

Stock Market Prediction Application with Fractal Decomposition

To help your understanding with the Fractal Decomposition Analysis (FDA), we provide the light practical application for Stock market prediction. This application can be used for Forex market prediction too. In this chapter, we will be demonstrating this Stock Market Prediction Application in detail. Direct Download for this application is available from the link below:

www.algotrading-investment.com/FreeDownload/StockMarketPrediction.zip

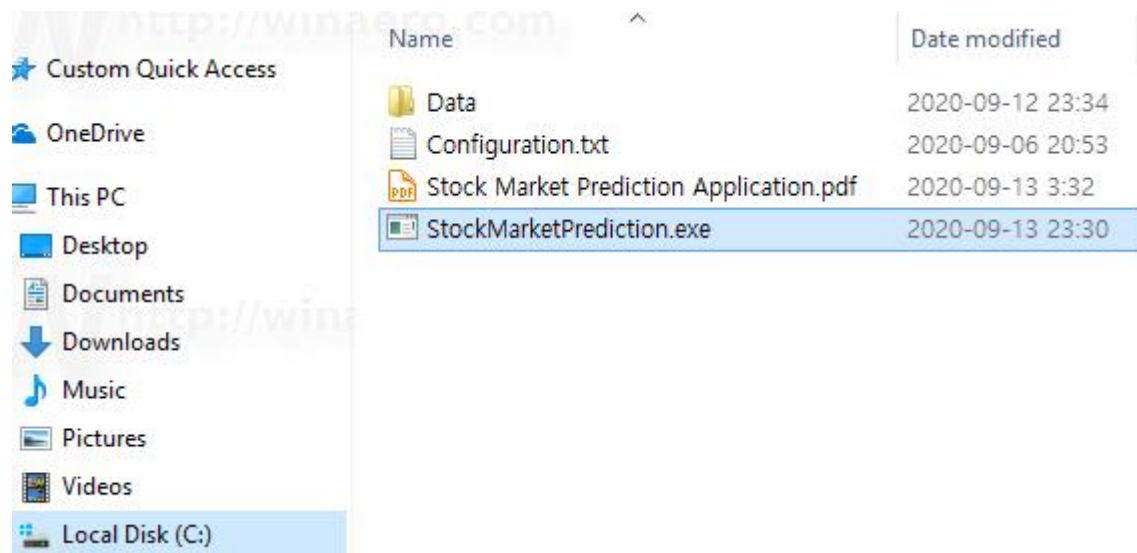


Figure 4.11-1: Contents inside the unzipped Stock Market Prediction Application

Once you have unzipped the download, you will find StockMarketPrediction.exe file inside the Folder. You need to know few things about the application. Firstly, the application was built from Dot Net Framework 4.5 for the time being. Hence, you need to have the Windows OS with Dot Net Framework 4.5 or later version installed. For your information, we do not have much knowledge on how this Dot Net Framework can run on other OS like Mac or Linux. Secondly, I can swear

that there is no harmful virus inside this light application. However, some antivirus software can always cause some false positive alert (i.e. wrong alert) since many antivirus software are not so friendly toward the Dot Net Framework Application. Antivirus software Vendors ask contacting them in the case of false positive alert. However, there are literally thousands of antivirus software vendors and we cannot contact all of them to release one free software. Hence, when you get the false positive alert, you can ignore them. This application is safe to use for sure. Thirdly, this is the free software. Hence, there is no restriction on the usage. You are free to use and free to share on online. When you use this free application for trading, use it at your own risk.

Now let us run the Stock Market Prediction executable file. When you run the executable file, you will get to see the simple user interface. Usage of this application is simple like using the vending machine. Use of this application consists of two steps. Firstly, input data. Secondly, the application will output the prediction results for the Fractal Decomposition analysis.

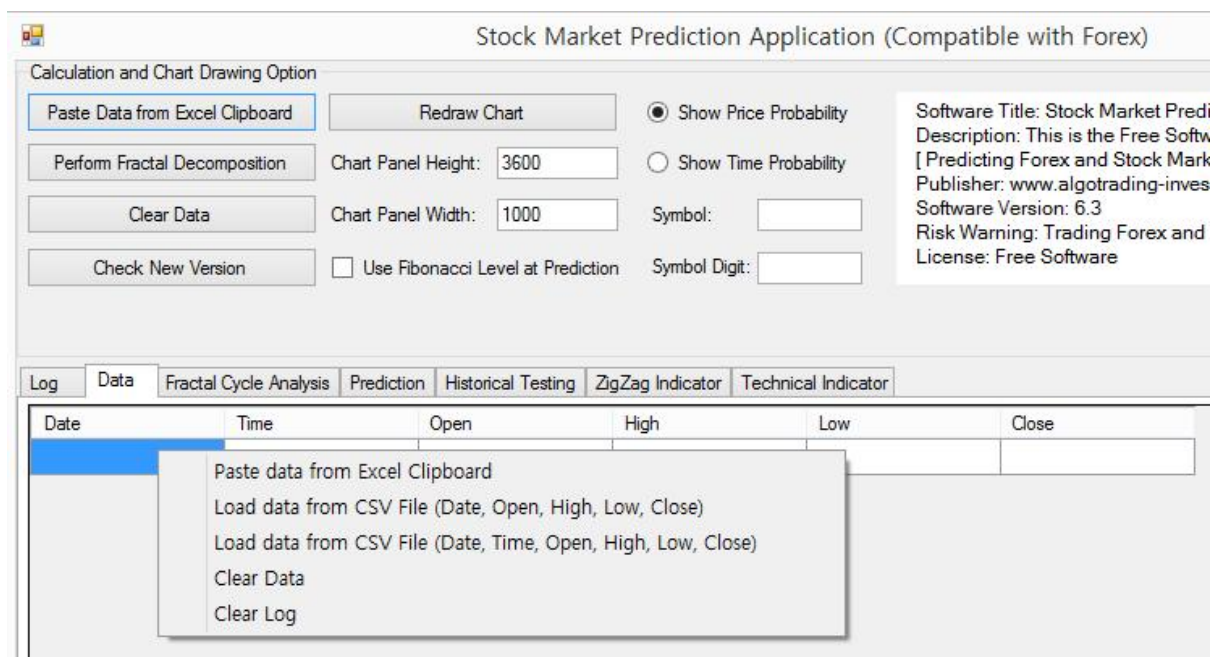


Figure 4.11-2: Data loading option menu with the right mouse click in the Data Tab page

To fulfil the data input step, the best way is to gather the Forex or Stock market data in the order of Date, Time, Open, High, Low, and Close in Excel. This should be not so hard as the most of Forex and Stock market data are provided in the similar manner. However, in some daily data, they might provide the five columns only like Date, Open, High, Low, and Close. In that case, you can just create Time column between Date and Open price column in Excel. Just fill the time column with 00:00:00 (hh:mm:ss) or 00:00 (hh:mm) or some other time if you prefer. Fortunately, the application is not sensitive with date and time format. As long as you have the six columns of data in the order of Date, Time, Open, High, Low, and Close in the worksheet in Excel, you can copy them using the “Paste Data from Excel Clipboard” option.

