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## Assessing Credit Risk: an Application of Data Mining in a Rural Bank

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### Abstract

Credit risk assessment for secured loans is an important operation in banking systems to ensure the lenders pay the loans on schedule and to classify the bank as a well performing bank due to regulation. This paper aims to identify factors which are necessary for a rural bank (Bank Perkreditan Rakyat) to assess credit application. By aiming on the reduction of number of non-performing loans, current decision criteria on credit risk assessment are evaluated. Subsequently, a decision tree model is proposed by applying data mining methodology.

The credit risk assessment model is applied to PT BPR X in Bali that had 1082 lenders (11.99%) who had non-performing loans and were identified as bad loan cases. This made PT BPR X was categorized as a poorly performing bank.

Data mining is used to suggest a decision tree model for credit assessment as it can indicate whether the request of lenders can be classified as performing or non-performing loans risk. Using C 5.0 methodology, a new decision tree model is generated. This model suggests that new criteria in analyzing the loan application. The evaluation results show that if this model is applied, PT BPR X can reduce non-performing loans to less than 5% and the bank can be classified as a well performing bank.

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**Keywords:** rural bank; data mining; non-performing loans; decision tree; credit risk assessment.

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## 1. Introduction

Rural bank or Bank Perkreditan Rakyat is a bank that has a specific business activity in serving mutual loans and saving for rural areas and micro small medium enterprises (MSME). The term of BPR referring to rural bank is used in this paper. Undang-undang no 10 1998 defined rural bank, opposed to general banks, as a bank that has business activities without offering services in payment transactions which follows either conventional way or syariah principles. It means that a rural bank must only focuses on mutual loan and saving activities.

Bank Indonesia has a regulation that operational areas of a BPR are limited to a certain province (Bank Indonesia 2011). Bank Indonesia, on its website, informs that in April 2012 there are 1,667 conventional BPR which have in total more than 12 millions customers (or accounts) and about a quarter of these accounts are mutual loan account and the rests are saving accounts. In Bali Province alone, there are 137 active BPR.

As a rural bank, BPR is ideally owned by local entrepreneurs because BPR's main purpose is to develop local economy. It is important that a BPR maintains its operations as a healthy bank to ensure its sustainability to support local businesses and economy. A well performed and healthy BPR should have the following indicators (Bank Indonesia, 2011):

1. CAR (Capital Adequacy Ratio) > 8%
2. Productivity – Non Performing Loans (NPL) < 5%
3. ROA (Return on Asset) > 1,3%
4. Cash Ratio > 4%
5. LDR (Loan to Deposit Ratio) 80% - 95%

Non performing loan (NPL) indicator becomes a crucial indicator for a BPR. A BPR have no make sure that it gives loans to verified and accountable lenders so that the bank would not risk having high NPL rate. To ensure the bank gives loans to right persons, credit assessment is a critical decision making process.

This paper aims to evaluate the decision tree that a BPR had made and to identify what criteria should be considered first. A new decision tree model is recommended using data mining approach. A case study is used in a BPR in Bali (PT BPR X). This bank has served their customers with various products, such as saving, time deposit, western union service, and mutual loans. This bank has a NPL indicator of 11,99% that was way above the determined range. As a result, the study is focused to reduce this NPL indicator.

## 2. Literature Review

### *Credit assessment*

Credit assessment is a study to identify a feasibility of a loan application. It is performed to assess if a potential lender has business activities that are feasible, marketable, profitable and id the laon can be paid on time (Rivai 2006). Usually credit assessment is done by banking account officer which can be a part of an assessment committee. This assessment is done to analyse all factors involved in credit application, such as business financial performance and credit rating of the lenders. Rivai (2006) define 6C's analysis for credit assessment, which are:

1. Character. Character is the lender credit rating, which assess the willingness to pay and the ability to pay based on defined agreement. Character is the most important factor in credit assessment.
2. Capital. Capital is the amount of available initial fund of the lender. The higher the fund, the more the lender is considered to be able to repay the loan.
3. Capacity. Capacity is the ability of the lender to pay the annuity. It is evaluated by the income and the expected income during the period of the loan payment. The capacity is needed to assess the ability to pay from the lender.
4. Collateral. Collateral is lender's properties which should be given to the bank as a warrsnty for the loan. The collateral should have value similar to the loan applied by the lenders.

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