Gammath SPOT and Gammath Score User's Guide

Version 15.6
November 2026
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PURPOSE

The purpose of this document is to introduce Gammath SPOT (**S**tock **P**rice-**O**pining **T**oolset) software and explain how to use its stock analysis along with its supporting subsystems.

OVERVIEW

Gammath SPOT is a free and open source software for comprehensive technical analysis of stocks with a Graphical User Interface (GUI) and a Command Line Interface (CLI). SPOT can be run on a Mac, PC, Linux, and Cloud. It consists of tools such as scraper, analyzer/scorer, projector, historian, backtester and screener that are packaged together and can be installed using Python's pip, or a CLI-only containerized version can be conveniently installed using Docker. SPOT software can also be obtained in source code form from GitHub.

These tools are used to assist in smart, fast, and consistent decision-making (manual and/or automated). The intent is to identify stocks that meet the risk tolerance and target return criterion for intended investment time horizon and then make buy/sell/hold decisions using a trading strategy that is back tested to preferably do better than the benchmark (e.g., S&P500) performance.

Each tool in this toolset has a specific purpose as described below:

- The scraper tool obtains the necessary information (from the Internet) for stock technical analysis. This is the only tool in the toolset that needs internet access. Rest of the tools can be run offline (unless you are running them in the Cloud).
- The analyzer/scorer tool analyzes the scraped data and computes a stock analysis score using my proprietary algorithm for each stock in the watch list to express its opinion on degree to which the stock is trading at a perceived premium or at a perceived discount.
- I'm calling this score gScore. The word "gScore" by itself has no meaning. I coined this word to mean Gammath Score to distinguish my stock analysis score in the marketplace. It is pronounced as "ga Score" (to reflect third consonant in Devanagari writing system that is transliterated here).
- The 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.
- *Please note that gScore is NOT G-Score/G Score/g-score/GScore* as gScore differs in its usage, appearance, spelling, pronunciation, meaning and results from totally different stock analysis and scoring system comprised in Gammath SPOT software.
- The analyzer/scorer tool also generates charts to show the micro-Gammath Scores in one convenient file that help visualize and correlate micro-Gammath Scores with the stock price movement.
- The analyzer/scorer tool also generates chart to help visualize current rough support and resistance level along with stock price.

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- Below is an example of Gammath Scores presented for a sample watchlist from the past (i.e., this is not current data):

sample_watchlist_overall_gscores

Ticker	sh_gscore	sci_gscore	Note
PEP	-0.64	0.4	NO_PRICE_DATA_FROM_TODAY
AMZN	-0.5	0.5	NO_PRICE_DATA_FROM_TODAY
WMT	-0.37	0.1	NO_PRICE_DATA_FROM_TODAY
DE	-0.22	0.5	NO_PRICE_DATA_FROM_TODAY
MSFT	-0.17	1.0	NO_PRICE_DATA_FROM_TODAY
PFE	-0.12	0.7	NO_PRICE_DATA_FROM_TODAY
AAPL	-0.1	0.2	NO_PRICE_DATA_FROM_TODAY
BAC	0.29	0.2	NO_PRICE_DATA_FROM_TODAY
META	0.31	1.0	NO_PRICE_DATA_FROM_TODAY
AMD	0.37	0.9	NO_PRICE_DATA_FROM_TODAY
GOOGL	0.58	0.7	NO_PRICE_DATA_FROM_TODAY
INTC	0.69	0.7	NO_PRICE_DATA_FROM_TODAY
NVDA	0.86	0.9	NO_PRICE_DATA_FROM_TODAY

