Top Secret Report

The Truth About Automated Trading

Brought to you by:

Written by: Andrea Salvatore

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Introduction

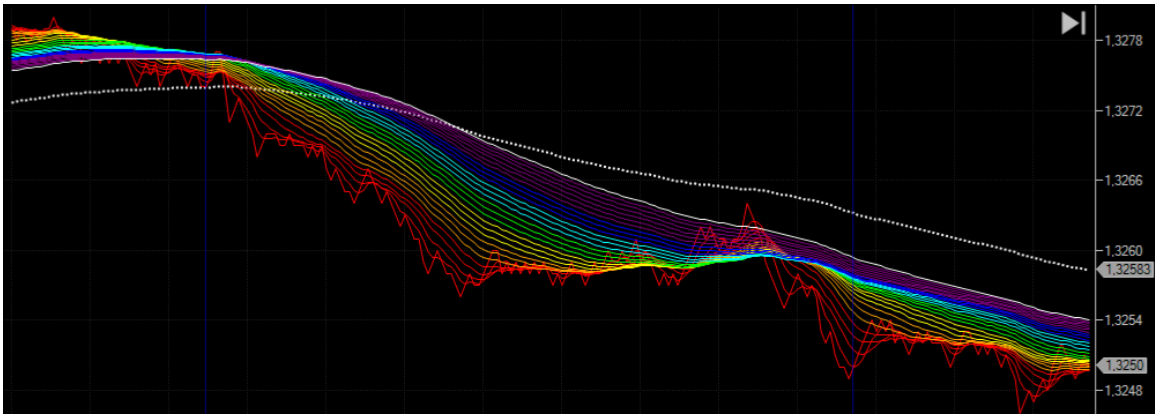
How it all started...

My name is Andrea Salvatore, and I'm currently a trader and professional EA/indicator developer.

Before that, I was a manager at one of Verisign's affiliates here in Italy where I live. I used to specialize in IT security, particularly, in cryptography.

I started coding when I was 12, and I was sort of a little genius. Now that I'm 40, I don't consider myself so anymore. But, I got a good attitude in "reverse engineering" things as I've found that I'm good in discovering the principles behind how things work. I'm trying to apply this attitude to understand the underlying principles that move the markets, particularly, the Forex market.

I'm a very curious person. I love to study new things every day. And my inspiration comes from everything. I observe the market. When I first started my journey into Forex trading, I spent my first weeks only looking at charts. I used Ninja Trader, and I used one-second timeframes. :)



This is the actual setup that I used on a 1 second chart to study patterns on the EURUSD and the EURJPY.

I know it may sound absurd, but I learned to recognize patterns before even studying them. Every currency has its "personality" and you have to become familiar with it, especially if you want to trade manually.

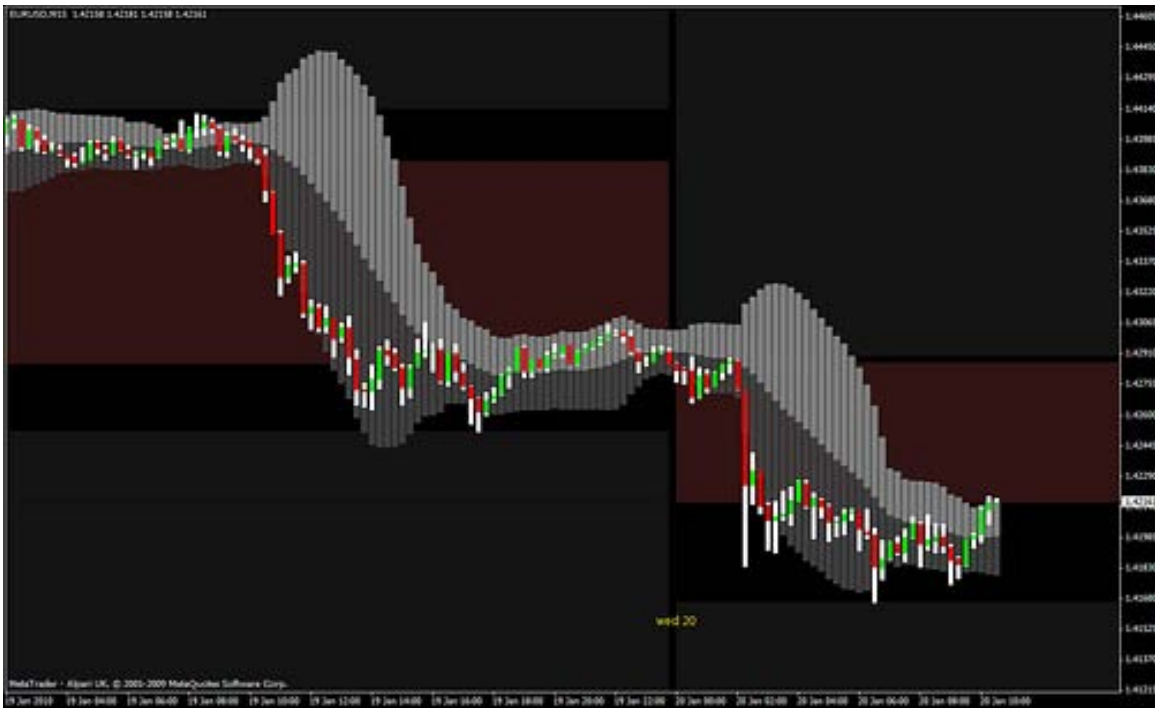
I started coding the Crescendo EA more than a year ago. The idea was to find a way to "square" the market, by using an algorithm which would be able to approximate and draw the market price. It took me a few months before I found the right balance between space and time. But that was only the first step.

The second step, and the most difficult one, was related to money management. The real key factor for the Crescendo EA's performance is risk management.

I started my tests using 12 currency pairs, and after a few months of backtests and forward tests, I came out with the two pairs that performed best in all market conditions: GBPUSD and GBPJPY. The Crescendo EA trades these two pairs only. They've been chosen, thanks to their "volatility", which is what makes Crescendo more profitable.

What is automatic trading?

Simply put, it is the future! :) An ever growing percentage of the total volume of trades made in every market (whether stocks, futures, options, forex, etc.) is made by computer programs using very different approaches and strategies. Last year for example, 73% of NYSE trades were generated by algorithmic trading systems.



This is actually 3 indicators in one. It tells you the range of the day, there is also a solid Bollinger Band and a price indicator that shows candles in a unique way.

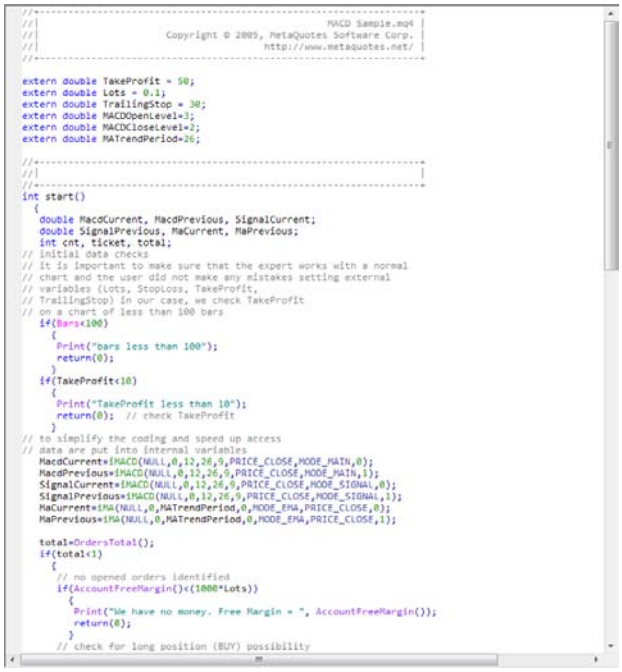
Today, there's a massive shift from traditional manual trading, where you decide on a trade yourself and execute it, toward using automated trading robots (known as Expert Advisors), which analyze the market and trade for you.

As the Forex market continues to evolve, it is important not only to assess the

potential for growth with the adoption and performance of Forex algorithmic trading, but also to identify possible hurdles to its development and issues that can decrease its performance.

What is an EA?