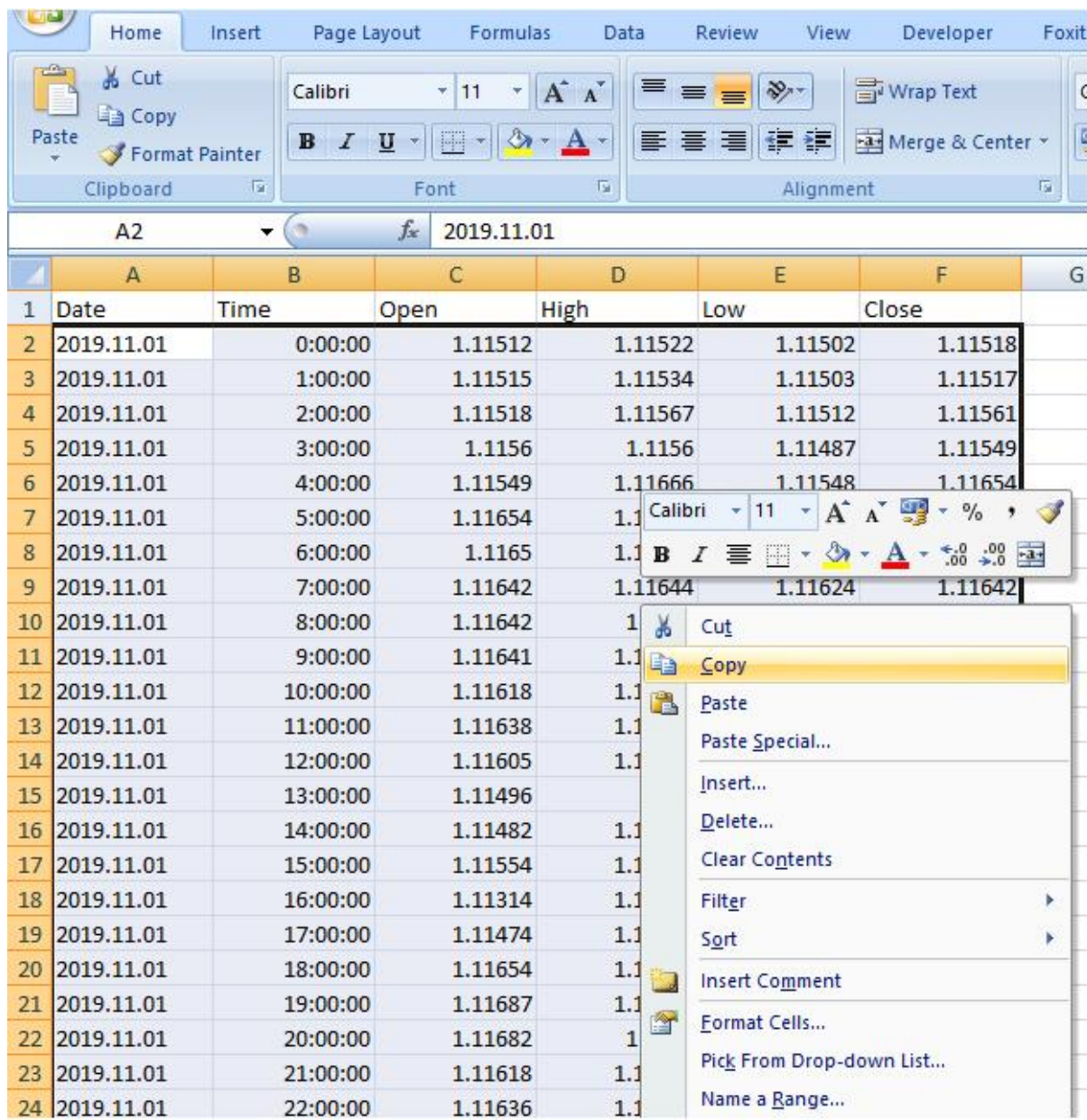


Figure 4.11-3: Forex market data preparation in Excel

Once, you have gathered Date, Time, Open, High, Low, and Close in Excel. Make sure that you have the oldest data on top and the newest data on the bottom. For Fractal Decomposition Analysis, we need at least 1000 data sets. For example, that is nearly 5 years of Daily Stock market data assuming 200 trading days in one year. Select the data in Excel from top left to bottom right using mouse. Do not include the column header. Then, click on the mouse right button

to bring the pop up menu. Click “Copy” in the pop up menu. Clicking on the copy menu will load the selected data in your clipboard.

Now go to the application and click “Paste Data from Excel Clipboard” button. This will paste the copied data into the application. You can visually check the loaded data in the application. Make sure that the same data are loaded from the Excel.

Click Paste Data From Excel Clipboard

Date	Time	Open	High	Low	Close
2019.11.01	0:00:00	1.11512	1.11522	1.11502	1.11518
2019.11.01	1:00:00	1.11515	1.11534	1.11503	1.11517
2019.11.01	2:00:00	1.11518	1.11567	1.11512	1.11561
2019.11.01	3:00:00	1.1156	1.1156	1.11487	1.11549
2019.11.01	4:00:00	1.11549	1.11666	1.11548	1.11654
2019.11.01	5:00:00	1.11654	1.11657	1.1161	1.1165
2019.11.01	6:00:00	1.1165	1.11664	1.11633	1.11642
2019.11.01	7:00:00	1.11642	1.11644	1.11624	1.11642
2019.11.01	8:00:00	1.11642	1.1165	1.11628	1.11641
2019.11.01	9:00:00	1.11641	1.11645	1.11604	1.11618
2019.11.01	10:00:00	1.11618	1.11668	1.11554	1.11636
2019.11.01	11:00:00	1.11638	1.11688	1.11552	1.11605
2019.11.01	12:00:00	1.11605	1.11606	1.11478	1.11496
2019.11.01	13:00:00	1.11496	1.115	1.11398	1.11482
2019.11.01	14:00:00	1.11482	1.11578	1.11462	1.11554
2019.11.01	15:00:00	1.11554	1.11575	1.11281	1.11312
2019.11.01	16:00:00	1.11314	1.11534	1.11311	1.11469
2019.11.01	17:00:00	1.11474	1.11687	1.11474	1.11654
2019.11.01	18:00:00	1.11654	1.11718	1.11622	1.11686
2019.11.01	19:00:00	1.11687	1.11708	1.11623	1.11682
2019.11.01	20:00:00	1.11682	1.1169	1.11611	1.11618

Figure 4.11-4: Data loaded in the application before Fractal Decomposition Analysis

If the data is loaded correctly, click on “Perform Fractal Decomposition” button. This will trigger the Fractal Decomposition Analysis on the data you have just loaded from the Excel. In the Fractal Decomposition Analysis page, it will output the Zig Zag indicator drawn on the candlestick chart and the turning point probability. You can use the vertical scroll to access other fractal cycles.

