# The Prediction Of A Financial Performance Of Educational Institutions


## Abstract

This study describes the prediction of a financial performance of educational institutions, especially the Multi-agency based. That is one educational institution that has several educational institutions under it. To measure the prediction of the financial performance, the researchers integrate the concept of multiagent system and asyncronuos backtracking algorithm whose function is to look back on the processes of activities in each institution in terms of finance, and then compared from one institution to another. The workings of this algorithm is to calculate some of the result variables from the calculations of each institution. So what will be the best educational institution will appear as the end result or ouput from this research.



## Keywords-Asynchronous Backtracking, Multiagent system, Financial Performance


### Introduction

The professionalism of an institution can be measured, one of which is from the implementation of financial management. Financial administration in an organization is a function that involves the process of recording all financial transactions both from those entering and leaving in a certain period. Financial administration recording period can be made periodically starting from daily, weekly, monthly, quarterly, and yearly.

In the economic perspective, measuring financial performance, there are several types of methods, namely Return On Investment (ROI), Return On Equity (ROE), Economic Value Added (EVA), Market Value Added (MVA), Earnings Per Share (EPS), and using Financial Ratios. with several types, namely Liquidity Ratio, Financial Leverage Ratio, Profitability Ratio, Activity Ratio. Of course with some of the above methods to measure the financial performance of a company or agency has weaknesses and strengths. The backtracking algorithm aims at avoiding the generation of all possible solutions, thereby cutting short the calculation time.

Multiagent system is the task of modeling and calculation becomes a lot more complex because of its increasing size. Then the results from that are very tiring and difficult to handle using a centralized method. Although the motivation to implement Multiagent System (MAS) researchers from a variety of different disciplines, the main advantages of using multi-agent technology are:

1. individuals take into account the specific nature and environment of the application;
2. local interactions between individuals can be modeled and investigated;
3. difficulties in modeling and calculation are arranged as sub-layers and / or components.

Dwija Bhakti has two units of kejuran dwija bhakti 1 and dwija bhakti secondary school. Where management starts paying students until spending is carried out centrally, but the Foundation

has problems related to monitoring and evaluation related to the development of the Education unit, especially in the financial sector of each education unit. the researcher starts to make research related to multiagent system-based financial management with the process of solving it by using the asyncronour backtracking algorithm, which is expected to be able to complete related monitoring and evaluation in the form of financial performance in each institution along with a solution offer after calculation of the acyncronous backtracking algorithm.

## Research Method

The method in this study was divided into three sequences that are Data Collection, Data Pre-Processing, and Data Processing. The data was processed both manually and by using software support. The purpose of this study was to see measurement of financial performance of educational institutions based on multi-system using the ABT approach. Asyncronous Backtracking itself is a computational approach, which is based on building a state-space tree to find solutions. For more details, the algorithm will be explained as shown below.

### Data Collection

The data used for this study is historical data from financial reports of the Dwija Bhakti educational foundation under which there are two educational unit institutions from jombang. The numerical data used was taken from the 2009 period until 2010 from the two units of educational institutions. Total data collectedis 40744 transactions from all types of student payments for student payments (Income) and the total of expenditure transactions is 971. with a total of 2,227 student master data, consisting of 1,171 students from the dwija bhakti 1 educational unit and 1,056 students from the dwija bhakti educational unit 2.

### Pre-Processing

Financial data from the dwija bhakti jombang education foundation must be selected and extracted from each financial report in the form of data tables that can be further processed. Figures and variations of the Selection variable are carried out based on economic theory conducted by previous research. A list of variables can be seen as below. After each feature is needed to calculate the variables obtained, each variable is calculated, and then the variable is obtained in accordance with the existing definition. The number of variables used is more than 10 variables. by using several variables as below:

VPS = Payment From Student (Payment From Student)

VGC = Government Cost Assistance

VNP = Net Profit

VWACC = Weighted Average Cost of Capital

VCD = Cost of debt after tax.

VOC = own cost of capital

VPD = proportion of debt.

VPC = proportion of debt

VNT = Net profit after tax

VPL = Profit and Loss (profit and loss)

2.3. Data Processing

This study uses the Asyncronous backtracking method based on multi-system to process numerical data such as the financial statements of the Dwwi Bhakti Foundation. But the calculation process uses several steps as below by applying the formula, where, i = 1, 2, 3, ..., N and j = 1, 2, 3, ..., D, N, and D represent the number of populations and the number of parameters in each constraint, and rand is the number random at [0,1]. The minimum and maximum values of these parameters are each presented with x_min and x_max. The fitness of the initial population was evaluated and the best kept as the best global.

Selection I

Historical populations are randomly determined as given below to be used to search for paths. At the beginning of each iteration to redefine oldPop, Backtracking uses the 'if-last' rule and after selecting oldPop from the initial and oldPop populations, the position of the population is randomly scrambled to make preparations for the mutation process. The parameters used r1 and r are uniformly distributed random numbers in [0, 1].



## Mutation

The BSA mutation process is completely different from other evolutionary algorithms. This results in the initial form of the experimental population (Mutant) using the control factor F specifying the size of the matrix (oldPop-Pop), which is generally known as the search direction matrix.

## Selection II

In this stage, the suitability of the trial population is evaluated. If the agent's performance of the trace population is better than the corresponding agent performance of the initial population, the agent's initial population and performance are updated with the agent experimental population and concurrent performance based on selection. If the optimal solution is updated the population is better than the best stored solution so the best global solution is updated.

## Result And Analysis

From the results of manual and computational calculations, the following values are obtained. Number of concurrent constraints checks performance of distributed algorithms, two independent measures of performance are commonly used run-time, in the form of concurrent constraints checks of computation, and communication load, in the form of the total number of messages sent. Figure 6 presents the average number of messages sent and the average run-

time in number of concurrent constraints checks of ABT-cf on a binary random DisCSP with Pintra =0.7, T =0.7 and P=0.5. The connectivity density of the agents graph Pintr change from 0.2 to 0.9. We shows that the results of the communication load closely match the results of run-time, as measured by the number of concurrent constraints checks. In other hand, a phase transition reveals when the connectivity of agents increase (i.e from a DisCSP strongly feasible to one weakly feasible).

## Conclusion

In this study, it can be concluded that the financial performance of the revenue section, dwija bhakti 1 is much better than Dwija Bhakti 2, but the financial performance with Dwija Bhakti 2's expenditure section is much better than Dwija Bhakti 1.