An Expert Advisor (EA) or trading "Robot" is a computer program based on a set of rules, usually generated by price action and/or by indicators, that helps determine whether to buy or sell a currency pair. After the opening of a trade, another set of "rules" will manage when to close that trade.



```
//+------------------------------------------------------------------+
//|                                                  MACD Sample.mq4 |
//|                   Copyright © 2005, MetaQuotes Software Corp.    |
//|                                       http://www.metaquotes.net/ |
//+------------------------------------------------------------------+

extern double TakeProfit = 50;
extern double Lots = 0.1;
extern double TrailingStop = 30;
extern double MACDOpenLevel=3;
extern double MACDCloseLevel=2;
extern double MATrendPeriod=26;

//+------------------------------------------------------------------+
//|                                                                  |
//+------------------------------------------------------------------+
int start()
  {
   double MacdCurrent, MacdPrevious, SignalCurrent;
   double SignalPrevious, MaCurrent, MaPrevious;
   int cnt, ticket, total;
// initial data checks
// it is important to make sure that the expert works with a normal
// chart and the user did not make any mistakes setting external
// variables (Lots, StopLoss, TakeProfit,
// TrailingStop) in our case, we check TakeProfit
// on a chart of less than 100 bars
   if(Bars<100)
     {
      Print("bars less than 100");
      return(0);
     }
   if(TakeProfit<10)
     {
      Print("TakeProfit less than 10");
      return(0);  // check TakeProfit
     }
// to simplify the coding and speed up access
// data are put into internal variables
   MacdCurrent=iMACD(NULL,0,12,26,9,PRICE_CLOSE,MODE_MAIN,0);
   MacdPrevious=iMACD(NULL,0,12,26,9,PRICE_CLOSE,MODE_MAIN,1);
   SignalCurrent=iMACD(NULL,0,12,26,9,PRICE_CLOSE,MODE_SIGNAL,0);
   SignalPrevious=iMACD(NULL,0,12,26,9,PRICE_CLOSE,MODE_SIGNAL,1);
   MaCurrent=iMA(NULL,0,MATrendPeriod,0,MODE_EMA,PRICE_CLOSE,0);
   MaPrevious=iMA(NULL,0,MATrendPeriod,0,MODE_EMA,PRICE_CLOSE,1);

   total=OrdersTotal();
   if(total<1)
     {
      // no opened orders identified
      if(AccountFreeMargin()<(1000*Lots))
        {
         Print("We have no money. Free Margin = ", AccountFreeMargin());
         return(0);
        }
      // check for long position (BUY) possibility
```

This is an example of MQL4 source code for the MACD Sample EA that can be found in all MT4 trading platforms.

Fundamentally, an EA is designed to remove the psychological aspects of trading. The aim of an EA is to grant to traders the chance to accelerate the execution of their forex trading operations, as they can work in automatic mode, saving the trader from the monotony of repetitive actions.

Money management, the opening of new trades, cutting losses, closure of profitable positions... an EA can do all these operations for you. But there is one important note: you should know and understand the mechanisms and basic features of Forex trading, and always remember that an EA should be considered as a trading tool.

The main element of Forex trading is always the trader, and the EA is just the executor.

The truth about automatic trading

Automated does not mean unattended. It is still very much the trader's responsibility to oversee the system and ensure that nothing goes wrong. Internet connections can be lost causing the system to lose track of open or pending orders. Account margins may be violated preventing orders from being properly transmitted and simple equipment failure can occur at any time.

Perhaps the best comparison I can give is the following: Technology exists today that can fly an airplane from Rome to New York. This includes taking off and landing using only an autopilot with no physical pilot on board. Would you want to be on that plane?

This is an example of a UAV: Unmanned Aerial Vehicles

Automatic trading is the same. The trader is there to supervise, manage and direct the situation in case of a problem. If you have been trading for any period of time, then you know that temporary internet downtime, computer failure, power failure, and loss of data feeds do happen. Although these situations are not frequent, prevention is simple: do not leave your auto trading system unattended for a long time.

Whether you're a newbie or a veteran trader, the use of a high quality automatic trading robot provides you with an edge that the average trader doesn't have.

Most of the traders lose part or all of their money due to many factors. The most frequent ones are emotional trading, overtrading, or simply wrong analysis. When trading with robots, you do not suffer from any of these human drawbacks.

Trading robots have many unique advantages:

1. **They are fast.**
   Robots react in real time to every change in the market. Placing or closing an order and moving a stop loss are actions that take only a few fractions of seconds for an EA.

2. **They work for you.**
   When you use an automated trading robot, you're free to do everything you like while your robot works for you. No need to sit all day in front of a computer, waiting for a trading opportunity to evolve. Just monitoring that everything is going well every now and then during the day will suffice. And all that can be so easily done using a smartphone.

3. **They are systematic.**
   To be profitable, you must be consistent in your approach. You need a predetermined plan and follow it. Trading systematically is one of the things that a computer robot does best. The robot operates according to predefined rules, no exceptions.

4. **They don't get bored and tired.**
   An automated trading robot is not prone to the kinds of mistakes that make human traders lose money. No greed or fear, no lack of concentration, no confusion, no doubts. The computer never gets tired of watching and scanning the market. It doesn't have a boss at work, no kids and/or a husband/wife to worry about… It's an accurate analyzer and performer. Every trade is done 100% according to plan.

5. **They perform simultaneous tasks.**
   The trading robot is able to analyze and trade many currencies and in many time frames simultaneously. It can perform complex monitoring tasks over multiple markets with 100% accuracy and speed.

Good EA coders have those characteristics in mind and try to use them as best they can when developing an automatic trading strategy. Most of the time, taking even a good manual strategy and converting it into an EA doesn't work. It can be a good start (usually for entries) but then, it needs to be "adapted" to become a good automatic one.

Problems with EAs

Expectations

How many of you did try to run an EA which seemed to be very promising, only to be disappointed by its performance? How many of you started to run an EA with great expectations, but after a few weeks of highs and lows then only lows, you removed it from you charts and went on to the next robot?

I'm sure most of you have. Almost everyone goes through this, including me... a few years ago. At that time, when the first commercial Forex EAs came out, it was love at first sight. People loved them.

They seemed to be the perfect solution: you know almost nothing about Forex and trading, you install an MT4 platform, attach the EA to the charts and go to sleep. The morning that you wake up, your account has grown. Too good to be true... at least for time being. And that's what happened.

When EAs started to lower their performances due to many reasons, the love dissipated.

Still now, many people think that there's an easy way to make money. Many look at Forex as an open air gold mine. Someone depicted it so to them. EAs are thought to be the easiest way to trade Forex.

I have to say that many of those who sell them, many times, don't care much about developing something that really works for more than the 60 days of the money back guarantee policy. Sometimes, they simply don't work.

The fact is that it is not difficult to hire any programmer and ask him to develop an EA in a few weeks, probably based on some manual strategy that more or less works, do some backtests, optimize parameters so that they look good and make money selling it.

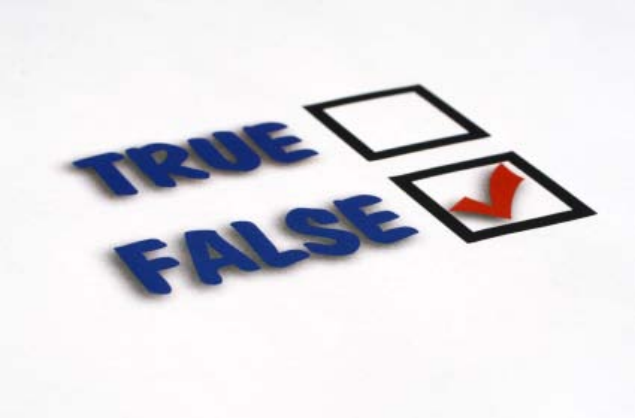
Put client expectations and unscrupulous sellers together and you got the picture.

The EA market is now full of deluded expectations.

Urban legends on EAs

If you ask most of the people that bought one or more EAs recently on what they think about them, many of them will probably reply that all EAs are scams.

The love for EAs has now become suspicion. Who’s guilty of that is not really that important. The real main reason for this report is to try to get some trust back for EAs. They are not all that bad.