Use the scroll to access other Fractal Cycle

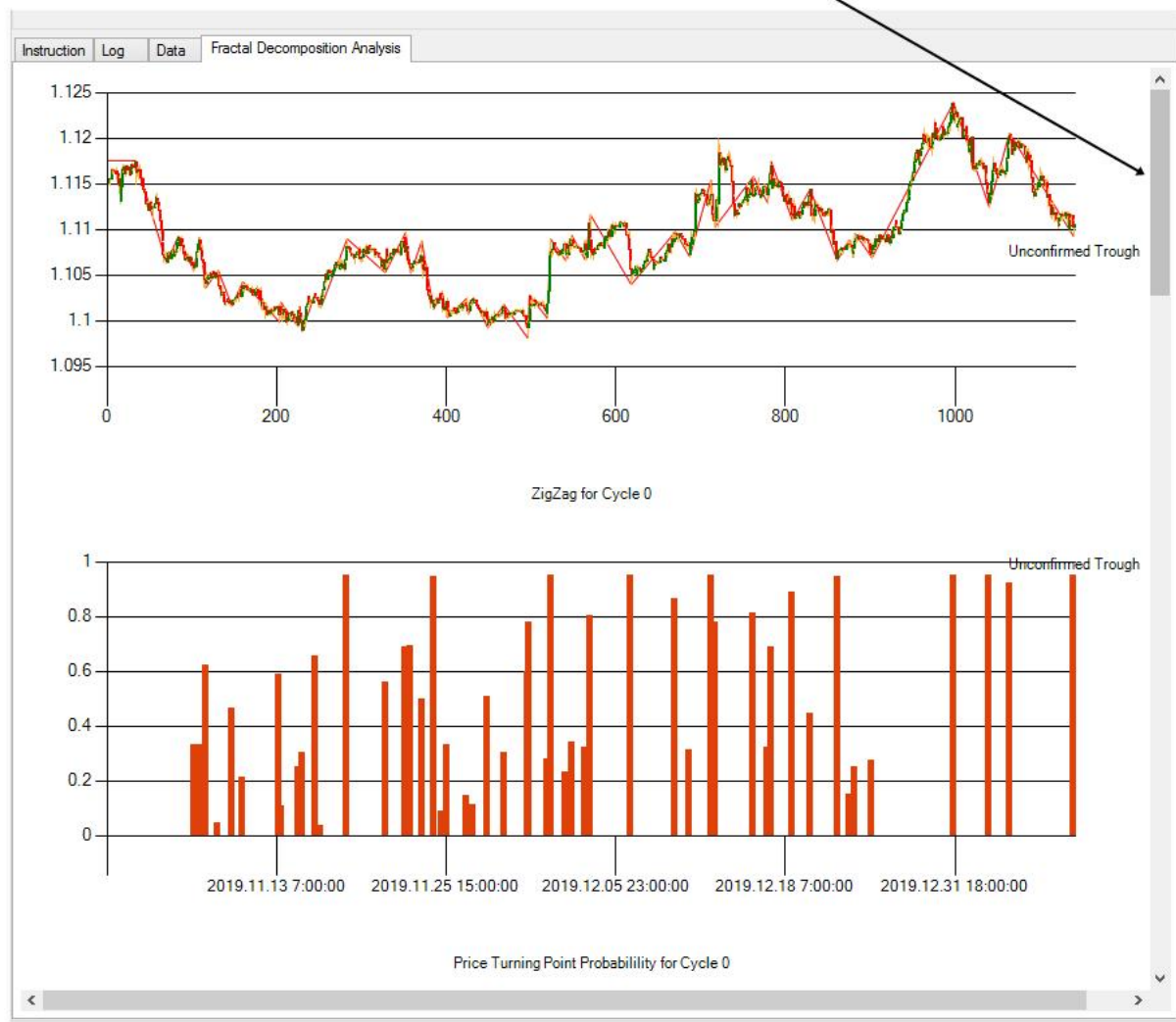


Figure 4.11-5: First Fractal Cycle in the Fractal Decomposition Analysis

For your information, Cycle 0 indicates the smallest fractal cycle in FDA. The application supports up to four Fractal Cycle Analysis for the time being. Hence, Cycle 3 is the biggest cycle you can access. However, occasionally, you will get only three Fractal Cycles in the output. It is because the algorithm will get rid of any insignificant cycle from the analysis. Do not get surprise even if you get the three cycles only.

Calculated turning point probability is corresponding to each peak and trough of the ZigZag indicator. The turning point probability will be displayed in between 0.0 and 1.0. However, the application will not display anything over 0.95 (i.e. 95%). In practical application, our interest for the prediction is at the last extreme point. We want to know what will happen in that peak or trough. The application will label the last extreme point as unconfirmed peak or trough in the chart. You will make your analysis around this unconfirmed extreme point. The corresponding turning point probability will tell a lot about what can happen at that unconfirmed extreme point.

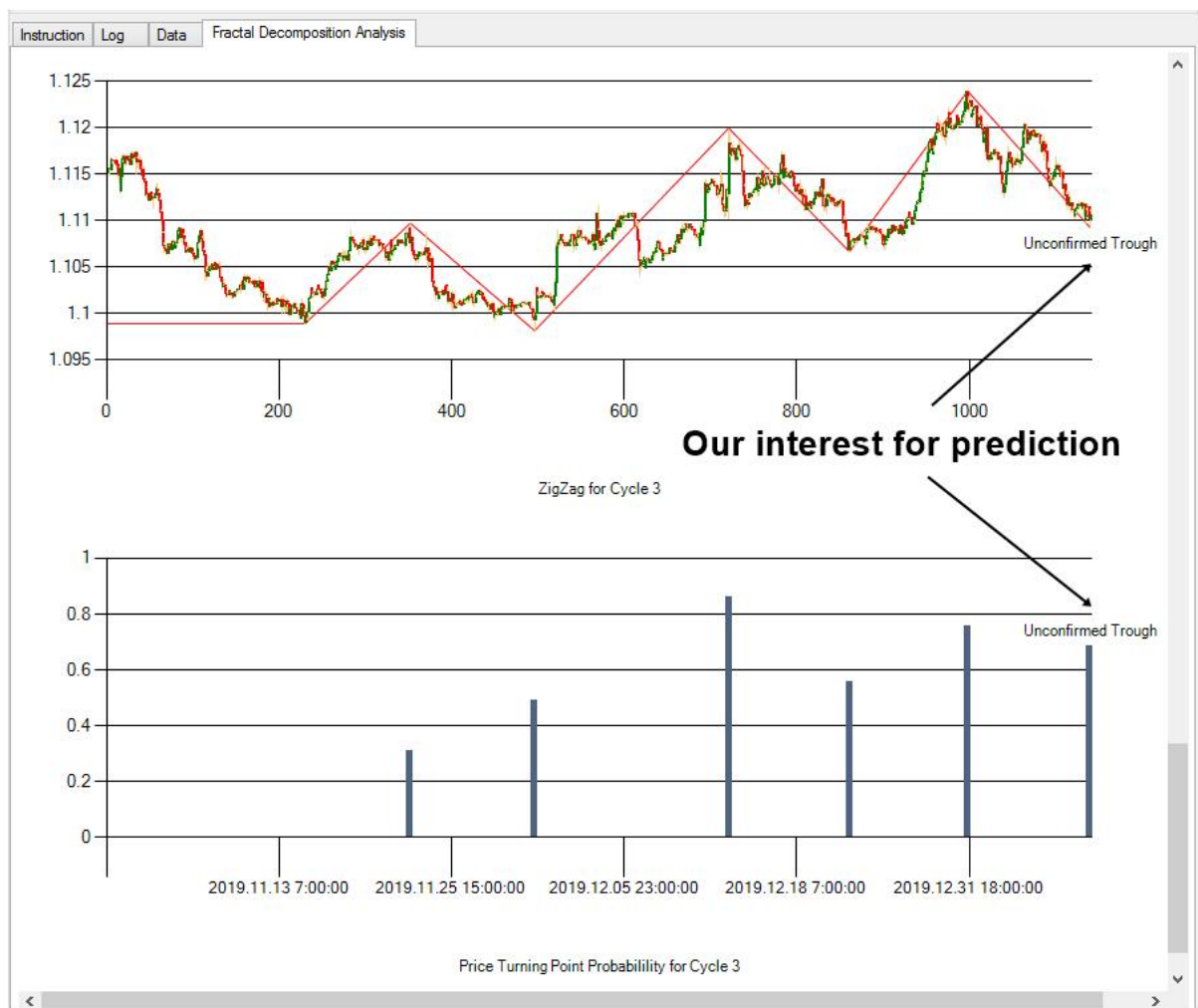


Figure 4.11-6: Last Fractal Cycle in the Fractal Decomposition Analysis

We have discussed how to use the turning point probability in previous chapters. We will not repeat the length explanation here. However, the starting point is that you can pick the breakout trading opportunity in the low probability area and you can pick the reversal trading opportunity in the high probability area.



Figure 4.11-7: Breakout and Reversal Trading Range recommended by the turning point probability

Good thing about this application is that it can display the turning point probability in time too. When you click on the radio button “Show Time Probability”, the application will display the corresponding turning point probability for time for each peak and trough in the Zig Zag indicator. To go back to the price probability, just click on the radio button “Show Price Probability”.

