Indonesian Journal of Electrical Engineering and Computer Science
Vol. 4, No. 3, December 2016, pp. 605 ~ 610
DOI: 10.11591/ijeecs.v4.i3.pp605-610

A New Dynamic Intelligent Model to Determine Reliability and Trust of Online Banking by Using Fuzzy C-Mean

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Abstract

The main purpose of the present study presents a new model of smart dynamically determine the validity and reliability survey of Internet users bank is using Fuzzy C-Mean model. In other words, the aim of this study is to provide a smart system to determine the behavior of Internet users bank is confidence, so that we can fit the points by the customer, providing banking services to defined limits. In terms of method, a descriptive and exploratory data mining is in use. The method of research was descriptive survey and the use of data mining, exploration. The aim of this study is applied. The survey of methods for qualitative and quantitative data. Since the data of the Agricultural Bank documents (bills of transfer, transfer funds transfers, the number of IT users, foundations, etc.) were collected and interviews with experts in the field of electronic banking Agricultural Bank, Agricultural Bank branch target population for were randomly selected. The results showed that the diagnostic accuracy provided structure to determine the acceptable level of confidence in Internet banking is user behavior.

Keywords*: credibility, confidence surveys, user behavior, E-Banking agricultural bank*

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1. Introduction

The success of any organization depends on its positive interaction with customers. Creating a positive interaction to identify the basic needs of these customers depends to a large extent. However, that new paradigms large impact on the type of needs. The advent of the Internet had a significant impact on commercial interactions interest of companies, organizations, banks and even their customers to do business over the Internet has increased [3]. In today's information organizations considered as part of the capital and in many of these organizations directly to monetize information, ie dominant business model in this kind of organization of production, processing and presenting data is based. However, the sensitivity is doubled organizations active in the field of financial and business information from these organizations is important. The safety and security of data and information in this section even linked to social and national security [5]. By increasing the competitive advantages of the Internet in new business space, in the last decade as an Internet banking has always been the main channel for retail banking. The internet banking fraud more complex every day, and security and trust in this type of banking is being considered more seriously [1]. In other words, increase the attractiveness of internet banking customers doing online transactions is increasing growth. The same applies to the incidence of financial crime in this area is greatly increased. So that the growth rate of these crimes is about 8 to 9 percent a year. In this regard, banks in the UK can be financial losses in 2013 totaled 27 million pounds of this place cited [4]. The figures released by the UK Cards Association show a growing trend is mentioned sums. So that the financial losses of banks in 2014 compared to the previous year of 17.6% growth. Of course, if the statistics are not financial institutions, the growth rate will be added to the sums [6].

However, the growing trend of online banking fraud, the importance of new approaches to the issue of authentication and the behavior of Internet users has increased banks [2]. Usually in different aspects of Internet banking customer data, including demographic, financial

Received August 26, 2016; Revised October 6, 2016; Accepted October 26, 2016

transactions and credit collection and fraud detection processes are carried out based on this data. Thus, this research is based on information Internet behavior algorithm to identify the specific behavior of each customer so that the structure can provide services to customers in cyberspace is unlimited. In other words, in this study to enhance the level of security and delimitation of specialized services to customers and creating an appropriate electronic virtual banking is a new algorithm. The new algorithm based on the recognition of each customer behavior and confidence will be his behavior. The Internet banking services can be calculated level of trust associated. According to the interpretation of super-intelligent dynamic present study presents a new model to determine the validity and reliability survey of Internet users bank is using Fuzzy C-Mean model.

2. Methodology

This research method is a descriptive and exploratory data mining and the use of functional purpose. It should be noted both quantitative and qualitative research methods in terms of data to be taken. Since the data of the Agricultural Bank documents (bills of transfer, transfer funds transfers, the number of users and the IT foundations...) and interviews with experts in the field of electronic banking Agricultural Bank is collecting statistical branch of the Agricultural Bank of randomly will be selected. Data collection tools Agricultural Bank documents (bills of transfer, transfer funds transfers, the number of users and the IT foundations...) and interviews with experts in the field of Agricultural Bank of electronic banking. The research from the standpoint of objective, Tvshay- applied and in terms of data, analytical and explore. It is noteworthy that the strategy used in this research was to study the case. Intelligent dynamic modeling survey to determine the validity and reliability of Internet user bank while the library studies, interviews with experts and Fuzzy C-Mean model is used. One of the most widely used clustering algorithm C-Mean.

