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## FAITH Software Life Cycle Model for Forex Expert Advisors

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### ABSTRACT

The emotional stress and uncertainties associated with foreign exchange (forex) trading due to the high risk of losing the investment capital has left most forex traders in a state of indecision on the best methodology to apply for achieving long term profit. The provision of lot sizes, leverages, take profits and stop losses in forex trading implies that very high profit can be made within a very short time with the same capital, but at the same time, very high losses can be incurred. On one hand, this provision often prompts a set of traders to become greedy by increasing their take profit levels, lot sizes and leverages, which in turn increases their probability of losing out. On the other hand, the provision creates doubts and induces the fear of losses in some other set of traders. Consequently, these set of conservative traders employ the use of relatively small lot sizes, low leverages and low values of take profit and high stop loss levels. This in turn often results in a devastating effect on the investment capital due to lost opportunities and resulting losses. The problem of losses in forex trading effort is compounded by the fact that many programmers and developers of forex expert advisors do not adopt a software life cycle, having learned only how to write codes to program the trading platform. Furthermore, software engineering professionals who understand the import of software development life cycles soon discover that conventional software life cycles are not capable of effectively handling the complexity of the forex market. This paper models the human characteristics of greed, fear and doubt as manifested by traders in forex trading using selected expert advisors' properties. It proposes Facts, Analysis, Implementation, Testing and Hope (FAITH) software life cycle model for Forex trading profitability to tackle the problem of indecision in the development of forex expert advisors. The proposed model was implemented on a live trading platform for a period of three months and compared with doubt, fear and greed approach to trading. The results showed that while a level of greed can be profitable, FAITH software life cycle produced more profitable results and can be adopted for forex trading.

**Keywords:** Software Development Life Cycle, Expert advisors, Forex Model, Losses, Profit





### 3. MATERIALS AND METHOD

The methods applied for this study consist of the analysis of the existing software development life cycle, through literature survey, to discover their drawbacks, and the design of the proposed model to address the drawbacks of the existing software development life cycles for the development of expert advisors. The experiment was carried out by deploying the expert advisors on a Commercial Network Services, US, virtual private server, through a paid subscription for live trading for a period of three months. Microsoft Windows server 2016 and Microsoft Window 11 operating systems machines were employed for the experiments.

#### 3.1 Greed, Fear and Doubt Approaches to Expert Advisors' Development

In the development of expert advisors and in forex trading, the characteristics of greed, doubt and fears are manifested by traders and developers in diverse ways.

##### 3.2 Greed

The natural instinct of greed is manifested when a trader or an expert advisor developer desires to acquire much profit with little risk or inadequate capital. This can be done by setting high values of lot sizes with low funds or opting for high take profit values with low or no stop loss. Greed also comes into play due to overconfidence concerning the stability of a country's currency exchange rate, prompting a decision to go long or go short repeatedly over a period of time without due consideration for the possibility of a sudden reversal in the currency prices. In this study, greed is implemented by making the swing take profit (TP) values to be greater than the swing stop loss (SL) values. In addition, for the implementation of characteristics of greed, the trend TP is made to be slightly less than the trend SL.

##### 3.3 Fear

For a currency pair, the currencies which constitute the pair are dependent on one another in terms of supply and demand. During trends, price reversal or price breakout, when a set of traders' decision is bearish, the decision of other traders is automatically bullish for a currency pair. This turns forex trading to a game of making profit or incurring losses, creating fear in the minds of traders. This fear can prompt a trader to exit a profitable position prematurely or retrieve relatively small TP with high SL. The lost opportunities, which is the product of fear, often result in cumulative losses at the end of a trading session. The characteristics of fear are implemented in this study by setting the values of the TPs for trend and swing to be half of the values of the SLs respectively.

##### 3.4 Doubt

Obtaining an optimal value for the TP and SL is not a simple task. Many traders and expert advisors' developers are at loss concerning the values to set for the TP and SL for profitability. Consequently, the same values are set for both the TP and SL. In this study, fear is implemented by setting the value of TP to be approximately equal to the value of SL. The conceptual diagram for greed, fear and doubt models is shown in Figure 1.