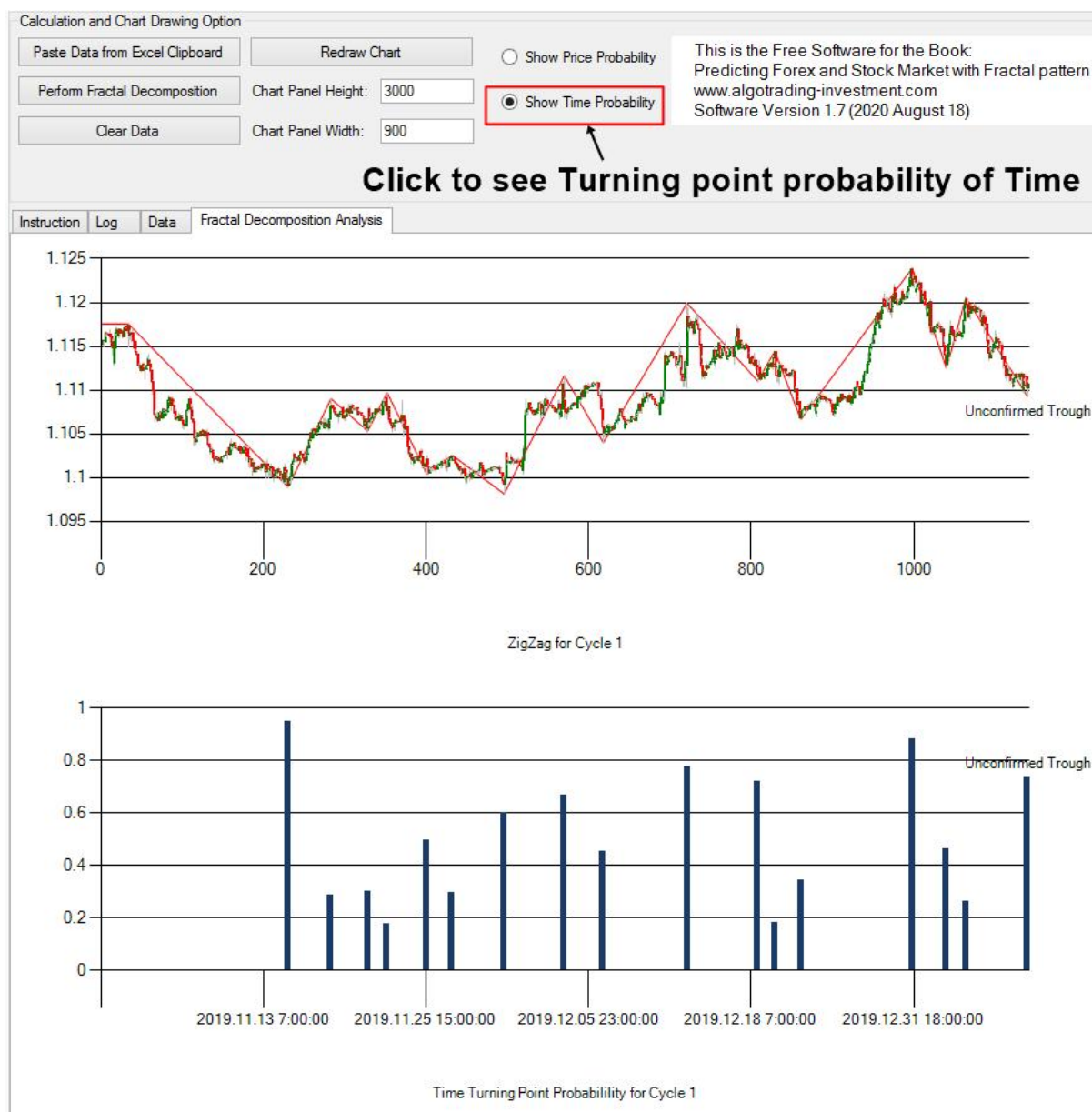


Figure 4.11-8: You can choose between Price Probability and Time Probability

Beside the automatic Fractal Decomposition Analysis, there are some additional features in the application. For example, it could draw chart in the scale as you wish. In the default setting, the chart scale is set to 3,000 x 1,000 resolutions (height x width). If you want to have a bigger chart, then change the height and width of Chart Panel. The chart resolution can go up to 10,000 x 10,000 resolutions. However, we cannot guarantee that it always works. In some

personal computer, the available resolution size might be limited depending on your graphic card and some other factors. If your computer does not support the resolution, then the application can crash. If you do not want to change the chart resolution, then you can also use the zoom-in feature. The zoom-in can be done by selecting the chart area. The zoom-in can be cancelled when the small circle button is clicked.

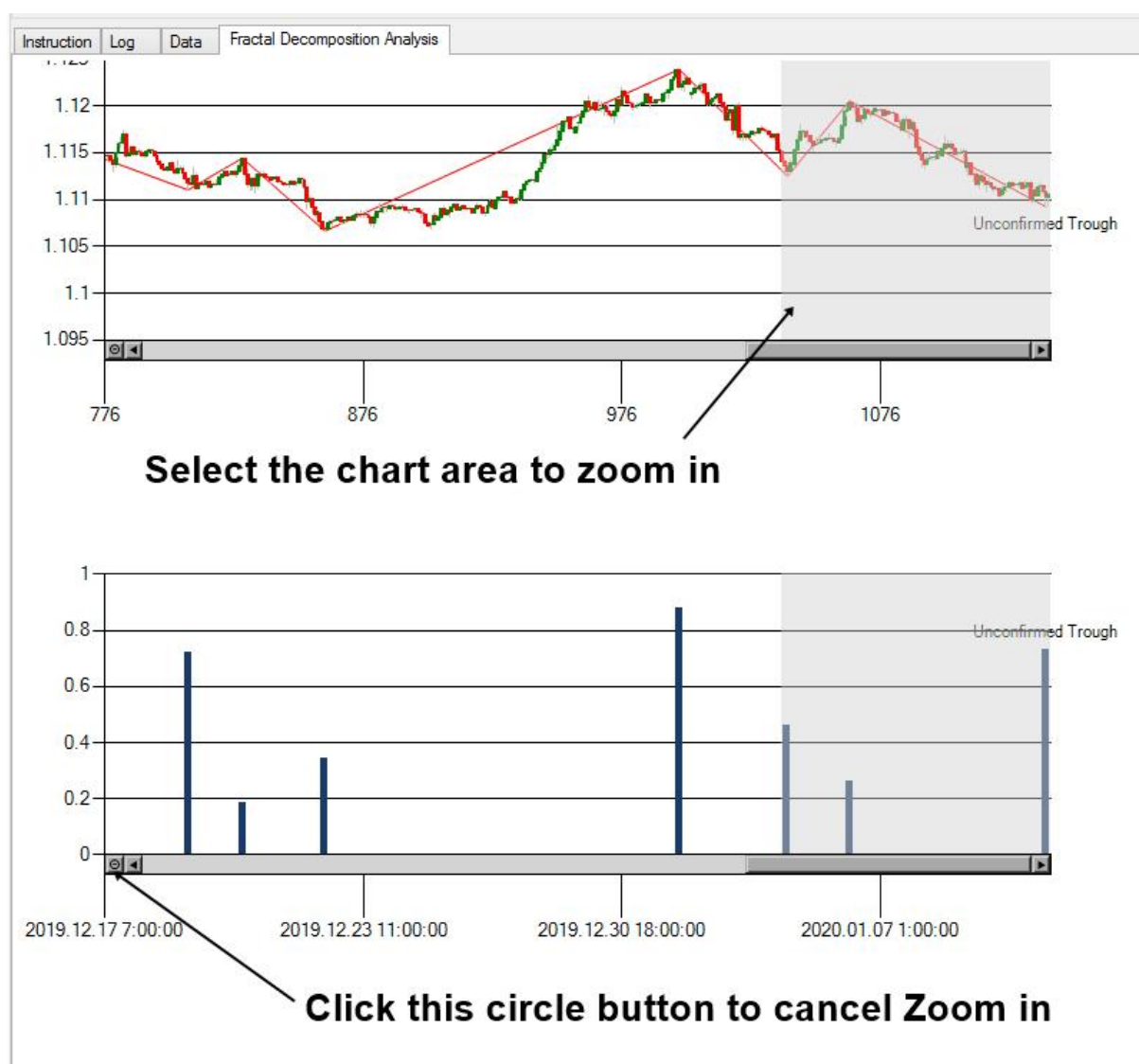


Figure 4.11-9: Zoom-in feature in the application

This application can also locate the turning point probability matrix (i.e. the joint probability between each cycle) at any zigzag point. To do so, click on any column graph, and then it will locate the turning point probability matrix and the vertical line to indicate the location of the calculated data point. The turning point probability matrix is much more convenient because you can have the bird eye view on all four cycles. With the vertical line, you can check which zigzag point in each cycle is overlapping together.