In my opinion, the actual biggest misconception (or urban legend) about automated trading is that "all the commercial EAs are scams". I know that it may sound like, as a developer, I'm defending my side but my phrase is based on facts. Those who know me or have already read something written by me know that I'm not exactly a diplomatic person. I don't have problems to say what I really think.

But let me tell you what my every day experience is like.

Part of my job is to study and run most of the commercial EAs out there. Actually, I'm running a sort of closed "competition" between more than 20 of the most popular EAs commercially available.

The results are only available to the subscribers of a members-only site I participate in. After 10 weeks of trading (so more than 2 months), 68% of them are in profit and only one blew the account. (But I won't tell you which one!)

Some of them gained only a few percent points, while others gained tens of percentage points. And they are all tested using the "out-of-the-box" settings.
This percentage of "in profit" EAs goes up and down, but it never was below 50%.

Even "just" half of them in profit is great news as it is a much better performance than any average group of "human" traders. Brokers know that fact very well.

In the last trading competition I was involved with, the "Surefire Trading Competition", we had only 15% of the participants in profit after the first phase of the competition (one month). And, even the second phase where the TOP 20 traders battled saw only 10% (2 of them) in profit (one month again). Only 2 out of the TOP 20 traders were in profit... you read well!

What does that mean? I still think that a very good trader can beat hands down the best EA out there, but... finding a good trader is much more difficult than finding a good EA. Imagine a very good one!

So learn to use them well, learn to understand how they work as trading robots as this can really be an important edge in the hands of a trader.

Probably another urban legend we've heard more often than not, is that "everybody" can become rich using the EA XYZ. Although it is not difficult to set up a starting platform and start to make money with it, it's not easy to "maintain" performances... unless you rely on someone doing that for you.

It's a learning path requiring an understanding of how EAs work, understanding their strengths and weaknesses. Once you know them better you can then start to manage them. And when you became more experienced, you can mitigate weaknesses thereby building a portfolio of EAs, just like how fund managers do with their "human" traders.

I always say that EAs are trading tools. Like manual traders use setups made of sets of indicators like the RSI, Moving Averages, etc. to build they trading strategy, an "automatic trader" has to use his "creatures" to build his/her strategy.

Then there are a lot of people that think that you need to be a programmer and know how to build an EA to be profitable with them. Again, that's not true. A general understanding of how EAs work helps a lot.

A good understanding of the strategy behind the EA you're trading surely helps to get the best out if it. But you don't need to be a mechanic to drive a car really well.

With time and experience you can even be able to modify the parameters so that it works in a way that not even the coder thought of.

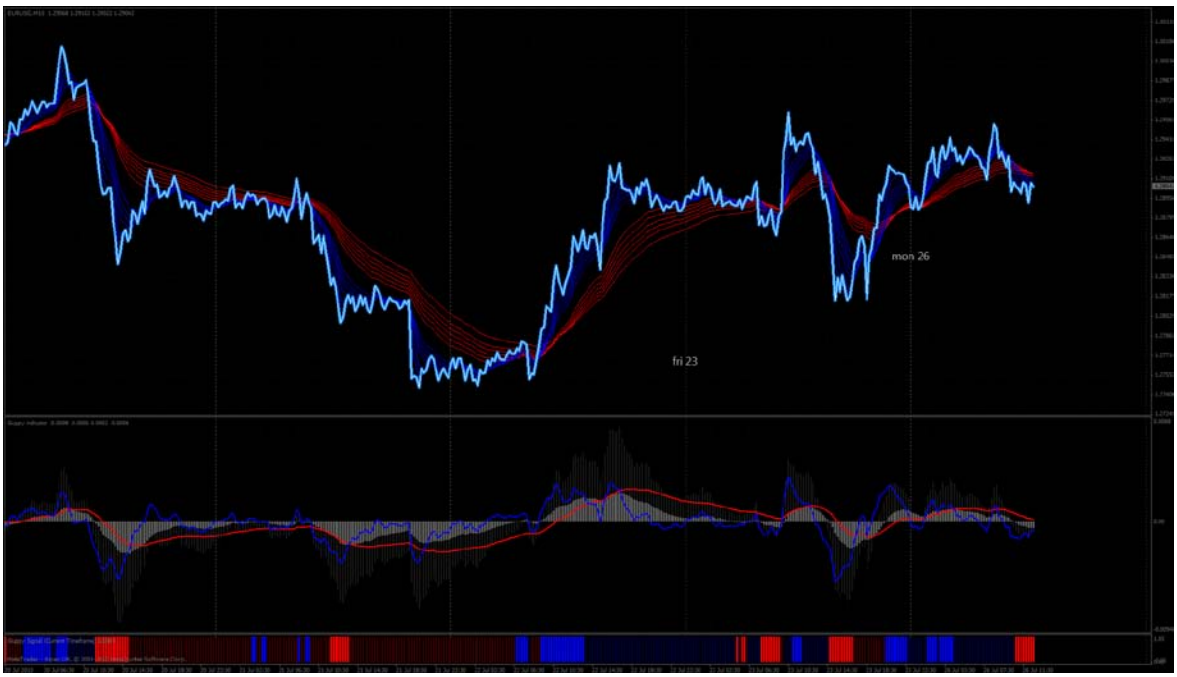
A fast way to understand how it works, is to make it run under the strategy tester, but in visual mode. So that it's like looking at it live trading but in fast forward mode. But we'll discuss that in further detail in the "How to" section of the document.

From manual to automatic

During my last few years of Forex programming I've been asked many times by different kinds of traders, to code an EA using their very successful strategies so that they don't have to spend any more time in front of the computer.

I've never been too fond of this because it always goes the same way. First I ask them to write out a set of rules that they use for entries and exits.

After a while they come out with their set of rules. I start writing an EA that doesn't trade but simply tells them when it would enter based on their rules.



This is set of indicators that I coded based on the Guppy System to make it easier to receive Buy/Sell signals.

I ask them to test it for a few days to see if the EA is entering at the same time as that of their entries. It never happens.

Why? Because the set of rules is not exactly the one they use. They start to add exceptions, or rounding off number ("I enter long when the RSI is AROUND the oversold area").

After a few days of this "refinement" job we come out with something that trades like them. I code the order processing and I backtest it. Result? Most of the time not that good.

Not as good as they expected. We start the forward test on demo account and the EA performs even worse.

What's missing? What's wrong? The instinct, the experience, the human eye and brain. The "gut factor".

You don't realize it but your decisions to enter/exit are very influenced by (other than by sentiment) what you see, by the virtue of the fact that what you see is something that you've seen and experienced in the past.

How many times did you "know" that it was not a good trade and you should have not entered it? How many times did you "know" that the price was about to reverse (and you didn't close the trade)?

This "knowledge" is something that an "EA" will never have, and it is that which ALL the good and very good traders have. Even those that are not so good have it. It's mainly instinct.

The difference between good and bad traders is in discipline mainly, not the "pure" trading skills.

Because of that, the EAs that I tend to like more, and that perform better, are those able to do things that no human can do: work on multiple currencies and time frames simultaneously, do complex calculations fast and place orders fast.

Money management

Behind any good EA is a good money management strategy. This is where EAs are strong.

You can build very sophisticated money management strategies using computers, based on some mathematical algorithm able to reduce risks and increase performances.

To see how important money management is for a specific EA, try testing it with a fixed lot size and with more or less automatic lots. This is a quick test that works on most of the EAs that tell you a lot of things.

Very often, money management is the real key to success.

This is also valid for manual strategies, but for EAs, it is even more important. You don't want to wake up one morning and find out that you lost your account or a big part of it all in one night!

Also, don't be fooled by big gains made with big lots. Everything is relative. If you trade using big lots, you're probably risking too much. You can then have big gains but have big losses as well.

The evolving market

One thing that people (even developers) tend to forget about is that Forex, even more than other markets, is in continuous evolution, particularly in the last few years. Whatever worked a few years ago doesn't work anymore, and any winning strategy can become a losing one even after just a few years.

For EAs, this becomes even more valid. When EAs come out, they usually have optimized parameters. The optimization is made using the last few months/years of data.

The cheaters

It's important to understand who you can trust. To do that, ask around in forums or consult websites that conduct serious tests and reviews on EAs. They are usually a good start for evaluating an EA.

Remember that you'll always find someone who really loves a particular EA and someone else who hates it completely. Don't get confused by the extremes. Try to look for the average "mood" regarding it.