3. Results

Step One: Determine input parameters

Through reviewing the issue and interviews with experts, a total of 10 input variables were extracted according to the degree of importance, were ranked. The analysis undertaken in the Table 1 is provided.

Table 1. Ranking Variables

Weight	IMP.	Varibales
0.145	4.001	The number of errors caused by incorrect second card
0.199	3.765	The number of incorrect password to login to Internet banking regulation system
0.111	3.365	The number of browsers used by users
0.109	3.268	Time using internet banking
0.106	3.126	Use different IP number of Internet bank
0.105	3.122	The number of errors due to a deficit balance
0.086	2.825	The amount of conductive wire transfers in certain period
0.071	2.465	The number of transfers certain transitional period
0.061	2.462	Time to use Internet banking as an active member
0.007	2.209	Failure to change the password long periods of time

According to information contained in the Table 1 that shows the ranking of variables, the experts of the Agricultural Bank of errors due to incorrect password of the card with the highest degree of importance and priority of 4.001 and 0.145 with the weight of their opinion and password unchanged in the range of 2.209 and a weight of 0.007 in the last priority long time with them.

After ranking variables in determining confidence in the Agricultural Bank of Internet bank, were 6 main variables for the fuzzy system. Commensurate with the nature of the variables and to the experts, the variables were divided into two general categories.

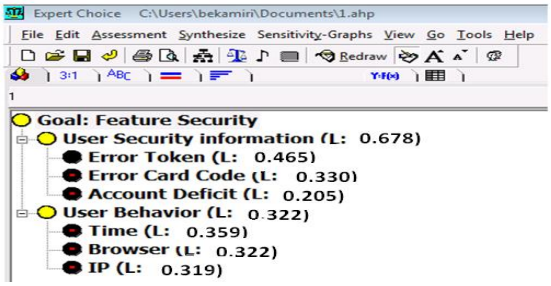
1. Change the behavior of variables using electronic services
   a. Changes geographic location based on IP

b. Used Internet browsers Bank
c. Time using the Internet bank

2. Variables confidential account information
   a. The number of errors caused by incorrect password
   b. The number of errors caused by the deficit balance
   c. The number of incorrect password login Internet bank

Six variables through the Analytic Hierarchy Process (AHP) were re-rating.

Figure 1. Expert Choice Software Output



According to the information given in Figure 1, Expert Choice software output of 6's major determinant for the research reveals that the most important variables confidential account information weights of 0.678 to change variables use of electronic services. Also, as shown in (1) of confidential information on variables account password system error (Error Token) with 0.465 weight and weight fraction of error (Account Deficit) minimum weight is accounted for in the meantime (Figure 2-4).

The second step: optimization of fuzzy rules

Given the importance of proper selection of variables in the system implementation phase intervals, intervals based on actual values of variables in the study database in the Internet bank and using data mining, clustering analysis C-Mean.

Table 2. The Number of Customers in Each Cluster by Changing the Password Error

Error Card Code		Customer No.
Cluster	1	55
	2	198
	3	35
Number of reliable information		288
Number of unreliable information		0

Table 3. The Number of Customers in Each Cluster Based on Variable Balance Deficit

Account Deficit		Customer No.
Cluster	1	69
	2	7
	3	1
	4	5
Number of reliable information		82
Number of unreliable information		0

Table 4. Clustering Customers Based on Variable Password System Error

Error Token		Customer No.
Cluster	1	1452
	2	228
	3	987
	4	6
Number of reliable information		2673
Number of unreliable information		0

Step three: architecture expert system to determine the level of confidence in the behavior of Internet user bank

The structure provided in this system is based on identifying the behavior of Internet users is the bank in monthly periods. In this system, the level of confidence in the safety of users of Internet banking services are provided special security without restriction. Fuzzy expert system consists of three main sections "inputs", "rule base" and "outputs" is formed. Implementation of fuzzy expert system using MATLAB software and calculations using data mining software, Clementine is done. The following describes each of these steps is provided.

Input phase system: providing a dynamic algorithm behavior

Input parameters and linguistic values of these parameters was defined in the first and second steps expert system based on customer status on these parameters, the customer status is derived. More information in electronic behavior variables in accordance with the Table 5 for Internet user bank was extracted.

