ICEBM

The Fourth International Conference on
Entrepreneurship and Business Management

PROCEEDING

ISBN No: 9789799234544

"Building Sustainable Business Networks: The Role Of Entrepreneurs and Professionals"

Bangkok
Thailand

5-6
NOV 2015

Conference Venue:
Dusit Princess Hotel

Organized and hosted by:

UNTAR
Tarumanagara University

วิทยาลัยดุสิตธานี
DUSIT THANI COLLEGE

KUN SHAN UNIVERSITY
崑山科技大學

UNIVERSITI SAINS MALAYSIA

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ISBN : 978-979-9234-54-4

PREFACE

The International Conference of Entrepreneurship and Business Management (ICEBM) brings together researchers and practitioners to facilitate the discussion on various topic in the field of entrepreneurship and business management. This conference was organized by Tarumanagara University together with partner institutions. This year, the Fourth ICEBM is held in Bangkok in collaboration with: Dusit Thani College, Kun Shan University, Universiti Sains Malaysia, and Ciputra University. The focus of the Fourth ICEBM is Building Sustainable Business Networks: The Role of Entrepreneurs and Professionals.

In this information era, businesses are challenged by the fierce competition. The way firms and its stakeholders communicate are changing due to the development of the Internet. The Internet has created an open hyper-connected world where individuals or institutions are free to voice their opinions quick and easy. For instance, websites are considered as an additional communication field where firms and stakeholders interact. Extant research considers business networks as a prominent source of firms' performance. Academic researchers note that business practices increasingly discuss the terms "relationships" and "networks". Hence, it is prominent to develop sustainable business networks in order to answer the competition.

Each paper submitted to the Fourth ICEBM 2015 has gone through a stringent peer review process by members of the ICEBM Scientific Committee, comprising 39 reviewers from 17 different institutions and 10 different countries. A total of 61 papers have been accepted out of 79 papers and 123 abstracts submitted to the conference. The reviewing process of this year conference was on a two-step reviewing process. First, the abstract was submitted and reviewed. After notified the acceptance of the abstract, the author(s) was asked to submit the full paper. Then, the full paper was reviewed using double blind peer-review process. Finally, the author(s) submitted the revised version of the full paper.

These papers address diverse areas of application in entrepreneurship and business management. Starting from the field of accounting and finance, economics, marketing, and so forth through addressing a wide variety of theoretical and methodological approach. We hope that this book of proceedings could promote and stimulate further the discussion of practitioners and academics. Particularly on what research needed to be conducted to advance the body of knowledge in the field of entrepreneurship and business management, which could help firms deal with diverse issues.
Finally, we wish to acknowledge the support of the collaborating institutions, sponsors, scientific committee, and organizing committee. We would also like to thank all the contributing authors for their valuable work in supporting the success of the Fourth ICEBM. Thanks for you contribution, the Fourth ICEBM 2015 would not have been possible without your support.

Conference Chair,

Arnold Japutra, Ph.D.

ISBN : 978-979-9234-54-4

SPEECH FROM THE RECTOR

Welcome to Bangkok and to the Fourth ICEBM,

It's an honor to open the Fourth ICEBM on this lovely day in Bangkok, Thailand. This year, this conference put forward the theme of "Building Sustainable Business Networks: The Role of Entrepreneurs and Professionals."

It is without a doubt that in this era, businesses are faced with challenges in order to face the competition and to grow. Particularly, due to the development of a very dynamic communication through the Internet, which creates a hyper-connected world.
Firms all over the world are looking for ways to expand their business. However, with limited resources, firms need to find a solution to deal with this issue. One of their strategies is to collaborate and build sustainable business networks. What is considered a sustainable business networks? How to build sustainable business networks? What should professionals and entrepreneurs do to achieve a sustainable business networks? These are some of the questions arising that needs to be addressed.

This conference brings together practitioners and academics that are well known in their fields to address this theme. We are proud to present Mr. Chanin Donavanik as the CEO of Dusit International – a well-know firm in hotel management and education, which comprises a unique international portfolio of distinctive hotels and resorts. I believe that his knowledge and expertise would be valuable in addressing the theme of this conference. We are also proud to present Prof. Carunia M. Firdausy (Untar), Prof. Chen Cheng-Nan (Kun Shan), and Dr. Chong Chee Leong (UniSIM) that would share their expertise to address the conference theme.

