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PREDICTION OF STOCK PRICES AT KUALA
LUMPUR STOCK EXCHANGE (KLSE) USING
ARTIFICIAL NEURAL NETWORK

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SUPERVISOR DECLARATION

I hereby declare that I have checked this thesis and my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Bachelor of Software Engineering.

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Date : 5 JANUARY 2015

STUDENT DECLARATION

I hereby declare that the work in this thesis is my own for quotations and summaries which have been duly acknowledge.

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Date : 5.1.2015

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ABSTRACT

It is known that Artificial Neural Network (ANN) technique that can make prediction. Stock market prices are tough to predict because there are many factors involve thus making it hard to make prediction. Three counters from KLSE, AIRASIA, AMBANK, and ASTRO are chosen to compare the prediction between those counters. Six month's of data from each of those counter are used for the predictions and compared for getting the results. Two values of predictions for today and yesterday are obtained by using the prototype. By comparing both values, the increase and decrease of the stock prices can be revealed. The results from the prototype shows that ANN can be used to predict increase or decrease of the stock prices for each of the related counters.

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LIST OF ABBREVIATION

KLSE	-	Kuala Lumpur Stock Exchange
FRET	-	fuzzy rule extraction tool
FAM	-	Fuzzy Associative Memories
ANN	-	Artificial Neural Network

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

A stock market or equity market is a public entity for the trading of company stock (shares) and derivatives at an agreed price. The stocks are listed and traded on stock exchanges which are entities of a corporation or mutual organization specialized in the business of bringing buyers and sellers of the organizations to a listing of stocks and securities together. Sometimes, the market seems to react irrationally to economic or financial news, even if that news is likely to have no real effect on the fundamental value of securities itself. So, it is quite hard to really predict the ups and down of stock price. Luckily, there exist techniques in Artificial Intelligence (AI) especially for making prediction .Fuzzy logic, Artificial Neural Network, and Rule Induction are three of the techniques that are proven effective in making prediction. Three (3) counters will be compared from Kuala Lumpur Stock Exchange (KLSE) as references to prove the technique used in this thesis.

1.2 PROBLEM STATEMENT

Stock market is a place that has high risk because stock price changes frequently and hard to predict. The prices will depend on many factors such as internal developments of the company, world event, inflation and interest rate, exchange rates, and hype. For internal developments, stock price of a company will increase. World event such as war has a lot of effect on stock price too. The periodic adjustment of inflation and interest rate, also exchange rates for money affect stock price. Hype involves the release of new product or promotion of a company that directly involves the stock price of that company. It is problematic to make decision about the stock even for an experienced person. They must have perfect timing either want to sell, buy, or hold the stock in their portfolio. One wrong move will cause great losses of money and time. Also, human mind cannot analyze data as fast as computer when it comes to gigantic amount of data. There is simply not enough time to analyze all that data as fast as possible especially for a human mind.

1.3 OBJECTIVE

The objectives of the research are to:

- 1) To built a prototype that can make prediction for stock market prices at Kuala Lumpur Stock Exchange (KLSE).
- 2) To apply the use of Artificial Neural Network, an Artificial Intelligence technique used for prediction.
- 3) To test the ability of the prototype to predict the increase or decrease of the stock market prices at KLSE.

1.4 SCOPE

- 1) Make use of 6months' worth of data from Kuala Lumpur Stock Exchange (KLSE) to make prediction.
- 2) Compare 3 related counters chosen from Kuala Lumpur Stock Exchange (KLSE)
- 3) Compare 3 different Artificial Intelligence techniques to be used for prediction, Fuzzy Logic, Artificial Neural Network, and Rule Induction.

1.5 THESIS ORGANIZATION

This thesis consists of six (6) chapters:

- Chapter 1: This chapter will discuss on introduction to research on the Prediction of Stock Market Using Artificial Neural Network. Problem statement is also discussed and also the scopes and objectives of this thesis.
- Chapter 2: This chapter is literature review, will explain more about the selected project and also previous work related to it. This is where information related with regards to the project will be explained.
- Chapter 3: This chapter proposed the methodology that discusses the overall approach and framework of research. It should cover method, technique or approach to be used.
- Chapter 4: This chapter is design and implementation. It is to develop the framework and model through flow work, continuously design the research which includes any planning of data analysis.
- Chapter 5: This chapter is results and discussion. Its purpose is about finding the results from data analysis. The important content is Result Analysis, and Research Constrains.
- Chapter 6: This chapter is for conclusion. Conclusion for all the researches that have been done throughout the chapters must be included.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Stock market prediction is an area that has been gaining long interest across the fields of finance and many research communities. The difficulty of predictability of the financial markets has stood for a long time while many techniques are invented in order to reduce it. Technical analysis believes that historical prices and other indicators can reveal correlations and patterns of stock price movements and leads to the predictability of future prices. In recent years, more advanced computational techniques such as artificial neural networks, genetic algorithms and support vector machines make the analysis and learning of such patterns more popular. These machine learning techniques have been seen successfully application on text based task such as information retrieval, text categorization and clustering. Holding the belief that stock prices are highly correlated and sensitive to unseen news and events that bring new information for the market to absorb, approaches utilizing learning scheme to find out such correlation and impact from past in order to predict future reaction on news are devised.

In general the approaches to predict stock price could be roughly categorized into two kinds, fundamental analysis and technical analysis. Fundamental analysis is based on macroeconomic data, such as export and imports, money supply, interest rates, inflationary rates[8], foreign exchange rates, unemployment figures, and the basic financial status of companies such as dividend yields, earnings yield, cash flow yield, book to market ration, price-earning ratio, lagged returns, and size.

Technical analysis is based on the rationale that history will repeat itself and that the correlation between price and volume reveals market behavior. Prediction is made by exploiting implications hidden in past trading activities, and by analyzing patterns and trends shown in price and volume charts.

Basically the test of weak form efficient market is to test whether there exist excess return by using technical analysis. There have been some researches claiming the existence of the weak form of efficient market [9]. Also some claiming that the weak form efficient market does not exist, and so far the research remains inconclusive.

One of the most commonly used methods in technical analysis is the moving average filter rule. The criterion is that the buying signal happens when the short term moving average line breaks through the long term moving average line from down, and the selling signal happens when the short term moving average line breaks through the long term moving average line from up. The logic behind this rule is to identify periods when expected returns deviate from unconditional means [10]. Although concluded that the filter rules are not useful, the non trivial ability to predict the price change by using the filter rules.

Similar to the filter rules, KD technical rules proposed by Lane (1957), is trying to capture the period when expected returns deviate from unconditional means by using K and D indexes instead of the moving averages. Essentially K and D indexes with the advantages of momentum, relative strength, and moving average, and with the consideration of the highest and the lowest prices, are expected to be capable of capturing the short term variance. However, the KD filter rules could be too simple to be effective. Besides, the parameters for the rules are arbitrary.

However, this thesis is all about making prediction for stock market at KLSE by using certain techniques that can be use for prediction. Several peoples agreed that there are three AI techniques identified for predicting stock market; Artificial Neural Network, Fuzzy Logic, and Rule Induction [1], [2], [3].

2.2 FUZZY LOGIC

Fuzzy logic are trading models designed usually consist of a few fuzzy rules expressing the relationship between inputs and desired output of the market. In these models, inputs are fuzzified, membership functions are created, association between inputs and outputs are defined in a fuzzy rule base, and fuzzy outputs are rest at the crisp values [4]. Fuzzy logic is already in used a lot of time by other people.

Benachenhou (1994) developed a fuzzy rule extraction tool (FRET) that extracts fuzzy rules from input-output data by FAM method, and then uses them in a fuzzy decision support system. A fuzzy rule set derived from sample data is then used as a fuzzy expert system for trading. The model achieves the ratio of winning versus losing trades equal to 4.6.

Assisting the traders in arriving at purchase decisions, Man and Bolloju (1995) implemented a prototype of a fuzzy rule based decision support system. To extract and transfer dealers' expertise, they employed unstructured interviews with some experienced dealers. Fuzzy rules representing the dealers' decision making process are quite close to the terminology used by the dealers and the rules are easily interpretable by the dealers. Authors believe that use of fuzzy logic for knowledge representation has facilitated a high level of abstraction of the experts' knowledge. Moreover, the flexible relationship represented by membership functions and fuzzy rules, between the variables in the model have provided a robust model of the decision making process.

Fuzzy Associative Memories (FAM) a method proposed by Kosko (1992) was used to determine market rules. In Kosko's method, the weight vector of a network trained by input-output data is considered as the membership function of input-output space. The model is trained by daily data of six months, and the rate of correct prediction is found to be 74%. The duration in which this performance is achieved is not mentioned in the literature

Ye and Gu (1994) developed a hybrid neuro-fuzzy model in which fuzzy logic enhances a neural trading system. The model takes the closing price, and Shanghai Stock Indicator of individual stocks as inputs, and outputs three values indicating whether a trend is ascending, descending or stationary.

2.3 ARTIFICIAL NEURAL NETWORK

Neural networks are usually used for pattern recognition or classification, are a connected set of simple processing elements or nodes, where a weight is associated to each connection between nodes. Weights are initialized randomly at the beginning, and as the network begins to learn, the weights change [5]. Like fuzzy logic, neural network also have seen to be used for prediction.

Several systems based on neural networks have produced promising results. Most of them only use indicators and historical market data, such as moving average, or closing price. A study has been done to predict stock prices on short-term, day to day type of prediction. It is tested by using three German stocks randomly chosen to compare the effectiveness of neural networks and BACK-PROPAGATION. The results for neural networks were outstanding within 10 days time span, an accuracy of up to 90% was achieved from the prediction between those three German stocks. By comparing both technique, it led to the expectation that neural network could improve prognosis of stock prices in the future [18].

James Hall (1994) built a stock selection system using neural networks. Unlike many stock selection methods, this system does not use expert rules. Instead, the system discovers some patterns in the market and selects attractive stocks based on them.

Gencay (1998) used a total of 90 years of daily Dow Jones Industrial Average Index from 1897 to 1988; to examine the predictability of the stock market. The market is modeled by single layer feed for neural networks. The technical trading used in this study is very simple and popular, like the moving average. The simplest version of this rule suggests that traders sell, whenever the price climbs above its moving average, and

buy when it drops below. The results report strong evidence of nonlinear predictability in the stock market returns by using the past buy and sell signals of the moving average rules. They also suggest that it is worth investigating more elaborate rules and the profitability of these rules after accounting for transaction costs.

Lawrence (1997) stated that neural networks are not perfect in their prediction, but their performances are better than all other methods and some day make dynamic, chaotic systems such as the stock market can be fully understood [19].

2.4 RULE INDUCTION

Rule induction or decision tree methods are capable of culling through a set of predictors by successively splitting a data set into subgroups on the basis of the relationships between predictors and the output field.[6]

All the techniques mentioned are all used already for many existing systems and proven to be effective. However, only the best technique is going to be used for the system in this thesis and it is neural networks. Schöneburg(1990) has done research using neural networks and stated that the prediction using that technique gave 90% accuracy than other techniques. It is also simple and easy to implement in the system to make prediction fast and efficiently.

The three techniques are compared and neural networks proven to be the best among all three techniques.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

The project is done by doing research about stock market at KLSE. Trying to enter the stock market is difficult for inexperienced broker, but it is not impossible. By using certain technique in Artificial Intelligence, buying or selling are much easier even for beginners. First the research is done by researching other thesis about the prediction of stock market. During research, three AI techniques are found applicable for prediction in stock market. The three techniques are fuzzy logic, neural network, and rule induction.

By more researching, it is found that by comparing the three techniques, fuzzy logic is the best choice for predicting stock market. All the other techniques is good but among the thesis researched, it is proven that fuzzy logic are better.

Next is detail research about the stocks at KLSE. Research is done thoroughly and three counters are chosen from KLSE, which are AIRASIA, AMBANK, and ASTRO.

3.2 METHODOLOGY

The development of this thesis involves a few steps that must be done to accomplish all the objectives. The following flowchart will show all the important steps that are vital to this thesis.

