Guide for Gammath™ SPOT gScores

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Gammath Works

Table of Contents

PURPOSE

The purpose of this document is to explain how to use Gammath™ SPOT and interpret details of gScores and micro-gScores.

OVERVIEW

Gammath™ SPOT (patent pending) is a toolset and consists of tools such as scraper, analyzer/scorer, historian and backtester.

- The scraper tool obtains the necessary information (from the Internet) for stock technical analysis.
- The analyzer/scorer tool analyzes the scraped data and algorithmically computes the gScore ('g' is for Gammath™) for each stock in the watch list (for which the scraper collected data) to express its opinion on degree at which the stock is trading at a perceived premium or at a perceived discount. The gScore can then be used like an indicator in the process of making buy/sell/hold decision on the stock.
- The computed gScore is between -1 and +1. If the gScore is closer to -1 then it means that the algorithm perceives the stock to be trading at a premium. If the gScore is closer to +1 then it means that the algorithm perceives the stock to be trading at a discount.
- Below is an example of gScores presented for a sample watchlist from the past/old data:

overall_gscores

Ticker	sh_gscore	sci_gscore	final_gscore	Note
WMT	-0.55	0.11	-0.44	
TWTR	-0.21	0.04	-0.17	
PFE	-0.19	0.04	-0.15	
GS	0.02	0.01	0.03	
C	0.13	-0.05	0.08	
FB	0.11	0.03	0.14	
INTC	0.27	-0.05	0.22	
AAPL	0.08	0.19	0.27	
TSLA	0.26	0.04	0.3	
NVDA	0.29	0.03	0.32	
JPM	0.29	0.1	0.39	
AMZN	0.22	0.22	0.44	
GOOGL	0.3	0.15	0.45	
AMD	0.39	0.1	0.49	
BAC	0.47	0.1	0.57	
MSFT	0.42	0.19	0.61	

Trading at a perceived premium

Trading at a perceived discount

- It is important to note that the gScore by itself does NOT indicate a buy/sell/hold/avoid signal. The assumption is that the gScore is used to make buy/sell/hold/avoid decision on stocks that user has chosen based on recommendations or fundamental analysis. In other words, gScore in conjunction with fundamental analysis or stock recommendation by an expert or your own selection of stock(s) determines buy/sell/hold/avoid decision.
- We recommended that the users subscribe to one of the affordable plans from https://www.gammathworks.com at least for the first year to understand how to use this system effectively. Subscription will grant you access to the premium content, technical support and access to daily blog ("On the SPOT" blog) where gScores and micro-gScores are discussed/explained with real examples (free samples of the blog are available here).
- Historian tool is used to generate the gScores' history for the respective stocks in the watchlist. This is used for correlation of price with different micro-gScores. Please note that the historian tool still needs to be optimized so it is recommended to use a smaller watchlist (e.g., a list of closely watched stocks that the user wants to analyze for buy/sell/hold).
- Backtester tool is used to test a strategy using gScores and micro-gScores. This way the user can check how the strategy did historically and then decide on whether to use it for making buy/sell/hold decisions.
- A basic backtesting example is provided in the source code that the user can use as a starting point and then fine tune using micro-gScores or your own strategy

WHERE DO I FIND USAGE INSTRUCTIONS?

For instructions on installation, build, obtaining source code and how to run the scraper, scorer, historian and backtester tools, please check here.

HOWTO USE GSCORE

We think that gScore is a clear, easy, and effective way of comprehending stock technical analysis results.
Following are some ways in which we have used gScore that has served us very well.

1. We use gScore for better dollar cost averaging i.e., Instead of buying our favorite stock (i.e., a stock we have researched and like the business and fundamentals of the company) on arbitrary days, we choose buying over a period after gScore is relatively higher (for example in above list, we would consider buying WMT after its gScore is 0.54 as opposed to when its gScore is -0.44).
2. We consider buying (meaning we add the stock on close watch list) when stock's gScore is more than 0.5 (higher the better unless we have strong reasons to buy at lower gScore). This parameter can be fine-tuned for specific stock based on its gScores history.

3. We consider selling (meaning we add the stock on close watch list) a stock when its gScore is less than 0 or when any of our sell criteria are met. This parameter can be fine-tuned for specific stock based on its gScores history.

4. We diversify as much as possible i.e., if there are 20 stocks in our watchlist that have a gScore of more than 0.5 then we consider buying stock(s) of many of those 20 companies that we like (in small quantity) and have higher gScore.