I would also like to take this opportunity to congratulate all the parties who are involved in hosting and organizing this conference – partner institutions (Dusit Thani College, Kun Shan University, Universiti Sains Malaysia, and Ciputra University), scientific committee, organizing committee, and the sponsors. I believe that through this conference, where great minds gather, we will be able to advance our knowledge in findings innovative ways and solutions to build sustainable business networks.

Once again, welcome and enjoy the conference.

Prof. Ir. Roesdiman Soegiarso, M.Sc., Ph.D.
Rector

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(Managing Director and CEO Dusit International, Thailand)

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The Fourth International Conference on Entrepreneurship and Business Management (ICEBM 2015)
Bangkok, Thailand – November 5-6, 2015
ISBN : 978-979-9234-54-4

E-COMMERCE APPLICATION WITH APRIORI METHOD TO DETERMINE TOP AND RECOMMENDATION PRODUCT

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Abstract

E-commerce is online media to make selling, purchasing and marketing. There are lots of features in E-commerce that have goal to increase selling. One of them is a feature that displays the items most frequently purchased and items purchased concurrently."Istana Accessories" Store, is one of the stores that want to use e-commerce to boost sales service to their customers. In this research, we make E-commerce web based application with focus on determining the features of top and recommendation product. Top and recommendation product obtained by doing market basket analysis, so we can get the association rule between items. By display product recommendations, the store has been doing cross-selling processApriori method applied to determine top and recommendation product in general based on transaction record. Apriori identifying the frequent individual items and extending to the larger items as long as those items set appear quite often in transaction. The results show that top product and recommendation product from the applied of Apriori algorithm successfully obtained and displayed on the customer page.The test value obtained as the best value with Top minimum support count is 8, Recommendation minimum support count is 3 and Minimum confidence is 50%.

Keywords: E-Commerce, Cross-Selling, Apriori Method, Top Product and Recommendation Product

Introduction

E-commerce (electronic commerce or EC) is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the Internet (Turban, 2008). Currently, e-commerce has been very widely used as a medium of sales that are considered to reach various groups and places. It cannot be denied that the items sold on e-commerce have not only the goods with high prices, but also second-hand items sold through e-commerce. Starting from lazada.com, bukalapak.com, tokopedia.com, blibli.com and many more forms of e-commerce that began to appear in the virtual world.

Forms of e-commerce are presented unique. But many e-commerce only display photos of the goods and only equipped with a category of goods. Displaying the goods as it is, sometimes make it difficult for buyers to select or search for items according with their wishes. One way to do marketing and increase sales is by creating or displaying the goods that are interconnected. Arrange the goods regularly facilitate the buyer to see the linkage the goods with each other. If the e-commerce has been able to show the items concerned, then the next stage is to give discounts if the goods are purchased simultaneously.

The process of searching for the relationship between the objects with each other is not easy. One way is to record every transaction data that has happened then analyzed the relationship between one items to another. Results of this analysis can help the seller to determine the most frequently purchased item, goods that can be a recommendation because it is related to each other.

Currently, many studies were done to make the process of analysis of sales data automatically. The analysis process can automatically simplify and accelerate the application in determining the best-selling products and products that are interrelated. The process of recording and analyzing the sales data can be performed by the method of data mining.

Based on this background, in this study the analysis of the customer's buying process is carried out using association rules in data mining. Association rules can also be called a market basket analysis, where the analysis is performed against the purchase transaction has occurred. The analysis process should be done with a lot of data transactions in a given period. Market basket analysis was conducted to determine the relationship between products based on purchases already made. If the analysis of the product purchase has been made, the results of this analysis can be used to develop a marketing strategy.

One of the methods used in the search for association rules on transaction data is to use Apriori algorithm. The Apriori algorithm is a classical data mining method for association rule discovery typically applied to market basket data, such as the study of what products tend to be purchased together in an on-line market place (Maheswari, 2014). There are two approach in this algorithm, bottom-up and top-down approach. The classical Apriori algorithm follows bottom up approach. In this research, we use top down approach, where in the rules are generated by avoiding generation of unnecessary patterns. The major advantage of this approach is that, the number of database scan and times are reduced.