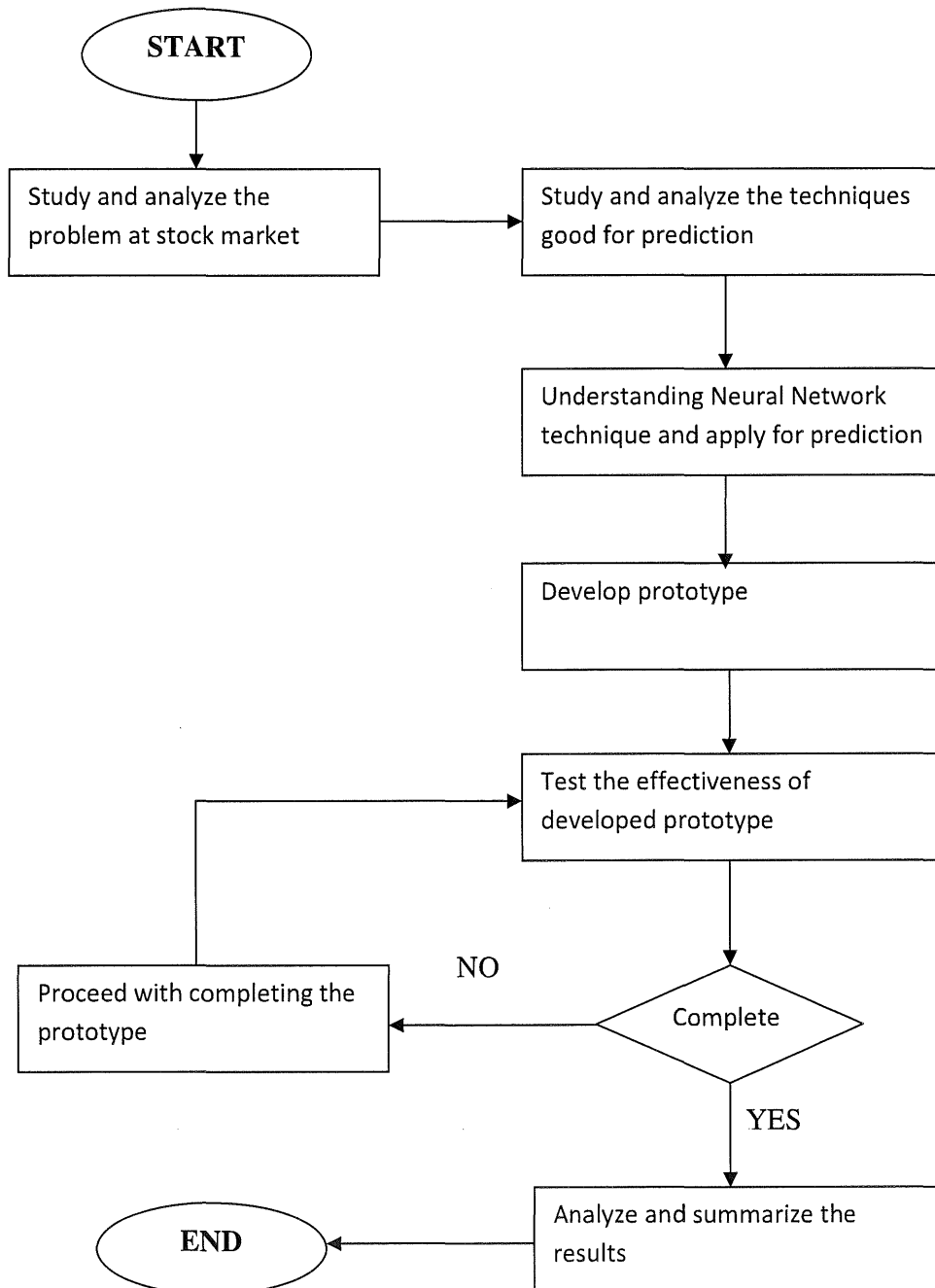
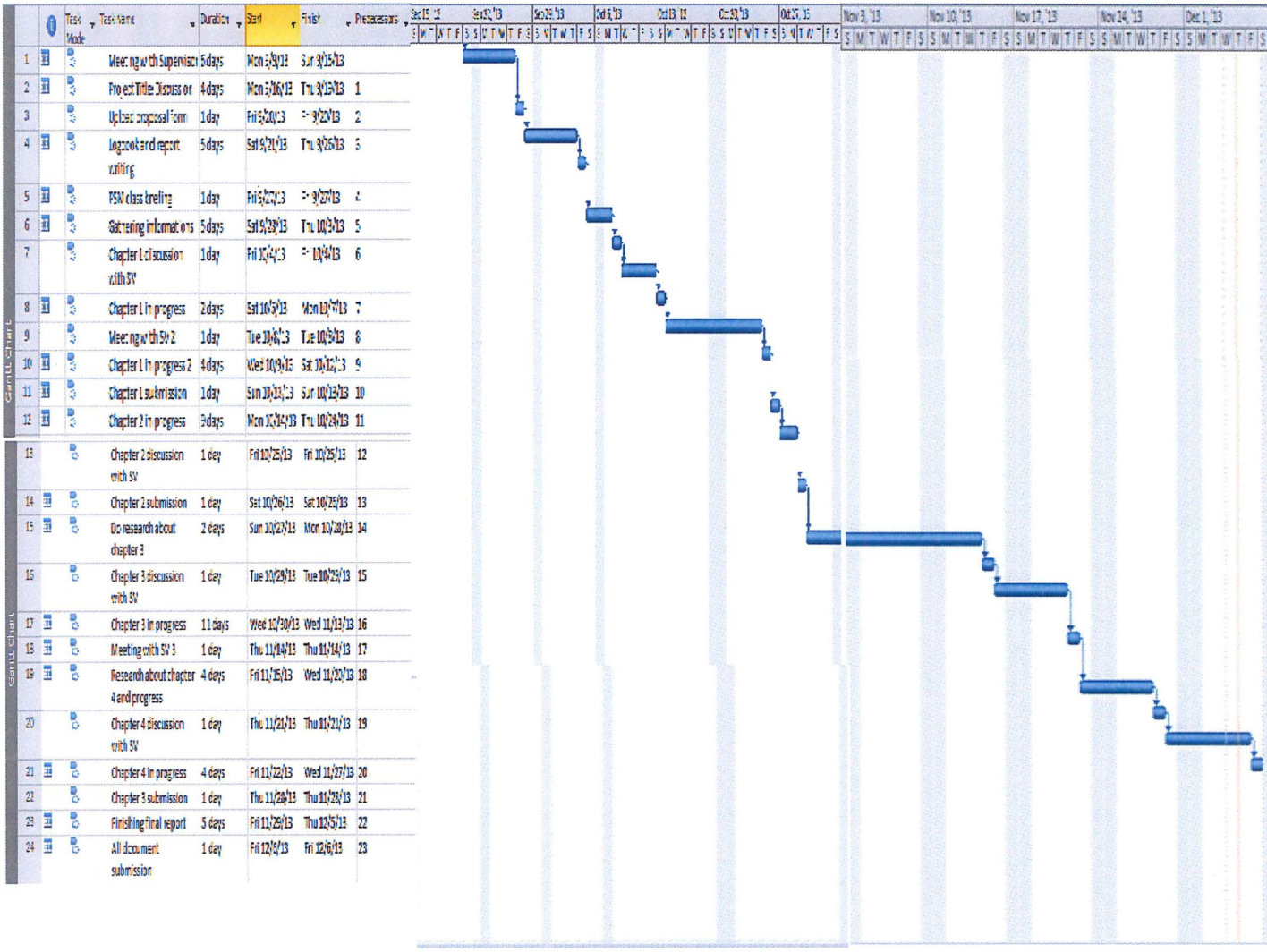


Figure 1: Flowchart of the thesis

3.3 HARDWARE AND SOFTWARE

Hardware & Software	Descriptions	Importance
1) Toshiba Qosmio F60 Laptop	The hardware use to keep all the software and project.	All information are stored here
2) IDM 6.15	Software used to download information.	Much faster download that saves time.
3) Netbeans IDE 7.3	Software use to actually make the program for predicting stock market.	Main software for programming.
4) Chartnexus 4.2	Software that shows all stock markets at KLSE for the last 3 years.	Shows all information about the stock market.
5) Microsoft Word	Software used to make documentation.	Make it easier with many tools for making document.
6) Microsoft Project	Software use to make Gantt chart	Make schedule more effective and precise

Table 1: Hardware and software used in the system



3.4 GANTT CHART

CHAPTER 4

DESIGN AND IMPLEMENTATION

4.1 INTRODUCTION

The purpose of this chapter is to develop the framework and model through flow work and continuously designing the research which include any planning of data analysis.

This thesis will discuss the process and data gathering for research purposes and sketching the work flow and model using special software such as Microsoft Visio, Rational Rose or other. Microsoft Words are not allowed.

It will be explain how the data/model/ process/ hardware been implemented into selected algorithm.

4.2 DEFINE ALGORITHMS

Artificial neural networks are inspired from biological neurons in the brain. The brain has been studied by scientist to understand their complexity and only small portion knows by scientists. Signals are transferred from one neuron to another by synapses using a complex chemical process released from the sending side of the junction. It is this characteristic that the artificial neural network attempt to reproduce

by making artificial ways by copying the brain functions. The neuron model shown in Figure 2 is the one widely used in artificial neural networks for making prediction.

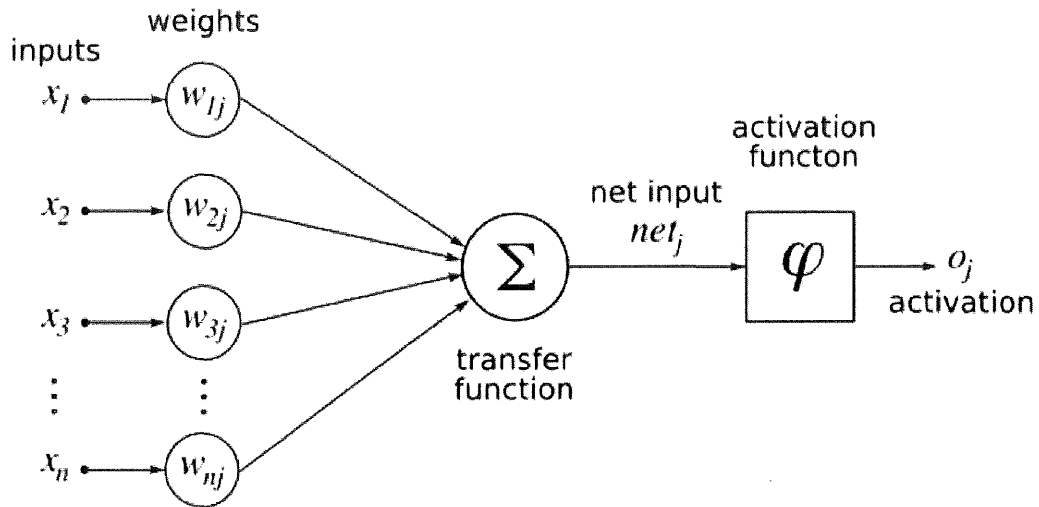


Figure 2: Artificial Neuron Structure

The artificial neuron shown in this figure has N input, represented by $x_1, x_2, x_3, \dots, x_n$. Each line connected to the inputs is assigned a weight which represented by $w_{1j}, w_{2j}, w_{3j}, \dots, w_{nj}$. Weights in the artificial neural networks have connections in biological neurons. For the prediction of stock market, there are eight inputs that includes weight are the open, close, highest and lowest stock price for yesterday and today. The input and the weight will be used to find the value of x by using the following formula.

Transfer Function:

$$x = \sum_{j=1}^N w_{ij} x_i$$

The weight, w can be the open stock price of today and close stock price of yesterday, and input, x is the highest and lowest stock price during the day. Four inputs are needed for yesterday and today for making the prediction of the closing price for the stock market.

After finding the value of x , activation function needs to be calculated and one formula for the activation function is chosen. The formula is the sigmoid activation function, a mathematical function having an “S” shape of sigmoid curve.

Sigmoid Activation Function:

$$f(x) = \frac{1}{1+e^{-(x)}}$$

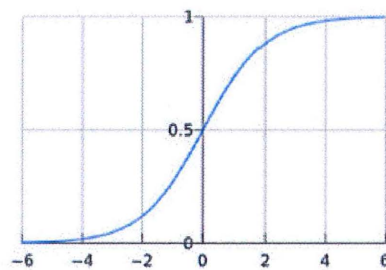


Figure 3: Sigmoid Curve

The value of x in this sigmoid activation function is used from the output calculated in the transfer function.

The last step is to use formula for prediction by using all the calculation done in transfer function and activation function. The formula used is shown below.

Prediction Formula:

$$\text{Prediction} = \text{Range} \times (\text{output} + \text{low price})$$

The value for range is the highest price minus the lowest price. The value for output is the value calculated by using the sigmoid function. The value of low price is the lowest stock price during the day.

Two value of prediction will be available that are prediction value of yesterday and today stock price. Lastly, both the values are compared to show prediction of the stock price of today will increase or decrease. This is a Feedforward ANN technique where connections between unit do not form a cycle and move in one direction, forward from input nodes, through hidden nodes to outputs.

4.3 DATA GATHERING

For this thesis, data are taken from KLSE and the amount of data is one year. All these data are taken by using Chart Nexus 4.2, a software specific for viewing data at stock market that contain three years of data. Although one year of data is obtained, only six month data are shown in this thesis for reference. The data are chosen from three different counters at KLSE which are AIRASIA (AirAsia Berhad), AMBANK (AMMB Holdings Berhad), and lastly, ASTRO (Astro Malaysia Holdings Berhad). The following are all information about the counters and the one month worth of data from each company.

The data shown are only one month of data for each company with date 1 November 2011 to 29 November 2011. Open indicates the open price of those stocks during that day and 2.68 in the tables means RM 2.68 per stock. High in the table means the highest stock price and low means the lowest stock price during that day. Close means the closing price of the stock after KLSE is close at 5 p.m.

