International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 6 Issue 03, March-2017

Implementation of K-Nearest Neighbor Method in Eligible Creditor (Case Study: Aceh Bank)

*Dicky Nofriansyah[1]
Department Computer Engineering,
STMIK Triguna Dharma Medan,
Jln.A.H Nasution No.73 F, Telp 061-8224051

Muhammad Dahria[2]
Department Computer Engineering,
STMIK Triguna Dharma Medan,
Jln.A.H Nasution No.73 F, Telp 061-8224051

Rudi Gunawan[3]
Department Computer Engineering,
STMIK Triguna Dharma Medan,
Jln.A.H Nasution No.73 F, Telp 061-8224051

Hendra Jaya[4]
Department Computer Engineering,
STMIK Triguna Dharma Medan,
Jln.A.H Nasution No.73 F, Telp 061-8224051

***Abstract*— The system identifies the recipient eligibility investment credit at Bank BPD Aceh to the recipients still done manually on each process, which consists of a file for a process, selecting the files, interviews, observation for prospective Customers are still done manually. In order to overcome the existing problems, then made a classification system for identifying the Investment Credit with data mining using K-Nearest Neighbor method to identify objects or people that are similar to consider several criteria.**

Thus the results of the grouping which has been designed to assist the Aceh Bank in the identification process Investment Loan recipients based on criteria that have been determined so that the grouping and decision making can be more rapid, precise, and accurate and avoid mistakes.

Keywords*— *Data Mining, K-Nearest Neighbor, Eligible Creditor, Case Based Reasoning, Expert System

I. INTRODUCTION

Credit is a financial facility that allows a person or business entity to borrow money to buy products and pay it back within the prescribed period. UU no. 10 of 1998 states that the credit is the provision of money or bills can be equated with it, based on agreements between bank lending with another party that requires the borrower to repay the debt after a certain period of time with interest. One credit give authorities are Bank Aceh. Bank Aceh Had some types of credit offered to customers, one of which is the investment credit. but in any determination of the provision of credit acceptance is done is not easy, because the Bank Aceh apply some procedures and eligibility requirements for credit recipients. And from several disciplines who used one of them is Data Mining[1] [2] [3].

Data Mining is a discipline of artificial intelligence (Artificial Intelligence). In data mining, there are several methods in accordance with its use includes: Predictions, association, classification, clustering, and Estimation[1]. In this method of classification, there are several methods including of K-Nearest Neighbor algorithm. It is one of the classification methods used to problem solving. In this case with the criteria used, Capacity (C1), Collateral (C2), Capital (C3), Condition (C4), Character (C5). Another variant of the K-Nearest Neighbor approach is Bayesian Theory.[4]

II. THEORY

A. *Data Mining*

As new branch of science in the world of Computer Data mining itself is pretty hard to pin down, because science itself is a field of science that is pretty much the application moreover supported by the richness and diversity of the various disciplines that exist in Artificial Intelligence, Database, Statistics, Modeling Mathematical Processing Citra etc. Creating a more extensive application of data mining. Therefore, when translated, the data mining itself can be defined as a data mining process that produces an output in the form of new knowledge [1] [2]

B. *K-Nearest Neighbor*

The nearest Neighbor algorithm is one method of classification, K-Nearest Neighbor (KNN) also includes a group of instance-based learning. This algorithm is also one lazy learning techniques. KNN is done by finding the objects in the group k closest training data (similar to) the object on the new data or data testing [5] . K-Nearest Neighbor algorithm is a method to perform the classification of objects based on the learning data that were located closest to the object. Nearest Neighbor is the approach to look for cases by calculating the affinity between new cases and an old case that is based on matching the weight of a number of existing features. [6] [7]

Step 1: Determine the parameters K
Step 2: Calculate Distance
Step 3: Then sort these objects into groups the smallest
Step 4: Collecting Y category
Step 5: Using Nearest Neighbor most categories, the majority.
Sample of illustration K-Nearest Neighbor

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 6 Issue 03, March-2017

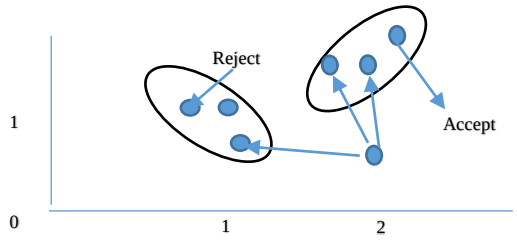

Figure I: Illustration

For each training example <x, f(x)>, add the example to the list of training examples. Given a query instance xq to be classified. Let x1,x2….xk denote the k instances from training examples that are nearest to xq Return the class that represents the maximum of the k instances. Standard Euclidean Distance d(xi ,xJ) = √(For all attributes a ∑ (xi,a – xJ,a)2)

III. ANALYSIS AND DISCUSSION

Analysis covered are K-Nearest Implementation Method neighbor to identify the recipient eligibility Credit Investment in PT. Bank BPD Aceh Medan. As described in the previous chapter that to determine the recipient of the investment loan there are several criteria that have been determined by the Bank of Aceh. Furthermore, the criteria that was used as a barometer to determine which customers can receive credit.[8]

