AN APPROACH SIMILARITY TO CUSTOMER BEHAVIOR IN E-METRICS ECOSYSTEM

Marischa Elveny, M K M Nasution, Muhammad Zarlis, E M Zamzami
*Fakultas Ilmu Komputer dan Teknologi Informasi, Universitas Sumatera Utara
Padang Bulan 20155 USU, Medan, Indonesia*

Abstract

Merchant is a business entity in cooperation with banks in the provision of payment. To the north Sumatran region has 33 districts of the city and a population of 13,937,797 inhabitants. Each city district has a variety of merchants that built on each corner or side of the road with a data sample of 1,383 users. To search for users based on their behaviours be competitive merchant who takes the similarity of some objects. The similarity involves characterizing each object or expounds tour- tour of the object. How to measure the similarity to characterize each object resulting in the naming and weighting. The way it is made by comparing to what is common and what is different from the object. Results will be achieved in the form of a method of similarity to look for in a merchant's customer behavior that competitive advantage.

Keyword: Merchant, Similarity, E-Metric, Customer Behaviour, Ecosystem

1. Introduction

Merchant is a business entity in cooperation with banks in the provision of payment. There are 1,383 customers and 448 merchants be competitive scattered in the region of North Sumatra province. Each city district has a variety of merchants that built on each corner or side of the road. Behaviour of customers in diverse merchant resulting complexity of big data. Technology can solve the problem of large amounts of data, which requires a technique that involves resemblance to group data in specific groups [26].

In similarity techniques, extracting information involves the measurement of the distance between the objects that can be used to trace the origin of the information, or it can be used to predict social behaviour. Similarities are looking for similarities between the input source. The similarity is used to look for linkages or linkages between customer behavior on merchant competitive advantage. The similarity of the two objects is measured based on the concept of proximity, which is used to provide limited value. There are many similarities measurement, but it involves a sequence of components of the object requires a special approach. This study aims to reveal something in common, where each object is grouped by distance proximity, similarity and difference [26].

According to previous studies [28]. Measurement of similarity between two objects is done to avoid duplication on objects that are similar. However, characteristics of the object can be measured by a variety of similarities. The existence of similarity gives the meaning of the measurement results. Measurements such as Jaccard coefficient, mutual information, dice coefficient and coefficient overlap are measurements that concept involves the same vector. Thus, the purpose of this paper is to outline the evidence of the existence of a similarity with the range of values (0.10).

Based on the description above, this study was conducted to get a new similarity method used to find linkage or similarity of customer behaviour on merchant competitive advantage.

2. Research Purpose

Merchant is the seller of the goods / services that have a business form (physical store) as well as online stores that cooperate with the Bank in the provision of payment receipt via e-money bank. Similarity (similarity) is a measurement to determine the similarity of one object to another object. Similarities involves characterizing each object to perform ontology and taxonomy or describe in detail the features of the object. That process resulted in the naming and weighting of the characteristics of the object so that gives way to measure similarity. The manner determined by placing a comparison with what is common and what is different from the two objects. Each object or entities contained in

the study (the universe of discourse) has the characteristics that the features and weight. When an object is known behavior, of course, the efficient behavior of the other can be determined by measuring the similarity or proximity of the objects.

There are three objectives discussion conducted in the research methodology. The first is a competitive merchant and customer, this meant is looking at the behavior of customers when transacting at a merchant. After being awarded the weighting, weighting is a technique of decision-making in a process that involves a variety of factors together by assigning weights to each of these factors in order to obtain a value that results in behavioral similarity. Next look for similarities in customer behavior from the weighting is done to get a new algorithm for the similarity.

Figure 1. Research methodology

In *Figure 1*. Try solving our research we made three steps where each round starts from us to become a cluster of traders and users. Then, after being classified, we make a weighting of each relationship and model between the customer and the trader who conducts e-metric transactions. In other words, after determining the weighting, we estimate the relationship and the model and determine the boundary value between. With the insert we determined looking for slices between the customer's research on the tests conducted.

3. Result and Discussion

a. Data collection

This study begins with collecting data and information on the number of subscribers, and the number of merchants that exist in the entire region in northern Sumatra. From the results of the data collected, there are 1383 number of customers spread across North Sumatra with a presentation that can be seen in Table 1 as follows:

figure 2. Total Merchant in North Sumatra region

Research will be conducted noticed four stages as in figure 2.

Figure 4. Description Framework Research

Figure 2 shows the steps that will be passed in this study with the following explanation.

From Figure 3.2 it can be seen that there are 448 number of merchants scattered across the North Sumatra and the region has 171 merchant terrain, where the terrain city has among the highest number of other areas.