4.3.1 AIRASIA

AirAsia Berhad (AirAsia) is engaged in the provision of air transportation services. As of December 31, 2010, the Company operated a fleet of 90 aircraft and flies to more than 65 destinations in 18 countries from hubs in Malaysia, Thailand and Indonesia. In 2011, the Company had added Chiang Mai and Medan as new hubs in Thailand and Indonesia, respectively. Its subsidiaries are AA International Ltd, which is an investment holding company; AirAsia Go Holiday Sdn Bhd, which is engaged in tour operating business; AirAsia (Mauritius) Limited, which is engaged in providing aircraft leasing facilities to Thai AirAsia Co. Ltd; Airspace Communications Sdn Bhd, which is a media owner with publishing division; Aras Sejagat Sdn Bhd, which is a special purpose vehicle for financing arrangements required by the Company, and Asia Air Limited, which is engaged in the provision and promotion of AirAsia Berhad's in-flight food to the European market.

No.	Date	Open	High	Low	Close
1	Tue, Nov 01 2011	3.840	3.840	3.690	3.690
2	Wed, Nov 02 2011	3.600	3.870	3.580	3.850
3	Thu, Nov 03 2011	3.860	3.860	3.760	3.780
4	Fri, Nov 04 2011	3.800	3.840	3.770	3.800
5	Tue, Nov 08 2011	3.850	3.870	3.810	3.810
6	Wed, Nov 09 2011	3.810	3.840	3.810	3.840
7	Thu, Nov 10 2011	3.790	3.790	3.720	3.770
8	Fri, Nov 11 2011	3.740	3.790	3.740	3.780
9	Mon, Nov 14 2011	3.800	3.840	3.770	3.840
10	Tue, Nov 15 2011	3.840	3.920	3.830	3.880
11	Wed, Nov 16 2011	3.880	3.920	3.870	3.910
12	Thu, Nov 17 2011	3.900	3.900	3.800	3.800
13	Fri, Nov 18 2011	3.750	3.810	3.650	3.650
14	Mon, Nov 21 2011	3.680	3.690	3.610	3.660
15	Tue, Nov 22 2011	3.670	3.680	3.610	3.670
16	Wed, Nov 23 2011	3.590	3.640	3.450	3.550
17	Thu, Nov 24 2011	3.470	3.680	3.470	3.660
18	Fri, Nov 25 2011	3.670	3.670	3.580	3.620
19	Tue, Nov 29 2011	3.640	3.680	3.620	3.660
20	Wed, Nov 30 2011	3.640	3.710	3.640	3.690
21	Thu, Dec 01 2011	3.750	3.870	3.750	3.810
22	Fri, Dec 02 2011	3.790	3.910	3.720	3.910
23	Mon, Dec 05 2011	3.920	3.940	3.870	3.920
24	Tue, Dec 06 2011	3.930	3.940	3.880	3.930
25	Wed, Dec 07 2011	3.910	3.930	3.810	3.920
26	Thu, Dec 08 2011	3.900	3.900	3.790	3.790
27	Fri, Dec 09 2011	3.770	3.780	3.650	3.670
28	Mon, Dec 12 2011	3.720	3.800	3.720	3.790
29	Tue, Dec 13 2011	3.750	3.760	3.700	3.710
30	Wed, Dec 14 2011	3.730	3.740	3.650	3.650
31	Thu, Dec 15 2011	3.660	3.720	3.650	3.710
32	Fri, Dec 16 2011	3.720	3.750	3.680	3.740
33	Mon, Dec 19 2011	3.740	3.740	3.700	3.720
34	Tue, Dec 20 2011	3.720	3.720	3.590	3.600
35	Wed, Dec 21 2011	3.670	3.700	3.630	3.660
36	Thu, Dec 22 2011	3.640	3.700	3.630	3.700
37	Fri, Dec 23 2011	3.720	3.730	3.690	3.700
38	Mon, Dec 26 2011	3.720	3.730	3.690	3.700
39	Tue, Dec 27 2011	3.680	3.730	3.670	3.730
40	Wed, Dec 28 2011	3.730	3.770	3.680	3.750
41	Thu, Dec 29 2011	3.720	3.770	3.710	3.770
42	Fri, Dec 30 2011	3.770	3.780	3.730	3.770
43	Mon, Jan 02 2012	3.770	3.780	3.730	3.770
44	Tue, Jan 03 2012	3.760	3.780	3.680	3.680
45	Wed, Jan 04 2012	3.750	3.770	3.650	3.650
46	Thu, Jan 05 2012	3.650	3.670	3.630	3.650

47	Fri, Jan 06 2012	3.680	3.690	3.640	3.660
48	Mon, Jan 09 2012	3.670	3.700	3.640	3.700
49	Tue, Jan 10 2012	3.690	3.720	3.660	3.700
50	Wed, Jan 11 2012	3.700	3.710	3.670	3.690
51	Thu, Jan 12 2012	3.690	3.700	3.680	3.680
52	Fri, Jan 13 2012	3.670	3.690	3.660	3.660
53	Mon, Jan 16 2012	3.650	3.660	3.610	3.630
54	Tue, Jan 17 2012	3.630	3.660	3.610	3.650
55	Wed, Jan 18 2012	3.650	3.680	3.630	3.650
56	Thu, Jan 19 2012	3.650	3.650	3.620	3.630
57	Fri, Jan 20 2012	3.630	3.650	3.600	3.620
58	Wed, Jan 25 2012	3.620	3.630	3.590	3.600
59	Thu, Jan 26 2012	3.610	3.610	3.570	3.590
60	Fri, Jan 27 2012	3.580	3.610	3.570	3.590
61	Mon, Jan 30 2012	3.590	3.610	3.540	3.560
62	Tue, Jan 31 2012	3.570	3.590	3.540	3.550
63	Thu, Feb 02 2012	3.600	3.700	3.580	3.700
64	Fri, Feb 03 2012	3.660	3.730	3.660	3.700
65	Wed, Feb 08 2012	3.660	3.730	3.660	3.700
66	Thu, Feb 09 2012	3.700	3.720	3.690	3.720
67	Fri, Feb 10 2012	3.740	3.800	3.720	3.780
68	Mon, Feb 13 2012	3.790	3.790	3.730	3.760
69	Tue, Feb 14 2012	3.750	3.750	3.680	3.680
70	Wed, Feb 15 2012	3.690	3.700	3.650	3.670
71	Thu, Feb 16 2012	3.700	3.700	3.610	3.640
72	Fri, Feb 17 2012	3.700	3.740	3.620	3.660
73	Mon, Feb 20 2012	3.660	3.710	3.660	3.670
74	Tue, Feb 21 2012	3.680	3.700	3.660	3.700
75	Wed, Feb 22 2012	3.700	3.700	3.630	3.650
76	Thu, Feb 23 2012	3.640	3.640	3.560	3.580
77	Fri, Feb 24 2012	3.560	3.620	3.540	3.610
78	Mon, Feb 27 2012	3.610	3.630	3.610	3.610
79	Tue, Feb 28 2012	3.610	3.640	3.600	3.610
80	Wed, Feb 29 2012	3.620	3.670	3.590	3.660
81	Thu, Mar 01 2012	3.660	3.670	3.650	3.650
82	Fri, Mar 02 2012	3.650	3.690	3.630	3.650
83	Mon, Mar 05 2012	3.660	3.720	3.650	3.680
84	Tue, Mar 06 2012	3.700	3.700	3.650	3.700
85	Wed, Mar 07 2012	3.600	3.690	3.600	3.670
86	Thu, Mar 08 2012	3.690	3.700	3.650	3.660
87	Fri, Mar 09 2012	3.680	3.690	3.620	3.630
88	Mon, Mar 12 2012	3.610	3.640	3.590	3.590
89	Tue, Mar 13 2012	3.600	3.630	3.540	3.540
90	Wed, Mar 14 2012	3.560	3.680	3.560	3.590
91	Thu, Mar 15 2012	3.620	3.620	3.560	3.580
92	Fri, Mar 16 2012	3.590	3.620	3.510	3.580
93	Mon, Mar 19 2012	3.600	3.600	3.570	3.580

94	Tue, Mar 20 2012	3.610	3.620	3.550	3.590
95	Wed, Mar 21 2012	3.590	3.600	3.550	3.590
96	Thu, Mar 22 2012	3.600	3.630	3.580	3.590
97	Fri, Mar 23 2012	3.600	3.600	3.520	3.590
98	Mon, Mar 26 2012	3.580	3.580	3.460	3.460
99	Tue, Mar 27 2012	3.480	3.480	3.340	3.350
100	Wed, Mar 28 2012	3.360	3.400	3.360	3.380
101	Fri, Mar 30 2012	3.440	3.470	3.420	3.450
102	Fri, Mar 30 2012	3.440	3.470	3.420	3.450
103	Mon, Apr 02 2012	3.460	3.480	3.390	3.400
104	Tue, Apr 03 2012	3.420	3.440	3.400	3.410
105	Wed, Apr 04 2012	3.410	3.430	3.400	3.430
106	Thu, Apr 05 2012	3.430	3.440	3.400	3.420
107	Fri, Apr 06 2012	3.400	3.430	3.400	3.400
108	Mon, Apr 09 2012	3.410	3.420	3.390	3.390
109	Tue, Apr 10 2012	3.390	3.420	3.390	3.410
110	Thu, Apr 12 2012	3.370	3.440	3.350	3.440
111	Fri, Apr 13 2012	3.440	3.520	3.440	3.470
112	Mon, Apr 16 2012	3.480	3.520	3.460	3.470
113	Tue, Apr 17 2012	3.450	3.470	3.440	3.450
114	Wed, Apr 18 2012	3.440	3.470	3.430	3.460
115	Thu, Apr 19 2012	3.460	3.520	3.460	3.500
116	Fri, Apr 20 2012	3.520	3.520	3.490	3.500
117	Mon, Apr 23 2012	3.500	3.500	3.440	3.480
118	Tue, Apr 24 2012	3.420	3.430	3.350	3.410
119	Wed, Apr 25 2012	3.410	3.410	3.300	3.310
120	Thu, Apr 26 2012	3.330	3.390	3.270	3.380
121	Fri, Apr 27 2012	3.390	3.400	3.360	3.370
122	Mon, Apr 30 2012	3.370	3.400	3.330	3.330

Table 2: Six month of AIRASIA data

4.3.2 AMBANK

AMMB Holdings Berhad is an investment holding company. The Company's business segments include retail banking offers credit facilities; business banking operations provide trade services, cash management and transactional banking services; investment banking encompasses debt capital markets and equity capital markets services, equity derivatives, funds management and private banking; corporate and institutional banking offers commercial and investment banking products through the overseas business operations and providing real estate management services; insurance segment offers life and general insurance products; treasury and markets operations focuses on activities and services, which include foreign exchange, money market, derivatives and trading of capital market instruments, and group functions and others comprises activities, which complements and supports the operations of the main business units, and noncore operations.

No.	Date	Open	High	Low	Close
1	Tue, Nov 01 2011	5.950	5.960	5.900	5.940
2	Wed, Nov 02 2011	5.830	5.930	5.770	5.840
3	Thu, Nov 03 2011	5.850	5.850	5.790	5.850
4	Fri, Nov 04 2011	5.900	5.910	5.840	5.850
5	Tue, Nov 08 2011	5.880	5.960	5.830	5.840
6	Wed, Nov 09 2011	5.830	5.900	5.830	5.830
7	Thu, Nov 10 2011	5.730	5.770	5.720	5.740
8	Fri, Nov 11 2011	5.760	5.780	5.730	5.740
9	Mon, Nov 14 2011	5.850	5.850	5.700	5.720
10	Tue, Nov 15 2011	5.700	5.750	5.660	5.670
11	Wed, Nov 16 2011	5.650	5.720	5.650	5.650
12	Thu, Nov 17 2011	5.650	5.680	5.600	5.660
13	Fri, Nov 18 2011	5.660	5.660	5.600	5.630
14	Mon, Nov 21 2011	5.600	5.600	5.490	5.510
15	Tue, Nov 22 2011	5.500	5.510	5.450	5.490
16	Wed, Nov 23 2011	5.490	5.530	5.490	5.510
17	Thu, Nov 24 2011	5.550	5.600	5.510	5.560
18	Fri, Nov 25 2011	5.520	5.640	5.510	5.640
19	Tue, Nov 29 2011	5.660	5.930	5.660	5.920
20	Wed, Nov 30 2011	5.850	5.970	5.850	5.940
21	Thu, Dec 01 2011	6.000	6.030	5.900	5.980
22	Fri, Dec 02 2011	5.990	5.990	5.930	5.930
23	Mon, Dec 05 2011	5.900	5.950	5.860	5.930
24	Tue, Dec 06 2011	5.900	5.950	5.900	5.910
25	Wed, Dec 07 2011	5.900	5.910	5.880	5.890
26	Thu, Dec 08 2011	5.850	5.910	5.850	5.900
27	Fri, Dec 09 2011	5.710	5.800	5.710	5.740
28	Mon, Dec 12 2011	5.840	5.890	5.840	5.860
29	Tue, Dec 13 2011	5.720	5.860	5.720	5.860
30	Wed, Dec 14 2011	5.700	5.800	5.700	5.760
31	Thu, Dec 15 2011	5.760	5.830	5.700	5.770
32	Fri, Dec 16 2011	5.830	5.840	5.810	5.830
33	Mon, Dec 19 2011	5.830	5.840	5.810	5.820
34	Tue, Dec 20 2011	5.720	5.800	5.700	5.700
35	Wed, Dec 21 2011	5.710	5.900	5.710	5.900
36	Thu, Dec 22 2011	5.890	5.910	5.880	5.90
37	Fri, Dec 23 2011	5.910	5.930	5.850	5.930
38	Mon, Dec 26 2011	5.910	5.930	5.850	5.930
39	Tue, Dec 27 2011	5.920	5.980	5.900	5.970
40	Wed, Dec 28 2011	5.970	5.980	5.960	5.980
41	Thu, Dec 29 2011	5.950	5.970	5.920	5.950
42	Fri, Dec 30 2011	5.980	5.990	5.880	5.950
43	Mon, Jan 02 2012	5.980	5.990	5.880	5.950
44	Tue, Jan 03 2012	5.950	5.960	5.800	5.800
45	Wed, Jan 04 2012	5.810	5.870	5.740	5.740
46	Thu, Jan 05 2012	5.740	5.850	5.740	5.800