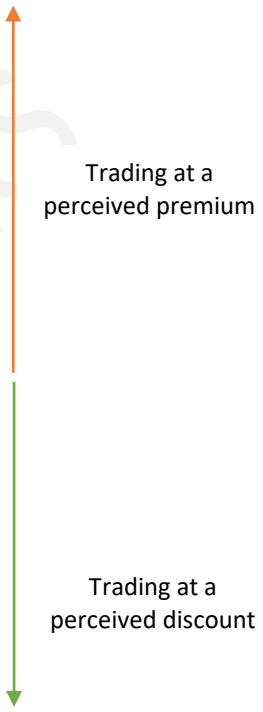


Figure 1: Sample watchlist with gScores and micro-gScores

- It is important to note that the Gammath Score needs to be incorporated in a trading strategy to make buy/sell/hold decision on stocks.
- Analyzer tool also generates signals (without the score) for S&P500 history analysis.
- Example of an automated trading strategy (long-term and short-term) is provided in my back testing example source code that the user can use as a starting point. This can be customized to match your specific trading strategy.
- For manual decision-making, I describe how to use this system effectively in my On The SPOT™ blog where Gammath Scores and micro-Gammath Scores are discussed/explained with real examples (free samples of the blog are available here).
- Price Projector tool is used to estimate and project moving future price/value of the stocks and S&P500.
- Historian tool is used to generate the Gammath Scores' history for the respective stocks in the watchlist. This is used for correlation of price with Gammath Score and micro-Gammath Scores. Please note that the first time you run the historian tool for your watch list, it will take long time to run as it computes Gammath Scores for approximately last 5 years. Subsequent runs should take a lot less time as it reuses the existing Gammath Scores history. It is recommended to use a smaller watchlist (e.g., a list of closely watched

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stocks that the user wants to trade [buy/sell/hold]) for generated Gammath Scores history. The Gammath Scores' history is very helpful in formulating and verifying a trading strategy via backtesting.

- Backtester tool is used to test a trading strategy using historical Gammath Scores and micro-Gammath Scores. The user can check how the strategy did historically and then decide on whether to use the respective trading strategy for making concurrent buy/sell/hold decisions.
- The Screener tool is used to generate a list of stocks based on the micro-Gammath Stock Current information (fundamental and options analysis) based filtering/screening criteria. This way, users can easily generate a list of stocks to focus on that suits their criteria.

WHERE DO I FIND GENERAL INSTRUCTIONS?

For instructions on installation, obtaining source code, building, and running the scraper, scorer, projector, historian, backtester and screener tools, please refer to the link here. Once you familiarize with toolset, you can use the -h option for each tool to get command line help. You can also find *introduction and instruction videos here.*

HOWTO USE THE GAMMATH SPOT GUI APP?

The Graphical User Interface of Gammath SPOT is self-explanatory. Enter the ticker symbols in the "Watchlist" table, save it using the "Watchlist" menu and you can start using the toolset. Note that when a tool is running, other tool buttons and operations such as updating of the watchlist are disabled. These are re-enabled when the tool completes its execution. This is also the case when a new watchlist is being created. Tools will be re-enabled after the new watchlist is saved. You can browse through the results using the Results menu item or you can choose to use your machine's native apps such as file explorer, web browser, PDF viewer, spreadsheet program to directly view the detailed results. The GUI looks like the picture shown below (actual image might vary depending on user's OS).

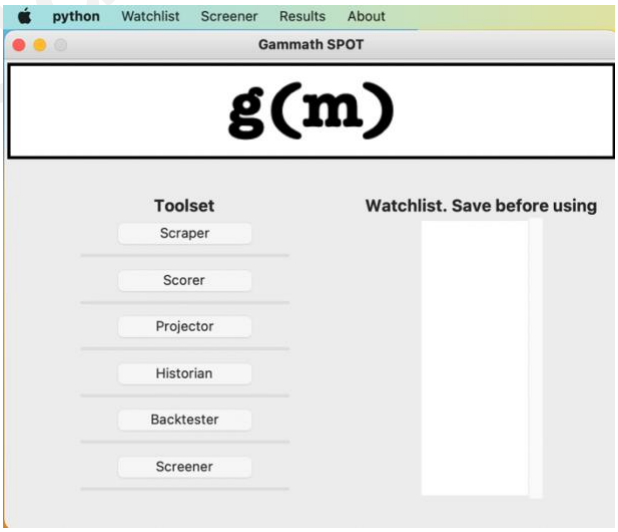


Figure 2: Gammath SPOT GUI appearance

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HOWTO CREATE A WATCHLIST TO USE WITH GAMMATH SPOT?