ISBN : 978-979-9234-54-4

In this study, the data used is the data at the "Istana Aksesoris" Store. "Istana Aksesoris" store is a store that sells mobile phone accessories and equipment. These stores can sell goods wholesale or retail. Most sales are sales made in the form of wholesale. During this time "Istana Aksesoris" doing sales as manually, where buyers place an order in person or by telephone. The shop is hoping to increase the number of sales and increase the number of customer. Therefore, these results are applied in the form of the creation of e-commerce for the "Istana Aksesoris". E-commerce made equipped with features that can show top and recommendations product based on the analysis of transaction data that is done automatically.

E-commerce

E-Commerce or so-called electronic commerce is spread, purchasing, sales, and marketing of goods via the Internet or computer network (Laudon and Trevor, 2009). The advantages of the use of e-commerce that is able to overcome the problem of integration, publication, interaction and transaction. Typically, the menu contained in e-commerce is a shopping cart, payment methods, contact person and the search menu. But further, web-based e-commerce features that support aimed at increasing sales. Such features include a menu that can display product category, latest products, special offer, payment, sitemap, testimonials, top product, recommendation product, and related product.

Some important features to be presented are the top product, recommendation product, and related product. The top product menu is displayed with the aim that the customer can find out information of the most frequently purchased product (top product). While the recommendation product menu is displayed for expected that customer will add the type of goods that relevant with the first product (recommendation product). And the related product is references option for other similar products with different brands (related product).

Analysis of the association or the association rule mining is data mining techniques to discover the rules of associative between combinations of items (Han and Kamber, 2006). Examples of association rules of analysis of purchases in a supermarket are able to know how likely a customer to buy bread along with milk. With the knowledge of the owner of the supermarket can adjust the placement of the goods or designing a marketing campaign by using a combination of discount coupons for certain items. The association analysis become famous because of its application to analyze the contents of a shopping cart in the supermarket, association analysis is also often referred to as market basket analysis (Linoff and Berry, 2011).

Apriori Algorithm with Top-Down Approach

Apriori is designed to operate on databases containing transactions (for example, collections of items bought by customers, or details of a website frequentation (Agrawal and Srikant, 1994). There are two approach of Apriori algorithm, bottom-up and top-down approach. Apriori algorithm with a top-down approach chosen because it has advantages, the process does not generate all frequent itemset like the classic Apriori thus reducing unneeded pattern itemset (Maheshwari, 2014). This is expected to create a data mining time becomes shorter.

Apriori is a method that follows the analysis of the association which is trying to find a technique of associative rule between combinations of items. Such as assessing, how frequently purchased item A together with item B. It is important or not of association rule, assessed by two parameters, namely the support and confidence. Support is the percentage of the combination of the items in a set of items in the transaction. While confidence is a strong relationship between the values of items in the collection of the item.

For example, if known {hand phone, case} -> {screen protector} gets value of support is 40% and confidence is 50%. Could mean that, handphone, case and screen protector purchased together occurs with probability 50%. The transaction is valid because 40% of people of all transactions making a purchase like that.

Apriori is a classic algorithm for learning association rules in data mining. This algorithm is an iterative approach and there are two steps on each iteration. The first step generates a set of candidate itemsets. Then, in the second step we count the occurrence of each candidate set in database and prune all disqualified candidates (i.e. all infrequent itemsets). The algorithm is based on the closure property of frequent itemsets: if a set of items is frequent, then all its proper subsets are also frequent. There are two properties (Maheshwari, 2014):

1. Generate all frequent itemsets: One frequent itemsets is an itemsets which support higher than minimum support (min_sup).

$$support\,(A \cap B) = \frac{transaction\ contains\ A\ and\ B}{total\ transaction} \ldots(1)$$

2. Generate all confident association rules from frequent itemsets: One confident association rule is a rule which confidence level greater than minimum confidence (min_conf).

$$confidence = p(A|B) = \frac{transaction\ contains\ A\ and\ B}{transaction\ contain\ A} \ldots(2)$$

ISBN : 978-979-9234-54-4

Flowchart of the Apriori algorithm with Top-Down approach can be seen in Figure 1.

