

Case Study: Stock Market Price Predictions by different Datamining Techniques

Introduction

The main reason why every trader trades is to earn money. If only there was an effective way to predict the market price, it would have made trading less challenging. Prediction of stock market price is done using trend and momentum indicators defined by legends. Stock market prediction using data mining techniques is a common practice as data mining is a powerful tool for data analysis.

Data mining

Data mining can be described as making better use of data. Stock market predictions have also been achieved using the traditional and charting techniques. But the results have been observed to be affected by the human biases of the understanding of the market trends. Applying business intelligence techniques of data mining helped increase the accuracy levels of the predictions.

This case study compares predictions by 6 different data mining techniques.

Data

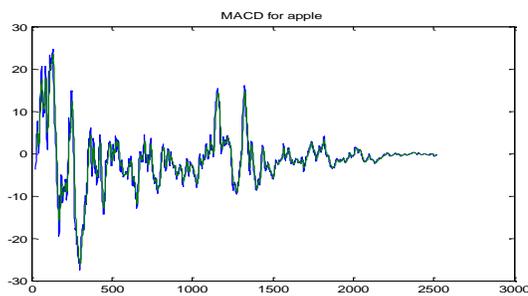
The data selected is intraday data leaving out Saturday and Sunday. The experimental data is collected from stock market data of Reliance Group and it was directly taken from yahoo finance. The data was stored from August 2nd 2002 to December 30th 2011 for a period of 11 years, 4 months and 28 days. A total of 2,500 data was used for

prediction of stock market using different data mining techniques.

Data Mining Techniques

1. MACD

Moving Average Convergence Divergence indicator is referred as a **trend oscillator** that is constructed by subtracting the value of a long EMA from a short EMA. The MACD "oscillator" or "indicator" is a collection of three signals that is calculated from historical price data, most often the closing price. These three signal lines are: the MACD line, the signal line or average line, and the difference or divergence. Since the MACD is based on moving averages, it is inherently a **lagging indicator**.

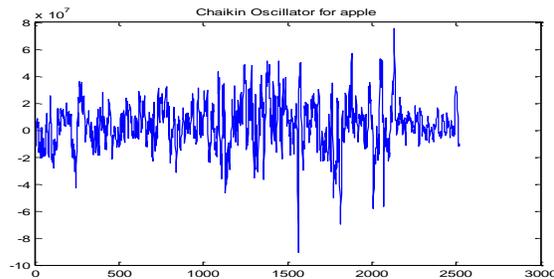


2. Chaikin Oscillator

The Chaikin Oscillator is created by subtracting a 10-period EMA of Accumulation or Distribution from a 3-period EMA of Accumulation or Distribution. This allows us to analyze the accumulation and distribution in the convenient form of an oscillator. The Chaikin Oscillator is the difference between the 3-day EMA of the Accumulation Distribution Line and the 10-day EMA of the

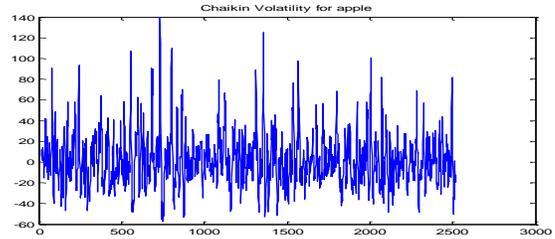
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Accumulation Distribution Line. It is a **momentum indicators**, differs from other volume oscillators because it substitutes the average price of the day for the **opening price**. Strong rallies need rising volume. Without that volume, the rallies have no depth. Declines, on the other hand, are usually accompanied by low volume, because 'hope' tends to make investors hang on far longer than they should. When a volume increase occurs, it usually indicates panic selling, and may thus mark the end of the decline.



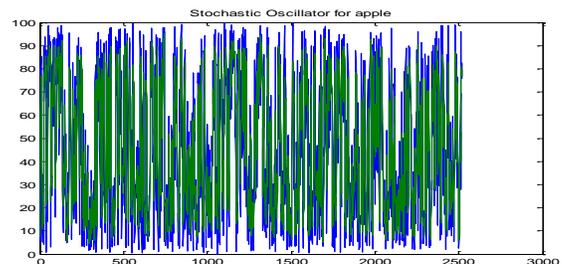
3. Chaikin Volatility

The Chaikin Volatility indicator is the rate of change of the trading range. The indicator is defined as volatility as an increasing of the difference between the high and low. A rapid increase in the indicator indicates that a low is approaching while a gradual decrease indicates a high is approaching. The Chaikin Volatility Indicator is the difference between two moving averages of a volume weighted accumulation-distribution line.