Please see this sample watchlist as an example. The scraper tool also creates an example watchlist based on S&P500 list and is saved as "SP500_watchlist.csv" in the '`tickers/SP500`' directory. You can copy and edit these or create your own using these examples.

HOWTO USE GAMMATH SPOT TOOLSET?

The typical order of using these tools with your watchlist is as follow:

1) Run the Scraper tool to collect the data for analysis.
2) Run the Scorer tool to analyze information, to compute Gammath Scores/micro-Gammath Scores, to compute useful probabilities, to calculate support and resistance levels, and to draw corresponding charts for the stock.
3) Run the Price estimator and projector tool to get future moving estimated price projection for stocks (and S&P500). Pick the stocks that meet future return criteria and create a "closely watched" watchlist.
4) Run the Screener tool to filter out stocks based on stocks' current information micro-Gammath Score based filtering criteria. This should make it easier to create a "closely watched" watchlist.
5) Run the Historian tool to generate historical Gammath Scores/micro-Gammath Scores (approximately last 5 years) for "closely watched" watchlist created from step 3.
6) Run the Backtester tool to test your strategy for the "closely watched" watchlist created from step 3. Based on how the strategy did over historical intervals, one can decide whether to use it for contemporary trading (buy/sell/hold) decisions. An example of back testing for a short-term and long-term trading strategy is provided with the software. It also generates "Todays_Actions" that can be used as convenient summary of buy/sell recommendations of the day if one chooses to use the default strategy implemented for back testing.
7) This way the entire technical stock analysis and decision-making process is fully automated.
   Please remember to check the relevant news before trading to make informed decisions.

HOWTO USE THE GAMMATH SCORE

I think that Gammath Score is a clear, easy, and effective way of comprehending technical analysis of stocks. Following are some manual ways in which I have used Gammath Scores that has served me very well. For automated ways, please refer to the back testing source code example for more detail.

1. I use Gammath Score for better dollar cost averaging i.e., Instead of buying my favorite stock (i.e., a stock I have researched and like the business and fundamentals of the company) on arbitrary days or all at once, I choose buying over a time interval after Gammath Score is relatively higher (for example in above list, I would consider buying NVDA [if there is no news suggesting otherwise] as its Gammath Score is 0.50 as opposed

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to when its Gammath Score is -0.50). If I decide to buy 100 shares of a stock then instead of buying all 100 at once, I prefer to buy in steps over a period depending on the Gammath Score. Please note that dollar cost averaging is not the only strategy that can be used with Gammath Scores. I use it because it helps reduce risk given that the future is unknown and most online trading platforms offer $0 trades.

2. I consider buying (meaning I add the stock to my closely watched list) when stock's Gammath Score is more than 0.5 (higher the better unless I have strong reasons to buy at lower Gammath Score). If you are using the historian tool, then the Gammath Scores' history can be examined to decide on a "buy zone" (back testing example in the software might help clarify).
3. I consider selling (meaning I add the stock on closely watched list) a stock when its Gammath Score is less than -0.5 or when any of my sell criteria are met (back testing example in the software might help clarify for long-term and short-term criteria).
4. I diversify as much as possible i.e., if there are 10 stocks in my watchlist that have a Gammath Score of more than 0.5 then I consider buying stock(s) of as many of those 10 companies that I like (starting with small quantity. Buying in quantities based on nth Fibonacci number is one way to manage buy quantity as show in example backtester).
5. I tend not to buy when the stock price is falling. So, as mentioned in point 2 above, once the Gammath Score is above 0.5, I put the stock on closer watch, and I prefer to buy only when the stock price starts rising. Similarly, when Gammath Score is negative, I put the stock on closer watch, and I prefer to sell only when the stock price starts falling (and my sell criteria is met).
6. I check the news of specific company and evaluate any positive or negative impact of the news before deciding to buy/sell/hold.
7. I check the general news affecting the markets before deciding to buy/sell/hold.
8. If you run Gammath SPOT on your machine or in the cloud, then the stock's signal.txt file and charts (for graphical visualization) can be checked for finer detail (described later in this document) before making buy/sell/hold decision. There are many criteria logged in it and can be used to match personal preference.
9. A significant component of this algorithmic analysis is the historical price data. As a result, I prefer to invest in stocks that have at least 5-years price history.
10. I prefer to invest in stocks that have a positive 5-years and 1-year return on investment.
11. I use micro-Gammath Scores and Gammath Scores history to fine tune my buy/sell/hold criteria.
12. It is much easier to explain how Gammath Score-based dollar cost averaging would work from back testing example. I have provided a default back testing example (for short-/long-term investment time horizon and medium-/high-risk trading strategy) in the source code to show one way to do this.
13. I backtest my strategy on each stock on my closely watched list before deciding which strategy to use. Please refer to the backtester tool source code for an example.
14. I do not use a strategy unless I know that it has consistently worked at least historically (based on backtesting results).

