Gordon Expert Advisor

Architecture/Design Document

Introduction

The Gordon Expert Advisor uses three different signals in order to make good trade decisions. It takes the Bollinger Bands as the main signal and uses MACD and RSI as confirmation signals in order to make sure that the trades have a high probability of being profitable.

Forex Indicator Basics

Bollinger Bands

Bollinger Bands is a technical analysis tool defined by a set of lines plotted two standard deviations (positively and negatively) away from a simple moving average (SMA) of the security's price, but can be adjusted to user preferences. The bands are characterized by two central concepts squeeze(contraction) and breakouts (expansion). Squeeze implies low volatility in the market but can lead to expansion.

For more information visit: https://www.investopedia.com/terms/b/bollingerbands.asp

MACD

Moving Average Convergence Divergence is a trend-following momentum indicator that shows the relationship between two moving averages of an exchange rate. The MACD is calculated by subtracting the 26-period Exponential Moving Average (EMA) from the 12-period EMA. The result of that calculation is the MACD line. A nine-day EMA of the MACD called the "signal line," is then plotted on top of the MACD line, which can function as a trigger for opening and closing the position.

For more information visit: https://www.investopedia.com/terms/m/macd.asp

RSI

The relative strength index is a momentum indicator that measures the magnitude of recent price changes to evaluate overbought or oversold conditions in the price of an asset.

For more information visit: https://www.investopedia.com/terms/r/rsi.asp

Custom Signals

The Gordon Expert Advisor is built out of three signals that use the Standard Library of MQL5. Each signal has its own unique patterns, where each pattern has a significance value. This value is used in the calculation of probability for opening/closing a position. The value that each pattern has assigned can be modified in order to fit a particular trading strategy. The value should indicate how likely it is that a profitable trade can be made upon the detection of that pattern.

SignalGordBollinger

The Bollinger Bands signal is a custom implementation of the Standard Library CiBands, the bands have two patterns.

The first pattern focuses on the squeeze and breakout of the prices towards the upper band for long positions or towards the lower band for short positions, a breakout during an expansion period is a good indicator that the current trend of the market is going to be maintained and opening positions will generate profit.

The second enables the expert advisors to open positions where the Bollinger Bands are expanding and the market trend is bullish but there is no breakout, allowing the expert advisor to be more flexible while maintaining the integrity of Gordon's strategy.

SignalGordMACD

The MACD comes with the patterns described by Gordon out of the box. It uses nearly all patterns available to it with a focus for the detection of divergence and crossovers.

For all patterns available to MACD see: Signals of MACD

SignalGordRSI

In order to follow Gordon's algorithm, the patterns that come with RSI are currently disabled.

Two simple patterns were implemented to match the idea of the algorithm:

1. Strong trend detection: Is the RSI breaking it's top or bottom limits?
2. Medium trend detection: Is the RSI heading towards its top or bottom limits?

For all patterns available to RSI see: [Signals of RSI]

Chart Objects

MQL5 provides a library of different objects to apply to the charts on MetaTrader, allowing for further analysis of current market conditions. As of right now, the information that these objects provide is purely visual, however, future iterations of the Gordon Algorithm may wish to use this to inform trading decisions automatically.

Support and Resistance Lines

These lines are used on the daily chart in order to get an approximation of what the trend will be looking like on the current day. If the price breaks the resistance line, it is likely to continue in an uptrend. If the price breaks the support line, it is likely to continue in a downtrend.

Calculation for Support and Resistance Line

- Resistance Lin: Previous day low + 20 day Average True Range
- Support Line: Previous day high - 20 day Average True Range

Fibonacci Retracement

This chart object is used as an addition to the lines that are already drawn in order to find further areas of support and resistance and further gauge where the market may be headed.

Calculation of Fibonacci Retracement

- Top-level is set to previous day high
- Bottom level is to previous day low

Strategy Tester

MetaTrader5 provides a suite of tools to help optimize and test expert advisors. The tester is useful for pinpointing the strengths and weaknesses of each advisor.

