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- Machine Learning Analysis
- MACD 101
- Daily Vs. Weekly Trend Following
- Testing ChatGPT
- Understand The Bullish % Index

TECHNICAL ANALYSIS OF STOCKS & COMMODITIES

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EDITORIAL
editor@traders.com

Editor in Chief Jack K. Hutson
Production Manager Karen E. Wasserman
Graphic Designer Wayne Shaw
Webmaster Han J. Kim
Contributing Editors John Ehlers, Anthony W. Warren, PhD.
Contributing Writers Thomas Bulkowski, Martin Pring, Barbara Star, Markos Katsanos, Leslie N. Masonson

OFFICE OF THE PUBLISHER

Publisher Jack K. Hutson
Industrial Engineer Jason K. Hutson
Project Engineer Sean M. Moore

ADVERTISING SALES

4757 California Ave. S.W.
Seattle, WA 98116-4499
206 660-8577 Fax 206 938-1307
advert@traders.com

National Sales Manager Edward W. Schramm
ESchramm@traders.com

CIRCULATION

Subscription & Order Service 1 800 832-4642
1 206 938-0570 Fax 1 206 938-1307
circ@traders.com

Subscription Manager Sean M. Moore

WEBSITE

http://www.**traders**.com

Staff members may be emailed using first initial plus last name plus @traders.com

CONTENTS

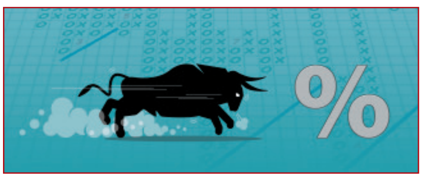
BONUS ISSUE 2024, VOLUME 42 NUMBER 4

FEATURE ARTICLE

6 Enhanced Technical Indicator Analysis Using Machine Learning
by Domenico D'Errico
We'll take some example trading strategies based on technical analysis indicators and analyze the results from the new perspective of today's artificial intelligence capabilities. What can that tell us? And what does it suggest for the future of technical analysis?

14 MACD 101
by Jeffrey Gibby
You see it on charts, but do you understand what goes into the calculation of it? Here's a guide to using and interpreting the MACD.

18 Pros And Cons Of Daily Versus Weekly Trend Following
by Perry J. Kaufman
Weekly data is smoother than daily data. So should we be using weekly data for trend-following signals? Here's a test to find out.



22 Understanding The Bullish Percent Index
by Stella Osoba, CMT
How bullish or bearish is the market at any point? Is a current market trend likely to continue or reverse? Comparing the current number of buy signals to the current number of sell signals in a market of stocks provides an easy indication of the general bullishness or bearishness of that market, as well as whether that market is reaching an overbought or oversold saturation point. And using a percentage-based scale such as the one discussed here gives you an index with levels you can read and interpret. Here's how to use this indicator.

26 Testing ChatGPT's Potential For Systematic Trading
by Andrea Unger
Traders want to know: How can the new AI technologies be harnessed for their trading? Can they be used to help you create effective trading strategies? Here's a look.