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15. I tend to use current-info-component (sci_gscore) of Gammath Score as a filtering criterion and then on that filtered list, I use the stock-history-component (sh_gscore) of Gammath Score for historical analysis and back testing.
16. Once I finalize a thoroughly back tested strategy to use, I simply use the "Todays_Actions.csv" (generated by backtester tool) to get a list of "today's" buy/sell actions. This saves me a lot of time.
17. If it is a stock that I'm not so familiar with then I'd also run the Projector/Estimator to gauge price in few years before deciding on when to buy. Please note that the estimation is not based on business information, so it is only meant to give adaptive estimate for up to approximately 5 years into the future.
18. Please note that if the strategy doesn't conclude a buy/sell-decision for any stock in your watchlist on the day then Todays_Actions.csv list would be empty. There could be many days where there is no buy/sell activity. This is fine as it depends on the strategy chosen. One can verify strategy's prior recommendations in stock-specific backtesting stats as described here.

***Please note**: Past performance does not guarantee future performance.*

HOWTO BACKTEST MY STRATEGY?

A general strategy that uses Gammath Scores is provided in the source code as an example. The intent is to show a strategy for the short-term (less than 1 year intended holding time interval), long-term (more than 1 year intended holding time interval) and for medium and high-risk tolerance as an example to make buy/sell/hold decisions. You can check the results in the corresponding files (described in later section). You can use the historian-generated charts to correlate and come up with a different strategy that matches your investment style.

WHERE DO I FIND GAMMATH SCORES?

If you are using the free version of Gammath SPOT software, then Gammath Scores (for entire watchlist) are saved in a file name '`<watchlist_name>_overall_gscores.csv`' (e.g.: '`sample_watchlist_overall_gscores.csv`') in the '`tickers`' directory.

HOWTO INTERPRET OVERALL_GSCORES.CSV?

The six columns in this file are:

a) `ticker`: Stock ticker symbol of the company.
b) sh_gscore [overall Gammath Score (between -1 and +1)] and sci_gscore (current information based on fundamentals and options data) show the scoring information. Current information (sci) based Gammath Score component can be used as a filtering criterion.
c) `Note`: This field contains special notes. For e.g., '`NO_PRICE_DATA_FROM_TODAY`' indicates that stock history is not valid because data could be stale.

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WHERE FROM DO YOU OBTAIN FREE DATA FOR ANALYSIS?

Currently, Gammath SPOT uses free data available from the following sources:

1) FRED (Federal Reserve Bank of St. Louis)
2) Wikipedia
3) Yahoo Finance

This list can change as some free data availability isn't always reliable (for example data scraping of Stocktwits seems unavailable).

WHERE DO I FIND DATA USED FOR ANALYSIS?

The stock-specific scraped 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. S&P500-specific data can be found in the '`tickers/SP500`' directory. The first time you run the Scraper for a stock, it will obtain the entire history (up to 10 years if available) from the Internet. Subsequently, it will attempt to obtain the stock history date only from last scraped data date to most recent available data date and reuse the previously scraped data. If you want to always obtain all history from the Internet, then simply delete or rename the `<ticker_symbol>_history.csv` file in corresponding sub-directory.