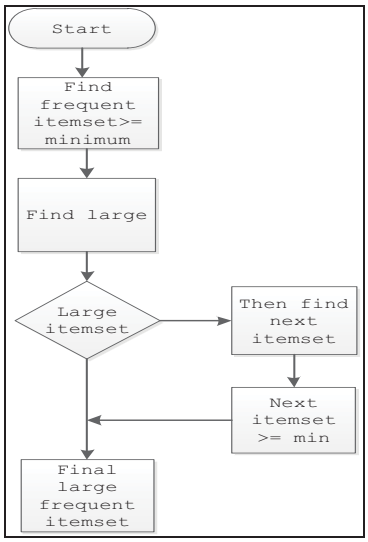

Fig.1 Flowchart Algoritma Top-Down Apriori Method

At Apriori algorithm, the top product obtained by the largest itemset candidates who meet the minimum support count so made as frequent itemset. Item that is in frequent itemset is shown as a top product. While the recommended products are products that are based on the candidate itemsets containing products related to the selected product. Candidates who fulfill used as frequent itemset and value his support and confidence. If it meets the specified value of the items in a frequent itemset can be displayed as recommendation product.

Result and Discussion

Based on a survey, it is known that this store has a lot of salesmen in charge of promotion and send the goods to the customer. The process is analyzed to see how the real store policy to determine the top products and product recommendation for promotion to customers. According to the shop owner, a product said to be a top product in terms of the much sought after or in the sense that many appear in the sales transaction. Further to recommendation product, obtained by the frequency of an item purchased together with other goods.

E-commerce websites are created using the programming language PHP. The software used to design the look and build a web site is Adobe Photoshop CS6 and Adobe Dreamweaver CS6. MySQL is used for building and managing databases. While Apache is choose as web server for running PHP. This website is built in two parts, to customers (front end) and store (back end). E-commerce website has 8 main features, namely, Home, Product, Chart, Retur, Customer Profile, Payment Method, Shipping Information and Contact Person. At Figure 2 we can see the interface of "Istana Aksesoris" e-commerce. We can see the most wanted product at the Home menu and we can see the recommendation product for selected product at the Product menu.

Fig.2 The interface of "Istana Aksesoris" e-commerce

Testing top product and recommendation product from the application of Apriori algorithm done using real data from the store. The data used is the sales transaction data, products and customers. The test is divided into two conditions, namely the use of data 3 months and 6 months. 3 months of data taken from January 1, 2014 until March 30, 2014, consisted of 133 transactions. Data 6 months from January 1, 2014 until June 30, 2014, consists of 327 transactions.

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Based on the experimental results, it is known that the data of 3 months with top minimum support count is 9 only produce 2 products as the top product. It is considered that minimum support count produces too little number of top products. Then the data of 6 months to experiment with the recommendation minimum support count is 3 and minimum confidence is 75% obtained recommendation product only 4. It was thought a product that has too little product recommendation. After testing, the test value obtained as the best value is as follows: Top minimum support count is 8, Recommendation minimum support count is 3 and Minimum confidence is 50%. At table 1 we can see the top product result and at table 2 we can see the recommendation product result that using that score.

Table 1 Top Product with top minimum support count = 8

Period	Date		Top Product
3 month	January 1, 2014	March 30, 2014	VIORA 5600MAH VIORA 8400MAH FUZE IPHONE 4 FUZE IPHONE 5
6 month	January 1, 2014	June 30, 2014	FLIP CASE GALAXY ACE 3 FLIP CASE GALAXY CORE FLIP CASE GALAXY GRAND FLIP CASE GALAXY S4 VIORA 5600MAH VIORA 8400MAH FUZE IPHONE 4 FUZE IPHONE 5

Table 2. Recommendation Product with minimum support count = 3 and minimum confidence = 50%.

Period	Date		Product Choice	Recommendation Product
3 month	January 1, 2014	March 30, 2014	FLIP CASE UNIVERSAL 7" PICT	FLIP CASE UNIVERSAL 7"
			FLIP CASE GALAXY S4	FLIP CASE GALAXY CORE
			FLIP CASE LENOVO A516	FLIP CASE LENOVO A369I
			BATERAI HIPPO BB 9900	BATERAI HIPPO BB 9700
			BATERAI HIPPO BB 9700	BATERAI HIPPO BB 9900
			BATERAI BB 9700 ORI	BATERAI BB 9800 ORI BATERAI BB 9300 ORI
			BATERAI BB 9300 ORI	BATERAI BB 9700 ORI
			BATERAI BB 9800 ORI	BATERAI BB 9700 ORI
			VIORA 5600MAH	VIORA 8400MAH
			VIORA 8400MAH	VIORA 5600MAH
			FUZE IPHONE 5	FUZE IPHONE 4
			FUZE IPHONE 4	FUZE IPHONE 5
6 month	January 1, 2014	June 30, 2014	FLIP CASE UNIVERSAL 7" PICT	FLIP CASE UNIVERSAL 7"
			FLIP CASE GALAXY ACE 3	FLIP CASE GALAXY CORE
			FLIP CASE GALAXY S4	FLIP CASE GALAXY CORE FLIP CASE GALAXY GRAND
			FLIP CASE ANDROMAX I2	FLIP CASE ANDROMAX C
			BATERAI HIPPO BB 9900	BATERAI HIPPO BB 9700
			BATERAI HIPPO BB 9700	BATERAI HIPPO BB 9900
			BATERAI BB 9320 ORI	BATERAI BB 9300 ORI
			BATERAI BB 9900 ORI	BATERAI BB 9300 ORI
			BATERAI BB 9800 ORI	BATERAI BB 9700 ORI
			VIORA 5600MAH	VIORA 8400MAH
			VIORA 8400MAH	VIORA 5600MAH
			FUZE IPHONE 5	FUZE IPHONE 4
			FUZE IPHONE 4	FUZE IPHONE 5