READERS' CHOICE AWARDS

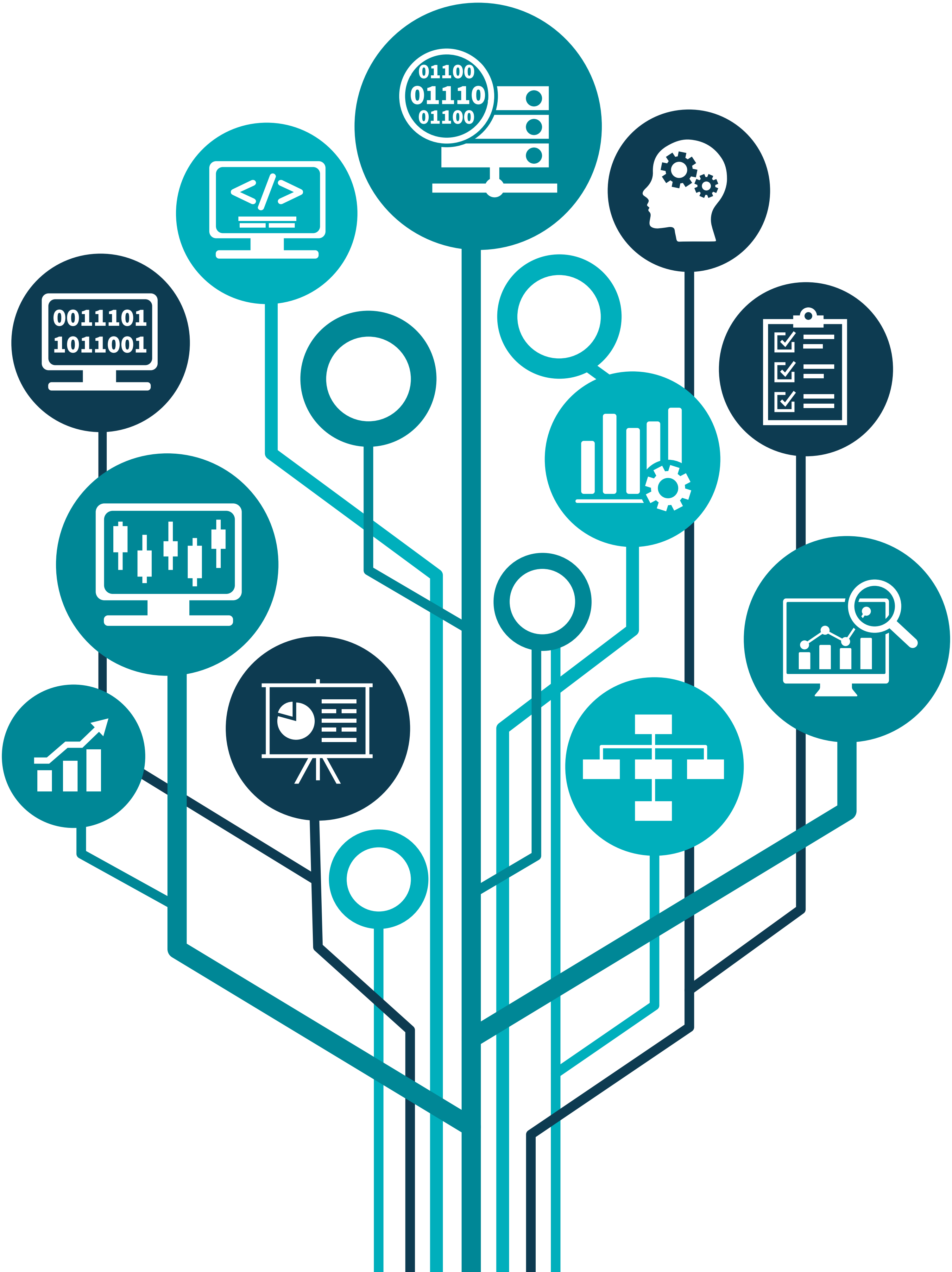
29 2024 Readers' Choice Awards
Stocks & Commodities presents the 2024 Readers' Choice Awards, with products and services that our subscribers are using and find useful, in more than 20 categories.

38 2023 S&C Articles
If you weren't subscribing to *Technical Analysis of* Stocks & Commodities, The Traders' Magazine, throughout 2023, you missed out on a lot of information. Here is some of what you missed.

42 A Retrospective: Interviews
by Technical Analysis, Inc.
Here, we look back at some of the wisdoms and insights offered by the accomplished analysts, technicians, traders, and educators we've interviewed over the years for this magazine.

DEPARTMENTS

44 Books For Traders
45 Advertisers' Index
45 Editorial Resource Index
46 Classified Advertising
46 Traders' Resource



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New Tools For New Times

Enhanced Technical Indicator Analysis Using Machine Learning

We'll take some example trading strategies based on technical analysis indicators and analyze the results from the new perspective of today's artificial intelligence capabilities. What can that tell us? And what does it suggest for the future of technical analysis?

Integrating machine learning with technical indicators in trading can be a game-changer, yet this won't be just another article advocating for how AI will revolutionize the trading world and significantly improve traders' lives. Seasoned traders comprehend that trading isn't a win-win scenario; it's a battlefield where there's inevitably a winner and a loser. Enhancing the lives of both concurrently within trading is simply not feasible.

Imagine a future where every trader has easy access to AI models. The same machine learning algorithms, available through free Python libraries, would analyze the same datasets. Consequently, many traders might start receiving similar entry signals for the same assets. And while AI could foster the development of sophisticated trading models, it also poses the risk of losses due to inadequate execution during live sessions. Does this scenario seem plausible to you?