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

Depending on the availability of free data (currently using `yfinance` Python package that at the time of writing obtains free data from `Yahoo Finance`), one can find all or some of the following data saved in ticker_symbol-specific sub-directory (e.g., '`tickers/AAPL`' directory):

1. `<ticker_symbol>_call_<date>.csv:` Information about calls (options data if available) can be found in this file.
2. `<ticker_symbol>_put_<date>.csv:` Information about puts (options data if available) can be found in this file.
3. `<ticker_symbol>_history.csv:` Information about Price history (if available) can be found in this file.
4. `<ticker_symbol>_qbs.csv:` Information about quarterly balance sheet (if available) can be found in this file.
5. `<ticker_symbol>_qcf.csv:` Information about quarterly cash flow (if available) can be found in this file.
6. `<ticker_symbol>_qe.csv:` Information about quarterly earnings flow (if available) can be found in this file.
7. `<ticker_symbol>_qf.csv:` Information about quarterly financials (if available) can be found in this file.
8. `<ticker_symbol>_reco.csv:` Information about Industry Analysts' recommendations (if available) can be found in this file.

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9. `<ticker_symbol>_summary.csv`: Information about Stock summary (if available) can be found in this file.
10. '`tickers/`SP500_fear_gauge.csv': VIX history to gauge broad fear in the market.

WHERE DO I FIND GENERATED CHARTS?

1. The stock-specific charts generated by Gammath SPOT Analyzer/Scorer tool can be found in '`tickers/<ticker_symbol>/<ticker_symbol>_charts.pdf`'. For example, charts generated as part of analysis of Apple, Inc's stock can be found in '`tickers/AAPL/AAPL_charts.pdf`' file.
2. Trend lines to show current moving estimated support and resistance level lines can be found in '`tickers/<ticker_symbol>/<ticker_symbol>_tc.pdf`'.
3. Stock-specific Gammath Score/micro-Gammath Score history charts generated by the historian tool can be found in '`tickers/<ticker_symbol>/<ticker_symbol>_gscores_charts.pdf`' file.

WHERE DO I FIND PROJECTOR DATA FOR THE STOCK?

If you ran the PEP tool, then the stock-specific Price Estimator and Projector (PEP) data from Gammath SPOT can be found in '`tickers/<ticker_symbol>/<ticker_symbol>_pp.csv`' file. You can load its content into a Pandas series/dataframe.

WHERE DO I FIND SORTED LIST OF 5Y PEP?

A sorted (moving estimated projected 5Y return) list of 5Y PEP from Gammath SPOT can be found in '`tickers/MPEP.csv`' file (if you ran the PEP tool). You can load its content into a Pandas series/dataframe.

WHERE DO I FIND MICRO-GAMMATH SCORES FOR THE STOCK?

Stock specific Gammath Score and micro-Gammath Scores from Gammath SPOT can be found in '`tickers/<ticker_symbol>/<ticker_symbol>_gscores.csv`' file. For example, micro-Gammath Scores 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 GAMMATH SCORE-HISTORY FOR THE STOCK?

Please note that this is generated if the historian tool is run based on these instructions. The Gammath Score consists of stock-history-specific component and current-info-specific component.

1. Gammath Scores history is obviously available for the stock-history-specific component only. This (along with micro-Gammath Scores) can be found in

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'tickers/<ticker_symbol>/<ticker_symbol>_micro_gscores.csv'. You can load the CSV file's content into a Pandas dataframe.

2. 'tickers/<ticker_symbol>/<ticker_symbol>_gscores_charts.pdf' has the corresponding charts.

For description of each micro-gScores included in the gScores' history, please refer to the description here. In addition, the gScores' history CSV file also includes markings for default discount zone to buy zone and default premium zone to sell zone transition points.

WHERE DO I FIND BACKTESTING STATS FOR THE STOCK?

Please note that this is generated if Gammath SPOT's backtester tool is run based on these instructions. Backtesting stats of specific strategy used for a stock can be found in 'tickers/<ticker_symbol>/<ticker_symbol>_gtrades_stats_<term>_<risk>_risk_appetite.csv' (where, 'term' is "short-term" or "long-term", and 'risk' is "medium" or "high").

WHERE DO I FIND TODAY'S ACTIONS?