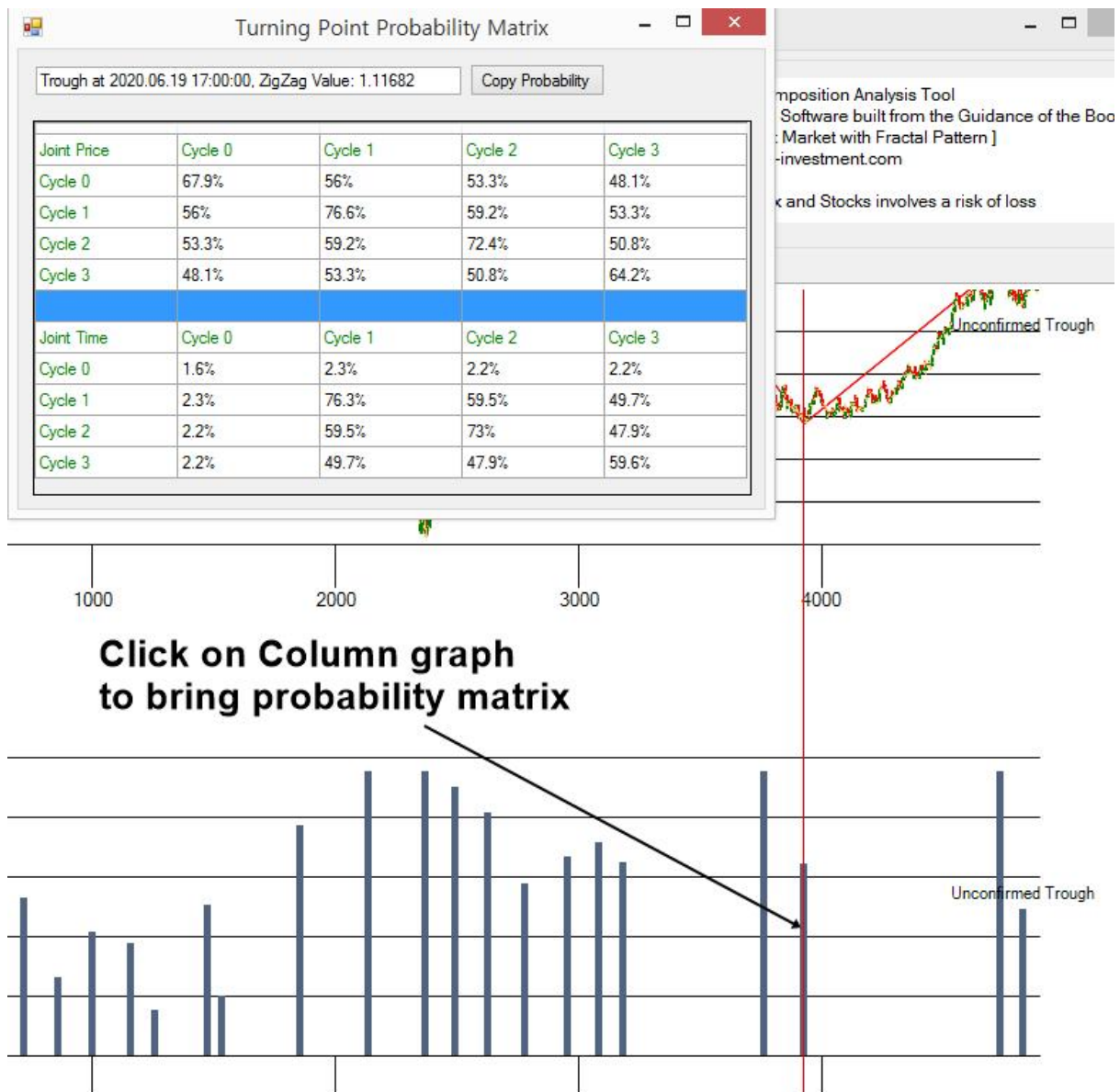


Figure 4.11-10: Click on Column Graph to bring the turning point probability matrix

The most popular geometric analysis for your trading is to recognize the support and resistance patterns from your chart. When we want to detect the support and resistance patterns, lines are the important tool. This application provides the functionality to add some lines and shapes, known as the chart object. For the time being, you can add five chart objects including the vertical line, horizontal line, line, box, and triangle. These lines and shapes are useful when you want detecting the support and resistance patterns from your chart. In addition, they can be also used to detect more advanced price patterns too.



Figure 4.11-11: Use mouse right click to bring the pop up menu to add chart objects

You can resize or relocate the lines and shapes. To resize the lines and shapes, select the chart object first. Then drag the small squares in each corner. For the

vertical line, you can only resize its height. Likewise, for the horizontal line, you can only resize its width. Line is useful because you can resize them for both the height and width. Probably, the line would be the most frequently used chart object in and out of your trading. The box is also the powerful supplementary for the geometric analysis. It can be used for several different purposes. For example, you can use the box to mark up the supply and demand zone. In addition, you can use box to mark up the potential breakout zone or potential reversal zone too. Triangle can be used for another purpose. They are useful when you detect the price patterns like the symmetric triangle, rising wedge, falling wedge, Elliott Wave, Harmonic Pattern, or X3 Price Pattern. However, in some cases, it might be easier to detect the symmetric triangle, rising wedge, and falling wedge pattern using the two lines instead of the triangle. It differs from case to case.

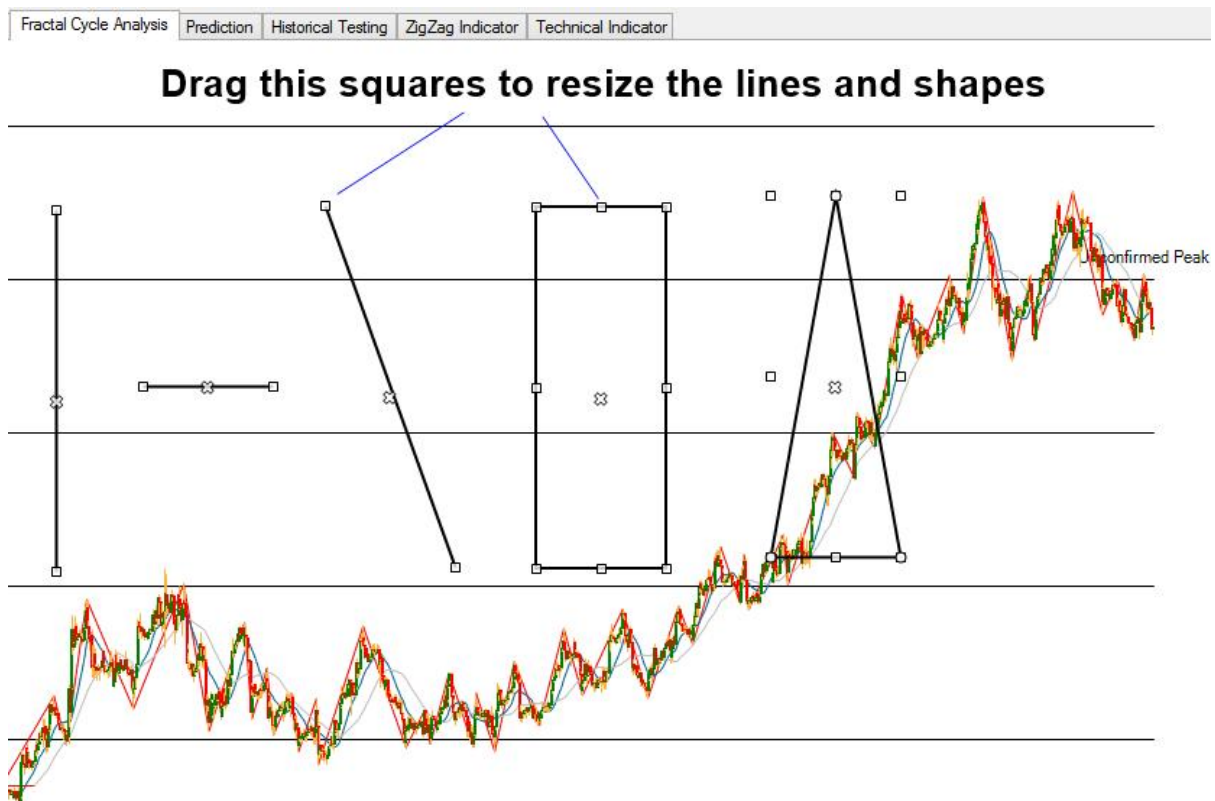


Figure 4.11-12: Select the chart object and drag the squares to resize the lines and shapes

You can also get the individual control over each chart object. To do so, click the chart object to select. Then use mouse right click to bring the pop up menu for the individual chart object. From the pop up menu, you can change the width, style, and colour of each chart object. In addition, you can also remove each chart object one by one from this pop up menu.



Figure 4.11-13: Select the chart object and click mouse right button to bring the pop up menu

We have already covered how to combine the geometric analysis and the statistical prediction from the previous chapters. With this tool, you can apply the same trading principle. For example, while you are recognizing the support and resistance patterns or some other price patterns, you can bring the turning point probability matrix. As results, you can not only gauge the possible turning point or breakout point in the geometric analysis but also you can confirm your trading decision with the statistical prediction. Since this tool provides some common technical indicators too, you have the various choices in making the buy and sell decision for your trading.



Figure 4.11-14: Combine the geometric analysis with the statistical prediction for better trading performance

In Prediction tab page, you can access the turning point prediction made for the latest peak and trough in your data. This Prediction tab page probably contains the most important information for your trading. Left Y-axis indicates the turning point probability in price dimension. Right Y-axis indicates the corresponding price level at each turning point label. Turning point prediction in time dimension is also shown in X-axis. When we predict the turning point at peak, the turning point prediction in time will be drawn in the bottom axis. When we predict the turning point at trough, the turning point prediction in time will be drawn in the top axis. It follows the explanation of the Fibonacci Probability Graph we made earlier.