47	Fri, Jan 06 2012	5.830	5.830	5.780	5.800
48	Mon, Jan 09 2012	5.820	5.850	5.810	5.830
49	Tue, Jan 10 2012	5.750	5.850	5.750	5.820
50	Wed, Jan 11 2012	5.820	5.820	5.720	5.740
51	Thu, Jan 12 2012	5.730	5.800	5.730	5.760
52	Fri, Jan 13 2012	5.770	5.780	5.750	5.760
53	Mon, Jan 16 2012	5.760	5.780	5.740	5.760
54	Tue, Jan 17 2012	5.770	5.840	5.750	5.840
55	Wed, Jan 18 2012	5.820	5.840	5.770	5.780
56	Thu, Jan 19 2012	5.780	5.830	5.780	5.800
57	Fri, Jan 20 2012	5.830	5.860	5.800	5.840
58	Wed, Jan 25 2012	5.870	5.910	5.770	5.790
59	Thu, Jan 26 2012	5.840	5.840	5.790	5.820
60	Fri, Jan 27 2012	5.880	5.900	5.770	5.770
61	Mon, Jan 30 2012	5.770	5.850	5.770	5.810
62	Tue, Jan 31 2012	5.850	5.850	5.810	5.850
63	Thu, Feb 02 2012	5.960	5.960	5.850	5.880
64	Fri, Feb 03 2012	5.940	5.970	5.920	5.960
65	Wed, Feb 08 2012	5.940	5.970	5.920	5.960
66	Thu, Feb 09 2012	5.980	6.110	5.960	6.100
67	Fri, Feb 10 2012	6.100	6.140	6.090	6.130
68	Mon, Feb 13 2012	6.120	6.150	6.090	6.110
69	Tue, Feb 14 2012	6.150	6.160	6.090	6.120
70	Wed, Feb 15 2012	6.130	6.140	6.090	6.110
71	Thu, Feb 16 2012	6.110	6.110	6.060	6.100
72	Fri, Feb 17 2012	6.110	6.140	6.090	6.140
73	Mon, Feb 20 2012	6.140	6.150	6.120	6.140
74	Tue, Feb 21 2012	6.150	6.150	6.070	6.070
75	Wed, Feb 22 2012	6.050	6.120	6.010	6.080
76	Thu, Feb 23 2012	6.090	6.120	6.010	6.070
77	Fri, Feb 24 2012	6.010	6.080	6.000	6.030
78	Mon, Feb 27 2012	6.030	6.120	6.030	6.110
79	Tue, Feb 28 2012	6.170	6.170	6.070	6.100
80	Wed, Feb 29 2012	6.140	6.170	6.100	6.130
81	Thu, Mar 01 2012	6.160	6.180	6.140	6.170
82	Fri, Mar 02 2012	6.170	6.270	6.160	6.260
83	Mon, Mar 05 2012	6.260	6.280	6.250	6.270
84	Tue, Mar 06 2012	6.260	6.300	6.260	6.300
85	Wed, Mar 07 2012	6.270	6.270	6.210	6.220
86	Thu, Mar 08 2012	6.220	6.230	6.140	6.170
87	Fri, Mar 09 2012	6.150	6.220	6.150	6.170
88	Mon, Mar 12 2012	6.180	6.200	6.160	6.160
89	Tue, Mar 13 2012	6.100	6.180	6.100	6.170
90	Wed, Mar 14 2012	6.200	6.200	6.140	6.170
91	Thu, Mar 15 2012	6.170	6.280	6.160	6.190
92	Fri, Mar 16 2012	6.190	6.220	6.190	6.200
93	Mon, Mar 19 2012	6.220	6.240	6.170	6.180

94	Tue, Mar 20 2012	6.220	6.260	6.130	6.230
95	Wed, Mar 21 2012	6.240	6.250	6.200	6.230
96	Thu, Mar 22 2012	6.230	6.260	6.210	6.220
97	Fri, Mar 23 2012	6.160	6.220	6.160	6.200
98	Mon, Mar 26 2012	6.190	6.210	6.180	6.200
99	Tue, Mar 27 2012	6.210	6.280	6.210	6.230
100	Wed, Mar 28 2012	6.230	6.240	6.180	6.200
101	Thu, Mar 29 2012	6.180	6.210	6.160	6.210
102	Fri, Mar 30 2012	6.250	6.310	6.240	6.310
103	Mon, Apr 02 2012	6.300	6.450	6.300	6.400
104	Tue, Apr 03 2012	6.390	6.410	6.380	6.380
105	Wed, Apr 04 2012	6.380	6.400	6.320	6.320
106	Thu, Apr 05 2012	6.320	6.330	6.290	6.320
107	Fri, Apr 06 2012	6.330	6.360	6.330	6.350
108	Mon, Apr 09 2012	6.310	6.340	6.300	6.300
109	Tue, Apr 10 2012	6.280	6.390	6.280	6.340
110	Thu, Apr 12 2012	6.340	6.360	6.180	6.350
111	Fri, Apr 13 2012	6.380	6.390	6.330	6.350
112	Mon, Apr 16 2012	6.310	6.340	6.300	6.330
113	Tue, Apr 17 2012	6.350	6.350	6.320	6.330
114	Wed, Apr 18 2012	6.220	6.340	6.220	6.330
115	Thu, Apr 19 2012	6.330	6.340	6.310	6.330
116	Fri, Apr 20 2012	6.330	6.350	6.270	6.300
117	Mon, Apr 23 2012	6.320	6.320	6.210	6.300
118	Tue, Apr 24 2012	6.300	6.300	6.250	6.260
119	Wed, Apr 25 2012	6.250	6.290	6.250	6.280
120	Thu, Apr 26 2012	6.250	6.300	6.250	6.290
121	Fri, Apr 27 2012	6.290	6.300	6.280	6.300
122	Mon, Apr 30 2012	6.320	6.320	6.240	6.260

Table 3: Six month of AMBANK data

4.3.3 ASTRO

Astro Malaysia Holdings Berhad is a leading integrated consumer media entertainment group in Malaysia and Southeast Asia with operations in 4 key areas of business, namely Pay-TV, Radio, Publications and Digital Media. With a customer base of over 3.5 million residential customers or approximately 52% penetration of Malaysian TV households, Astro offers 170 TV channels, including 37 HD channels, delivered via Direct-To-Home satellite TV, IPTV and OTT platforms. Astro provides HD, 3D, PVR, VOD and IPTV services through Astro B.yond and Astro On-The-Go. Fulfilling its promise to bridge the digital divide for all of Malaysia, Astro introduced NJOI as an entry-level DTH satellite TV service and is the country's first non-subscription based satellite TV, offering 22 TV and 20 radio channels. Astro Radio includes Malaysia's highest rated stations across key languages and is available on both terrestrial and digital channels, reaching approximately 13 million weekly listeners and capturing a 52% share of listenership in Malaysia in April 2012. Its digital arm is involved in digital publishing, applications and platforms as well as publication of entertainment and lifestyle magazines locally.

No.	Date	Open	High	Low	Close
1	Thu, Nov 01 2012	2.710	2.750	2.700	2.710
2	Fri, Nov 02 2012	2.720	2.730	2.700	2.710
3	Mon, Nov 05 2012	2.710	2.720	2.650	2.660
4	Tue, Nov 06 2012	2.670	2.720	2.610	2.710
5	Wed, Nov 07 2012	2.720	2.720	2.660	2.680
6	Thu, Nov 08 2012	2.670	2.680	2.640	2.650
7	Fri, Nov 09 2012	2.640	2.660	2.600	2.610
8	Mon, Nov 12 2012	2.610	2.640	2.590	2.640
9	Wed, Nov 14 2012	2.640	2.720	2.640	2.720
10	Fri, Nov 16 2012	2.700	2.740	2.700	2.740
11	Mon, Nov 19 2012	2.730	2.730	2.700	2.700
12	Tue, Nov 20 2012	2.710	2.710	2.660	2.700
13	Wed, Nov 21 2012	2.680	2.680	2.650	2.650
14	Thu, Nov 22 2012	2.660	2.660	2.640	2.650
15	Fri, Nov 23 2012	2.650	2.690	2.640	2.660
16	Mon, Nov 26 2012	2.650	2.680	2.640	2.680
17	Tue, Nov 27 2012	2.680	2.690	2.640	2.670
18	Wed, Nov 28 2012	2.680	2.750	2.670	2.740
19	Thu, Nov 29 2012	2.740	2.890	2.730	2.880
20	Fri, Nov 30 2012	2.880	2.880	2.830	2.870
21	Mon, Dec 03 2012	2.890	2.920	2.870	2.900
22	Tue, Dec 04 2012	2.890	2.930	2.890	2.900
23	Wed, Dec 05 2012	2.910	2.980	2.910	2.970
24	Thu, Dec 06 2012	2.940	2.960	2.930	2.960
25	Fri, Dec 07 2012	2.960	3.000	2.950	2.990
26	Mon, Dec 10 2012	2.990	3.000	2.940	2.970
27	Tue, Dec 11 2012	2.970	3.000	2.950	2.980
28	Wed, Dec 12 2012	2.970	2.990	2.960	2.980
29	Thu, Dec 13 2012	2.970	2.980	2.940	2.950
30	Fri, Dec 14 2012	2.950	2.960	2.940	2.950
31	Mon, Dec 17 2012	2.940	2.960	2.930	2.960
32	Tue, Dec 18 2012	2.950	2.950	2.930	2.940
33	Wed, Dec 19 2012	2.920	2.920	2.860	2.910
34	Thu, Dec 20 2012	2.910	2.910	2.900	2.900
35	Fri, Dec 21 2012	2.900	2.950	2.900	2.920
36	Mon, Dec 24 2012	2.920	2.950	2.920	2.940
37	Wed, Dec 26 2012	2.930	2.930	2.910	2.930
38	Thu, Dec 27 2012	2.930	2.970	2.930	2.960
39	Fri, Dec 28 2012	2.970	2.970	2.940	2.950
40	Mon, Dec 31 2012	2.950	3.000	2.920	3.000
41	Wed, Jan 02 2013	2.960	2.960	2.920	2.930
42	Thu, Jan 03 2013	2.940	2.950	2.920	2.940
43	Fri, Jan 04 2013	2.930	2.980	2.920	2.980
44	Mon, Jan 07 2013	2.970	3.010	2.960	3.000
45	Tue, Jan 08 2013	2.980	3.020	2.980	3.020
46	Wed, Jan 09 2013	3.020	3.050	3.020	3.050