5. We tend not to buy when the stock price is falling. So, as mentioned in point 2 above, once the gScore is above 0.5, we put the stock on closer watch, and we prefer to buy only when the stock price starts rising. Similarly, when gScore is negative, we put the stock on closer watch, and we prefer to sell only when the stock price starts falling (and our sell criteria is met).

6. We check the news of specific company before deciding to buy/sell.

7. We check the general news affecting the markets before deciding to buy/sell.

8. If you run Gammath SPOT on your machine or in the cloud, then the stock's signal.txt file can be checked for finer detail (described later in this document) before making buy/sell decision. There are many criteria logged in it and can be used to match personal preference (automated in your code or manually).

9. If you run Gammath SPOT on your machine or in the cloud, then the stock's charts can be checked for graphical visualization of indicators.

10. The significant component of this algorithmic analysis is the historical price data. As a result, we prefer to invest in stocks that have at least 5-years price history.

11. We prefer to invest in stocks that have a positive 5-years and 1-year return on investment.

12. We use micro-gScores and gscores history to fine tune our buy/sell/hold criteria.

13. It is much easier to explain how gScore-based dollar cost averaging would work from backtesting example. We have provided a basic backtesting example in the source code to show one way to do this.

14. We tend to backtest our strategy on each stock on our closely watched list before deciding which strategy to use. Please refer to the backtester tool source code for an example.

15. We tend to use current info based gScore component (sci_gscore) as a filtering criterion and then on the filtered list, we use stock history based gScore component (sh_gscore) for historical analysis and backtesting.

16. ***Please note****: Selling a stock is a very subjective criteria and one is not necessarily required to sell a stock just when it is trading at a premium (especially if the user decides that the stock has great long-term prospects). However, if user wants to get out a stock position when in "green" then gScore based dollar cost averaging could possibly show a way out. We backtest our strategy to determine if historically we would have been able to get out of a position if we wanted to.*

HOWTO BACKTEST MY STRATEGY?

The general order of operation is as follow:

1) Run scraper to let the toolset collect the data for analysis.
2) Run the Scorer to analyze and compute gScores.

3) Run the Historian to generate historical gScores (approximately last 5 years).
4) Run the Backtester to test your strategy. A basic strategy is provided in the source code. The intent is to show a basic example for use to be able to make changes and/or add own strategy for testing. Use the historian-generated charts to correlate and come up with a strategy.

WHERE DO I FIND GSCORES?

You can get access to our published gScores through one of the subscription plans from our website https://www.gammathworks.com. If you are using the free version of Gammath™ SPOT software or have subscribed to our premium content, then gScores (for entire watchlist) are saved in a file name 'overall_gscores.csv' in the 'tickers' directory.

HOWTO INTERPRET OVERALL_GSCORES.CSV?

The three columns in this file are:
a) ticker: Stock ticker symbol of the company.
b) final_gscore: Final gScore between -1 and +1.
c) sh_gscore and sci_gscore show the two components that makeup the overall gScore. sh_gscore is stock history (sh) based gScore component and sci_gScore is stock current info (sci) based gScore component. Current information (sci) based gScore component can be used as a filtering criterion as it is comprised of current data analysis (e.g. industry analysts' recommendations micro-gScore, options traders activity micro-gScore, social media sentiment micro-gScore etc.). Stock history based gScore component is what one uses to check historical gScores, correlations with micro-gScores and backtesting.
d) Note: Special notes e.g., 'NO_PRICE_DATA_FROM_TODAY' indicates that stock history is not valid (stale/incomplete) so the gScore for that stock should NOT be used.

WHERE DO I FIND DATA USED FOR ANALYSIS?

The stock-specific data used and formatted by Gammath SPOT can be found in 'tickers/<ticker_symbol>' directory. For example, data used for analysis of Apple, Inc's stock can be found in 'tickers/AAPL' directory.

WHAT TYPE OF DATA IS USED/SAVED FOR ANALYSIS/REFERENCE?

Depending on the data availability, one can find all or some of the following data saved in ticker_symbol-specific directory:
1. <ticker_symbol>_calendar.csv: Information such as next earnings date (if available) can be found in this file
2. <ticker_symbol>_call_<date>.csv: Information about calls (options data if available) can be found in this file

3. `<ticker_symbol>_put_<date>.csv`: Information about puts (options data if available) can be found in this file

4. `<ticker_symbol>_history.csv`: Information about Price history (if available) can be found in this file

5. `<ticker_symbol>_qbs.csv`: Information about quarterly balance sheet (if available) can be found in this file

6. `<ticker_symbol>_qcf.csv`: Information about quarterly cash flow (if available) can be found in this file

7. `<ticker_symbol>_qe.csv`: Information about quarterly earnings flow (if available) can be found in this file

8. `<ticker_symbol>_qf.csv`: Information about quarterly financials (if available) can be found in this file

9. `<ticker_symbol>_reco.csv`: Information about Industry Analysts' recommendations (if available) can be found in this file

10. `<ticker_symbol>_summary.csv`: Information about Stock summary (if available) can be found in this file

11. `<ticker_symbol>_st_page.html`: HTML page referenced for sentiment score from stocktwits website (if available) can be found in this file

WHERE DO I FIND CHARTS GENERATED BY GAMMATH SPOT?