In the chart in the Prediction tab page, you can also cross-reference the location of one chart to another chart. For example, when you select the area with the mouse left click and drag in the chart at Cycle 0, then the same location will be highlighted in the rest of chart including Cycle 1, Cycle 2 and Cycle 3. This feature is useful as you can make sense with the location of the turning point in small cycle and in the greater cycle too.

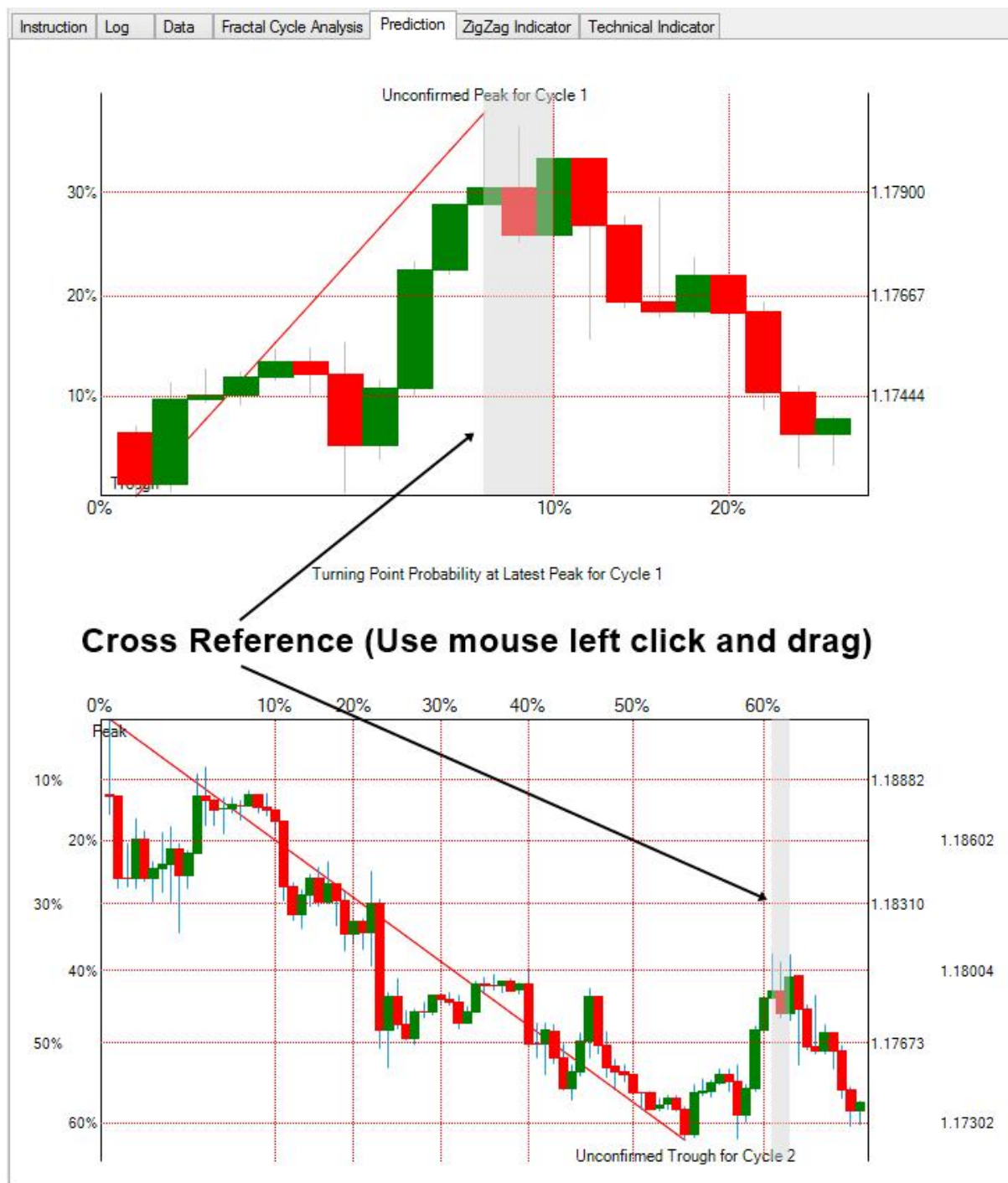


Figure 4.11-15: Turning point prediction shown in the Prediction Tab page

In addition, you can project the Fibonacci price level in the chart. To do so, tick on the “Use Fibonacci Level at Prediction” box. This also works after the full computation is done already. For example, once the box is ticked, click on “Redraw Chart button”. It will redraw the entire chart with the Fibonacci price level instead of the probability. To bring back the probability, untick on the box. Then click on “Redraw Chart” button.



Figure 4.11-16: Projecting Fibonacci Price Level in Prediction tab page

After learning to access on turning point probability and geometric analysis, you might want to tune your trading strategy. To tune your trading strategy, you can use Historical Testing tab page. In Historical Testing tab page, you can check all past turning points for each cycle. To check older turning point, move the trackbar to left. When you tune your trading strategy, check both turning point probability and Fibonacci price levels. You can do that by ticking or unticking on “Use Fibonacci Level at Prediction” box.



Figure 4.11-17: Historical Testing tab page

In the chart in the Historical Testing tab page, data starts from left side. It will start from one turning point, which is either peak or trough. Then the next turning point, which is either peak or trough, is our interest to predict. Since this is testing with historical data, we already know the resulting price move. The resulting price move will be drawn up to as far as it went in the same direction. After the testing with past turning points, you will find that combination of probability and Fibonacci price level will perform better than just using either probability or Fibonacci price level alone.



Figure 4.11-18: Testing the past Trough for Cycle 3 in Historical Testing tab page

If you want to drill down your analysis for your trading, we recommend bringing the ZigZag indicator data to Excel. You can do that in the ZigZag indicator tab page. Use the right mouse click to bring the popup menu. For example, with the ZigZag indicator data, you can detect any price pattern that are derived from the Fractal Wave like the Support, Resistance, Elliott Wave, Harmonic Pattern, and X3 Price pattern.