That is a very easy way to find cheaters... word spreads fast on the Internet too!

The broker

To trade Forex, you need someone to connect you to the Forex market. In practice, you need to open a trading account with a Forex broker, who will also supply you with a platform to be able to trade. Most brokers use the MetaTrader platform, but some of them have their own customized solutions.

The crucial part that Forex brokers play in your trading processes may have lead many of them to misuse their power.

The high profits involved have made dishonest brokers look for loopholes in the regulations or otherwise, find ways to cause traders to lose money, which will go directly into their pockets.

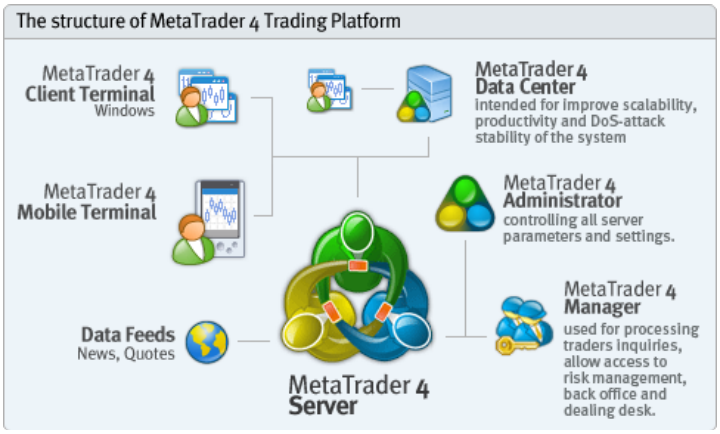
That's why in order to succeed in trading, you must find an honest and reliable broker. This is one of the crucial steps needed to be profitable with automatic trading.

Again, just like EA evaluation, utilize forums and specialized websites to get a general evaluation of the broker you have in mind.

The platform

There are many platforms that enable you to trade online. Several years ago, the MetaTrader trading platform was introduced, and it revolutionized the automated trading world. For the first time, every private investor could have a fully-featured robot development and implementation platform. All absolutely for free!

Anyone with some programming skills can use MetaTrader and its programming language (MQL) to transform their strategies into automated robots. They can also share these strategies with other people who use the same platform.



The latest version of MetaTrader is MT5, but Mt4 is more commonly used. They both have several tools to test developed strategies on demo accounts using backtests.

Actually, MT4 is a sort of "de facto" standard for retail Forex trading.

But MT4 is not the best platform for developing EAs due to its limitations. For example, the development and testing of multi-timeframe multi-pair strategies is almost impossible.

MT5 seems to partially solve those problems but introduces other limitations to be compliant with the US market, like the FIFO rules for orders.

Other platforms are also good but not as popular, so if you want to develop something for "sharing" with other people, you may have to work so much more with it.

The MT4 strategy tester is the main problem. It is very limited. You can't test multi-timeframe multi-pair strategies that are, in my opinion, one of the keys to success in automatic trading.

Another great limitation is related to the data and how it is used in backtesting. It is far from the real tick-by-tick live data.

If you don't know how to build "tick-by-tick" historical data files, your backtest won't ever reach a good level of reliability. And it's not an easy task. It takes a lot of time (and space on the HD) to build a complete set of data.

By the way, it is a mandatory step for a professional developer to build this complete set of data.

Now let’s talk about spreads. When you backtest an EA, the spreads applied are very far from the real ones. That's why most of the scalper EAs (EAs that have very small take profit, like only a very few pips) on backtests, can turn a $100 account into a $1M account in one year. But when you put them into a live account, they lose.

The Holy Grail

The first thing you need to realize is that there is no strategy that works all the time. Many have spent a lot of time and money in search of this "Holy Grail", which would be a strategy that wins as much as possible, losses almost nothing, and keeps working for a long time.

The bad news is that nobody seems to have one, or at least is keeping it really secret. Nevertheless, the effort to find one lead to the invention of many creative and fruitful strategies.

Those who didn't lose faith looking for it usually found their own personal approach to the markets, and for them, this approach became their "Holy Grail". It might not work for other people, but it certainly works for them. This for me is automatic trading.

Good EAs

Good EAs belong to a rare species, some would say, a "Chimera". My experience goes to show that the situation is not all that bad, especially if you look globally and don't expect one EA to solve all your money problems in months.

A good EA is a robot that can give you good consistent profits month by month and possibly do so without causing big draw downs on your account. But one of the good things in Forex is that you can scale everything.

Most of the time, by simply scaling the lot size (or the percent of risk for automatic lot size), you can still have good profits but with much lower draw downs. This means that you can sleep well while your EA trades.

How to recognize them

If I have to be quick, I'd find good EA's by looking at a few stats (profit factor mainly) and mostly at the equity curve. Then, I try to understand the strategy. I look mainly for an interesting strategy, and most often, a very simple one.

But, as with many other simple things... they do not become simple until someone finds them. A stroke of genius.

I don't look for extreme performances as I know that they are not sustainable. Instead, I look for steady profits.

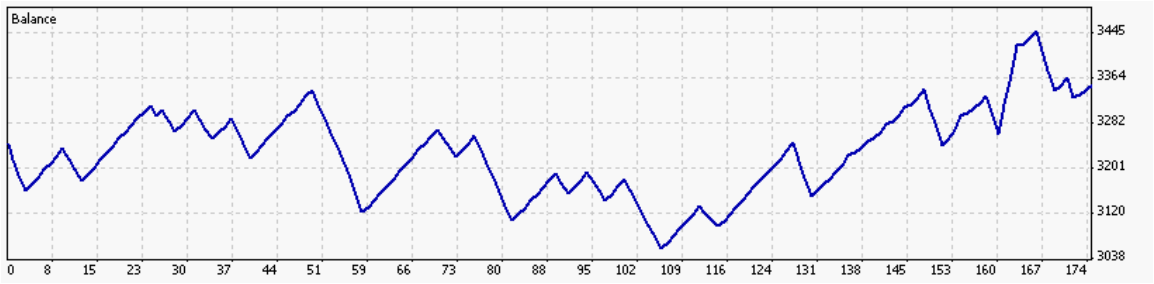
That's what makes a compounding strategy work. Compounding doesn't work if you have to deal with losses... big ones, I mean, as recovering from them takes out most of the power of compounding.

So, little steady profits are what I look for.

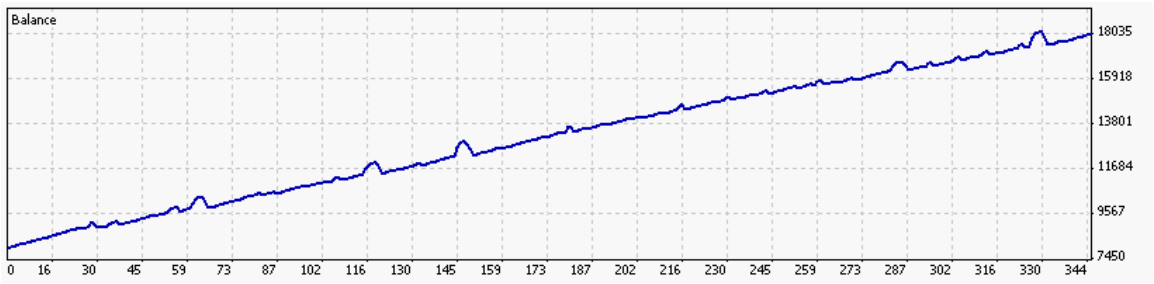
Performance vs consistency

By now, you should have understood that consistency is the key. It can be reached in different ways. The best approach when trading with robots is building a portfolio of good ones, possibly using different strategies, on different currency pairs, and on different time frames.

If you are to choose between performance and consistency, always choose the latter.



Having 10% a month is much better than having 40% the first month then -10%, +20%, and -30% on the succeeding months.



With the first case, you have a good ground for compounding your profits. But in the second, you can't as you will be risking a profitable strategy for a losing one.

What to look for

There are a few statistics that can help you judge a robot's performance by just looking at its performance statements even without testing it:

Total net profit – as high as possible…

Profit Factor – above 1.5.