Additionally, the behavior of traders, influenced by AI, will exert an influence on prices and trading volumes, potentially altering the makeup of future datasets. Therefore, unless AI integrates strategic elements—like forecasting the future actions of other AI-driven traders—or employs tailored models (distinct from the currently accessible libraries), akin to strategies used in strategic games such as chess, it could misguide individual traders.

Considering these assumptions, the future of AI trading could transform into a battleground where major corporations invest millions in technology, big data, and expert teams. Nevertheless, individual traders shouldn't be intimidated by this scenario. It mirrors the historical pattern whenever a new technology infiltrates the trading market. Just as observed with scalping and high-frequency trading, individual traders must exercise caution and select their battleground wisely. Incorporating chart analysis, price visualization, and strategic use of algorithms can markedly influence outcomes, enabling them to navigate this evolving landscape effectively.

Let's take an example, revisiting some traditional technical analysis indicators, and attempt to analyze them from a new perspective.

RSI

The relative strength index (RSI) oscillator is a popular technical indicator used in financial markets to assess whether an asset is overbought or oversold. Typically, it measures the magnitude of recent price changes to evaluate the asset's strength, thereby indicating potential reversal points.

Let's start from a very simple RSI strategy applied on 20 years of daily bars of AAPL:

- Entry rule: Buy 100K APPL shares when RSI(14) crosses over 40
- Exit rule: Sell after a 20-day trade window.

by Domenico D'Errico

TRADESTATION

FIGURE 1: EXAMPLE TRADING SIGNALS FOR TEST SYSTEM. Applying a simple RSI crossover strategy to 20 years of daily bars of AAPL, we get these signals. The example trading signals can be used in a test to compare analyzing the system in a traditional fashion versus using machine learning to analyze the system test results.

TradeStation Strategy Performance Report - AAPL Daily (29/12/2003-28/12/2023)

Account (USD) | ALL Data | Column View | Expand

TradeStation Performance Summary

	All Trades	Long Trades	Short Trades
Total Net Profit	$123,487.72	$123,487.72	$0.00
Gross Profit	$373,116.16	$373,116.16	$0.00
Gross Loss	($249,628.44)	($249,628.44)	$0.00
Profit Factor	1.49	1.49	n/a
Total Number of Trades	76	76	0
Percent Profitable	59.21%	59.21%	0.00%
Winning Trades	45	45	0
Losing Trades	31	31	0
Even Trades	0	0	0
Avg. Trade Net Profit	$1,624.84	$1,624.84	$0.00
Avg. Winning Trade	$8,291.47	$8,291.47	$0.00
Avg. Losing Trade	($8,052.53)	($8,052.53)	$0.00
Ratio Avg. Win:Avg. Loss	1.03	1.03	n/a
Largest Winning Trade	$32,176.92	$32,176.92	$0.00
Largest Losing Trade	($27,613.77)	($27,613.77)	$0.00
Max. Consecutive Winning Trades	8	8	0
Max. Consecutive Losing Trades	5	5	0
Avg. Bars in Winning Trades	22.00	22.00	0.00
Avg. Bars in Losing Trades	22.00	22.00	0.00
Avg. Bars in Even Trades	0.00	0.00	0.00
Max. Shares/Contracts Held	47,393	47,393	0
Total Shares/Contracts Held	694,609	694,609	0
Account Size Required	$50,474.23	$50,474.23	$0.00
Return on Initial Capital	123.49%		
Annual Rate of Return	4.06%		
Return Retracement Ratio	0.30		
RINA Index	37.89		
Trading Period	19 Years, 9 Months,...		
Percent of Time in the Market	31.97%		
Max. Equity Run-up	$156,424.72		
Max. Drawdown (Intra-Day Peak to ... Value	($64,240.22)	($64,240.22)	$0.00

FIGURE 2: CONVENTIONAL PERFORMANCE SUMMARY. Here you see a conventional performance report for the example trading strategy based on RSI crossovers. The performance summary for the example system looks quite good.

days	Did 20 days ago RSI cross above 40?	Is today close above 20 days ago?	Result	ML terminology	Traders terminology
1	Yes	Yes	right prediction	TP True-Positive	winning trades
2	Yes	No	wrong prediction	FP False-Positive	losing trades
3	No	Yes	wrong prediction	FN False Negative	not tracked
4	No	No	right prediction	TN True Negative	not tracked

FIGURE 3: MACHINE LEARNING TERMINOLOGY VS. TRADITIONAL TERMINOLOGY. The RSI strategy in Figures 1 and 2 can be assessed from a perspective of machine learning. Here you see some conventional analysis terminology compared with machine learning terminology for insight into how interpretations differ.