Please note that this is generated if Gammath SPOT's backtester tool is run based on these instructions. If the default strategy finds buy/sell actions for "today" then those can be found in 'tickers/Todays_Actions.csv'. Please note that if the strategy doesn't conclude "buy"/"sell" decision for any stock in your watchlist then this list could be empty (on many days).

WHERE DO I FIND SCREENED WATCHLIST?

Please note that this is generated if Gammath SPOT's screener tool is run based on these instructions. The filtered/screened list can be found in the file 'tickers/screened_watchlist.csv'.

WHERE DO I FIND ANALYSIS/SIGNALS FOR THE STOCK?

The stock-specific analysis/signals from Gammath SPOT can be found in 'tickers/<ticker_symbol>/<ticker_symbol>_signal.txt'. For example, signals information generated as part of analysis of Apple, Inc's stock can be found in 'tickers/AAPL/ AAPL_signal.txt' file. Analysis of S&P500 history data can be found in 'tickers/SP500/ SP500_signal.txt' file.

HOW DO I INTERPRET SIGNAL.TXT FILE FOR THE STOCK?

Following micro-Gammath Scores (when possible) can be found in <ticker_symbol>_signal.txt:

1	Price
2	RSI
3	Bollinger Bands
4	MACD

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5	KER-adaptive Kalman Filter
6	Ordinary Least Squares
7	MFI
8	Stochastic
9	Current Environment Confidence Score
10	Local Current Support and Resistance Score

Table 1: micro-Gammath SH Scores (overall gScore)

1	Options data
2	Fundamental Analysis

Table 2: SCI score (useful for filtering)

The stock-specific algorithmic analysis' output from Gammath SPOT is saved in `<ticker_symbol>_signal.txt` for reference. It can be used to get finer details on Gammath Score to help make criterion-specific decision on respective stock.
These micro-Gammath Scores make up the overall Gammath Score for the stock and can be used for more detailed selection criteria (manually or automated in your code). In the above table 1, items 1-10 make up the "stock history based Gammath Score" and items 9-11 make up the "current information based Gammath Score". In above table 2, items 1-2 can be used for filtering. In case the information for sub-items in table 2 is not available, then in most cases, the signal.txt will show a note indicating that data is missing. There is more information embedded for each of these micro-Gammath Scores in `<ticker_symbol>_signal.txt` as follows:

Price:
Price-micro-Gammath Score (between -10 and +10) based on Price history data analysis.
[price direction (rising/falling)] [bottom half/middle or top quantile for current rising/falling consecutive days count] [percent change] [current price] [bottom half/middle or top quantile in last 52-week range] [price Gammath Score (10% weightage in overall Gammath Score)] [note indicating if it is new 52-week low/high]

Relative Strength Index (RSI):
RSI-micro-Gammath Score (between -10 and +10) based on RSI analysis.
[RSI level below average/average/above average] [oversold/overbought/normal] [rising/falling/unclear] [bottom half/middle or top quantile for consecutive days if oversold/overbought] [RSI Gammath Score (10% weightage in overall Gammath Score)]

Bollinger bands:
Bollinger-bands-micro-Gammath Score (between -10 and +10) based on Bollinger bands analysis.

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[Price is below/above average compared to middle Bollinger band] [Price is closer to lower/middle/upper Bollinger band] [Bollinger band Gammath Score (10% weightage in overall Gammath Score)]

Moving Average Convergence/Divergence (MACD):

MACD-micro-Gammath Score (between -10 and +10) based on MACD analysis.
[Trend is positive/negative] [Price when buy/sell signaled] [bottom half/middle or top quantile for days in current trend] [bottom half/middle or top quantile for current difference] [MACD Gammath Score (10% weightage in overall Gammath Score)]

KER-adaptive Kalman Filter (KF):

KF-micro-Gammath Score (between -10 and +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 half/middle or top quantile for days in this trend] [bottom half/middle or top quantile for current difference compared to "filtered average"] [KF Gammath Score (10% weightage in overall Gammath Score)]

Ordinary Least Square (OLS):