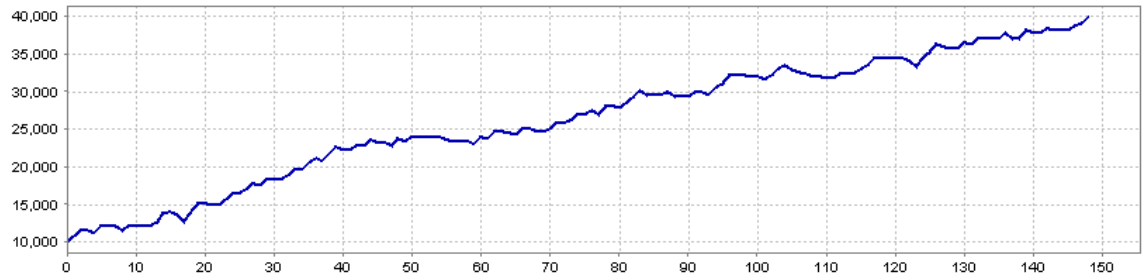
Maximal drawdown – fits your tolerance level. Many would not go for anything above 20% - 30%.

Profit trades (% of total) – as high as possible. More than 50% is preferable. However, you should also consider the average profit trade: loss trade as explained earlier.

Average profit trade, loss trade – The size of average loss should not be more than about 5 times the size of the average profit. You should also see the result for the Profit trades %, but it is not fundamental and depends much on the strategy used.

How to backtest an EA

To get the most out of your expert advisor, you'll need to optimize and backtest your strategy using MetaTrader's Strategy Tester. While forward testing on a demo account is essential, backtesting allows you to simulate trading over a long period of time in just minutes. And with the optimization feature, you can find out which settings should have performed best over a selected historical chart period.



This is an example of a backtest balance/equity curve for an EA I have developed and which is currently undergoing testing. The resulting line comes from backtests using different settings on different currency pairs.

Before backtesting or optimizing, it's important to make sure that your history data is complete and accurate, especially if you're using 'Every Tick' as your testing model. If you see 'Mismatched Chart' errors in your Journal log or if your modelling quality is less than 90%, your history data is insufficient to generate accurate ticks.

Open the History Centre from the Tools menu or press F2 on your keyboard. Double-click the chart pair in the left column that you plan to backtest, and a list of time periods will appear below it.
Start by double-clicking on the 1 Minute (M1) chart to load the history data for

that period. The backtester uses M1 data to generate ticks, so it is important that your M1 data is complete.

Click the Download button to download the full history data for that pair and period. You may receive a Download Warning message – hit OK to continue.
The history centre will start downloading. Repeat this process for all the other time periods and pairs that you plan to test with.

Good backtesting is important when considering a systematic trading approach because you want to ensure the feasibility of your idea before you go live with it. At least I do. If you're backtesting with a 50% model quality … you can't really be sure about what's going on. If you have a 90% modelling quality, you can have more confidence about how your system would have actually performed.

Backtesting with MT4 can be reliable but its reliability is dependent upon the data you are backtesting on. A demo account's data that is streamed in through a demo account broker has gaps and holes and is basically not suitable for testing.

When backtesting, you want to use the EVERY TICK MODEL option but you must have accurate 1M data to be able to conduct the most accurate possible test. The 1M data is important because the EVERY TICK MODEL option uses the smallest timeframe is available and "fakes" the movement of price within the smallest available bars. Having 1M data allows the fractal interpolation within bars to occur only within the very narrow range of 1M bars.

The easiest and only solution is to use good 1M data. This data requires a lot of work to convert into MT4 format but it can help achieve a backtest with 99% quality, which is the closest thing to forward testing. How to do that is beyond the scope of this document. So for now, we'll only go with the default data set and see how to use it at its best.

To do that:

- You need to modify MT4 to allow for more bars. Open the Tools Menu and select Options or just hit Ctrl + O. Next, open the Charts tab and type in 9999999999999 for Bars in History. MT4 defaults to whatever its maximum is.

- Download the 1M data from your broker for whatever currency it is that you're going to test on by using the History Center. Just open the

Tools Menu and select History Center (or press F2).

- Convert the data using the period converter script included in MT4 (you only have 1M bars right now) so you have to open offline charts to do this.

- Go to the File Menu, select Open Offline, and then the 1M data of the currency pair that you need to convert.

- A chart will pop up with that data.

- Then, drag & drop the period_converter script onto the offline chart. The ExtPeriodMultiplier that you can modify is actually the multiplier you applied. So to have 5M data, it will convert 1M data into 5M data.

- For complete data, you need to run the period converter with the following integers to get all the backtesting timeframes: 5, 15, 30, 60, 240 and 1440.

Now that you've successfully created complete data, there are a few more things you need to do to run a reliable backtest:

- Check the Recalculate option the next time you run a backtest because you need the backtester to utilize your data.

- Check the Use Date option and set the date range only over a time period where you have good reliable data. This way you're only backtesting the good stuff. It will be reflected in the modelling quality percentage.

- Make sure that the model is set to EVERY TICK. If you don't, all this hard work we just did will go to waste.

Remember that using a 90% data backtest is not completely reliable for two reasons:

- The first is that the data used for backtesting is not 100%. As a result, it is not similar to reality;

- The second is that in backtests, spreads are not real;

Those two are the more "practical" causes.

But, there is also a general fault in the concept of performance in backtests. When evaluating an EA based on backtests, we assume as a matter of fact that what happened in the past (historical data) is a good example for what will happen in the future.

Unfortunately, something that performed well in the past will not necessarily perform well in the future. This is so because the market changes every day.

Those who started trading Forex a few years ago know so well how much the forex market has changed since then. Nowadays, there's much more volatility.

And this is not only due to the world crisis. Also, it's not due to traders like you and I, for we only move a very small percentage of the market. More and more money is traded in Forex every day due to the so called "big dogs". Investing in currencies and/or covering commercial transactions with currencies, are ever growing behaviours.

How to optimize an EA

The optimization feature of MetaTrader 4 allows you to test thousands of combinations of expert advisor settings to find the most profitable settings for the selected chart, period and date range.

Strategies based on indicators will need to be optimized for maximum profitability. Almost all EAs will benefit from optimization – even those that trade on tick data, but you need to have a complete M1 history data.

While the optimizer will return the most profitable settings for the selected date range, this is no guarantee that these settings will be profitable in the future. Market conditions change often, so it is important to regularly re-optimize your expert advisor for best results.

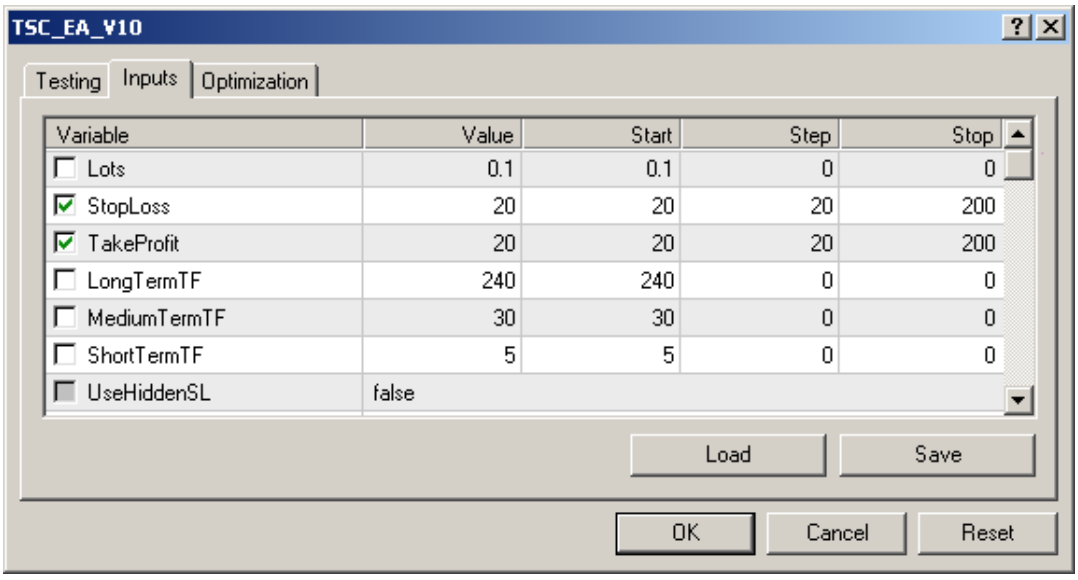
To optimize your expert advisor, select it from the Expert Advisors drop-down box. Select the currency pair from the Symbol box and chart period from the Period box.

