products.

In the exploration, both Apriori Algorithm and FP-Growth performed well considering the three (3) categories of products. In coconut non-food products, Apriori Algorithm performed best at 140% level of accuracy (lift ratio) while FP-Growth performed best at 114% level of accuracy on sarakat products. While both algorithms perform well on coconut food products with 92% and 93% level of accuracy. Hence, based on the result of the systematic review and following the MBA exploration, both Apriori and FP-Growth can be embedded to the Co-Market intelligent application taking into account the best performing model parameters in each of the three (3) product categories. It can significantly enhance the performance of the CO-Market intelligent application that can provide very good visions to optimized decision-making of farmers and weavers in the targeted market sectors.

Acknowledgement: We sincerely appreciate all of the help and advice we got while doing this study. My profound gratitude is extended to the Municipal Agriculture Office and Public Employment Service Office of Sanchez Mira, whose knowledge and support were crucial in determining the course of this investigation. We owe a special thanks to our family and friends for their unfailing support throughout this academic endeavor's hardships. Finally, we thank the participants whose willingness to share their data, allowing this study to be conducted.

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