A DECISION SUPPORT MODEL FOR STOCK TRADING SIGNAL DETECTION

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ABSTRACT

Most researches focus on the precise price prediction on stock market only; however, determining trading points may be more important than price prediction in decision making. This paper proposed an approach to discover the relationships between various technical indicators, and using ensemble classifier to explore the trading signals hidden in historical data. Experimental results show that we can get better profit with ensemble classifier on stock market in financial investment.

INTORDUCTION

The stock market is a highly non-linear dynamic system. It is subject to interest rates, inflation rates, economic conditions, political issues, and many other effects. Although there are dependencies and correlations between these factors, it is still difficult to model the stock price and these factors trough a mathematical formula. Recent study of stock forecasting only concerns the price variation, and trying to get an accurate models that can predict the future price movement of the stock, rather than its own trading decisions, such as buying / selling point on smart trading decisions support. In order to facilitate investors for their decision making in the stock market, a decision support model by using ensemble classifier is used to discover rules among different classifiers and the stock trading signals in this study.

METHODOLOGY

In this study, we try to detect the stock trading signals and realize the relationship of technical indicators by using a decision support model. First, we choose fourteen common technical indicators as our data set. Next, we use PCA to divide technical indicators into different constructs, and delete low factor loading attributes. Third, we construct a decision support model with ensemble classifier to identify the output of trading signals and evaluate profits of investment as shown in Fig. 1. In order to compare the result with other researches, a stock, AU Optronics Corp. (AUO), is selected for testing the performance of our proposed decision model. In AUO stocks, the historic data of the stock is derived from 2003 to 2011, a total of 462 weekly data. Total data are split into two parts, training data and testing data. The training

data will be based from 2003/01/06 to 2008/12/29 including 309 (2/3) data and the testing data from 2009/1/5 to 2011/12/26 including 153 (1/3) data. A classification rule is built by applying a classifier to the training set. Then, the samples in the test set are treated as new samples and are classified by our proposed decision model. After all, we will get the detected trading signals (buy/sell/hold) and then count the profits. The earning of each stock traded within these training and testing periods is calculated based on an initial investment of NT$1,000,000 dollars. Finally, the net profit is computed with ROI. The comparing results of different classifiers are shown in Table 1. In general, the proposed ensemble classifier has the best performance, followed by SVM and Bayes classifier. It can be seen that ensemble classifier consistently performs better than other classifier irrespective of the ROI.

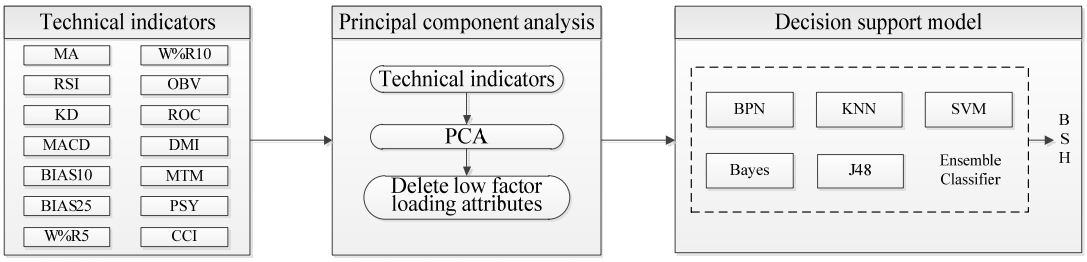

Figure 1 Flow chart of the proposed methodology

Table 1 ROI comparisons of classifiers in AUO Company

Comparison result						
Classifier	BPN	kNN	SVM	Bayes	J48	Ensemble
Trading times	40	36	36	34	36	34
ROI (%)	22.44	18.60	34.85	34.09	28.69	36.35

RESULT AND DISCUSSION

An ensemble classification model has been proposed for the interpretation of variance shift signal in multivariate processes. We applied a decision support model with ensemble classifier to generate trading signals. The experimental results show that decision support model with ensemble classifier can make significant amount of profit. The results of extensive simulation studies indicate that the proposed ensemble classifier provides better performance than single classifier. It is believed that the proposed ensemble classification system can be used in detecting the trading points of a specific stock. According to these reasons, we have provided a convenient model for individual investment which may be ensure that they can make profits in stock market investment.

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