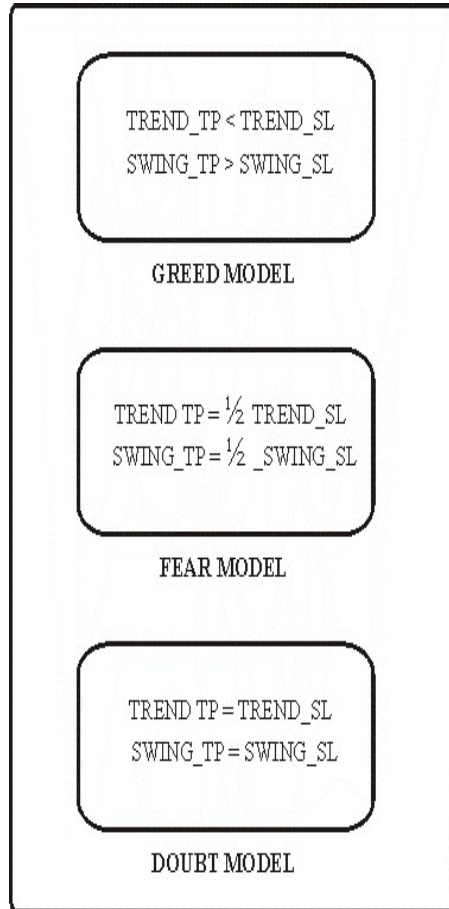
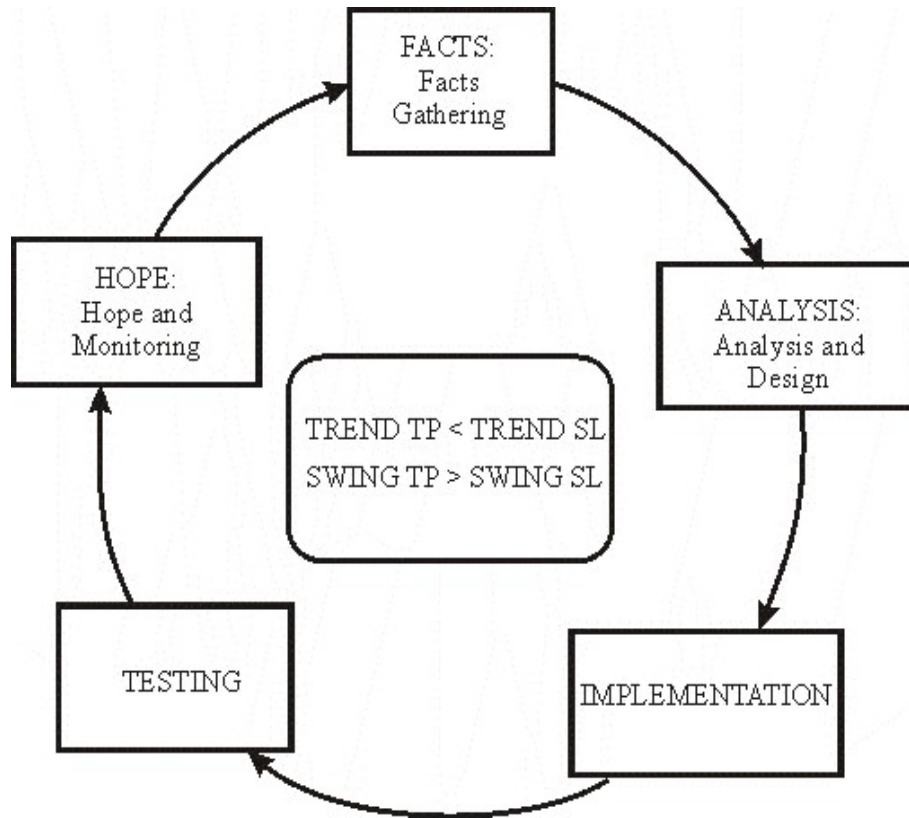


Figure 1: The Conceptual Diagram of Greed, Fear and Doubt Models

#### 4. FAITH SOFTWARE LIFE CYCLE MODEL

The proposed FAITH software life cycle model addresses the peculiarity and complexity of the forex market in the development of expert advisors to fill the vacuum created by the generic software life cycle. FAITH software life cycle consists of five phases and processes. Starting from the first phase, the model comprises of Facts gathering, Analysis and design, implementation, testing, hope and monitoring. At the center of these processes is a scheme for take profit and stop loss settings for swing and trend operations. The diagrammatic representation of FAITH software life cycle is shown in Figure 2.