The stock-specific charts generated by Gammath SPOT can be found in 'tickers/<ticker_symbol>/<ticker_symbol>_charts.png'. For example, charts generated as part of analysis of Apple, Inc's stock can be found in 'tickers/AAPL/AAPL_charts.png' file.

WHERE DO I FIND STOCK'S MICRO-GSCORES FROM GAMMATH SPOT?

The stock-specific gScore and micro-gScores from Gammath SPOT can be found in 'tickers/<ticker_symbol>/<ticker_symbol>_gscores.csv' file. For example, micro-gScores generated as part of analysis of Apple, Inc's stock can be found in 'tickers/AAPL/AAPL_gscores.csv' file. You can load its content into a Pandas dataframe.

WHERE DO I FIND STOCK'S GSCORE-HISTORY FROM GAMMATH SPOT?

Please note that this is generated if the Gammath historian tool is run based on the instructions. gScore consists of stock-history-specific component and current-info-specific component. gScores history is available for the stock-history-specific component. The historical gScores/micro-gScores and the corresponding charts from Gammath SPOT for the stock can be found in 'tickers/<ticker_symbol>/<ticker_symbol>_micro_gscores.csv' and 'tickers/<ticker_symbol>/<ticker_symbol>_gscores_charts.csv' files respectively. For

example, if the Gammath historian tool was used for generating Apple's historical gScores (stock-history-specific component) then the 'tickers/AAPL/AAPL_micro_gscores.csv' and 'tickers/AAPL/AAPL_gscores_charts.csv' will be available. You can load the CSV file's content into a Pandas dataframe.

WHERE DO I FIND STOCK'S BACKTESTED STATS FROM GAMMATH SPOT?

Please note that this is generated if the Gammath backtester tool is run based on the instructions. Backtesting stats of specific strategy used for a stock from Gammath SPOT for the stock can be found in 'tickers/<ticker_symbol>/<ticker_symbol>_gtrades_stats.csv'. It will use basic strategy that is implemented to provide it as an example. You can update the code locally to test your own strategy.

WHERE DO I FIND ANALYSIS/SIGNALS FROM GAMMATH SPOT?

The stock-specific analysis/signals from Gammath SPOT can be found in 'tickers/<ticker_symbol>/<ticker_symbol>_signal.txt'. For example, charts generated as part of analysis of Apple, Inc's stock can be found in 'tickers/AAPL/ AAPL_signal.txt' file.

HOW DO I INTERPRET <TICKER>_SIGNAL.TXT FILE FROM GAMMATH SPOT?

The stock-specific algorithmic analysis' output from Gammath™ SPOT's is saved in <ticker_symbol>_signal.txt for reference. It can be used to get finer details on gScore to help make criteria-specific decision on respective stock. Following micro-gScores (when possible) can be found in <ticker_symbol>_signal.txt:

1) Price
2) RSI
3) Bollinger Bands
4) MACD
5) Kalman Filter
6) Ordinary Least Squares
7) MFI
8) Stochastic
9) Options data
10) Analysts' recommendations (or in case this information is not available then fundamental analysis based on available information such as PE, PEG, Beta, Institutional holdings, Insider holdings, Quarterly balance sheet, PBR)
11) Sentiment scores (scraped from stocktwits website)

These micro-gScores make up the overall gScore for the stock and can be used for more detailed selection criteria (manually or automated in your code). There is more information embedded for each of these micro-gScores in `<ticker_symbol>_signal.txt` as follows:

Price:

Price-micro-gScore ([between -10 to +10]/10) based on Price history data analysis
[price direction (rising/falling)] [bottom, middle, top quantile (based on historical data analysis) for consecutive days count rising/falling] [current price] [quantile based on 52-week range] [price gScore (10% weightage in overall gScore)] [note indicating if new 52-week low/high was detected]

Relative Strength Index (RSI):

