Executive Summary

The recent tarnishing bankruptcies in US such as WorldCom, Enron, HealthSouth, Tyco and many other high profile banks failures in Asia, forced many banks and financial institutions to realize the need for a viable credit risk management. The early decades of this century have witnessed many sensational incidents of accounting irregularities, in which the executives have been caught cooking the books. Over the past few years the credit risk evaluation of MSME by banks and financial institutions has been an active area of research under the joint pressure of regulators and shareholders. The credit survey estimates that about 60% of the MSME credit is provided by commercial banks alone.

The Micro, Small and Medium scale Enterprises (MSME) segment is one of the fastest growing industrial sectors and constitute over 90% of total enterprises in most of the economies in the world. MSME segment has been the second largest employer after agriculture in all Asian countries. A MSME client always has more private information about the risk in his proposal, so that when a client comes with a loan request, the banks have no way to judge its risk extent from the facts in the loan documents. This is the direct reason leading to risk for the banks and the crux of the problem for the banks, an incorrect decision endangers bank’s financial capability ending up in steep decline in the margin of profits. MSME client find themselves spending a significant amount of time and effort while approaching the various banks for credit. Each bank adopts a separate credit risk rating procedure for sanctioning loans.

The manual Credit Risk Evaluation Systems are quite expensive and difficult to maintain. The high cost of retaining the qualified, experienced and trained credit rating executives. Research has shown that human brain is capable of evaluating only a small number of factors at a time, but the credit risk analyst needs to analyze and deal with large number of different value factors in short time which leads to complexity in credit decision making. The effective management of credit risk is a critical component of risk management and essential to the long-term success of any banking organization. The banks are in need of a consistent and integrated credit risk evaluation system to optimize their lending operations. Mathematical models of evaluation are at the core of modern credit risk management systems. The goal of credit risk management is to maximize bank’s risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters.
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The Credit Rating Assessment (CRA) forms an important part of credit risk assessment based on risk parameters like financial, qualitative, business, industry, and management. The present research applied a hybrid soft computing technique called Evolutionary Neuro Fuzzy Logic to design the methodology for evaluating creditworthiness of MSME client. This method takes into account the minute details of credit rating expert’s thought process to arrive at the final decision. A credit rating framework (CRF) is designed, which is flexible and organizes all the risk parameters of client data into five hierarchical levels using top down approach. Neural networks are used to build the self-learning capability to credit rating framework. This credit rating frame work can be customized to fit different business lines and industries.

Expert systems are computer programmes that can reproduce the behaviour of human experts in specific problem domains. Expert systems have enjoyed considerable success in many scientific and technological applications but their application in the field of management is relatively recent. So researchers have designed and developed an expert system prototype called Credit Risk Evaluation Expert System (CREES) using tools like FUZZY, Dream viewer, MySQL server in Eclipse environment.

Authors have studied loan evaluation process followed in various banks and interacted with credit rating experts for manufacturing, trading and service industries of MSME segment and designed rulebases for each of the industry. CREES system used more than 300 rules for each of the industries to evaluate the credit worthiness of the client. International standard credit ratings and Basel guidelines are adopted in the process.

The CREES system is tested with more than 500 samples and results are compared with that of manual decisions taken manually by credit rating executives in banks. The results are matching to the tune of about 95%. Researcher have also published the work in five international journals and presented research papers five International/National conferences. This work has been approved as minor research project by UGC and funded Rs 1,20,000/-

CREES systems can be tested with International Credit data sets as scope for further research.