This algorithm is included methods of entering the classification algorithm which is where the supervision Learning the characteristics of the data indicated the presence of a label or a target. K-Nearest Neighbor is also the case with the closeness to seek proximity counting new cases with old cases, which is based on matching the weight of a number of existing features.[9] Suppose it is desirable to find a solution to a new patient using the solution of old patients. To find a closeness between the new case with the case of the old ones, in this method, used the term "similarity" or commonality. Proximity usually is at a value between 1 and 0. [10] A value of 0 means that both cases absolutely not similar, on the contrary, if the value of 1 means mean absolute cases have similarities. As it is known that the required data mining. Completion and the problem with using this method following are step solution:

Table I: The Criteria and Weight

Criteria	Weights
Capacity (C1)	0.3
Collateral (C2)	0.3
Capital (C3)	0.2
Condition (C4)	0.1
Character (C5)	0.1

And these are Alternative of Creditor

Table II: Data History

Name of Creditor	C1	C2	C3	C4	C5	Note
A1	1	1	1	1	1	Accept
A2	1	1	1	1	2	Accept
A3	1	0	0	0	1	Reject

Table III: Next Creditor

Name of Creditor	C1	C2	C3	C4	C5
A4	0	0	1	0	1

So, we must find the similarity value of Criteria:

Table IV: Similarity from C1, C2, C3, C5

HD	NC	Value
0	0	1
0	1	0.1
1	0	0.1
1	1	1

Table V: Similarity from C4

HD	NC	Value
0	0	1
0	1	0.1
0	2	0.2
1	0	0.1
1	1	0
1	2	0.1
2	0	0.2
2	1	0.1
2	2	2

Note:
HD: History Data
NC: New Creditor

Calculate the value of proximity attribute condition new cases with case 1:

- Similarity A1 and A4

Table VI: Similarity A1 and A4

Data	C1	C2	C3	C4	C5
A1	1	1	1	1	1
A4	0	0	1	0	1
Similarity	0.1	0.1	0	0.1	0
Variable	V1	V2	V3	V4	V5

Distance
= (V1*C1) + (V2*C2) + (V3*C3) + (V4*C4) + (V5*C5)/1
= 0.07

- Similarity A2 and A4

Table VII: Similarity A2 and A4

Data	C1	C2	C3	C4	C5
A2	1	1	1	1	2
A4	0	0	1	0	1
Similarity	0.1	0.1	0	0.1	0.1
Variable	V1	V2	V3	V4	V5

Distance
= (V1*C1) + (V2*C2) + (V3*C1) + (V4*C2) + (V5*C5)/1
= 0.08

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 6 Issue 03, March-2017

- Similarity A3 and A4

Table VIII: Similarity A3 and A4

Data	C1	C2	C3	C4	C5
A2	1	0	0	0	1
A4	0	0	1	0	1
Similarity	0.1	0	0.1	0	0
Variable	V1	V2	V3	V4	V5

Distance
= (V1*C1) + (V2*C2) + (V3*C1) + (V4*C2) + (V5*C5)/1
= 0.4

From the above result obtained as follow:

Table IX: Rating

Alternative	Value	Check
A1	0.07	nearest value of similarity
A2	0.08	
A3	0.4	

Based on the results table closeness between the above cases, it can be concluded that the new case has enormous closeness to the case A3. Then the prospective new customers are said to have similar absolute closeness to the case 18 with the presentation of 0.4, so the classification is done above can be ensured that the candidate the new client will be denied credit application. And grouped into customers who are not accepted credit application.

IV. CONCLUSION

In this case using K-Nearest Neighbor method to solve the problem of eligible creditor of Aceh Bank. The result of study is K-Nearest Neighbor method to be useful of selection new creditor. Decision maker in Aceh Bank can using it as one of solution about it. Application in this section of method using data from Aceh Bank Medan.

REFERENCES

[1] D. Nofriansyah, Algoritma Data Mining Dan Pengujiannya. Yogyakarta: CV. Deepublish, 2016.
[2] F. Alam, et al., "Analysis of Eight Data Mining Algorithms for Smarter Internet of Things (IoT)," Procedia Computer Science, vol. 98, pp. 437-442, 2016.
[3] A. Bustillo, et al., "Data-mining modeling for the prediction of wear on forming-taps in the threading of steel components," Journal of Computational Design and Engineering, vol. 3, pp. 337-348, 2016.
[4] J. Arbel, et al., "Full Bayesian inference with hazard mixture models," Computational Statistics & Data Analysis, vol. 93, pp. 359-372, 2016.
[5] D. Arias-Aranda, et al., "A fuzzy expert system for business management," Expert Systems with Applications, vol. 37, pp. 7570-7580, 2010.
[6] O. Arsene, et al., "Expert system for medicine diagnosis using software agents," Expert Systems with Applications, vol. 42, pp. 1825-1834, 2015.
[7] O. Amayri and N. Bouguila, "A Bayesian analysis of spherical pattern based on finite Langevin mixture," Applied Soft Computing, vol. 38, pp. 373-383, 2016.
[8] J.-S. Chou and H.-C. Tseng, "Establishing expert system for prediction based on the project-oriented data warehouse," Expert Systems with Applications, vol. 38, pp. 640-651, 2011.
[9] E. Avci, "An expert system based on Wavelet Neural Network-Adaptive Norm Entropy for scale invariant texture classification," Expert Systems with Applications, vol. 32, pp. 919-926, 2007.
[10] O. Arsene, et al., "Medicine expert system dynamic Bayesian Network and ontology based," Expert Systems with Applications, vol. 38, pp. 15253-15261, 2011.