OLS-micro-Gammath Score (between -10 and +10) to determine if price is above or below "expected" average and if 5Y and 1Y slopes of Least Squares line is positive. This is used to determine if dollar cost averaging is risky for a given stock trend (e.g., if slopes are negative 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/negative] [5Y slope: positive/negative] [positive/negative difference compared to Least Squares line ("expected average")] [bottom half/middle or top quantile for current difference compared to "expected average"] [OLS Gammath Score (10% weightage in overall Gammath Score)]

Money Flow Index (MFI):

MFI-micro-Gammath Score (between -10 and +10]) based on MFI analysis.
[MFI level: below average/average/above average] [rising/falling/unclear] [oversold/overbought/blank] [MFI Gammath Score (10% weightage in overall Gammath Score)] [Indicator for possible price reversal: price could start rising or falling]

Stochastic Oscillator (stochs):

Stochastic-micro-Gammath Score (between -10 to +10) based on Stochastic analysis.
[stochs-slowd level: below average/average/above average] [oversold/overbought/blank] [Last slowk/slowd crossover date] [stoch Gammath Score (10% weightage in overall Gammath Score)]

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Current Environment Confidence Score (CECS):

CECS-micro-Gammath Score (between -10 to +10) based on stock performance and broad market (S&P500) fear gauge.
[CECS Gammath Score (10% weightage in overall Gammath Score)]

Local Support and Resistance Reference Score (LSR):

LSR-micro-Gammath Score (between -10 to +10) based on price relative to rough support and resistance lines.
[LSR Gammath Score (10% weightage in overall Gammath Score)]

Options data (options):

Options-micro-Gammath Score (between -10 and +10) based on Options data (short ratio, calls, puts info) analysis. This can be useful to estimate what currently the options traders are betting on stock.
[short ratio] [Bullish/Bearish] [options Gammath Score (Only used for filtering and can be used during manual decision making)]

Fundamental data:

Note: This is only used for filtering and can be used during manual decision making:

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 Gammath Score]

PEG:
[PEG value] [PEG Gammath Score]

Beta:
[Beta value] [Beta Gammath Score]

Institutional holding:
[Institutional holding percentage value] [IHP Gammath Score]

Insider holding:
Note: This is for reference only and not using in scoring
[Insider holding percentage value] [INSHP Gammath Score]

QBS:
[Debt to capital ratio value] [Current ratio] [Quick ratio] [QBS Gammath Score]

PBR:
[Price to Book ratio value] [PBR Gammath Score]

Total of fundamental analysis data:
[Fundamental analysis Gammath Score]

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Probabilities:

Probabilities score between -10 and +10 (for reference only and not included in overall scoring). This score is combination of probability up/down trend from Logistic regression and next day up/down probability.

Overall Price Direction Probability:
I use this to determine overall up/down price direction probability.

Next Day Price Direction Probability:
I use this to determine the price direction (up/down) probability for next day.

Next Month Price Direction Probability:
I generate price direction (up/down) probability for "after a month" ("after a week is discontinued") by using Logistic Regression. The intent is to use it in making buy/sell decisions. This data is also saved in the micro-Gammath Scores history.

Moving Technical Conjecture of Price in 5Y:

This is a dynamic/moving 5-year price conjecture. Price prediction doesn't make sense to me without accurate information on how the business is doing. In the absence of that, I am approximating price based on past performance and adapting to price changes dynamically. As a result, I call it a calculated, moving price conjecture. This is a quick solution for the sake of approximate analysis. I demonstrate how I use it for a basic long-term strategy in my back testing source code. This price conjecture is also included in 'tickers/<ticker_symbol>/<ticker_symbol>_micro_gscores.csv'.

Note: A more serious price projection is supported via my PEP tool.

Moving Technical Price Projection:

This is a dynamic/moving technical estimated price projection for approximately 3months, 1 year and 5 years. As mentioned in previous section, I don't do constant price prediction in the absence of up-to-date business-specific information. This is a more serious estimate (using GBM and weights derived from history with oldest with least weight and latest with maximum weight) that I use to check for projected rate of return over different intervals for future times. If you run the Gammath PEP tool, then entire price projection is saved in 'tickers/<ticker_symbol>/<ticker_symbol>_pp.csv'. This tool includes 5Y moving estimated projection for S&P500 value as well. A sorted list of moving estimated 5Y projected returns can be found in 'tickers/MPEP.csv' (corresponding to the watchlist that was passed to pep tool and includes the corresponding value for S&P500).