For Model, you'll generally want to select "Open Prices Only", unless you are optimizing an EA that runs on tick data. In that case, select "Every Tick". Check the Use Date option and select a range of dates to optimize for.

Lastly, make sure that Optimization is checked.

Click on the Expert Properties button to open your expert advisor settings.

Under the Inputs tab is where you'll enter the range of values to optimize for. The Start column will be the lowest value for a given setting, while the Stop column will be that of the highest. The Step column is the amount that the optimizer will "step through" from the Start to the Stop setting.



In the image above, we are optimizing StopLoss and TakeProfit settings for an expert advisor. The Start value is 20, the Step is 20, and the Stop is 200. The optimizer will test every combination of values from 20, 40, 60 and so on up to 200. Use start, step and stop values that are appropriate for the setting you are optimizing.

The checkbox to the far left must be selected for that setting to be optimized. Any settings that aren't checked will use the numbers in the Value column when optimizing.

Under the Testing tab, you can adjust the Initial Deposit, but leave the other settings at their defaults.

When you're ready to begin optimizing, hit the Start button at the bottom right of the Strategy Tester window.

Depending on the period, the date range, the testing model and the number of settings to be optimized, it can take anywhere from a few minutes to several hours. If it's taking too long, consider shortening the date range, optimizing fewer settings, or using a larger step value.

Once optimization is done, open the Optimization Results tab and double-click the Profit column to sort the results. Double-click any of the results to load it into the tester. Hit the Start button again to backtest with the selected settings.

Select Visual Mode only if you want a visual walkthrough of the backtesting. Leave Optimization unchecked.

Hit the Expert Properties button and enter your settings in the Value column under the Inputs tab. You can also load or save these settings using the buttons at the bottom right. The Start, Step and Stop columns are ignored, as are the checkboxes.

Close the Expert Properties dialog box and press Start to begin testing. It will take anywhere from a few seconds to several minutes depending on your settings. Once testing has finished, open the Report tab at the bottom to see your results.

Here are a few statistics to take note of:

- **Total net profit** – The Gross profit minus the Gross loss.
- **Profit factor** – The ratio of gross profit to gross loss. The higher the better, and anything above 1.5 is good.
- **Absolute drawdown** – The drawdown of your initial deposit. High drawdowns increase the likelihood that your account will be blown out.
- **Profit trades** – Your overall win percentage.
- **Modelling quality** – Only important if the testing model you're using is Every Tick. If so, this should be at 90%. If not, just follow the instructions above to update your history with accurate M1 data.

The Results tab at the bottom of the strategy tester will give you the details on opened and closed orders, including trailing stops, take profits and stop losses. Click the Open Chart button to get a visual representation of your results.

When testing your new EA, examine these closely to ensure that your strategy is working as intended.

When optimizing your EA, you should optimize as few parameters as possible. Optimizing too many parameters leads to curve-fitting, which produces great results in optimization, but performs poorly in real-time trading.

For indicator-based strategies, the period settings for your indicators will have the greatest impact on your results. Risk-based settings such as lot size, stop loss and take profit should be set according to your predetermined risk profile. Other settings can be left at their defaults.

The surest way to evaluate real-time performance based on optimized results is to do a walk-forward analysis.

This involves optimizing your EA over a reasonably large time period (the optimization window), and then testing your optimized parameters over a shorter time period following the optimization window (the walk-forward window).

Be sure to choose an optimization window that is large enough to include a sufficient number of trades, as well as a variety of market conditions.

Let's say I use 6 months of data to optimize my EA, from January 2010 to June 2010. After I have my candidates set, I do a backtest of each of the best

optimized settings on the following two months, July 2010 and August 2010.

If the performance of the optimized settings is good then it means that the optimization is good.

How do I evaluate that? I use a "walk forward efficiency score". In the above example, I take the performance of the first 6 months (the period used for the optimization) and divide it by the number of months (in this case 6).

Then, I take the performance of the "walk forward" period for each optimized set and divide it by the number of months of the walk forward (in this case 2).

The "walk forward efficiency score" is the monthly walk forward performance divided by the optimization period monthly performance. A score above 0.5 is a good start.

So for example, if the optimized set has a gain of $1200 in 6 months and the gain is 300$ in the 2 months of walk forward, I'd get a score that is 0.75 ($1200 / 6 = $200; $300 / 2 = $150; $150 / $200 = 0.75), which is a good result.

The higher, the better. This can really help a lot in deciding which optimized set to use.

By repeating the process of optimizing and forward testing over many consecutive testing windows and across several chart pairs, we can get a good idea of how our EA really performs.

Other than live trading, which would take weeks and months, this is the best way to evaluate an EA's performance.

Why Crescendo EA

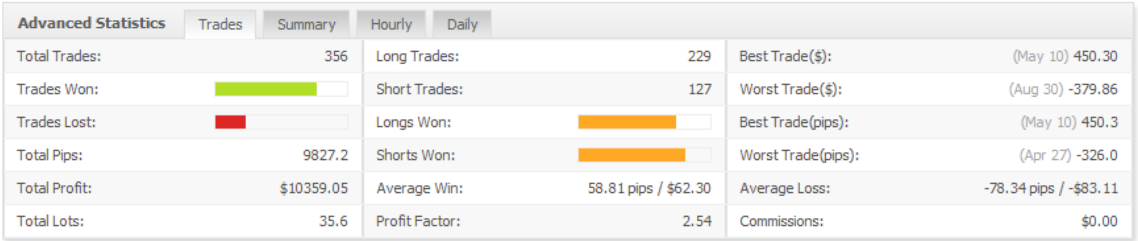
The Crescendo is an EA with a different approach to the market – a global approach. It trades with multiple currency pairs at the same time.

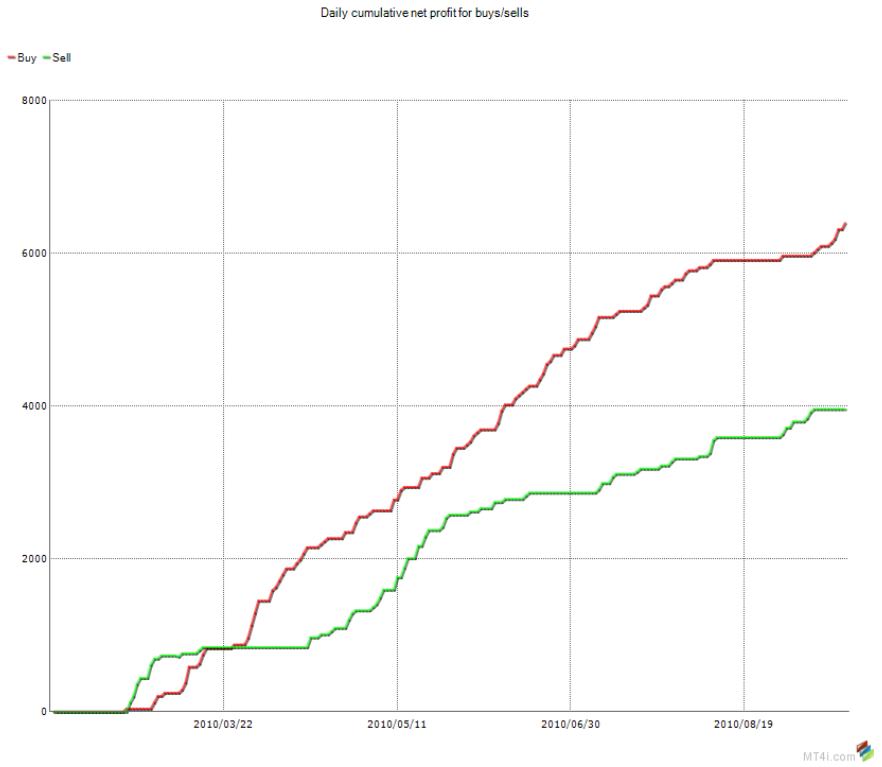
The trading and money management strategies are based on the multi-currency concept, so as to have a "portfolio-like" approach to trading.

