

# FOREX meet A.I.<sup>★</sup>

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## Abstract

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## 1. Introduction

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.

5 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 evalutaion of related works, we discovered that many deep learning algorithms, such  
10 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  
15 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.

20 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

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<sup>★</sup>Fully documented templates are available in the elsarticle package on CTAN.

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25 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  
30 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  
35 day.

The remainder of the paper is arranged as follows.

## 2. Preliminaries

### 2.1. Trading System: Meta Trader 5

### 2.2. Technical indicators

40 In our trading system, XX technical indicators are used as the basis of trading rules. 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 Exponential Moving Average, Avarage True Range, Bears Power, Bulls Power, MACD (Moving  
45 Average Convergence Divergence), Stochastic oscillator, William' Percentage Range, Momentum, RSI (Relative Strength Index), and Heiken Ashi Candles.

### 2.3. 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 heuristic  
50 methods, such as genetic algorithm (GA), simulated annealing (SA), etc. to resolve 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 genetics. Heuristic strategies yield nearly but not necessarily optimal solution with reasonable computational effort and time.

55 Genetic algorithm refers to the heuristic algorithm, which offers an acceptable answer 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  
60 complexity, alternatively of going via all of the options, which takes up a considerable quantity of time.

## 3. Filippo Experiments

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Here are two sample references: [1, 2].

#### References

- [1] R. Feynman, F. Vernon Jr., The theory of a general quantum system interacting with a linear dissipative system, *Annals of Physics* 24 (1963) 118–173. doi:10.1016/0003-4916(63)90068-X.
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