

FOREX meet A.I.[★]

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Abstract

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1. Introduction

People are involved more and more in trading of currencies these days. Amongst those markets, of the biggest buying and selling platforms are cryptocurrency trading and the FOREX marketplace. Although cryptocurrency promises better returns than foreign exchange, FOREX gives solid, especially secured, and relatively regulated trading in comparison to cryptocurrency trading. As a result, in latest years, the foreign exchange (FOREX) market has attracted pretty a lot of interest from researchers all over the world. Different kinds of studies have been performed to accomplish the task of predicting future FOREX currency prices accurately.

Researchers have been involved primarily in neural networks models, pattern-based approaches, and optimization techniques. The emergence of artificial neural networks performed a massive function in foreign exchange rate prediction. Due to its predictive capabilities, many researchers used neural networks for their prediction models. During our evaluation of related works, we discovered that many deep learning algorithms, such as gated recurrent unit (GRU) and long short term memory (LSTM), have been explored and exhibit massive potential in time sequence prediction.

The foreign exchange market, is the world's largest foreign money trade market with over 5.1 trillion of trade exchange per day. It is recognized to be very complicated and volatile. Currency trading occurs 24 h a day, however the buying and selling time is divided into 4 fundamental time zones. Each of these zones has its specific opening hours and closing hours. FOREX is divided into three specific categories: majors, cross-rates, and exotics. Majors are the most traded currencies which are priced in opposition to the USD and occupy the majority of the FOREX market. Our work is primarily based on Majors.

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Each forex pair has its opening price, highest price, lowest price, and closing price based on the trading session. For security reasons, it is now not possible for one person to at once go to, register with, and purchase from the FOREX market, but each individual needs to use third party like brokers, who are humans or corporations that have admission to the FOREX market and are capable to buy or sell currencies. In the FOREX market, solely two alternatives are available, either buying currencies or selling if they have brought any currencies previously.

Recent years have viewed a lot of researches in the FOREX market foreign money rate prediction. Predicting the FOREX market has been a key goal of investigators over the preceding couple of decades. There are two methods to forecast the market: undamental research and technical research. Fundamental research considers many factors, such as the financial system and political state of a country, the popularity of a company, all inner and exterior buying and selling news, etc. Technical research concentrates predicting the FOREX market based totally on historic data, in particular, the highest price, lowest price, opening price, and closing price of a currency and the volume traded on a particular day.

The remainder of the paper is arranged as follows.

2. Related Works

Numerous hybrid techniques have been examined in preceding years. Based totally at the papers we reviewed, according to the principle set of rules the studies prioritised, the papers can be cut up into going in conjunction with the following categories: regression strategies, SVM, neural networks, optimisation strategies, chaos theory, sample-based strategies, and others. Those classes had been made in keeping with the popularity of the principle method of the forecasting system in the past years.

2.1. Regression Methods

Raimund et al. [1] proposed a hybrid model for foreign exchange prediction that makes use of wavelet models along with support vector regression (SVR). Before everything, they used a discrete wavelet transform (DWT) technique to interpret facts from their forex dataset. Then the data were used as the input of support vector regression (SVR) for predicting the foreign exchange prices. They analyzed the overall performance of their system with ARIMA and ARFIMA models. The effects confirmed that their system performs higher than ARIMA and ARFIMA models.

Taveeapiradeechaoen et al. [2] proposed a version for time series inspection and prediction; this is based on compressed vector autoregression. At the start, they used random compression method to decrease a big wide variety of foreign exchange data into a smaller form. After that, they used the Bayesian model averaging (BMA) approach to establish the load of each random compressed datum to attain the intersecting parameters. Their approach can provide out of sample forecasting till fourteen days previous to the real time. They rconcluded that their system was not suitable to predict all of the 30 forex currencies. Their proposed version proved to have appropriate solution for specific 6 foreign money pairs and outperformed the existing benchmark of Bayesian autoregression.

A huge range of forecasting models have been proposed via the authors of the paper [3], by applying linear kernel SVR to historical data for EUR/USD, GBP/USD,

and USD/JPY currency pairs received from high-frequency trading. Previous successive
70 timeframes are used as features to predict the movement of rates in future/next time
frame. Upon building models, they found a easy rule that supplied high-quality results.

After reviewing recent papers, it's evident that support vector regression turned into
the most used approach included in our reviewed papers. Compressed vector autoregres-
sion, the CRT regression tree, and partial least squares regression had been additionally
75 utilized by researchers. However, there are different algorithms which include lasso re-
gression, logistic regression, and multivariate regression which have been abandoned in
later years. The reviewed literature shows that the system primarily based on a re-
gression model performed higher than ARIMA and ARFIMA models [1], and the model
performance may additionally growth [4] when a regression model is combined with other
80 techniques. However, when operating with a huge number of foreign money pairs, it is
able to become hard with regression techniques, as most of the currency pairs return a
higher MSE [2].

2.2. Optimization Techniques

2.3. Neural Network

85 2.4. Rest of the Methods

3. Preliminaries

3.1. Trading System: Meta Trader 5

3.2. Technical indicators

In our trading system, XX technical indicators are used as the basis of trading rules.
90 These technical indicators are: Adaptive Moving Average, Average Directional Moving
Index, Bollinger Bands, Double Exponential Moving Average, Envelope Moving Avarage,
Parabolic SAR, Fractal Adaptive Moving Avarage, Standard Deviation, Triple Exponen-
tial Moving Average, Avarage True Range, Bears Power, Bulls Power, MACD (Moving
Average Convergence Divergence), Stochastic oscillator, William' Percentage Range, Mo-
95 mentum, RSI (Relative Strength Index), and Heiken Ashi Candles.

3.3. Genetic Algorithm

The unstable and chaotic structure of exchanges in FX market complicates forecast
analysis. This leads to the utilization of optimisation methods. There are many heuris-
tic methods, such as genetic algorithm (GA), simulated annealing (SA), etc. to resolve
100 optimisation problems. GA is one of the most popular heuristic optimisation approach
that generates options which evolve in time. GA is based totally on evolution and genet-
ics. Heuristic strategies yield nearly but not necessarily optimal solution with reasonable
computational effort and time.

Genetic algorithm refers to the heuristic algorithm, which offers an acceptable an-
105 swer to the hassle in the majority of virtually practically significant cases, however the
correctness of the decisions has no longer been tested mathematically, and is used most
frequently for problems, the analytical solution of which is very hard or even impossible.

Heuristic algorithms are extensively used for fsolving problems of high computational
complexity, alternatively of going via all of the options, which takes up a considerable
110 quantity of time.

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4. Filippo Experiments

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Here are two sample references: [5, 6].

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