**Figure 2: The Conceptual Diagram of FAITH Software Life Cycle**

#### 4.1 Facts Gathering

The development of an expert advisor starts from facts gathering. Facts gathering should cover the acquisition of knowledge, information and facts in the following areas and concepts of the forex market: financial management, forex risk disclosure, currency pairs peculiarity, chart patterns, technical analysis, fundamental analysis, the effects of spikes, breakouts and volatility on the market prices, the diverse effects of high, medium and low impact news on opened orders and opened positions. Knowledge of various programmable trading methods such as hedging, swing, scalping, trending and martingale must be acquired. Brokers' constraints must be studied. Furthermore, programmable properties and components of the MetaTrader platform must be known: these include pips, lot sizes, bid, ask, spread, take profit, stop loss, currency type, time frame, order placement, order closing, order modification, pending order and market order. Requirement analysis is classified under facts gathering.

#### 4.2 Analysis and Design

Analysis includes the determination of the model and methods to be used for the expert advisor among many options and alternatives. This includes architectural decisions such as the choice of the trading platform and specific programming language. The design includes conventional design processes such as architectural, interface, component, data structure and algorithm design.

### 4.3 Implementation

In the implementation phase the design is converted into program codes in the appropriate programming language and debugging is done as necessary. Implementation in expert advisors' development is done in two stages: the demo implementation and the live implementation. The demo implementation is the deployment of the expert advisor on the forex broker's demo server and not on the live server. All forex brokers provide the demo server with virtual funds for trading for the purpose of strategy evaluation, since the certainty of profitability cannot often be guaranteed in forex trading. The evaluation of the strategy should continue until the expert advisor can generate profit. Such evaluation may continue for a period of more than six months before an expert advisor with reasonable stop loss can be trusted for profitability.

### 4.4 Testing

Apart from the conventional testing stages such as unit, module, sub-system, system and acceptance testing, in expert advisors development, testing should include profitability testing on the broker's live account server with real funds. Trading on the live server can produce results that are completely different from the demo account's results due to slippages which is peculiar to live account. Another testing process unique to the forex trading is the broker's platform test. It can be shown that the same expert advisor deployed on different brokers MetaTrader platform often produce significantly different results, due to a number of different constraints integrated by different forex brokers into their platform. The MetaTrader platform Strategy Tester, which is a trading simulation component, can also be used before testing with a demo account.

### 4.5 Hope and Monitoring

If after the deployment on both the demo and live account, an expert advisor consistently produces profit for a period of up to six months, it can be hoped that the expert advisor can produce a long term profit, although this cannot be guaranteed. Hope ensures that any emotional manual intervention of an active expert advisor's operation is completely avoided to allow its performance to evolve after subjecting it to various forex eventualities such as volatility, high impact news, natural disaster, which all have the potentials of crashing a live account. The monitoring of the expert advisor is crucial for a decision to start the cycle all over, that is, in case it is found unprofitable. If an expert advisor fails in performance, the cycle is repeated. In this case, process starts with the gathering of more facts. Software evolution or maintenance is classified under Hope and Monitoring phase.

## 5. TESTS AND RESULTS

The greed, fear, doubt and FATIH models were tested using swing method combined with a trending algorithm at the same period for three months. Instances of take profit and stop loss values used for the four different models are shown in Figure 3 which displays a week's results. For greed and fear models, apart from the standard take profit values, the algorithm was allowed to retrieve smaller profits only at the end of a daily trading session. The total profit generated by each model for a week can be calculated from Figure 3 but this is not necessary since one week is not sufficient to draw a conclusion on the performance of an expert advisor. Table 1 shows the summary of the stop loss and take profit values for the models as used for implementation.



Figure 3: One Week Profit and Loss Instances of Greed, Fear, Doubt and FAITH Models

Table 1: Summary of Take Profit and Stop Loss Values for Models

MODEL	TREND TP	TREND SL	SWING TP	SWING SL
Greed	36.5	43.5	85.7	50
Fear	25	50	25	50
Doubt	30	30	30	30
FAITH	34	45	76	45

The result of the three months comparative test for FAITH and Doubt models is shown in Figure 4. It can be seen from Figure 4 that FAITH is more profitable than Doubt.