Below are just a few numbers to give you an idea of the results achieved during the last 8 months using exactly the same EA and with exactly the same settings

from out of the box:

- The average monthly gain for the last 8 months has been 17.02%.
- The average daily gain for trading day is 0.57%. (Weekend included!)
- The closed trades draw down has been 5.31%.
- There has been no single losing month.
- There has been no single losing week.
- There has only been ONE losing day out of more than 160 days of trading (that is -14.27$ as compared to the best day that it gained 220.89$).
- The profit factor is actually 2.53 (that means that gains made are 2.53 times larger than losses).
- 77.25% of its trades are profitable trades (275 on a total of 356).
- On average, it has collected more than 9800 pips (around 60 pips per trading day).




Daily cumulative net profit for buys/sells
Buy
Sell
8000
6000
4000
2000
0
2010/03/22
2010/05/11
2010/06/30
2010/08/19
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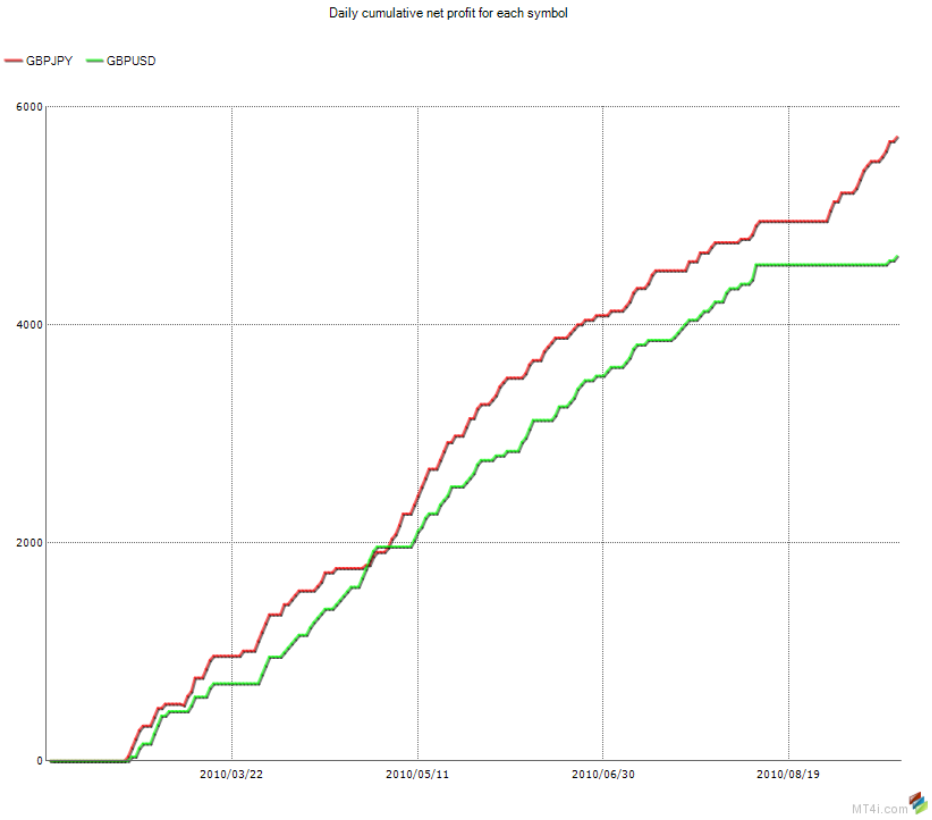
Daily cumulative net profit for each symbol
GBPJPY
GBPUSD
6000
4000
2000
0
2010/03/22
2010/05/11
2010/06/30
2010/08/19
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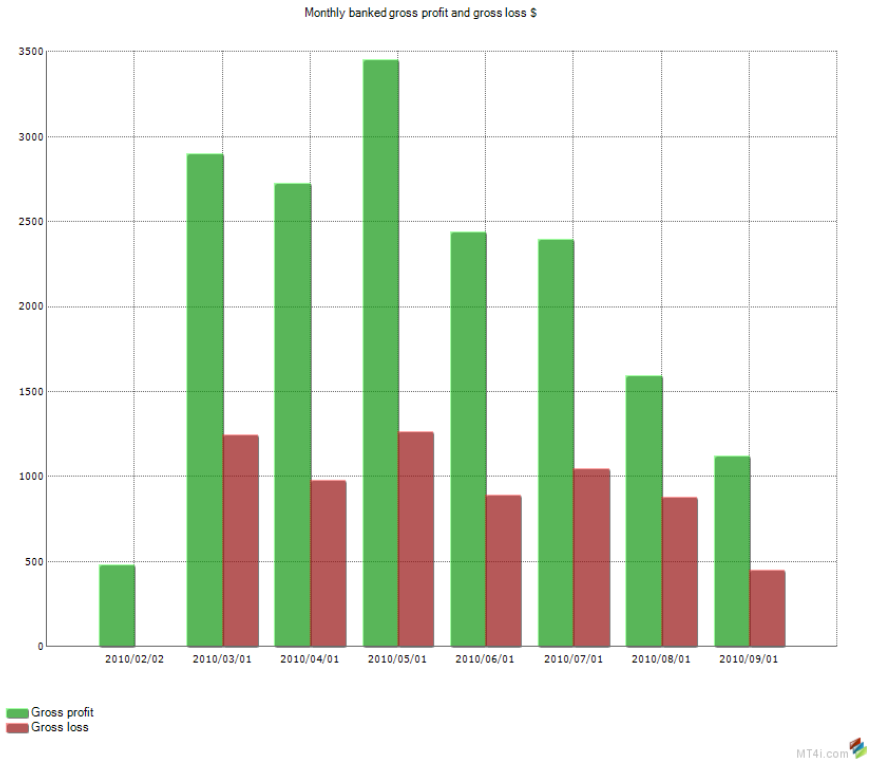
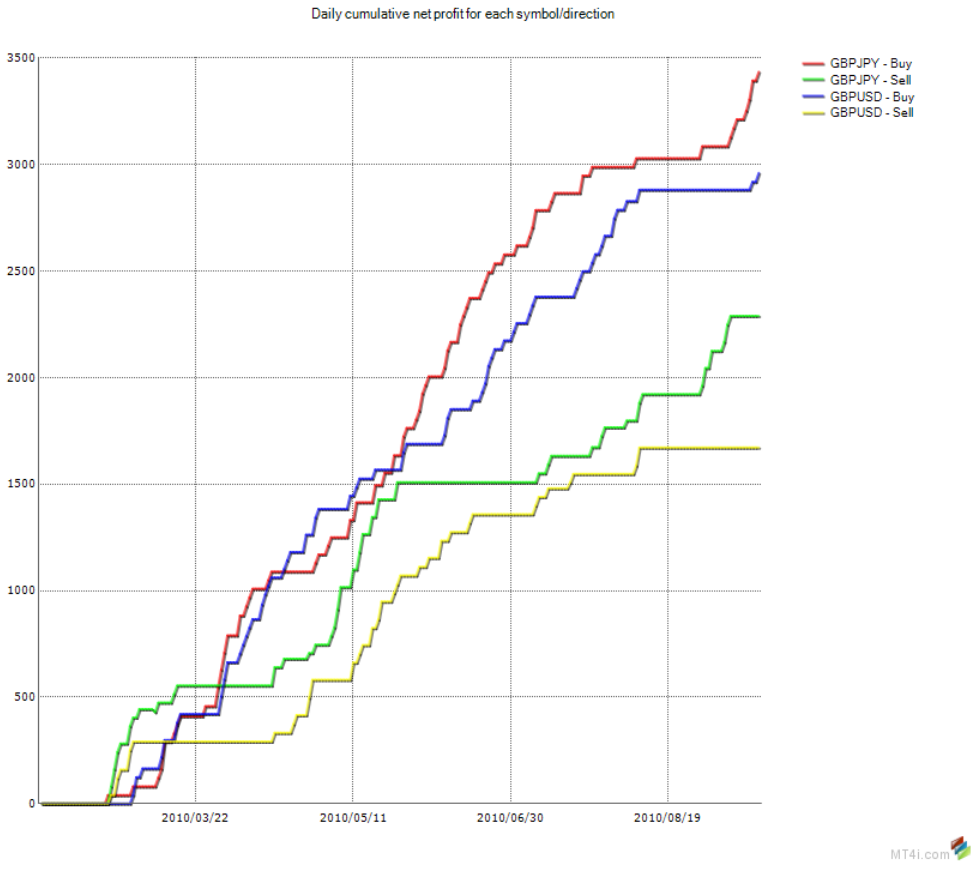
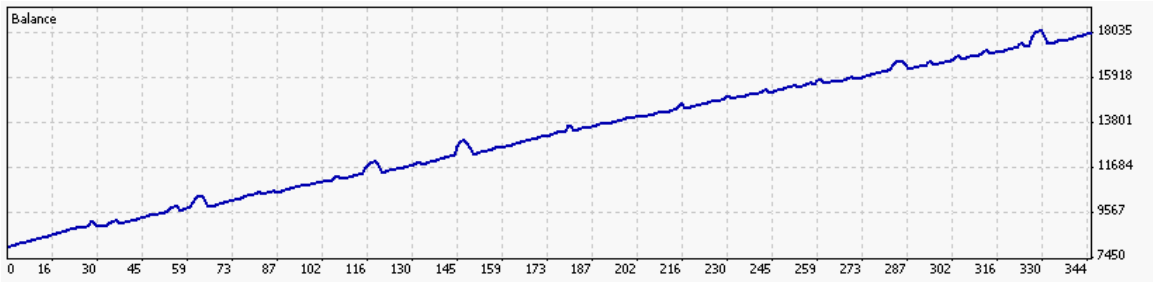