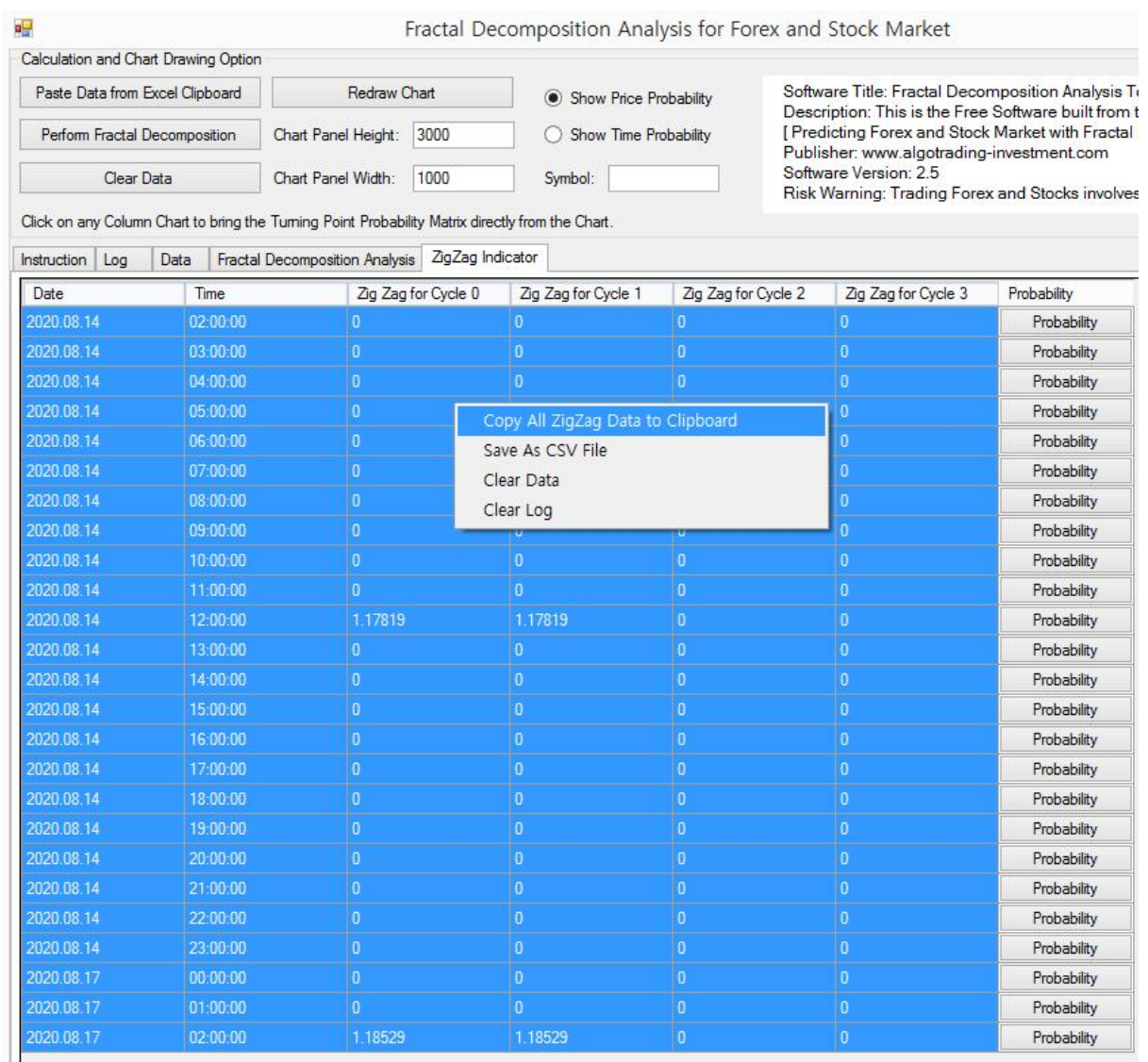


Figure 4.11-19: You can copy the ZigZag indicator data into your Excel via the Clipboard

In addition, you can use some technical indicators along with the turning point prediction. To add or to remove the technical indicators, you need to use Configuraion.txt file. Configuraion.txt file is zipped together with Fractal Decomposition Analysis.exe file. You can simply edit this file in the Notepad or any text editor. Indicator column, the first column, is used to type the indicator name and their parameters. For example, type SMA for simple moving average and EMA for exponential moving average. Decimal column, the second column, is used to specify the decimal places for the indicator calculation. From third column to seventh column indicates displaying the indicators in the chart in the Fractal Cycle Analysis tab page. Integer value 1 indicates drawing whereas integer value 0 indicates not drawing. Hence, if you want to enable the particular indicator in the chart, set them as 1. Some technical indicator like RSI, CCI and ADX requires the separate window to draw them. You can draw those technical indicators in sub window. This tool provides the sub window up to two. You can add up to twelve indicators in this tool. If the indicator is not recognized by the tool, then they will be ignored in the calculation stage.

Indicator		;	Decimal;	Cycle 0;	Cycle 1;	Cycle 2;	Cycle 3;	Sub Window 0;
SMA	(20)	;	5;	1;	1;	1;	0;	0;
SMA	(50)	;	5;	1;	1;	1;	0;	0;
EMA	(20)	;	5;	0;	0;	0;	0;	0;
EMA	(50)	;	5;	0;	0;	0;	0;	0;
BollingerBand	(20, 2)	;	5;	0;	0;	0;	1;	0;
RSI	(13)	;	2;	0;	0;	0;	0;	1;
CCI	(13)	;	2;	0;	0;	0;	0;	0;
ADX	(14)	;	2;	0;	0;	0;	0;	0;
MACD	(12, 26, 9)	;	3;	0;	0;	0;	0;	0;
ATR	(14)	;	6;	0;	0;	0;	0;	0;
DEMA	(20)	;	5;	0;	0;	0;	0;	0;

Figure 4.11-20: Configuration.txt file opened in the Notepad

Once you include the available indicators in Configuration.txt file, the tool will output the calculations into Technical Indicator tab page. Like the ZigZag indicator, you can copy these values into Excel clipboard. Then, you can perform further analysis if you wish.

Instruction	Log	Data	Fractal Cycle Analysis	Prediction	ZigZag Indicator	Technical Indicator	
Date	Time		SMA 20	SMA 50	EMA 20	EMA 50	
2020.08.10	13:00:00		1.17799	1.18202	1.18003	1.18110	
2020.08.10	14:00:00		1.17788	1.18180	1.17979	1.18099	
2020.08.10	15:00:00		1.17787	1.18165	1.17964	1.18091	
2020.08.10	16:00:00		1.17791	1.18154	1.17960	1.18086	
2020.08.10	17:00:00		1.17783	1.18137	1.17945	1.18078	
2020.08.10	18:00:00		1.17767	1.18117	1.17926	1.18067	
2020.08.10	19:00:00		1.17750	1.18099	1.17906	1.18057	
2020.08.10	20:00:00		1.17733	1.18078	1.17887	1.18046	
2020.08.10	21:00:00		1.17717	1.18051	1.17865	1.18034	
2020.08.10	22:00:00		1.17699	1.18024	1.17843	1.18022	
2020.08.10	23:00:00		1.17670	1.17997	1.17820	1.18009	
2020.08.11	00:00:00		1.17643	1.17969	1.17798	1.17996	
2020.08.11	01:00:00		1.17617	1.17942	1.17779	1.17985	
2020.08.11	02:00:00		1.17587	1.17914	1.17758	1.17972	
2020.08.11	03:00:00		1.17554	1.17883	1.17732	1.17958	
2020.08.11	04:00:00		1.17529	1.17857	1.17718	1.17948	
2020.08.11	05:00:00		1.17518	1.17831	1.17704	1.17938	
2020.08.11	06:00:00		1.17510	1.17807	1.17693	1.17929	
2020.08.11	07:00:00		1.17499	1.17790	1.17685	1.17920	
2020.08.11	08:00:00		1.17494	1.17774	1.17675	1.17912	
2020.08.11	09:00:00		1.17488	1.17754	1.17658	1.17900	
2020.08.11	10:00:00		1.17484	1.17735	1.17648	1.17892	
2020.08.11	11:00:00		1.17486	1.17723	1.17652	1.17888	
2020.08.11	12:00:00		1.17486	1.17712	1.17663	1.17888	

Figure 4.11-21: Computed indicator values in Technical Indicator tab page

The statistical prediction algorithm in this light application was taken from the original algorithm of the Fractal Pattern Scanner in the MetaTrader and Optimum Chart. Although this application does not provide the full Fibonacci

Probability chart and Mother Wave detection as in the Fractal Pattern Scanner in MetaTrader and Optimum Chart, the application should be able to provide you the functionality around the Fractal Decomposition and Fractal Cycle Analysis. Most importantly, it provides the turning point probability in both price and time dimension. Although you will not make your trading decision exclusively on the statistical prediction alone, statistical prediction provides huge advantage for your trading. With the statistical prediction, you can detect the extreme movement in the market accurately. In such case, you might point out the opportunity for the statistical arbitrage. This type of opportunity can happen at some extreme and conservative probability level.

The turning point probability is highly compatible with the market geometry analysis. You will not experience the compatibility problem like other statistical methods. For example, it is hard to utilize the prediction from the multiple regression while you are applying Elliott Wave or Harmonic Pattern analysis as well as other technical indicators for your trading. However, you can do all these seamless with the turning point probability because the statistical prediction is made at the point where we also draw Fibonacci pattern, Elliott Wave, Harmonic pattern and X3 price patterns. Remember how we taught that your intuition works in real life in this book. The geometric prediction, introduced in this book, mimic how the human intuition works in the scientific way. The core principle behind the geometric prediction is to combine the geometric and statistical analysis to create the simple and effective day trading method. With this tool, you can combine the statistical prediction from the turning point probability with the Fibonacci Ratio Analysis.



Statistical Prediction View

Figure 4.11-22: Statistical Prediction from Turning Point Probability



Fibonacci Ratio Analysis View

Figure 4.11-23: Geometric Analysis with Fibonacci Ratio

This tool is free for forever. Another good thing is that this tool is simple to use. You can use the free financial market data source like Yahoo Finance and Google Finance to load any stock market data you want. In addition, MetaTrader 4 and MetaTrader 5 also provide the free Forex market data. You can save them as csv file or some sort in your hard drive. Then you can load them using “Load data from CSV File” menu. To bring the entire data loading option, use the right mouse click from Data tab page. When you load the data from the CSV file, you need to check how the data is formatted.