47	Thu, Jan 10 2013	3.040	3.040	2.970	2.980
48	Fri, Jan 11 2013	2.990	3.000	2.980	2.990
49	Mon, Jan 14 2013	2.980	3.000	2.950	3.000
50	Tue, Jan 15 2013	3.020	3.020	2.990	3.000
51	Wed, Jan 16 2013	3.000	3.010	3.000	3.010
52	Thu, Jan 17 2013	3.000	3.000	2.960	2.960
53	Fri, Jan 18 2013	2.960	2.960	2.890	2.900
54	Mon, Jan 21 2013	2.890	2.900	2.780	2.800
55	Tue, Jan 22 2013	2.800	2.840	2.750	2.800
56	Wed, Jan 23 2013	2.800	2.880	2.790	2.840
57	Fri, Jan 25 2013	2.850	2.880	2.820	2.860
58	Tue, Jan 29 2013	2.840	2.860	2.830	2.830
59	Wed, Jan 30 2013	2.850	2.850	2.800	2.800
60	Thu, Jan 31 2013	2.780	2.820	2.770	2.790
61	Mon, Feb 04 2013	2.800	2.800	2.760	2.790
62	Tue, Feb 05 2013	2.760	2.800	2.760	2.770
63	Wed, Feb 06 2013	2.760	2.790	2.730	2.750
64	Thu, Feb 07 2013	2.740	2.790	2.730	2.790
65	Fri, Feb 08 2013	2.790	2.790	2.740	2.760
66	Wed, Feb 13 2013	2.760	2.830	2.760	2.800
67	Thu, Feb 14 2013	2.800	2.800	2.780	2.800
68	Fri, Feb 15 2013	2.790	2.800	2.760	2.770
69	Mon, Feb 18 2013	2.790	2.790	2.770	2.780
70	Tue, Feb 19 2013	2.770	2.780	2.750	2.760
71	Wed, Feb 20 2013	2.770	2.770	2.720	2.740
72	Thu, Feb 21 2013	2.760	2.760	2.700	2.740
73	Fri, Feb 22 2013	2.740	2.740	2.710	2.730
74	Mon, Feb 25 2013	2.720	2.720	2.700	2.710
75	Tue, Feb 26 2013	2.700	2.700	2.670	2.700
76	Wed, Feb 27 2013	2.700	2.710	2.690	2.690
77	Thu, Feb 28 2013	2.700	2.710	2.680	2.710
78	Fri, Mar 01 2013	2.700	2.830	2.700	2.79
79	Mon, Mar 04 2013	2.800	2.830	2.760	2.810
80	Tue, Mar 05 2013	2.770	2.820	2.770	2.810
81	Wed, Mar 06 2013	2.830	2.830	2.800	2.820
82	Thu, Mar 07 2013	2.830	2.830	2.790	2.810
83	Fri, Mar 08 2013	2.810	2.820	2.770	2.790
84	Mon, Mar 11 2013	2.800	2.810	2.770	2.800
85	Tue, Mar 12 2013	2.800	2.810	2.780	2.800
86	Wed, Mar 13 2013	2.780	2.800	2.760	2.760
87	Thu, Mar 14 2013	2.760	2.800	2.750	2.760
88	Fri, Mar 15 2013	2.780	2.780	2.740	2.760
89	Mon, Mar 18 2013	2.740	2.790	2.730	2.780
90	Tue, Mar 19 2013	2.760	2.800	2.760	2.770
91	Wed, Mar 20 2013	2.770	2.890	2.770	2.890
92	Thu, Mar 21 2013	2.870	2.870	2.830	2.860
93	Fri, Mar 22 2013	2.880	2.920	2.860	2.900

4.4 The Interface Design for the Prototype

4.4.1 Interface1.java

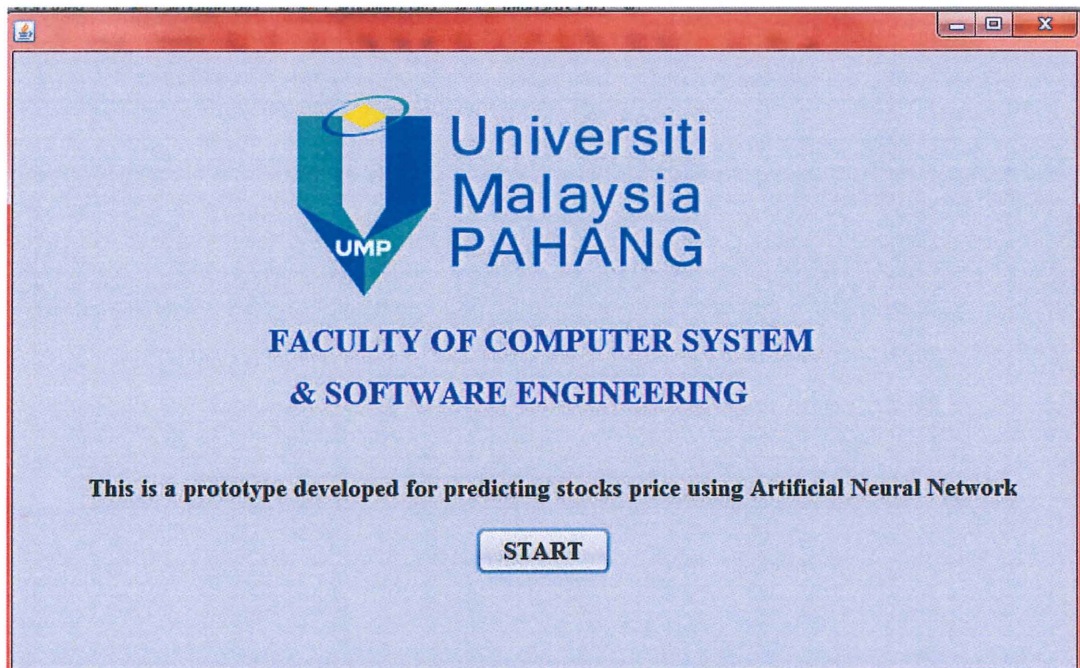


Figure 4: Interface 1.java

Figure 4 shows the first page of interface of this prototype that shows logo of UMP, my faculty, and the reason this prototype is made.

Start button code:

```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {  
  
    new Interface2().setVisible(true);  
  
    this.setVisible(false);  
  
}
```


4.4.2 Interface2.java

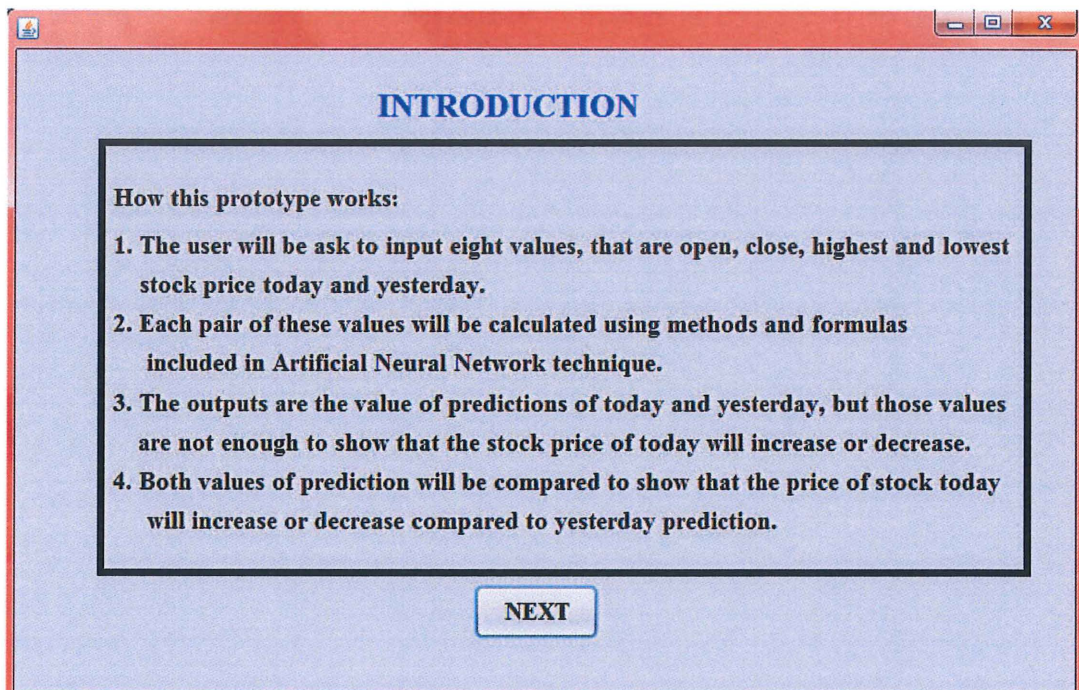


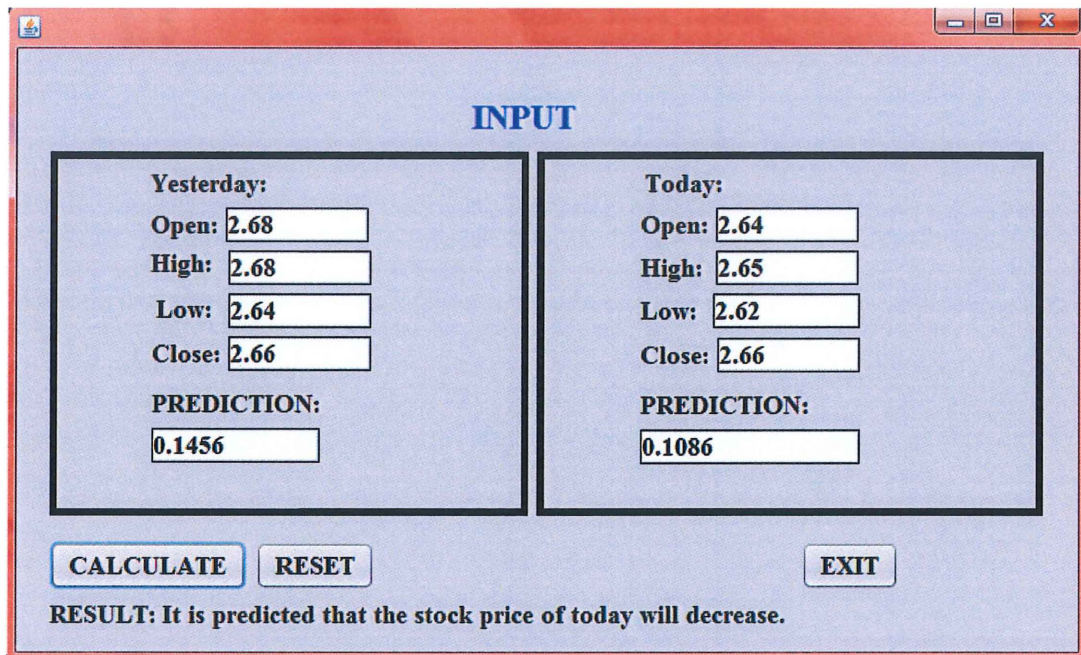
Figure 5: Interface2.java

Figure5 shows the introduction of this prototype. It will show the steps on how the prototype works by using Neural Network Technique.

Next button code:

```
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {  
  
    new Interface3().setVisible(true);  
  
    this.setVisible(false);  
  
}
```

4.4.3 Interface3.java



INPUT

Yesterday:	Today:
Open: 2.68	Open: 2.64
High: 2.68	High: 2.65
Low: 2.64	Low: 2.62
Close: 2.66	Close: 2.66
PREDICTION: 0.1456	PREDICTION: 0.1086

RESULT: It is predicted that the stock price of today will decrease.

Figure 6: Interface3.java

Figure 6 shows the input needed to calculate the values of prediction. There are two square area for putting inputs, yesterday and today. Each of them has four other inputs, min, max, open, and close. The low and high are the highest and lowest stock price of yesterday and today. Open and close for yesterday is the opening and closing price for yesterday, only the closing value for today is different. That is because we are trying to calculate prediction for that day, so the close for today is the same as close for yesterday.

Interface3.java has 2 other classes related to it that are Calculation.java and Calculation2.java. Calculation1 and Calculation2 contain the variables and Neural Network formulas used in Interface3.java.

Calculate Button code:

```
//this code will change the input from String into double
    low1=Double.parseDouble(jTextField2.getText());
    high1=Double.parseDouble(jTextField3.getText());
    open1=Double.parseDouble(jTextField6.getText());
    close1=Double.parseDouble(jTextField7.getText());
    low2=Double.parseDouble(jTextField5.getText());
    high2=Double.parseDouble(jTextField4.getText());
    open2=Double.parseDouble(jTextField8.getText());
    close2=Double.parseDouble(jTextField9.getText());

//Call the object from Calculation and Calculation2
    Calculation c1=new Calculation(low1,high1,open1, close1);
    Calculation2 c2=new Calculation2(low2,high2,open2,close2);

//call method cal() and cal2 from class Calculation 1 & 2
    c1.cal();
    c2.cal2();

//Set the decimal format to 4 decimal places
    DecimalFormat df = new DecimalFormat("#.####");

//Change the output according to the decimal format chosen before
    output1 = Double.valueOf(df.format(c1.getOutput1()));
    output2 = Double.valueOf(df.format(c2.getOutput2()));

//change the output from double back to string
    String prediction1 = Double.toString(output1);
    String prediction2 = Double.toString(output2);

//set the output to appear on interface
    jTextField11.setText(prediction1);
```

```
jTextField12.setText(prediction2);

if(output1<output2)
{
    jLabel11.setText("RESULT: It is predicted that the stock price of today will
increase. ");
}
else if(output1>output2)
{
    jLabel11.setText("RESULT: It is predicted that the stock price of today will
decrease. ");
}
else
{
    jLabel11.setText("RESULT: It is predicted that the stock price of today is the
same as yesterday. ");
}
```

Reset Button Code:

```
//reset values in textbox back to 0
    jTextField2.setText("");
    jTextField3.setText("");
    jTextField6.setText("");
    jTextField7.setText("");
    jTextField5.setText("");
    jTextField4.setText("");
    jTextField8.setText("");
    jTextField9.setText("");
    jTextField11.setText("");
    jTextField12.setText("");
```

Exit Button Code:

```
//exit command
    System.exit(0);
```

CHAPTER 5

RESULTS AND DISCUSSION

5.1 INTRODUCTION

The purpose of this chapter is to explain about findings or the results from data analysis

5.2 RESULT ANALYSIS

The developed applications, the prototype has met all the objectives of this project, which are:

- 1) To built a prototype that can make predictionfor stock market prices at Kuala Lumpur Stock Exchange (KLSE).
- 2) To apply the use of Artificial Neural Network, an Artificial Intelligence technique used for prediction.
- 3) To test the ability of the prototype to predict the increase or decrease of the stock market prices at KLSE.