Data profiling

From the data grouped, classified and mapped characteristics based on location. To define the vector needed some determinants Name, Latitude (LT), Longitude (LG), District (KC), Regency (KB) and Province (PS).

Table 1. User Data

Name	LT	LG	KC	KB	PS
tasmin	3.5723157	98.695341	Medan Area	Field	SU
indra zulfika	3.5773319	98.680927	Medan Maimun	Medan city	SU
mridho	3.5857218	98.670415	terrain Petisah	Medan city	SU
suandi tarihoran	3.56797981	98.697066	Medan Kota	Medan city	SU
nurul syamsul rijal	3.51962833	98.788343	Tanjung Morawa	Deli Serdang	SU
irwandi	2.968872	99.628996	East range	shavings	SU
ika septyananing	3.58907862	98.706732	terrain Tembung	Medan city	SU
sendi maulana	3.59947995	98.643895	Medan Helvetia	Medan city	SU

b. similarity

Similarity is a measurement to determine the similarity of one object to another object. Similarities involves characterizing each object to perform ontology and taxonomy or describe in detail the features of the object.

Figure 5. Similarity

The concept of similarity leads to a form of symmetrical like a line or a triangle, namely:

$$a^2 = b^2 + c^2 \quad (1)$$

Let β (customers) who represent as objects that conduct activities against the merchants, so that each pair of components $a, b \in \beta$, thus the relationship $\beta = (a \rightarrow b)$. As a set, the object β consists of the behavior, such that $i = 1, \dots, n$. The size of β is $|\beta| = n$, and applies: If the set $\beta = \{i = 1, \dots, n\}$ as an object with a behavior of the components of β , each component has a relationship with the other components. Suppose $|\beta| = N$, then we obtain $n(n-1)$ relationships. Every relationship can be expressed in binary $\{0,1\}$ to affirm the membership of the two components in the β, β_i, β_j . So, every component has one or more relationships with others.

Suppose that E is a vector, then a couple of, in E has a resultant vector as follows: $b_i b_j a_b$

$$a_b = b_i^2 + b_j^2 + 2b_i b_j \cos \alpha \quad (2)$$

Suppose that for every $a, b \in E$, there is the same application is declared as $a \cap b \in E$, with which this application shows the similarity between a and b , of course, $a \cap b$ is also a vector which is a vector space E , as well as the weight and direction. The distance to be the difference between a and b which express $c(a, b)$. As shown in the Definitions 2, which shows the existence of a and b in a vector space E , which is expressed in v or $a \cap b > 0$. Similarly, the measurement of the Jaccard coefficient [3], dice coefficient [37], and cosine similarity that conceptually a measure involving the same vector, ie $a, b, a \cap b \in E$ [11]. Based on the implementation can be formulated as follows:

Theorem 1: Jaccard coefficient

There is a vector of the equation $a, b \in E$ and $A \cap b \in E$ where Jaccard coefficient as a measurement of $x(a, b)$ then: j_c

$$j_c = a \cap b / a \cup b \quad (3)$$

Where: $a \cup b = a + b - a \cap b$.

Theorem 2: Dice coefficient

There are $a, b \in E$ and $A \cap b \in E$. A measure $x(a, b)$ is called dice coefficient if it satisfies

$$D_c = 2(a \cap b) / a + b \quad (4)$$

As, $= 0$ when $a \cap b = 0$. $j_c D_c$

Theorem 3: Cosine similarity

There are $a, b \in E$ and $A \cap b \in E$. A measure $x(a, b)$ is the cosine similarity if

$$C_s = x \cap y / \sqrt{ab} \quad (5)$$

As, $= 0$ when $a \cap b = 0$. For $a = 1$, Equation (5) becomes $= x \cap y$. $j_c C_s C_s \sqrt{ab}$

figure 6. Results to be achieved

The results of theorems 1,2 and 3 can be seen in figure 4. This shows that there is a strong symmetrical relationship between vectors in the vector space. In theory, each result of measuring similarity is in a certain position between $\{0,1\}$ and each similarity based on the formula of each method is different from one another. However, the existence of a similarity can still be sought using the derivative formulation that will be carried out in further research, which is seen in the following dotted lines, based on e-metric data to look for the similarity of customer behavior towards a merchant.

4. Conclusion

Based on these results a few methods that have been implemented using Jaccard confession looked the blue line, dice coefficient looked at the purple line and the cosine similarity shown in the red line, the research has on semantic web data. The study further studies coloured green with a dotted line that will be applied to the data in the customer e-metrics of mobile payment.

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