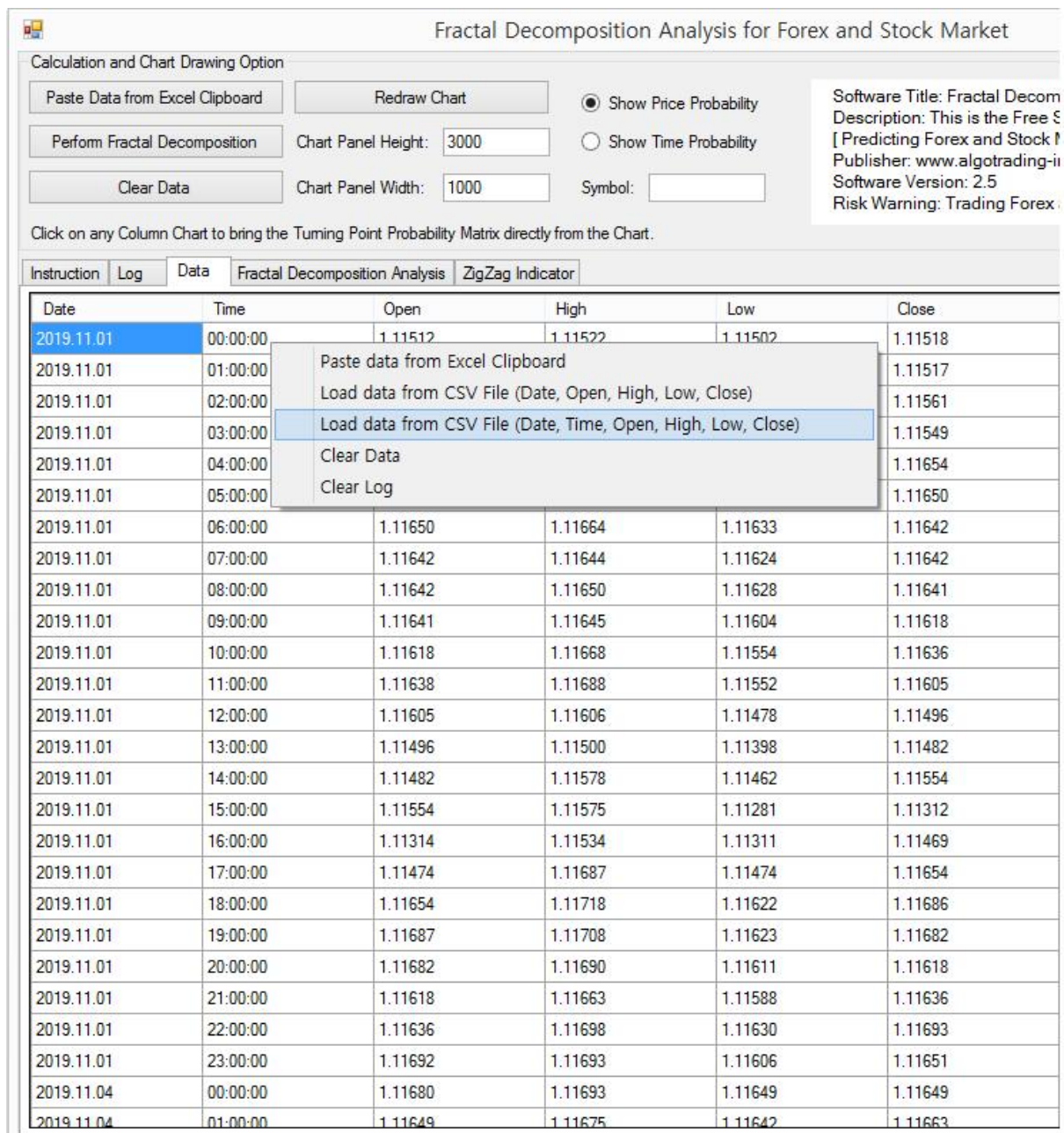


Figure 4.11-24: Load data from the CSV file

For example, we provided the some sample csv files including EURUSD_H1.csv and S&P500_Daily.csv file. EURUSD_H1.csv file was saved from MetaTrader 5 platform and S&P500_Daily.csv file was saved from Yahoo Finance. For EURUSD_H1.csv, use Date, Time, Open, High, Low, Close option. For S&P 500_Daily.csv file, use Date, Open, High, Low, Close option. If you are doubt,

then open the csv file from the Notepad. You will find how they are structured. Choose the right option for the data structure. This free application can load csv file with three delimiters including tab, comma, and semicolon. It will automatically choose the right delimiter before loading the data. When the csv data structure is not supported, then try to load the data with the Excel clipboard option. You should also understand that you would need some data to calculate the multiple Fractal cycles. We recommend at least 1000 data points for minimum. You can load more data if you wish. However, more data you load, the tool can slow down because it requires using more CPU and memory of your computer.

<DATE>	<TIME>	<OPEN>	<HIGH>	<LOW>	<CLOSE>	<TICKVOL>	<VOL>	<SPREAD>
2019.11.01	00:00:00			1.11512	1.11522	1.11502	1.11518	331 0 2
2019.11.01	01:00:00			1.11515	1.11534	1.11503	1.11517	580 0 0
2019.11.01	02:00:00			1.11518	1.11567	1.11512	1.11561	667 0 0
2019.11.01	03:00:00			1.11560	1.11560	1.11487	1.11549	1158 0 0
2019.11.01	04:00:00			1.11549	1.11666	1.11548	1.11654	1493 0 0
2019.11.01	05:00:00			1.11654	1.11657	1.11610	1.11650	1143 0 0
2019.11.01	06:00:00			1.11650	1.11664	1.11633	1.11642	598 0 0
2019.11.01	07:00:00			1.11642	1.11644	1.11624	1.11642	546 0 0
2019.11.01	08:00:00			1.11642	1.11650	1.11628	1.11641	698 0 0
2019.11.01	09:00:00			1.11641	1.11645	1.11604	1.11618	718 0 0
2019.11.01	10:00:00			1.11618	1.11668	1.11554	1.11636	2038 0 0
2019.11.01	11:00:00			1.11638	1.11688	1.11552	1.11605	2632 0 0
2019.11.01	12:00:00			1.11605	1.11606	1.11478	1.11496	2212 0 0
2019.11.01	13:00:00			1.11496	1.11500	1.11398	1.11482	2141 0 0
2019.11.01	14:00:00			1.11482	1.11578	1.11462	1.11554	2347 0 0
2019.11.01	15:00:00			1.11554	1.11575	1.11281	1.11312	5409 0 0
2019.11.01	16:00:00			1.11314	1.11534	1.11311	1.11469	3367 0 0
2019.11.01	17:00:00			1.11474	1.11687	1.11474	1.11654	4711 0 0
2019.11.01	18:00:00			1.11654	1.11718	1.11622	1.11686	3161 0 0
2019.11.01	19:00:00			1.11687	1.11708	1.11623	1.11682	2503 0 0
2019.11.01	20:00:00			1.11682	1.11690	1.11611	1.11618	1701 0 0
2019.11.01	21:00:00			1.11618	1.11663	1.11588	1.11636	1384 0 0
2019.11.01	22:00:00			1.11636	1.11698	1.11630	1.11693	1161 0 0
2019.11.01	23:00:00			1.11692	1.11693	1.11606	1.11651	910 0 0
2019.11.04	00:00:00			1.11680	1.11693	1.11649	1.11649	310 0 2
2019.11.04	01:00:00			1.11649	1.11675	1.11642	1.11663	745 0 0
2019.11.04	02:00:00			1.11663	1.11668	1.11597	1.11603	682 0 0
2019.11.04	03:00:00			1.11604	1.11684	1.11604	1.11672	826 0 0
2019.11.04	04:00:00			1.11673	1.11722	1.11660	1.11714	781 0 0
2019.11.04	05:00:00			1.11715	1.11738	1.11694	1.11694	761 0 0

Figure 4.11-25: EURUSD_H1.csv file was opened in Notepad to check the data structure

Although this is probably the minor point, you can control the number of decimal places in your chart. Sometimes, this is necessary. For example, in the US Stock market data, usually two decimal places might be sufficient. However, this is not the case for the Forex market. In the Forex market, you often need five decimal places. If you need to control the decimal places in the chart in the Prediction tab page, change the value in the “Symbol Digit” box. When you enter 5, it will show the numbers in the five decimal places.



Figure 4.11-26: Control Decimal places of the labels in chart using Symbol Digit