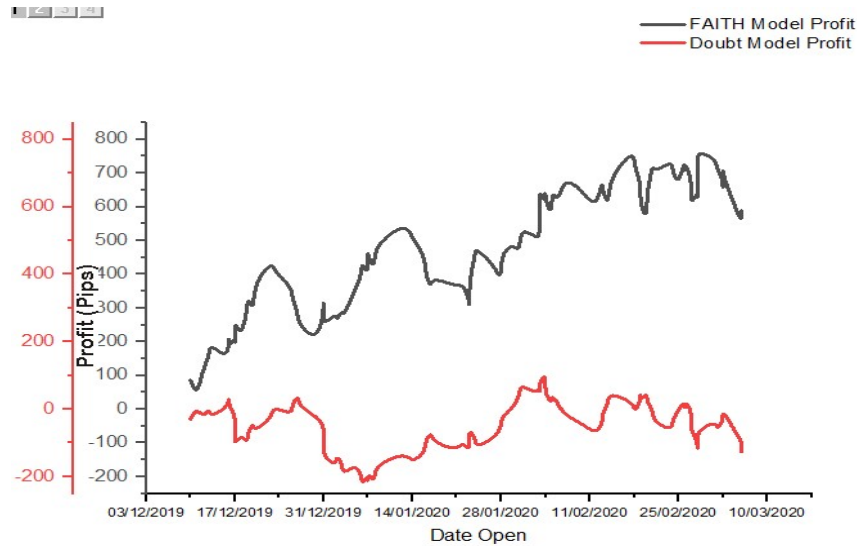


Figure 4: FAITH and Doubt Models Three Months Comparative Charts

Figure 5 shows the result of three months comparative test for FAITH and Fear models. It can also be seen from Figure 5 that FAITH is more profitable than Fear.

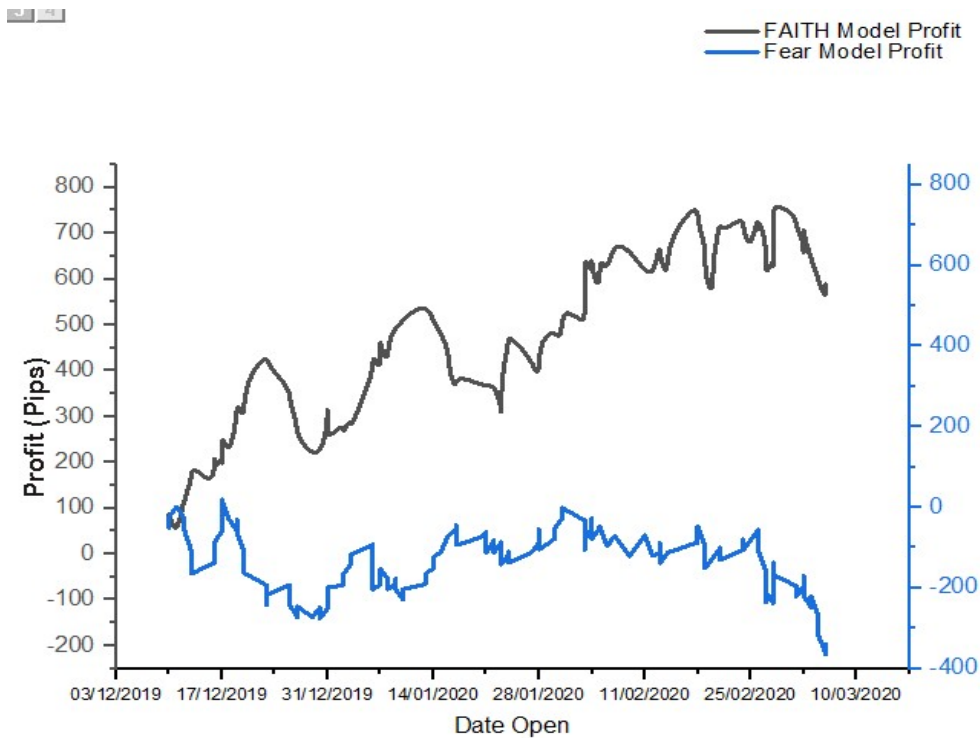
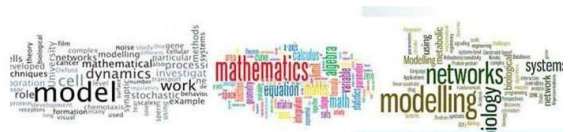


Figure 5: FAITH and Fear Models Three Months Comparative Charts





## 6. CONCLUSION

In this paper, we have proposed FAITH software life cycle model for profitability in expert advisors development to address the drawbacks of existing generic software development life cycle. The study models the human natural emotions of greed, fear and doubt often manifested by foreign exchange traders. The results showed that FAITH is more profitable than fear, doubt and greed. The research results further shows that Greed is more profitable than Fear and Doubt. However, Doubt is more profitable than Fear. The overall result reveals that the proposed FAITH software life cycle model is the most profitable of the four models and can be adopted for expert advisors' development. However, a level of greed is profitable. Future works shall focus on knowledge discovery through each phase of the FAITH software life cycle.

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