Inputs

Example of inputs that consistently performed well in the strategy tester:

```
Expert_Title=GordonEA
Signal_ThresholdOpen=30
Signal_ThresholdClose=20
Signal_PriceLevel=0
Signal_StopLevel=20
Signal_TakeLevel=15
Signal_Expiration=4
Signal_GMACD_PeriodFast=12
Signal_GMACD_PeriodSlow=26
Signal_GMACD_PeriodSignal=9
Signal_GMACD_Weight=.8
Signal_GRSI_PeriodRSI=8
Signal_GRSI_Weight=.6
Signal_Gordon_Bollinger_Bands_PeriodBANDS=20
Signal_Gordon_Bollinger_Bands_ShiftBANDS=0
Signal_Gordon_Bollinger_Bands_DeviationBANDS=2
Signal_Gordon_Bollinger_Bands_WindowLength=10
Signal_Gordon_Bollinger_Bands_HeadLength=2
Signal_Gordon_Bollinger_Bands_Squeeze=0.6
Signal_Gordon_Bollinger_Bands_Expansion=1.3
Signal_Gordon_Bollinger_Bands_Weight=1
```

Issues

The Gordon Expert Advisor is weak in two particular areas:

- Ability to adapt to current market conditions
  - It would be up to the user to analyze the chart objects generated on the daily chart when starting the expert advisor and adjust it accordingly.

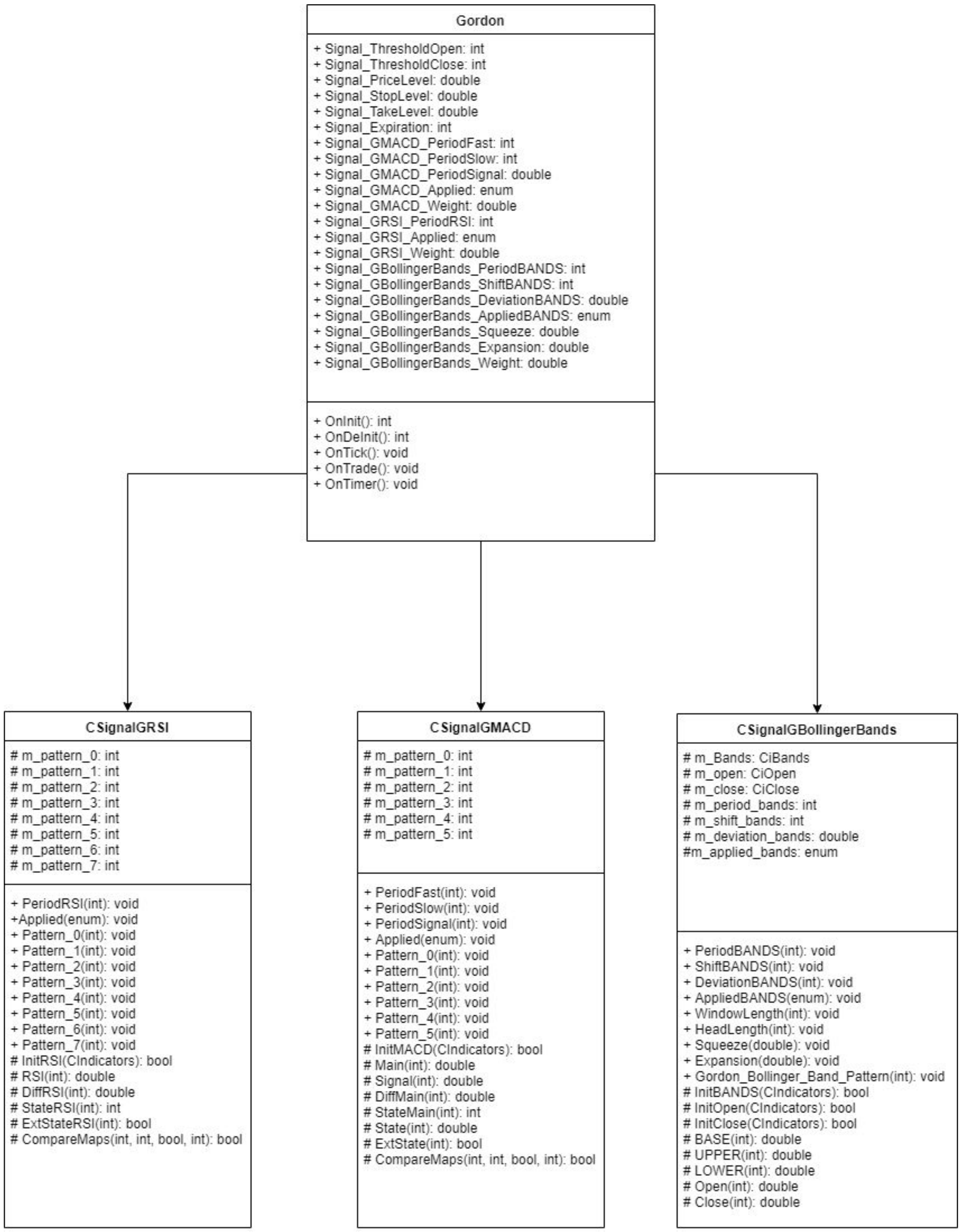
  - Future iterations should automatically take the information from the chart objects and self-adjust.