Table 5. A User Profile

A. User				
Novelty	IE8	IE7	Type	Browser
IE7	33	19	No.	
24-7	15-24	7-15	Time	Time
1	11	32	Input No.	
Recently	Recently	Tehran	City	Geographical Location
95.03.07	Tehran	46	No.	

According to the description provided in this feature relatively common user items (above average) is located. It is worth noting that the formula be modified by the user in the long-term changes. The following example can be calculated in all user rating. User rating to this entry Table 5 is provided.

Fuzzy rule base system

After determining the values of input and output triangular fuzzy systems (Table 6), fuzzy rule base which contains 720 laws was the rule was produced. Implementing this rule base was carried out by Excel software. At this stage fuzzy rule base using the input language variables and experts with rule 729, "if and when" was extracted.

Table 6. The Status of a User Variable

Fuzzy system output		The fuzzy system language	Phase input numbers	Variable status	Varible	User
		Stable	0	Tehran	IP	
		Relatively common	0.57	IE7	Browser	
		Odd	0.787	15-24	Time	A.User
		Too bad	2	2	ErrorCardCode	
Normal	0.511	Inerrant	0	0	AccountDeficit	
		Inerrant	1	1	ErrorToken	

Fuzzy Expert System Assessment

At this stage fuzzy expert system using data from the real environment was carried out. The analysis was carried out on the extracted information according to the user a user profile is provided. According to the fuzzy system output, a reliance on user behavior is normal. It may be the right strategy in the provision of electronic services tailored to his or her behavior.

To further investigate the function fuzzy fuzzy system is another example of the state of Internet user bank to enter and exit the system was evaluated (Table 7 and 8).

Table 7. The Status of a User Variable

Fuzzy system output		The fuzzy system language	Phase input numbers	Variable status	Varible	User
		Stable	0	Tehran	IP	
		Relatively common	0.57	IE7	Browser	
		Odd	0.787	15.24	Time	A.User
		Too bad	2	2	ErrorCardCode	
Normal	0.511	Inerrant	0	0	AccountDeficit	
		Inerrant	1	1	ErrorToken	

Table 8. The Second User

B. User						
Novelty	FireFax32	S.5.0	IE8	IE7	Type	Browser
IE7	16	33	5	2	No.	
0	0	24-7	15-24	7-15	Time	Time
0	0	0	4	21	Input No.	
Recently	Recently	Torrance	Manassa	Tehran	City	Geographical Location
95.03.07	Torrance	15	8	59	No.	

The following table describes the status of the second user in fuzzy system variables (Table 9) is presented.

Table 9. The Status of the Second User Variable

Experts evaluation	Fuzzy system output	The fuzzy system language	Phase input numbers	Variable status	Varible	User
		Stable	0.911	Manassa	IP	
		Relatively common	0.899	IE7	Browser	
Unreliable		Odd	0.871	15-24	Time	B.User
		Too bad	4	4	ErrorCardCode	
	Unreliable	0.689 Inerrant	0	0	AccountDeficit	
		Inerrant	2	2	ErrorToken	

As fuzzy system output shows that the second user behavior information according to user profiles and rules of rule base, in a state of uncertainty (Unreliable) is. It is therefore not recommended offer special services to the user. Accordingly, the output of the system were studied for 20 clients, according to the experts evaluated the performance of the system at an acceptable level.

4. Conclusion

Changes in information technology and the emergence of new concepts like cloud computing in this area has led to the implementation of intelligent systems to enhance the security of data exchange becomes essential and vital for organizations of all sizes. Therefore, the study of structural try to be smart in order to identify the behavior of Internet users bank. The innovation presented in this study, data-driven approach based on the combined use of data mining, and knowledge-based approaches based on fuzzy systems, as well as the use of clustering to determine the range of linguistic fuzzy system is concerned.

5. Suggestions

a. It is recommended that senior managers and planners Agricultural Bank senior strategic measures for the infrastructure for this technology.

b. Should establish specialized workshops and seminars different aspects of benefits to users and staff to be transferred to the results.
c. Efficient management of information and knowledge and the creation of an integrated database (database), knowledge lies in getting consumers used as inputs to the model.

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