4. Stochastic Oscillator

The Stochastic Oscillator measures how much a price tends to close in the upper or lower areas of its trading range. Stochastic %D is a smoothed version of the stochastic %K. Stochastic D% is used as a signal line for Stochastic K%. A buy is triggered when Stochastic K% crosses above Stochastic D% from a level typically below 30. A sell if triggered when Stochastic K% crosses below Stochastic D% from typically above 70. The stochastic oscillator is a **momentum indicator** that uses support and resistance levels.

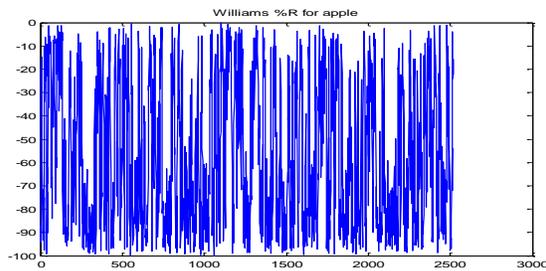


5. Williams %R

Williams %R is a **momentum indicator** that is the inverse of the Fast Stochastic Oscillator. Williams %R reflects the level of the close relative to the highest high for the look-back period. In contrast, the Stochastic Oscillator reflects the level of the close relative to the lowest low. %R corrects for the inversion by multiplying the raw value

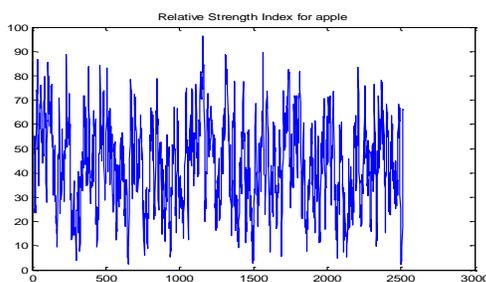
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by -100. As a result, the Fast Stochastic Oscillator and Williams %R produce the exact same lines, except for scaling. Williams %R, or just %R, is a technical analysis oscillator showing the current closing price in relation to the high and low of the past N days.



6. RSI

RSI measures a market's internal strength, by dividing the sum of up day closing prices by the sum of down day closing prices over a specific period of time. It returns a value within the range of 0 to 100. The indicator should not be confused with relative strength. The RSI is classified as a **momentum oscillator**, measuring the velocity and magnitude of directional price movements.



Decision Table

The decision table shown below indicates when to Buy, Sell and Hold a stock based on individual data mining techniques results.

	Buy	Hold	Sell
MACD	less than 10	-10 to 10	Above 10
RSI	Below 30	30 to 70	Above 70
William %R	Below -80	-80 to 20	Above -20
Stochastic oscillator %D	Below 25	25 to 70	Above 70
Chaikin oscillator	Above 40,000	40,000 to 40,000	Below 40,000
Chaikin volatility	Below -25	-25 to 50	Above 50

Results

In this study 6 data mining techniques are applied to predict Buy, Hold, Sell signals then final decision is taken by comparing the signal appearing maximum no. of times will be selected.

	Hold	Sell	Buy
MACD	2236	152	129
RSI	1720	181	616
William %R	1297	447	773
Stochastic %D	1249	480	788
Chaikin oscillator	5	976	1536
Chaikin volatility	2081	131	305
Final decision	1811	192	515

Conclusion

The input data of 2,500 approximately predicted as, from MACD technique, 2236 hold, 152 sell, 129 buy. From RSI technique, 1720 hold, 181 sell, 616 buy. From William %R 1297 hold, 447 sell, 773 buy. From Stochastic %D, 1249 hold, 480 sell, 788 buy. From chaikin oscillator 5 hold, 976 sell, 1536 buy. From chaikin volatility, 2081 hold, 131 sell, 305 buy. In final decision, the results are 1811 hold, 192 sell and 515 buy.