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The test results of top product of the table 1 shows that for three months of data, acquired four products which become the top product is VIORA 5600mAh, VIORA 8400MAH, FUZE IPHONE 4, IPHONE FUZE 5. This means that within a span of 3 months (January 1, 2014 to 30 March 2014), many customers buy 4 of these products. 5600mAh VIORA products are purchased simultaneously with 8400MAH VIORA and FUZE IPHONE 4 lots purchased together with FUZE IPHONE 5.

Results of testing the top product for data of 6 months, gained 8 products become the top product is FLIP CASE GALAXY ACE 3, FLIP CASE GALAXY CORE, FLIP CASE GALAXY GRAND, FLIP CASE GALAXY S4, VIORA 5600mAh, VIORA 8400MAH, FUZE IPHONE 4, FUZE IPHONE 5. This means that within a span of 6 months, many customers buy 8 products. FLIP CASE product GALAXY ACE 3 lots purchased together with the FLIP CASE CORE GALAXY, GALAXY GRAND CASE FLIP lot purchased together with the FLIP CASE GALAXY S4, VIORA 5600mAh lot purchased together with VIORA 8400MAH, and FUZE IPHONE 4 lots purchased together with FUZE IPHONE 5.

Conclusion

The results show that top product and recommendation product from the applied of Apriori algorithm successfully obtained and displayed on the customer page.The test value obtained as the best value with Top minimum support count is 8, Recommendation minimum support count is 3 and Minimum confidence is 50%. Support count value may affect the amount of product produced. When value is used as the bare minimum is getting smaller, the less the amount of goods that can be obtained. However, if the minimum value is made smaller, it will affect the relationship between products. The smaller the minimum value linkages between product confidences mean getting away. Besides the characteristics of the transaction data also affect the results of the analysis so that the experiment must be carried out by using different values.

E-commerce websites are expected to increase sales of Istana Accessories store. Furthermore, the website is still to be developed in order to have features that maximum. For example personalize based on customer characteristics or add period time transaction data that can be further evaluated. Besides online payment feature and other features can be added to support this website.

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Menu

Background

International Conference on Entrepreneurship and Business Management is one among various international seminars organized by Universitas Tarumanagara (UNTAR) that has been entering the ninth year consecutively. ICEBM 2020 is organized to be held in Jakarta via teleconference. During the year of 2020, The Covid-19 pandemic has occurred that makes changes in various aspects of life, which finally shift the pattern of public demand. With the theme of "Post Covid-19 Pandemic: How Entrepreneurs and Managers Adapt and Reshape Business Strategies", The Ninth ICEBM UNTAR aims to provide opportunities for academics, professionals, decision-makers, and practitioners from various fields to present their researches and views, while interacting with members inside and outside their disciplines

Publication Opportunities

All papers submitted to the 8th ICEBM Untar 2020 will be sent to two reviewers and evaluated based on their originality, technical, and research content. Papers should be written in English, no more than 6 pages long in total for each paper. All papers accepted will be proposed for publication in a reputable publisher and will be submitted for further indexing to Web of Science. Award will be provided for exceptional papers.

IMPORTANT DATES

Submission Deadline

~~August 21st~~

~~September 21st~~

October 21st, 2020

Notification of Full Paper Acceptance

~~September 11th~~

~~September 28th~~

October 28th, 2020

Early Bird Registration

October 2nd, 2020

Registration Deadline

November 2nd, 2020

Conference Date:

November 19th, 2020

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