Monthly banked gross profit and gross loss $
3500
3000
2500
2000
1500
1000
500
0
2010/02/02
2010/03/01
2010/04/01
2010/05/01
2010/06/01
2010/07/01
2010/08/01
2010/09/01
Gross profit
Gross loss
MT4i.com

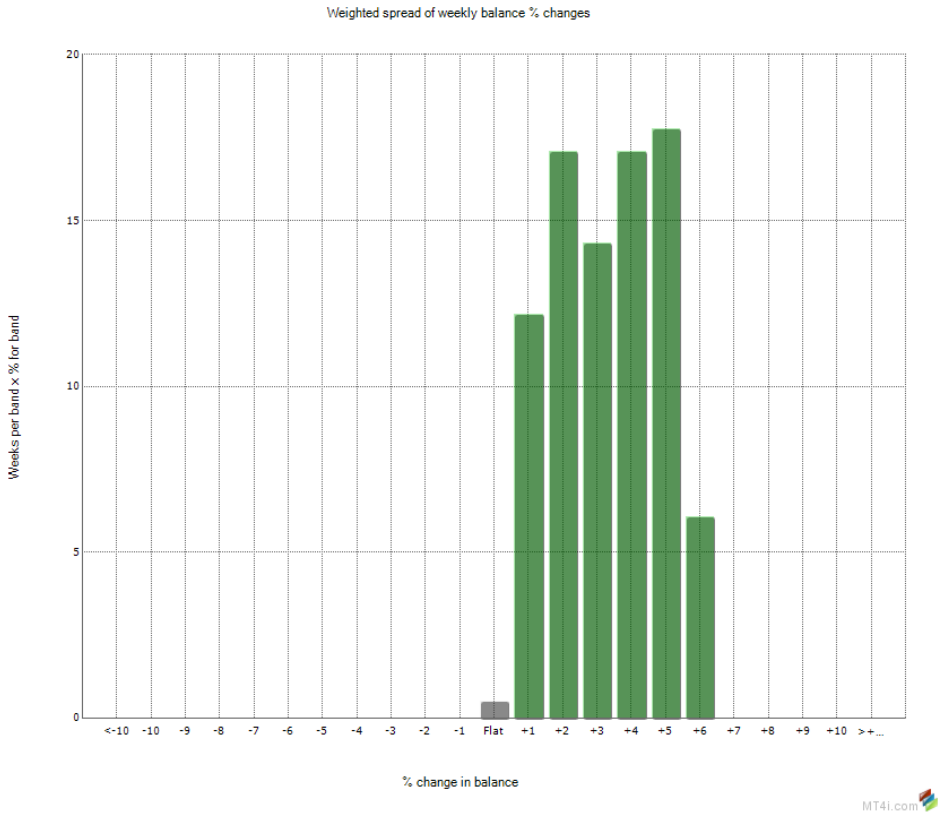

Daily cumulative net profit for each symbol/direction
3500
3000
2500
2000
1500
1000
500
0
2010/03/22
2010/05/11
2010/06/30
2010/08/19
GBPJPY - Buy
GBPJPY - Sell
GBPUSD - Buy
GBPUSD - Sell
MT4i.com

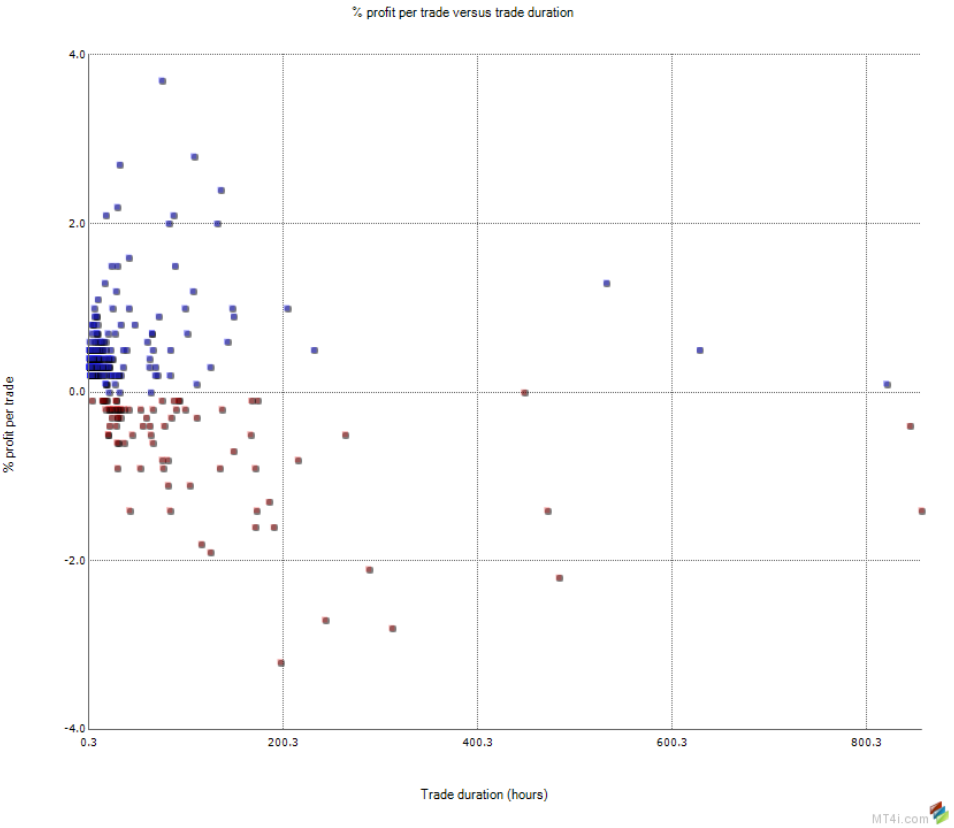
Impressive isn't it? It is to me at times as well!

And if the statistics are not enough... take a look at the balance/equity curve below.

As the saying goes, "A picture is worth a thousand words", and I find that true most of the time.




Weighted spread of weekly balance % changes
Weeks per band x % for band
20
15
10
5
0
<-10
-10
-9
-8
-7
-6
-5
-4
-3
-2
-1
Flat
+1
+2
+3
+4
+5
+6
+7
+8
+9
+10
>+...
% change in balance
MT4i.com


% profit per trade versus trade duration
% profit per trade
4.0
2.0
0.0
-2.0
-4.0
0.3
200.3
400.3
600.3
800.3
Trade duration (hours)
MT4i.com

That's it. I hope you enjoyed reading this report and that you now have a better understanding of automatic trading potentials. Again, always remember that EAs are trading tools, and just like every other trading tool, you have to maintain them to keep them efficient.

Ciao,
Andrea Salvatore
http://www.forexcrescendo.com