A Review on Role of Expert System in Banking Sector

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Abstract

Financial institutions and banks are seeks to expand their business with the new amendments of technology. Nowadays many of them are using the various types of expert system for running their day to day business operations like problem solving and decision making. The role of commercial banks is vital in less developed countries. Through their banking services in globalization world they play very important role for the underdeveloped countries. Commercial banks provide finance to vital sectors of the economy. The industrialist cannot make higher investment due to inadequate saving or they may fail to raise the fund, so the commercial banks and financial institutions lead them by lending money for them. Author wants to present the exhaustive review on the role of expert system in Banking Sector with special reference to loan evaluation for the large scale industries.

Keywords – Expert System, Banking Sector, Large Scale Industries, Loan Appraisal, Loan Sanction

1. Introduction

As matter 40% of funds of the banks should be lent to the priority sector and 25% of the bank deposits are kept to meet the financial needs of the all remaining sectors. In the recent scenario banking sector undergoes some of the drastic changes. Due to globalization and use of new technology, by which it creates increased competition and more risks into the financial institutions and banks. There are many emerging area in the banking sector and one of the major area is the risk management. Risk management in the banking has three important areas:-

1. Market Risk Management
2. Credit Risk Management
3. Operations Risk Management

So by considering this phenomena use of expert system for risk management is the new amendment in the today’s world. The proposed paper deals with the expert system in banking sector.

Through this paper author wants to take survey of the expert system in banking sector specifically for loan evaluation for large scale industries which come in the area of risk management and especially in the credit risk management.

2. Expert System

Expert system refers to the mechanism which has the capability of collecting core data, process on it, analyze, make synthesis, perform operations, and provide the correct and accurate results which help to any individual or to any organization to take their best decisions. It is the specialized branch of Artificial Intelligence.

Expert System has some of the Major components:-

1. Knowledge Base:
   It is the storage of rules which are designed as per the knowledge derived from the human experts. It is just like the IF-THEN rules.

2. Inference Engine:
   It is main processing part of the Expert System. This retrieves rules from knowledge base for the problem being solved

3. User Interface:
   It is the mechanism by which the user interacts with the Expert System through dialog boxes, command prompts, forms and other output windows.
4. Working Memory:
   It stores the data which grab from the user during the problem being solved.

5. Explanation Mechanism:
   This method reaches at the conclusion of the problem being solved. It explains the reasoning process that leads to final answer of the system.

6. Domain Expert:
   The individuals who are the experts for solving the problem for which the system is intended to solve.

3. Objective
   To take the review on the role of expert system in Banking Sector with special reference to loan appraisal for the large scale industries.

4. Importance of expert system in banking sector

   From the ancient time bank plays vital role in the development of Indian economy. Due to global changes and higher investments in the industrial or priority sectors forces on banks or financial institutions to come up with better product and services to its customers.

   If we pay attention on the risk management then we found that nobody can directly manage the risk without the prior planning or backup plan or there is the uncertainty of risk. So there is need of some kind of technical assistance which helps to banks managers to take quick action and manage all the risk.

   Following are the major factors that found which will be benefited by the use of expert technology:-
   1. Increase Speed for completing complex task.
   2. Increase Quality.
   3. Reduced Errors.
   4. Less Manpower.
   6. Reduced Cost.
   7. Reduced Training Time.
   8. Improved Decisions.
   10. Improved Customer Services.
   I. ATM
   II. Electronic Fund Transfer
   III. Computerized Check Clearing
   IV. Credit/Debit Cards.
   V. Personal Banking.

6. Mobile Banking.

5. Review of literature

   Hamid Eslami Nosratabadi, Ahmad Nadali, and Sanaz Pourdarab presented paper on “Credit Assessment of Bank Customers by a Fuzzy Expert System Based on Rules Extracted from Association Rules” that states Credit assessment is a very typical classification problem in Data Mining. A type of classification technique that has attracted an increasing number of attempts in recent years is finding classification rules based on association rule mining techniques. This paper aims to contribute to this kind of research by classifying the bank's customers via association rules with the use of the APRIORI algorithm and CRISP-DM methodology and considering the Experts’ opinions to filter the obtained rules and define the Membership functions for the considered criteria, finally a Fuzzy Expert System is designed based on the selected rules from association rules to specify the Credit Degree of banks’ customers. The presented steps have been studied in an Iranian Bank as empirical study.

   Mates D., Iancu E., Bostan I., Grosu V. presented paper on “Expert System Models in the Companies' Financial and Accounting Domain” stated that studying, analyzing and implementing the expert systems in the financial and accounting domain of the companies, describing the use method of the informational systems that can be used in the multi-national companies, public interest institutions, and medium and small dimension economical entities, in order to optimize the managerial decisions and render efficient the financial-accounting functionality. The purpose of this paper is aimed to identifying the economical exigencies of the entities, based on the already used accounting instruments and the management software that could consent the control of the economical processes and patrimonial assets.