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Automated SPOT trade simulator:

This is an automated SPOT trade simulator that uses Reinforcement Learning (Double Deep Q-learning Network) and takes significant amount of time to run. The tool takes ticker symbol and number of trading days to simulate as input. Please note that this tool requires gScore historian to be run for corresponding ticker symbol before running this tool. The simulated rewards (percentage gain) based on the simulated trades using a "learnt" strategy will be saved in '`tickers/<ticker_symbol>/<ticker_symbol>_rl_episodes_info.csv`'.
Please note that this tool is still work-in-progress with limited testing.

Gammath Score summary:

This file includes component scores (viz. SH_gScore and SCI_gScore) for convenient reference.

HOW DO I INTERPRET BACKTESTING STATS FOR THE STOCK?

The location of stock-specific back testing stats from Gammath SPOT are described here.
The twelve columns in these files are:

a) `Date`: Date when action was taken.
b) `Price`: Share price when action was taken.
c) `Action`: BUY or SELL.
d) `Quantity`: Number of shares corresponding to `Action` field (Bought or Sold).
   Note: The buy-quantity used by default back testing strategy is arbitrary but relative in the sense that its first buy is small quantity and subsequent purchases are bigger quantity (any ascending series e.g., Fibonacci series could be used to derive buy quantity). There are many ways to decide on a buy-quantity that I have avoided to list here for the sake of brevity. Gist of it is that I decide on buy-quantity based on how many attempts it takes to breakeven (historically) for a given strategy, available funds to allocate for that stock in my portfolio, news, macroeconomic conditions, risk tolerance etc.
e) `Avg_Price`: Average Price per share for total shares held.
f) `Profit`: Amount of profit [Only reported for "SELL" Action].
g) `Return_Pct`: Profit in terms of percentage of total purchase price [Only reported for "SELL" Action or for summary of currently held shares on the last row].
h) `SP500_Pct`: Percentage change in value of S&P500 for same time interval for which this security was held [Only reported for "SELL" Action].
i) `Days_Held`: Number of days this security was held (since first share was purchased). [Only reported for "SELL" Action or for summary of currently held shares on the last row].
j) `Last_Price`: Closing price of this stock when tool was last executed [Only reported on the last row as a summary].
k) `Stage`: Currently perceived cycle based on Gammath Score i.e., Buy cycle/Hold cycle/Sell cycle [Only reported on the last row as a summary].
l) `Notes`: Useful notes that can help in better decision-making for daily action [Only reported on the last row as a summary]. This includes:

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[Current_info_data sentiment: positive/negative][Price projection: approximately 3 months, 1 year, 5 years][Strategy worked or not historically (in approximately 5 years)][Reason if strategy is concluded to not have worked related to cash management and/or number of attempts to break even]

Note: Backtesting does not directly account for macroeconomic conditions and news. Notes on the last row could help in making a more informed decision. Irrespective of that, it is recommended that user should always check news before buying or selling a stock. Doing so could help perform better than backtesting performance.

HOW DO I USE GAMMATH SPOT FOR INTERNATIONAL STOCKS?

Please see the sample watchlist for examples of stocks listed outside the US. Note that some data points may or may not be available for stocks listed outside the US. I have done very limited testing for stocks listed outside the US so if you happen to test it thoroughly in a different geographic area then please let me know the results.

CONCLUDING REMARKS

Gammath SPOT provides a dynamic system intended to account for changes in the investment parameters as they happen. When the facts change, so should the conclusions (much like how a vehicle navigation system estimates arrival time and changes it if parameters change). A Gammath Score-based trading strategy along with SPOT's projector, historian, backtester, screener tools give me a "pragmatic" way of investing. It has helped me immensely especially because I have no privileged information. I wish you find it helpful too. For brevity, a lot of detail is not described in this document. If you have any questions/concerns/comments, then please don't hesitate to let me know via this form on my website.

Happy SPOTing!

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