- Optimized stop losses/take profits
  - It is difficult to determine what the input values for stop loss and take profit should be for any given day and often is up to the trader depending on how quickly they want to hold positions.

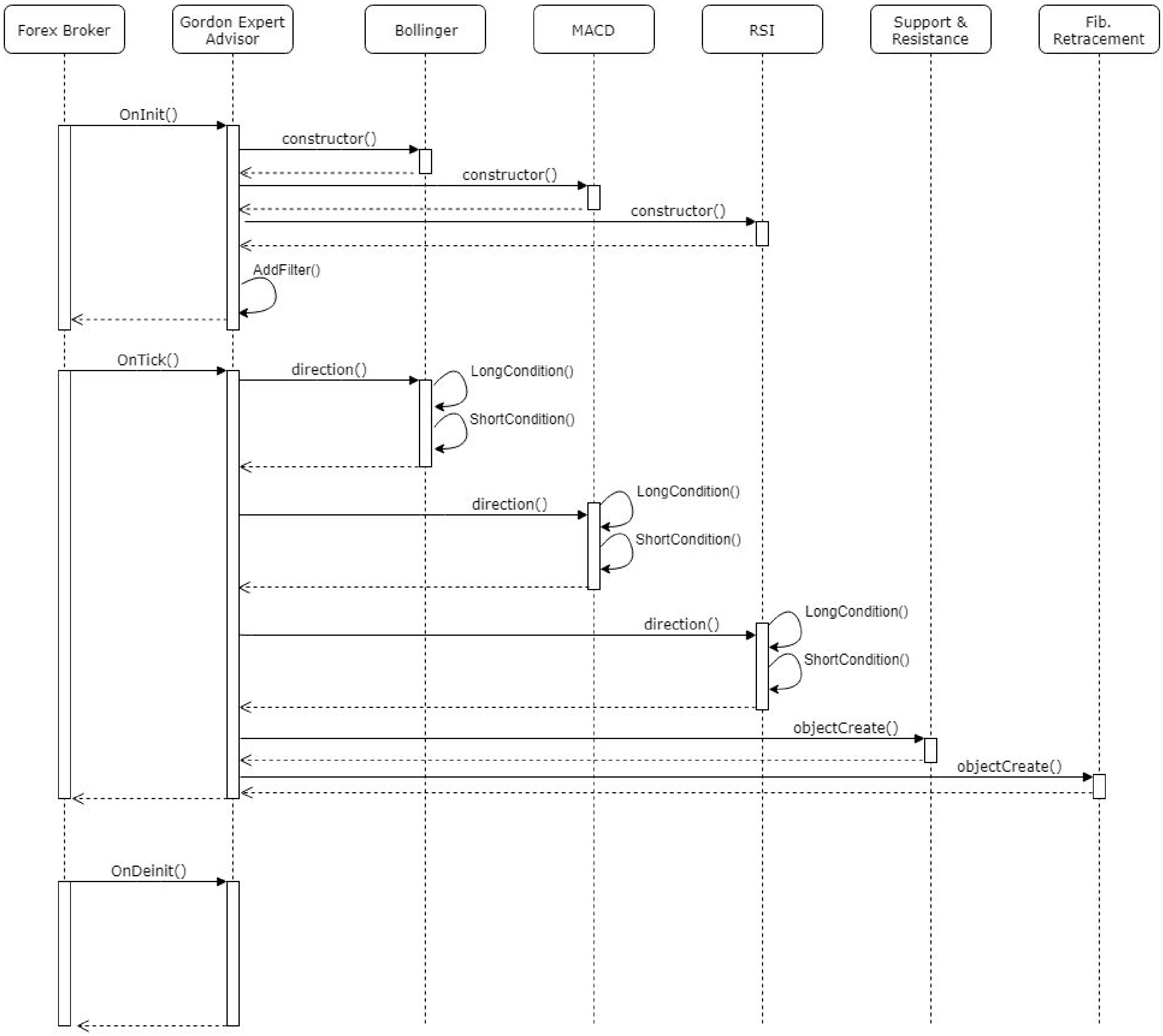
  - Future iterations should focus on when positions are closed and adding trailing stop losses.

UML Diagrams

Class Diagram



Sequence Diagram



Use Case Diagram