Elliott Wave Pattern Recognition for Forecasting GBP/USD Foreign Exchange Market

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Abstract—This research presents an approach to the Elliott wave pattern implicates a forecast of future movements in foreign exchange (forex) rates of the previous movement inductive analysis. Elliott wave is defined that each individual wave has its own characteristic or pattern, which as expected reflects the psychology of the moment. The forex market is one of the utmost intricate markets through the characteristics of high volatility, nonlinearity and irregularity. Meantime, these characteristics also make it very difficult to forecast forex. The problem is contained pattern recognition, classification, and forecasting. The research objectives are to recognize the pattern using the Elliott wave pattern, to validate accuracy patterns classification using Linear Discriminant Analysis (LDA) and to forecast short-term forex market using Elliott wave method. LDA is employed to obtain in term of classification's accuracy between 2 classes of selected data. The result shows the accuracy selected data is equal to 99.43%. Among of three levels of Fibonacci retracement which are 38.2%, 50.0%, and 61.8% results, the 38.2% shows the best forecasting for GBP/USD currency by using Mean Absolute Error (MAE), Root Mean Square Error (RMSE) and Pearson Correlation Coefficient (r) as the statistical measurements.

Index Terms—Elliott Wave; Fibonacci Ratios; Forex; Linear Discriminant Analysis.

1. INTRODUCTION

Forex is a liberty market that states the prices of currencies based on the supply and demand of a certain exchange. Forex trading is created by buying or selling a quantity of exchange against another. As the Bretton Woods System collapsed in 1970’s, the fluctuations in the forex market are more volatile than ever [1]. Additionally, some significant factors such as economic growth, political, trade development, psychological, interest rates and inflation rates have high impacts on the exchange rate fluctuation [2]. The collaboration of these factors is in a very intricate style. As a component of study in the forex markets, the risk is an inevitability countable as technical analysis instruments [3].

A. Definition of Technical Analysis

Technical analysis is a forex market analysis technique that explicitly finds to exploit trends in previous prices whether through graphical analysis or quantitative methods [4, 5]. The technical analysis method focuses on understanding the current market trends and attempt to identify any reversal of this trend and forecast by what method the forex market is probably to perform in the future. Forecasting demands past market actions with price movement. The exact technical analysis methods the more accurate forecasting. Technical analysis is apprehensive with what has actually occurred in the market relatively than what should occur and takes into account the price of instruments and the volume of trading and produces graphs from that data to employ as the primary instrument [6]. According to Yao & Tan [2], the forex market has its own trend, cycle, seasonality, and rules. Technical analysis is employed to identify patterns of market price actions that have extended been recognized as significant. For numerous given patterns there is a high probability that they will produce the expected results. Correspondingly, there are recognition patterns that repeat themselves on a steady foundation.

B. Elliott Wave Theory

The Elliott wave pattern is a comprehensive description of how sets of people act [7]. It reveals that mass psychology swings from pessimism to optimism and return to an expected sequence, generating specific and determinate patterns. The knowledge derives from Elliot waves that define psychological strength behind the act of prices. According to Kotyba et al. [8], Elliott wave theory is employed to recognize wave pattern including their deformation in the graphs and assist to improve the forecasting of its trend. Elliott wave patterns are not exact, they are marginally different every time they appear [9]. They can have a different amplitude and different period, although graphically the same pattern can appear different even though actually the same. Besides, these patterns do not cover every time point in the series, but are optimized so that the advanced classifier would be able to learn their key characteristics and accurately recognize them. One of the significant problem is to recognize the input pattern reliably. Elliott wave patterns can be classified into uptrend and downtrend pattern. Uptrend patterns indicate that the forex market price is going upward while downtrend patterns indicate that the market price will move to downward. Elliott wave pattern has basis with Fibonacci sequence numbers and the golden ratio stated that each market times fluctuations is confined evolution or reduce, but been controlled within a definite range, understanding the mathematical ratio between Elliott wave and grasp the swing high and swing low of the price action of securities market, it can be clear and effective [10]. Elliott wave patterns can be classified into two classes which are main pattern and opposite pattern [9]. Main pattern specify that the market price is going to downtrend while opposite patterns indicate that the market price action will move to uptrend. In the first method, investor psychology tends to created five waves in favour and three waves in contradiction of the trend. The second method creates a pattern of exchange rate trend reversal. Elliott wave theory stated that a Forex