   Rajendra M Sonar said in the paper “Business Intelligence through Hybrid Intelligent System Approach: Application to Retail Banking” that the traditional decision support systems use analytical tools while the latest trend has been using various business intelligence tools. While analytical methods in decision-making help the managers in managing organizational resources optimally, knowledge-based intelligent systems help to automate expertise and reuse experience. Instead of solving a problem using a single intelligent technique like expert system or neural network alone, these can be integrated to model and solve the problems. Integration of analytical
methods and intelligent techniques further makes it powerful combination of knowledge, experience and mathematical/statistical modeling. Such a hybrid framework applied to retail banking has been described and discussed.

Ljubicac Nedovic and Vladan Devedzic presented paper on “Expert systems in finance – a cross-section of the field” said that The breadth of application domains of financial expert systems is best seen in surveys of the entire field of expert systems. One such survey from mid-1990s (Durkin, 1996), has shown that the number of financial expert systems developed and actively used in practice at that time was well over 300 and that the applications ranged from various banking sub domains (such as credit card application processing, evaluation of financial conditions of banks, security transaction analysis, and loan advisory) to bidding and bid preparation, financial planning, market analysis, tax advisory, portfolio management, allowance planning, stock market prediction, investment advisory, insurance risk assessment, and claims authorization and processing.

Alex Louwe Kooijmans and Anna Wang, presented article on “Smarter Bank Data Centers with Expert Integrated Systems” and said that today, banks are operating in a highly volatile climate. Increasing regulation, continuous pressure on cost, changing business models, mergers and acquisitions, and remaining competitive require a flexible, efficient, and smart IT operation: Banks need IT as an accelerator of business growth, not as an inhibitor and data centers can and must be made smarter and need expert integrated systems.

R. V. Kulkarni, B. L. Desai Presented Paper on “Knowledge Based System in Banking Sector” said that In view of enhanced competition, the banking sector has already taken strides towards computerization and automation of their operations. However, this alone will not solve their problems in processing large amount of data and decision-making in scrutinizing and vetting proposals and projects for advances. It is difficult to handle loan proposals which need to be appraised from legal, technical, and economic angles. The need for electronic processing of loan proposals with the help of an expert system is obvious in the emerging scenario. This book explains recent developments in Indian banking. More specifically, it deals with how the experts in the field should take decisions in the process of evaluating a loan proposal, particularly small-scale industry term loans.

Ali Bazmara, Soheila Sardar Donighi, presented paper on “Bank Customer Credit Scoring by Using Fuzzy Expert System” said that Granting banking facility is one of the most important parts of the financial supplies for each bank. So this activity becomes more valuable economically and always has a degree of risk. These days several various developed Artificial Intelligent systems like Neural Network, Decision Tree, Logistic Regression Analysis, Linear Discriminant Analysis and etc. are used in the field of granting facilities that each of this system owns its advantages and disadvantages. But still studying and working are needed to improve the accuracy and performance of them. In this article among other AI methods, fuzzy expert system is selected. This system is based on data and also extracts rules by using data. Therefore the dependency to experts is omitted and interpretability of rules is obtained. Validity of these rules could be confirmed or rejected by banking affair experts. For investigating the performance of proposed system, this system and some other methods were performed on various datasets. Results show that the proposed algorithm obtained better performance among the others.

M. Mahmoud, N. Algadi, A. Ali, presented paper on “Expert System for Bank Credit Decision”, stated that The problem of credit-risk evaluation is a very challenging and important financial analysis problem. Recently, researchers have found that expert systems perform very well for this complex and unstructured problem when compared to more traditional statistical approaches. Expert systems with explanation for decision making can achieve a high predictive accuracy rate; the reasoning behind how they reach their decisions is not readily available. This paper presents an Expert System for Evaluating and Supporting Credit Decisions on the Banking sector (ESESCDB) uses the credit rating weights for each factor that affecting the decision of the credit. This work has established an expert system tool that aids the decision maker to issue the right decision with familiar and easy-to-use interface. There are two main methods have been applied to acquire the knowledge of credit evaluations systems in banking with effectiveness, efficiency and correctness, they are direct and indirect methods. The knowledge has been verified and evaluated with other senior experts, and then some modifications and enhancements have been done to reach the final system.

Wing S. Chow said in the Paper “a knowledge-based support system for personal bank loan analysis” stated that A personal bank
loan is considered as one of the highest risk and unsecured loans that is granted to any individual by the bank for various purposes that does not involve any collateral. For the purpose of reducing the risk factor that is entailed in such a deal, a knowledge-based personal bank loan analysis system is developed which is based on the four criteria of credit principles. The decision relies on a set of protocols that can be used by the bank to draw up a scoring point system for assessing application of this nature. To operate such a system, a series of questions relating to the applicant’s income stability, repayment ability and job mobility will be asked and upon which a decision is made.

6. Concluding remark

Although the literature presents that researches are made in the field of Banking but for the risk management there is no perfect efficient expert system available. There is Expert system for Banking Sector but not for the loan appraisal for large scale industries. No fully implemented expert system is available which open source and due to the lot of procedures may cause delay in processing for term loans proposals.

7. References