For the first objective that has been achieved, a working prototype has been made that is able to make prediction for stock market at KLSE successfully.

The second objective also successful when Artificial Neural Network, an Artificial Intelligence technique used for prediction is applied to the prototype. There are three techniques used in Artificial Neural Network for making this prediction, which are Transfer Function, Sigmoid Activation Function, and lastly the Prediction Formula. All three are vital in making prediction using this technique.

The last objective is achieved by testing the ability of the prototype to make prediction for the increase and decrease of stock price. This is done by predicting two values of prediction for today and yesterday by comparing both values to show the increase or decrease.

5.3 COMPARISON BETWEEN PREDICTION AND REAL DATA

This part will show comparison between the results of the prototype with the real data obtain from three counters at KLSE. A few graphs are shown to make the comparison easier to understand and better in colors.

5.3.1 Comparison of AIRASIA Data

No.	Date	Open	High	Low	Close	Prediction
1	Tue, Nov 01 2011	3.840	3.840	3.690	3.690	0.7035
2	Wed, Nov 02 2011	3.600	3.870	3.580	3.850	1.3282
3	Thu, Nov 03 2011	3.860	3.860	3.760	3.780	0.476
4	Fri, Nov 04 2011	3.800	3.840	3.770	3.800	0.3339
5	Tue, Nov 08 2011	3.850	3.870	3.810	3.810	0.2886
6	Wed, Nov 09 2011	3.810	3.840	3.810	3.840	0.1443
7	Thu, Nov 10 2011	3.790	3.790	3.720	3.770	0.3304
8	Fri, Nov 11 2011	3.740	3.790	3.740	3.780	0.237
9	Mon, Nov 14 2011	3.800	3.840	3.770	3.840	0.3339
10	Tue, Nov 15 2011	3.840	3.920	3.830	3.880	0.4347
11	Wed, Nov 16 2011	3.880	3.920	3.870	3.910	0.2435
12	Thu, Nov 17 2011	3.900	3.900	3.800	3.800	0.48
13	Fri, Nov 18 2011	3.750	3.810	3.650	3.650	0.744
14	Mon, Nov 21 2011	3.680	3.690	3.610	3.660	0.3688
15	Tue, Nov 22 2011	3.670	3.680	3.610	3.670	0.3227
16	Wed, Nov 23 2011	3.590	3.640	3.450	3.550	0.8455
17	Thu, Nov 24 2011	3.470	3.680	3.470	3.660	0.9387
18	Fri, Nov 25 2011	3.670	3.670	3.580	3.620	0.4122
19	Tue, Nov 29 2011	3.640	3.680	3.620	3.660	0.2772
20	Wed, Nov 30 2011	3.640	3.710	3.640	3.690	0.3248
21	Thu, Dec 01 2011	3.750	3.870	3.750	3.810	0.76
22	Fri, Dec 02 2011	3.790	3.910	3.720	3.910	0.8968
23	Mon, Dec 05 2011	3.920	3.940	3.870	3.920	0.3409
24	Tue, Dec 06 2011	3.930	3.940	3.880	3.930	0.2928
25	Wed, Dec 07 2011	3.910	3.930	3.810	3.920	0.5772
26	Thu, Dec 08 2011	3.900	3.900	3.790	3.790	0.5269
27	Fri, Dec 09 2011	3.770	3.780	3.650	3.670	0.6045
28	Mon, Dec 12 2011	3.720	3.800	3.720	3.790	0.3776
29	Tue, Dec 13 2011	3.750	3.760	3.700	3.710	0.282

30	Wed, Dec 14 2011	3.730	3.740	3.650	3.650	0.4185
31	Thu, Dec 15 2011	3.660	3.720	3.650	3.710	0.3255
32	Fri, Dec 16 2011	3.720	3.750	3.680	3.740	0.3276
33	Mon, Dec 19 2011	3.740	3.740	3.700	3.720	0.188
34	Tue, Dec 20 2011	3.720	3.720	3.590	3.600	0.5967
35	Wed, Dec 21 2011	3.670	3.700	3.630	3.660	0.3241
36	Thu, Dec 22 2011	3.640	3.700	3.630	3.700	0.3241
37	Fri, Dec 23 2011	3.720	3.730	3.690	3.700	0.1876
38	Mon, Dec 26 2011	3.720	3.730	3.690	3.700	0.1876
39	Tue, Dec 27 2011	3.680	3.730	3.670	3.730	0.2802
40	Wed, Dec 28 2011	3.730	3.770	3.680	3.750	0.4212
41	Thu, Dec 29 2011	3.720	3.770	3.710	3.770	0.2826
42	Fri, Dec 30 2011	3.770	3.780	3.730	3.770	0.2365
43	Mon, Jan 02 2012	3.770	3.780	3.730	3.770	0.2365
44	Tue, Jan 03 2012	3.760	3.780	3.680	3.680	0.468
45	Wed, Jan 04 2012	3.750	3.770	3.650	3.650	0.558
46	Thu, Jan 05 2012	3.650	3.670	3.630	3.650	0.1852
47	Fri, Jan 06 2012	3.680	3.690	3.640	3.660	0.232
48	Mon, Jan 09 2012	3.670	3.700	3.640	3.700	0.2784
49	Tue, Jan 10 2012	3.690	3.720	3.660	3.700	0.2796
50	Wed, Jan 11 2012	3.700	3.710	3.670	3.690	0.1868
51	Thu, Jan 12 2012	3.690	3.700	3.680	3.680	0.0936
52	Fri, Jan 13 2012	3.670	3.690	3.660	3.660	0.1398
53	Mon, Jan 16 2012	3.650	3.660	3.610	3.630	0.2305
54	Tue, Jan 17 2012	3.630	3.660	3.610	3.650	0.2305
55	Wed, Jan 18 2012	3.650	3.680	3.630	3.650	0.2315
56	Thu, Jan 19 2012	3.650	3.650	3.620	3.630	0.1386
57	Fri, Jan 20 2012	3.630	3.650	3.600	3.620	0.23
58	Wed, Jan 25 2012	3.620	3.630	3.590	3.600	0.1836
59	Thu, Jan 26 2012	3.610	3.610	3.570	3.590	0.1828
60	Fri, Jan 27 2012	3.580	3.610	3.570	3.590	0.1828
61	Mon, Jan 30 2012	3.590	3.610	3.540	3.560	0.3178
62	Tue, Jan 31 2012	3.570	3.590	3.540	3.550	0.227
63	Thu, Feb 02 2012	3.600	3.700	3.580	3.700	0.5496
64	Fri, Feb 03 2012	3.660	3.730	3.660	3.700	0.3262
65	Wed, Feb 08 2012	3.660	3.730	3.660	3.700	0.3262
66	Thu, Feb 09 2012	3.700	3.720	3.690	3.720	0.1407
67	Fri, Feb 10 2012	3.740	3.800	3.720	3.780	0.3776
68	Mon, Feb 13 2012	3.790	3.790	3.730	3.760	0.2838
69	Tue, Feb 14 2012	3.750	3.750	3.680	3.680	0.3276
70	Wed, Feb 15 2012	3.690	3.700	3.650	3.670	0.2325
71	Thu, Feb 16 2012	3.700	3.700	3.610	3.640	0.4149
72	Fri, Feb 17 2012	3.700	3.740	3.620	3.660	0.5544
73	Mon, Feb 20 2012	3.660	3.710	3.660	3.670	0.233
74	Tue, Feb 21 2012	3.680	3.700	3.660	3.700	0.1864
75	Wed, Feb 22 2012	3.700	3.700	3.630	3.650	0.3241
76	Thu, Feb 23 2012	3.640	3.640	3.560	3.580	0.3648

77	Fri, Feb 24 2012	3.560	3.620	3.540	3.610	0.3632
78	Mon, Feb 27 2012	3.610	3.630	3.610	3.610	0.0922
79	Tue, Feb 28 2012	3.610	3.640	3.600	3.610	0.184
80	Wed, Feb 29 2012	3.620	3.670	3.590	3.660	0.3672
81	Thu, Mar 01 2012	3.660	3.670	3.650	3.650	0.093
82	Fri, Mar 02 2012	3.650	3.690	3.630	3.650	0.2778
83	Mon, Mar 05 2012	3.660	3.720	3.650	3.680	0.3255
84	Tue, Mar 06 2012	3.700	3.700	3.650	3.700	0.2325
85	Wed, Mar 07 2012	3.600	3.690	3.600	3.670	0.414
86	Thu, Mar 08 2012	3.690	3.700	3.650	3.660	0.2325
87	Fri, Mar 09 2012	3.680	3.690	3.620	3.630	0.3234
88	Mon, Mar 12 2012	3.610	3.640	3.590	3.590	0.2295
89	Tue, Mar 13 2012	3.600	3.630	3.540	3.540	0.4086
90	Wed, Mar 14 2012	3.560	3.680	3.560	3.590	0.5472
91	Thu, Mar 15 2012	3.620	3.620	3.560	3.580	0.2736
92	Fri, Mar 16 2012	3.590	3.620	3.510	3.580	0.4961
93	Mon, Mar 19 2012	3.600	3.600	3.570	3.580	0.1371
94	Tue, Mar 20 2012	3.610	3.620	3.550	3.590	0.3185
95	Wed, Mar 21 2012	3.590	3.600	3.550	3.590	0.2275
96	Thu, Mar 22 2012	3.600	3.630	3.580	3.590	0.229
97	Fri, Mar 23 2012	3.600	3.600	3.520	3.590	0.3616
98	Mon, Mar 26 2012	3.580	3.580	3.460	3.460	0.5352
99	Tue, Mar 27 2012	3.480	3.480	3.340	3.350	0.6076
100	Wed, Mar 28 2012	3.360	3.400	3.360	3.380	0.1744
101	Fri, Mar 30 2012	3.440	3.470	3.420	3.450	0.221
102	Fri, Mar 30 2012	3.440	3.470	3.420	3.450	0.221
103	Mon, Apr 02 2012	3.460	3.480	3.390	3.400	0.3951
104	Tue, Apr 03 2012	3.420	3.440	3.400	3.410	0.176
105	Wed, Apr 04 2012	3.410	3.430	3.400	3.400	0.132
106	Thu, Apr 05 2012	3.430	3.440	3.400	3.420	0.176
107	Fri, Apr 06 2012	3.400	3.430	3.400	3.400	0.132
108	Mon, Apr 09 2012	3.410	3.420	3.390	3.390	0.1317
109	Tue, Apr 10 2012	3.390	3.420	3.390	3.410	0.1317
110	Thu, Apr 12 2012	3.370	3.440	3.350	3.440	0.3915
111	Fri, Apr 13 2012	3.440	3.520	3.440	3.470	0.3552
112	Mon, Apr 16 2012	3.480	3.520	3.460	3.470	0.2676
113	Tue, Apr 17 2012	3.450	3.470	3.440	3.450	0.1332
114	Wed, Apr 18 2012	3.440	3.470	3.430	3.460	0.1772
115	Thu, Apr 19 2012	3.460	3.520	3.460	3.500	0.2676
116	Fri, Apr 20 2012	3.520	3.520	3.490	3.500	0.1347
117	Mon, Apr 23 2012	3.500	3.500	3.440	3.480	0.2664
118	Tue, Apr 24 2012	3.420	3.430	3.350	3.410	0.348
119	Wed, Apr 25 2012	3.410	3.410	3.300	3.310	0.473
120	Thu, Apr 26 2012	3.330	3.390	3.270	3.380	0.5124
121	Fri, Apr 27 2012	3.390	3.400	3.360	3.370	0.1744
122	Mon, Apr 30 2012	3.370	3.400	3.330	3.330	0.3031

Table 5: Comparison of AIRASIA real and predicted data

From the result of Table 5, you can see that the real data and the predicted data are shown. The predicted data that are correct are highlighted to show and to make it easier for analyzing the data. After the data are analyzed, the research shown that out of 122 predictions, only 53 is correct for AIRASIA counter. From The accuracy percentages for AIRASIA counter is only 43% chance of success but that might be because the high and low of stock price are affected by many factors that cannot be predicted. Some of it might be natural disaster like earthquake, flood, or even dry season. Even the increase or decrease of oil will affect many counters.