RSI-micro-gScore ([between -10 to +10]/10) based on RSI analysis
[RSI level compared to mean below, above, or average] [oversold or overbought or normal] [rising or falling or unclear] [bottom or middle or top quantile (based on historical data analysis) for consecutive days in oversold or overbought level] [RSI gScore (10% weightage in overall gScore)]

Bollinger bands:

Bollinger-bands-micro-gScore ([between -10 to +10]/10) based on Bollinger bands analysis
[Price is below/above middle Bollinger band] [Price is closer to lower, middle, or upper Bollinger band] [Bollinger band gScore (10% weightage in overall gScore)]

Moving Average Convergence/Divergence (MACD):

MACD-micro-gScore ([between -10 to +10]/10) based on MACD analysis
[Trend is positive or negative] [Price when buy/sell signaled] [bottom, middle, top quantile (based on historical data analysis) for days in this trend] [bottom, middle, top quantile for current difference] [MACD gScore (10% weightage in overall gScore)]

Kalman Filter (KF):

KF-micro-gScore ([between -10 to +10]/10) based on "digital filtering" (Intent of using the Kalman Filter to "smoothen/filter out spikes" and check if current price is above or below "filtered" average)
[negative/positive days i.e., price is below or above "filtered average" respectively] [bottom, middle, top quantile for days in this trend] [bottom, middle, top quantile (based on historical data analysis) for current difference compared to "filtered average"] [KF gScore (10% weightage in overall gScore)]

Ordinary Least Square (OLS):

OLS-micro-gScore ([between -10 to +10]/10) to determine if price is above or below "expected" average and if 5Y and 1Y slopes of Least Squares line is +ve. This is used to determine if dollar

cost averaging is risky for a given stock trend (e.g., if slopes are -ve then it could be risky to double-down)

[fit score indicating how well stock price chart fits OLS model. Fit score >= 0.9 is considered a great fit] [1Y slope: positive or negative] [5Y slope: positive or negative] [positive or negative difference compared to Least Squares line ("expected average")] [bottom or middle or top quantile (based on historical data analysis) for current difference compared to "expected average"] [OLS gScore (10% weightage in overall gScore)]

Money Flow Index (MFI):

MFI-micro-gScore ([between -10 to +10]/10) based on MFI analysis

[MFI level compared to average: below, above, or average] [rising or falling or unclear] [oversold, overbought, or blank] [MFI gScore (10% weightage in overall gScore)] [Indicator for possible price reversal: price could start rising or falling]

Stochastic Indicator (stochs):

Stochastic-micro-gScore ([between -5 to +5]/5) based on Stochastic analysis

[stochs-slowd level compared to average: below, above, or average] [oversold, overbought, or blank] [Last slowk/slowd crossover date] [stoch gScore (5% weightage in overall gScore)]

Options data (options):

Options-micro-gScore ([between -10 to +10]/10) based on Options data (short ratio, calls, puts info) analysis. This can be useful to estimate what options traders are betting on stock

[short ratio] [Bullish or Bearish] [options gScore (10% weightage in overall gScore)]

Analysts' recommendations (reco):

Analysts'-recommendations-micro-gScore ([between -10 to +10]/10) based on analysis of Industry analysts' recommendations data (Upgrades/Downgrades, +ve/-ve rating data from industry analysts that is publicly available). This is particularly useful when making decisions on stock that one has no expertise in.

[reco gScore (10% weightage in overall gScore)]

In the absence of analysts' recommendations, if fundamental data is available then that is used with 10% weightage in overall gScore. This information (if available) is logged in the <ticker_symbol>_signal.txt for easy reference to help with quick decision making on the stock:

Fundamental data (optional):

> PE:
> [Trailing PE (TPE] [Average TPE of sector if stock is in S&P500 list] [Forward PE (FPE)]
> [Average FPE of sector if stock is in S&P500 list] [PE gScore]

PEG:

[PEG value] [PEG gScore]

Beta:

[Beta value] [Beta gScore]

Institutional holding:

[Institutional holding percentage value] [IHP gScore]

Insider holding:

[Insider holding percentage value] [INHP gScore]

QBS:

[Debt to capital ratio value] [Current ratio] [Quick ratio] [QBS gScore]

PBR:

[Price to Book ratio value] [PBR gScore]

Sentiment and message volume Score (st_sv):

Sentiment-micro-gScore ([between -5 to +5]/5) based on analysis of social media website such as stocktwits

[st_sv on stocktwits gScore (5% weightage in overall gScore)]

Logistic regression data:

This item is work-in-progress for "price direction prediction". It is not used for computing gScore in current version

[fit score] [probability prediction for labels] [labels]

If you have any questions, please use the "contact" form on https://www.gammathworks.com.

Happy SPOTing!