5.3.2 Comparison of AMBANK Data

No.	Date	Open	High	Low	Close	Prediction
1	Tue, Nov 01 2011	5.950	5.960	5.900	5.940	0.414
2	Wed, Nov 02 2011	5.830	5.930	5.770	5.840	1.0832
3	Thu, Nov 03 2011	5.850	5.850	5.790	5.850	0.4074
4	Fri, Nov 04 2011	5.900	5.910	5.840	5.850	0.4788
5	Tue, Nov 08 2011	5.880	5.960	5.830	5.840	0.8879
6	Wed, Nov 09 2011	5.830	5.900	5.830	5.830	0.4781
7	Thu, Nov 10 2011	5.730	5.770	5.720	5.740	0.336
8	Fri, Nov 11 2011	5.760	5.780	5.730	5.740	0.3365
9	Mon, Nov 14 2011	5.850	5.850	5.700	5.720	1.005
10	Tue, Nov 15 2011	5.700	5.750	5.660	5.670	0.5994
11	Wed, Nov 16 2011	5.650	5.720	5.650	5.650	0.4655
12	Thu, Nov 17 2011	5.650	5.680	5.600	5.660	0.528
13	Fri, Nov 18 2011	5.660	5.660	5.600	5.630	0.396
14	Mon, Nov 21 2011	5.600	5.600	5.490	5.510	0.7139
15	Tue, Nov 22 2011	5.500	5.510	5.450	5.490	0.387
16	Wed, Nov 23 2011	5.490	5.530	5.490	5.510	0.2596
17	Thu, Nov 24 2011	5.550	5.600	5.510	5.560	0.5859
18	Fri, Nov 25 2011	5.520	5.640	5.510	5.640	0.8463
19	Tue, Nov 29 2011	5.660	5.930	5.660	5.920	1.7982
20	Wed, Nov 30 2011	5.850	5.970	5.850	5.940	0.822
21	Thu, Dec 01 2011	6.000	6.030	5.900	5.980	0.897
22	Fri, Dec 02 2011	5.990	5.990	5.930	5.930	0.4158
23	Mon, Dec 05 2011	5.900	5.950	5.860	5.930	0.6174
24	Tue, Dec 06 2011	5.900	5.950	5.900	5.910	0.345
25	Wed, Dec 07 2011	5.900	5.910	5.880	5.890	0.2064
26	Thu, Dec 08 2011	5.850	5.910	5.850	5.900	0.411
27	Fri, Dec 09 2011	5.710	5.800	5.710	5.740	0.6039
28	Mon, Dec 12 2011	5.840	5.890	5.840	5.860	0.342
29	Tue, Dec 13 2011	5.720	5.860	5.720	5.860	0.9408
30	Wed, Dec 14 2011	5.700	5.800	5.700	5.760	0.67
31	Thu, Dec 15 2011	5.760	5.830	5.700	5.770	0.871
32	Fri, Dec 16 2011	5.830	5.840	5.810	5.830	0.2043
33	Mon, Dec 19 2011	5.830	5.840	5.810	5.820	0.2043
34	Tue, Dec 20 2011	5.720	5.800	5.700	5.700	0.67
35	Wed, Dec 21 2011	5.710	5.900	5.710	5.900	1.2749
36	Thu, Dec 22 2011	5.890	5.910	5.880	5.900	0.2064
37	Fri, Dec 23 2011	5.910	5.930	5.850	5.930	0.548
38	Mon, Dec 26 2011	5.910	5.930	5.850	5.930	0.548
39	Tue, Dec 27 2011	5.920	5.980	5.900	5.970	0.552
40	Wed, Dec 28 2011	5.970	5.980	5.960	5.980	0.1392
41	Thu, Dec 29 2011	5.950	5.970	5.920	5.950	0.346
42	Fri, Dec 30 2011	5.980	5.990	5.880	5.950	0.7568
43	Mon, Jan 02 2012	5.980	5.990	5.880	5.950	0.7568
44	Tue, Jan 03 2012	5.950	5.960	5.800	5.800	1.088

45	Wed, Jan 04 2012	5.810	5.870	5.740	5.740	0.8762
46	Thu, Jan 05 2012	5.740	5.850	5.740	5.800	0.7414
47	Fri, Jan 06 2012	5.830	5.830	5.780	5.800	0.339
48	Mon, Jan 09 2012	5.820	5.850	5.810	5.830	0.339
49	Tue, Jan 10 2012	5.750	5.850	5.750	5.820	0.675
50	Wed, Jan 11 2012	5.820	5.820	5.720	5.740	0.672
51	Thu, Jan 12 2012	5.730	5.800	5.730	5.760	0.4711
52	Fri, Jan 13 2012	5.770	5.780	5.750	5.760	0.2025
53	Mon, Jan 16 2012	5.760	5.780	5.740	5.760	0.2696
54	Tue, Jan 17 2012	5.770	5.840	5.750	5.840	0.6075
55	Wed, Jan 18 2012	5.820	5.840	5.770	5.780	0.4739
56	Thu, Jan 19 2012	5.780	5.830	5.780	5.800	0.339
57	Fri, Jan 20 2012	5.830	5.860	5.800	5.840	0.408
58	Wed, Jan 25 2012	5.870	5.910	5.770	5.790	0.9478
59	Thu, Jan 26 2012	5.840	5.840	5.790	5.820	0.3395
60	Fri, Jan 27 2012	5.880	5.900	5.770	5.770	0.8801
61	Mon, Jan 30 2012	5.770	5.850	5.770	5.810	0.5416
62	Tue, Jan 31 2012	5.850	5.850	5.810	5.850	0.2724
63	Thu, Feb 02 2012	5.960	5.960	5.850	5.880	0.7535
64	Fri, Feb 03 2012	5.940	5.970	5.920	5.960	0.346
65	Wed, Feb 08 2012	5.940	5.970	5.920	5.960	0.346
66	Thu, Feb 09 2012	5.980	6.110	5.960	6.100	1.044
67	Fri, Feb 10 2012	6.100	6.140	6.090	6.130	0.3545
68	Mon, Feb 13 2012	6.120	6.150	6.090	6.110	0.4254
69	Tue, Feb 14 2012	6.150	6.160	6.090	6.120	0.4963
70	Wed, Feb 15 2012	6.130	6.140	6.090	6.110	0.3545
71	Thu, Feb 16 2012	6.110	6.110	6.060	6.100	0.353
72	Fri, Feb 17 2012	6.110	6.140	6.090	6.140	0.3545
73	Mon, Feb 20 2012	6.140	6.150	6.120	6.140	0.2136
74	Tue, Feb 21 2012	6.150	6.150	6.070	6.070	0.5656
75	Wed, Feb 22 2012	6.050	6.120	6.010	6.080	0.7711
76	Thu, Feb 23 2012	6.090	6.120	6.010	6.070	0.7711
77	Fri, Feb 24 2012	6.010	6.080	6.000	6.030	0.56
78	Mon, Feb 27 2012	6.030	6.120	6.030	6.110	0.6327
79	Tue, Feb 28 2012	6.170	6.170	6.070	6.100	0.707
80	Wed, Feb 29 2012	6.140	6.170	6.100	6.130	0.497
81	Thu, Mar 01 2012	6.160	6.180	6.140	6.170	0.2856
82	Fri, Mar 02 2012	6.170	6.270	6.160	6.260	0.7876
83	Mon, Mar 05 2012	6.260	6.280	6.250	6.270	0.2175
84	Tue, Mar 06 2012	6.260	6.300	6.260	6.300	0.2904
85	Wed, Mar 07 2012	6.270	6.270	6.210	6.220	0.4326
86	Thu, Mar 08 2012	6.220	6.230	6.140	6.170	0.6426
87	Fri, Mar 09 2012	6.150	6.220	6.150	6.170	0.5005
88	Mon, Mar 12 2012	6.180	6.200	6.160	6.160	0.2864
89	Tue, Mar 13 2012	6.100	6.180	6.100	6.170	0.568
90	Wed, Mar 14 2012	6.200	6.200	6.140	6.170	0.4284
91	Thu, Mar 15 2012	6.170	6.280	6.160	6.190	0.8592

92	Fri, Mar 16 2012	6.190	6.220	6.190	6.200	0.2157
93	Mon, Mar 19 2012	6.220	6.240	6.170	6.180	0.5019
94	Tue, Mar 20 2012	6.220	6.260	6.130	6.230	0.9269
95	Wed, Mar 21 2012	6.240	6.250	6.200	6.230	0.36
96	Thu, Mar 22 2012	6.230	6.260	6.210	6.220	0.3605
97	Fri, Mar 23 2012	6.160	6.220	6.160	6.200	0.4296
98	Mon, Mar 26 2012	6.190	6.210	6.180	6.200	0.2154
99	Tue, Mar 27 2012	6.210	6.280	6.210	6.230	0.5047
100	Wed, Mar 28 2012	6.230	6.240	6.180	6.200	0.4308
101	Thu, Mar 29 2012	6.180	6.210	6.160	6.210	0.358
102	Fri, Mar 30 2012	6.250	6.310	6.240	6.310	0.5068
103	Mon, Apr 02 2012	6.300	6.450	6.300	6.400	1.095
104	Tue, Apr 03 2012	6.390	6.410	6.380	6.380	0.2214
105	Wed, Apr 04 2012	6.380	6.400	6.320	6.320	0.5856
106	Thu, Apr 05 2012	6.320	6.330	6.290	6.320	0.2916
107	Fri, Apr 06 2012	6.330	6.360	6.330	6.350	0.2199
108	Mon, Apr 09 2012	6.310	6.340	6.300	6.300	0.292
109	Tue, Apr 10 2012	6.280	6.390	6.280	6.340	0.8008
110	Thu, Apr 12 2012	6.340	6.360	6.180	6.350	1.2924
111	Fri, Apr 13 2012	6.380	6.390	6.330	6.350	0.4398
112	Mon, Apr 16 2012	6.310	6.340	6.300	6.330	0.292
113	Tue, Apr 17 2012	6.350	6.350	6.320	6.330	0.2196
114	Wed, Apr 18 2012	6.220	6.340	6.220	6.330	0.8664
115	Thu, Apr 19 2012	6.330	6.340	6.310	6.330	0.2193
116	Fri, Apr 20 2012	6.330	6.350	6.270	6.300	0.5816
117	Mon, Apr 23 2012	6.320	6.320	6.210	6.300	0.7931
118	Tue, Apr 24 2012	6.300	6.300	6.250	6.260	0.3625
119	Wed, Apr 25 2012	6.250	6.290	6.250	6.280	0.29
120	Thu, Apr 26 2012	6.250	6.300	6.250	6.290	0.3625
121	Fri, Apr 27 2012	6.290	6.300	6.280	6.300	0.1456
122	Mon, Apr 30 2012	6.320	6.320	6.240	6.260	0.5792

Table 6: Comparison of MAYBANK real and predicted data

From the result of Table 6, you can see that the real data and the predicted data are shown. The predicted data that are correct are highlighted to show and to make it easier for analyzing the data. After the data are analyzed, the research shown that out of 122 predictions, only 53 is correct for AIRASIA counter. The accuracy percentage for AIRASIA counter is 43% chance of success the same as AIRASIA counter and might be affected by outside factors.

5.3.1 Comparison of ASTRO Data

No.	Date	Open	High	Low	Close	Prediction
1	Thu, Nov 01 2012	2.710	2.750	2.700	2.710	0.185
2	Fri, Nov 02 2012	2.720	2.730	2.700	2.710	0.111
3	Mon, Nov 05 2012	2.710	2.720	2.650	2.660	0.2555
4	Tue, Nov 06 2012	2.670	2.720	2.610	2.710	0.3971
5	Wed, Nov 07 2012	2.720	2.720	2.660	2.680	0.2196
6	Thu, Nov 08 2012	2.670	2.680	2.640	2.650	0.1456
7	Fri, Nov 09 2012	2.640	2.660	2.600	2.610	0.216
8	Mon, Nov 12 2012	2.610	2.640	2.590	2.640	0.1795
9	Wed, Nov 14 2012	2.640	2.720	2.640	2.720	0.2912
10	Fri, Nov 16 2012	2.700	2.740	2.700	2.740	0.148
11	Mon, Nov 19 2012	2.730	2.730	2.700	2.700	0.111
12	Tue, Nov 20 2012	2.710	2.710	2.660	2.700	0.183
13	Wed, Nov 21 2012	2.680	2.680	2.650	2.650	0.1095
14	Thu, Nov 22 2012	2.660	2.660	2.640	2.650	0.0728
15	Fri, Nov 23 2012	2.650	2.690	2.640	2.660	0.182
16	Mon, Nov 26 2012	2.650	2.680	2.640	2.680	0.1456
17	Tue, Nov 27 2012	2.680	2.690	2.640	2.670	0.182
18	Wed, Nov 28 2012	2.680	2.750	2.670	2.740	0.2936
19	Thu, Nov 29 2012	2.740	2.890	2.730	2.880	0.5968
20	Fri, Nov 30 2012	2.880	2.880	2.830	2.870	0.1915
21	Mon, Dec 03 2012	2.890	2.920	2.870	2.900	0.1935
22	Tue, Dec 04 2012	2.890	2.930	2.890	2.900	0.1556
23	Wed, Dec 05 2012	2.910	2.980	2.910	2.970	0.2737
24	Thu, Dec 06 2012	2.940	2.960	2.930	2.960	0.1179
25	Fri, Dec 07 2012	2.960	3.000	2.950	2.990	0.1975
26	Mon, Dec 10 2012	2.990	3.000	2.940	2.970	0.2364
27	Tue, Dec 11 2012	2.970	3.000	2.950	2.980	0.1975
28	Wed, Dec 12 2012	2.970	2.990	2.960	2.980	0.1188
29	Thu, Dec 13 2012	2.970	2.980	2.940	2.950	0.1576
30	Fri, Dec 14 2012	2.950	2.960	2.940	2.950	0.0788
31	Mon, Dec 17 2012	2.940	2.960	2.930	2.960	0.1179
32	Tue, Dec 18 2012	2.950	2.950	2.930	2.940	0.0786
33	Wed, Dec 19 2012	2.920	2.920	2.860	2.910	0.2316
34	Thu, Dec 20 2012	2.910	2.910	2.900	2.900	0.039
35	Fri, Dec 21 2012	2.900	2.950	2.900	2.920	0.195
36	Mon, Dec 24 2012	2.920	2.950	2.920	2.940	0.1176
37	Wed, Dec 26 2012	2.930	2.930	2.910	2.930	0.0782
38	Thu, Dec 27 2012	2.930	2.970	2.930	2.960	0.1572
39	Fri, Dec 28 2012	2.970	2.970	2.940	2.950	0.1182
40	Mon, Dec 31 2012	2.950	3.000	2.920	3.000	0.3136
41	Wed, Jan 02 2013	2.960	2.960	2.920	2.930	0.1568
42	Thu, Jan 03 2013	2.940	2.950	2.920	2.940	0.1176
43	Fri, Jan 04 2013	2.930	2.980	2.920	2.980	0.2352
44	Mon, Jan 07 2013	2.970	3.010	2.960	3.000	0.198
45	Tue, Jan 08 2013	2.980	3.020	2.980	3.020	0.1592

46	Wed, Jan 09 2013	3.020	3.050	3.020	3.050	0.1206
47	Thu, Jan 10 2013	3.040	3.040	2.970	2.980	0.2779
48	Fri, Jan 11 2013	2.990	3.000	2.980	2.990	0.0796
49	Mon, Jan 14 2013	2.980	3.000	2.950	3.000	0.1975
50	Tue, Jan 15 2013	3.020	3.020	2.990	3.000	0.1197
51	Wed, Jan 16 2013	3.000	3.010	3.000	3.010	0.04
52	Thu, Jan 17 2013	3.000	3.000	2.960	2.960	0.1584
53	Fri, Jan 18 2013	2.960	2.960	2.890	2.900	0.2723
54	Mon, Jan 21 2013	2.890	2.900	2.780	2.800	0.4536
55	Tue, Jan 22 2013	2.800	2.840	2.750	2.800	0.3375
56	Wed, Jan 23 2013	2.800	2.880	2.790	2.840	0.3411
57	Fri, Jan 25 2013	2.850	2.880	2.820	2.860	0.2292
58	Tue, Jan 29 2013	2.840	2.860	2.830	2.830	0.1149
59	Wed, Jan 30 2013	2.850	2.850	2.800	2.800	0.19
60	Thu, Jan 31 2013	2.780	2.820	2.770	2.790	0.1885
61	Mon, Feb 04 2013	2.800	2.800	2.760	2.790	0.1504
62	Tue, Feb 05 2013	2.760	2.800	2.760	2.770	0.1504
63	Wed, Feb 06 2013	2.760	2.790	2.730	2.750	0.2238
64	Thu, Feb 07 2013	2.740	2.790	2.730	2.790	0.2238
65	Fri, Feb 08 2013	2.790	2.790	2.740	2.760	0.187
66	Wed, Feb 13 2013	2.760	2.830	2.760	2.800	0.2632
67	Thu, Feb 14 2013	2.800	2.800	2.780	2.800	0.0756
68	Fri, Feb 15 2013	2.790	2.800	2.760	2.770	0.1504
69	Mon, Feb 18 2013	2.790	2.790	2.770	2.780	0.0754
70	Tue, Feb 19 2013	2.770	2.780	2.750	2.760	0.1125
71	Wed, Feb 20 2013	2.770	2.770	2.720	2.740	0.186
72	Thu, Feb 21 2013	2.760	2.760	2.700	2.740	0.222
73	Fri, Feb 22 2013	2.740	2.740	2.710	2.730	0.1113
74	Mon, Feb 25 2013	2.720	2.720	2.700	2.710	0.074
75	Tue, Feb 26 2013	2.700	2.700	2.670	2.700	0.1101
76	Wed, Feb 27 2013	2.700	2.710	2.690	2.690	0.0738
77	Thu, Feb 28 2013	2.700	2.710	2.680	2.710	0.1104
78	Fri, Mar 01 2013	2.700	2.830	2.700	2.79	0.481
79	Mon, Mar 04 2013	2.800	2.830	2.760	2.810	0.2632
80	Tue, Mar 05 2013	2.770	2.820	2.770	2.810	0.1885
81	Wed, Mar 06 2013	2.830	2.830	2.800	2.820	0.114
82	Thu, Mar 07 2013	2.830	2.830	2.790	2.810	0.1516
83	Fri, Mar 08 2013	2.810	2.820	2.770	2.790	0.1885
84	Mon, Mar 11 2013	2.800	2.810	2.770	2.800	0.1508
85	Tue, Mar 12 2013	2.800	2.810	2.780	2.800	0.1134
86	Wed, Mar 13 2013	2.780	2.800	2.760	2.760	0.1504
87	Thu, Mar 14 2013	2.760	2.800	2.750	2.760	0.1875
88	Fri, Mar 15 2013	2.780	2.780	2.740	2.760	0.1496
89	Mon, Mar 18 2013	2.740	2.790	2.730	2.780	0.2238
90	Tue, Mar 19 2013	2.760	2.800	2.760	2.770	0.1504
91	Wed, Mar 20 2013	2.770	2.890	2.770	2.890	0.4524
92	Thu, Mar 21 2013	2.870	2.870	2.830	2.860	0.1532

93	Fri, Mar 22 2013	2.880	2.920	2.860	2.900	0.2316
94	Mon, Mar 25 2013	2.890	2.910	2.880	2.900	0.1164
95	Tue, Mar 26 2013	2.910	2.930	2.890	2.900	0.1556
96	Wed, Mar 27 2013	2.900	2.930	2.890	2.900	0.1556
97	Thu, Mar 28 2013	2.900	2.910	2.890	2.900	0.0778
98	Fri, Mar 29 2013	2.880	2.880	2.810	2.820	0.2667
99	Mon, Apr 01 2013	2.840	2.850	2.810	2.820	0.1524
100	Tue, Apr 02 2013	2.820	2.870	2.810	2.860	0.2286
101	Wed, Apr 03 2013	2.860	2.900	2.750	2.890	0.5625
102	Thu, Apr 04 2013	2.850	2.890	2.840	2.850	0.192
103	Fri, Apr 05 2013	2.860	2.880	2.840	2.880	0.1536
104	Mon, Apr 08 2013	2.850	2.890	2.850	2.860	0.154
105	Tue, Apr 09 2013	2.870	2.870	2.850	2.850	0.077
106	Wed, Apr 10 2013	2.860	2.880	2.840	2.870	0.1536
107	Thu, Apr 11 2013	2.870	2.900	2.870	2.900	0.1161
108	Fri, Apr 12 2013	2.900	2.920	2.890	2.910	0.1167
109	Mon, Apr 15 2013	2.910	2.910	2.880	2.890	0.1164
110	Tue, Apr 16 2013	2.860	2.880	2.850	2.850	0.1155
111	Wed, Apr 17 2013	2.870	2.910	2.860	2.900	0.193
112	Thu, Apr 18 2013	2.860	2.910	2.860	2.910	0.193
113	Fri, Apr 19 2013	2.900	2.910	2.860	2.870	0.193
114	Mon, Apr 22 2013	2.900	2.910	2.870	2.880	0.1548
115	Tue, Apr 23 2013	2.870	2.880	2.860	2.870	0.0772
116	Wed, Apr 24 2013	2.870	2.880	2.850	2.860	0.1155
117	Thu, Apr 25 2013	2.860	2.920	2.860	2.870	0.2316
118	Fri, Apr 26 2013	2.860	2.970	2.860	2.950	0.4246
119	Mon, Apr 29 2013	2.930	2.970	2.920	2.950	0.196
120	Tue, Apr 30 2013	2.950	2.960	2.930	2.950	0.1179

Table 7: Comparison of ASTRO real and predicted data

From the result of Table 7, you can see that the real data and the predicted data are shown. The predicted data that are correct are highlighted to show and to make it easier for analyzing the data. After the data are analyzed, the research shown that out of 120 predictions, only 56 is correct for AIRASIA counter. From figure 9, the accuracy percentage for AIRASIA counter is 47% chance of success higher than AIRASIA and MAYBANK counters. Maybe the data for this 6 month are not affected by any other factors and that increases the probability of success for the prediction.

5.4 RESEARCH CONSTRAINS

Constraints for this project are categorized into two parts:

- i. Development constraints
- ii. System constraints

5.4.1 Development Constraints

To enable the use of Artificial Neural Network in the prototype, the main ingredient is the data needed to make the prediction. Special software, ChartNexus 4.6 is used to gain 3 month worth of data to be used for making the prediction. Next is to understand more the use of Transfer Function, Sigmoid Activation Function, and lastly the Prediction formula. By understanding all three functions, prediction of the stock price can be done easily. After using all three functions, the trend can be seen of the stock price increasing or decreasing by comparing the values of prediction of today and yesterday. For the prototype, Netbeans IDE 8.0.1 is used make the prototype, with interfaces and the functions in it.

5.4.2 System Constraints

The ability of the prototype to make prediction is already approved by the research done but only the increasing, decreasing and no changes of the stock price. This prototype cannot predict the real price of the stock accurately. It also cannot make prediction for next month, only daily because of the needs to have data like open, close, high, and low. The formula used in the prototype is quite simple and it might be improved by using other better techniques and by combining other techniques to make it better.

CHAPTER 6

CONCLUSION

For conclusion, trying to predict stock market is so much easier after using certain technique and algorithm. That technique is neural network, an AI technique widely known and famous for predictions. There are 3 objectives that have been achieved that are creating a prototype that can make prediction, apply the use of neural network technique in the prototype, and test the ability of the prototype to predict increase and decrease of stock prices. All the objectives are met and proven to be quite effective with 43%-47% chance of success for 3 different counters at KLSE. By using the 6 month data from each of the three counters at KLSE, the prediction for the stock price are proven by using the algorithm and formulas in neural network. For better result and chance of success, some people try using hybrid techniques by combining 2 or more technique into one to make better prediction. I have learned neural network technique but never get the chance to apply it, with this thesis I am given a chance to do so.

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APPENDICE A**Calculation1.java**

```
public class Calculation extends Interface3{

    private double low1,high1,open1,close1,sum1,sigmoid1,output1;

    //contructor for Calculation1
    public Calculation(double low1, double high1, double open1, double close1) {

        this.low1 = low1;
        this.high1 = high1;
        this.open1 = open1;
        this.close1 = close1;

    }

    //get method to return value of low1
    public double getLow1() {
        return low1;
    }

    //get method to return value of high1
    public double getHigh1() {
        return high1;
    }

    //get method to return value of open1
    public double getOpen1() {
        return open1;
    }

    //get method to return value of close1
    public double getClose1() {
        return close1;
    }
}
```

```
//get method to return value of sum1
public double getSum1() {
    return sum1;
}

//get method to return value of sigmoid1
public double getSigmoid1() {
    return sigmoid1;
}

//get method to return value of output1
public double getOutput1() {
    return output1;
}

//method that contain formulas for neural network
public void cal()
{
    sum1=(low1*open1)+(high1*close1);
    sigmoid1=1 / (1 + Math.exp(-sum1));
    output1 = (high1-low1)*(sigmoid1+low1);
}
}
```

Calculation2.java

```
* @author apit6992
*/
public class Calculation2 extends Interface3 {

    private double low2,high2,open2,close2,sum2,sigmoid2,output2;
//constructor for Calculation2
    public Calculation2(double low2, double high2, double open2, double close2 ) {

        this.low2 = low2;
        this.high2 = high2;
        this.open2 = open2;
        this.close2 = close2;

    }

//get method to return value of low2
    public double getLow2() {
        return low2;
    }

//get method to return value of high2
    public double getHigh2() {
        return high2;
    }

//get method to return value of open2
    public double getOpen2() {
        return open2;
    }

//get method to return value of close2
    public double getClose2() {
        return close2;
    }
}
```



```
//get method to return value of sum2
public double getSum2() {
    return sum2;
}

//get method to return value of sigmoid2
public double getSigmoid2() {
    return sigmoid2;
}

//get method to return value of output2
public double getOutput2() {
    return output2;
}

//method that contain formulas for neural network techniques
public void cal2()
{
    sum2=(low2*open2)+(high2*close2);
    sigmoid2=1 / (1 + Math.exp(-sum2));
    output2 = (high2-low2)*(sigmoid2+low2);
}
}
```