In Figures 1 and 2 you see the related chart and the performance summary produced by TradeStation.

The traditional performance summary looks quite good: It shows 76 trades, with an average profit of $1,624 (1.6% per trade). There are 45 winning trades and 31 losing ones, with a hit rate % (ratio between winning trades and total trades) of 59.21%.

Let's now move onto a machine learning approach to assess the same RSI strategy.

In my January 2024 article "Artificial Intelligence Applied To Technical Trading," I delved into structuring a machine learning dataset aimed at classifying trading sessions. Figure 3 illustrates a dataset featuring "one feature only," providing a comparison with conventional trading terminology. Later in this article, we'll explore how the terminologies employed by traders and data scientists often diverge, impacting the understanding and application of AI in trading strategies.

But it is not only a matter of terminology: Whenever I engage in discussions with my data scientist peers, they

How data scientists validate a model

Confusion Matrix	Right predictions	Wrong predictions	Tot predictions	Predictions Accuracy %
Days with entry pattern	93	66	159	58%
Days without entry pattern	1628	2738	4366	37%
Tot Days	1721	2804	4525	38%

Days with entry pattern			4%	
Days without entry pattern			96%	
Tot Days			100%	

How traders validate a model

Performance Summary	
Total Trades	159
Winning Trades	93
Losing Trades	66
Hit Rate%	58%
Total Profit	$ 123,486
AvgTrade	$ 777
MaxDrawDown	$ -64,240
NetProfit/MaxDrawDown	1.92

FIGURE 4: CONFUSION MATRIX VS. TRADITIONAL PERFORMANCE SUMMARY. Here you see a side-by-side comparison of a traditional backtesting report and the confusion matrix. A confusion matrix is a table used in machine learning to evaluate the performance of a classification model. The confusion matrix provides an evaluation of the model's prediction accuracy, offering a more comprehensive analysis of the trading model's performance than is given by a conventional performance report.

often highlight that the *performance summary* commonly utilized by traders to assess a trading system might not suffice for evaluating a prediction model. But why is that? Does it only capture one facet of the issue? What exactly do they mean?

The primary disparity lies in how traders, relying on the performance summary, typically assume the strategy's fairness. Their immediate focus tends to be on the profit and risk aspects—the risk/reward approach—which is indeed a valid method for evaluating real-life financial matters. However, it's crucial not to overlook the fact that the performance summary relies on strategies that still require validation: a trading system, before the "first taste of battle" of live trading is just … paper.

Traders often engage in extensive discussions debating the optimal parameters for assessing a trading system. Nevertheless, the evaluation process isn't solely linked to financial metrics. The central query when scrutinizing a performance summary or equity line should be: "Will this strategy demonstrate comparable behavior in the future, or are we simply deceiving ourselves?"

Traders often assess a strategy as if it were a financial asset, using financial parameters. Yet, a trading system undergoing backtesting only becomes a financial asset after an extensive live trading period. Until then, its assessment should prioritize prediction accuracy, akin to the approach used in machine learning.

Let's further explore this idea with the RSI strategy.

In Figure 4 you can compare the RSI backtesting with the confusion matrix.

A *confusion matrix* is a table used in machine learning to evaluate the performance of a classification model. It's a grid that allows visualization of the model's performance by comparing predicted classes against actual classes.

Take a look at the numbers with the same background colors:

- Traders typically track trades by categorizing them as either winning or losing, focusing solely on instances where a positive prediction occurs (such as an RSI crossing above 40).
- On the other hand, data scientists go a step further. They not only monitor events with positive predictions but also pay attention to events where there is a negative prediction (for instance, when the RSI does not cross above 40). They meticulously evaluate the prediction accuracy in these instances as well, providing a more comprehensive analysis of the model's performance.

If you look at the confusion matrix (at the left of the Figure 4), you'll see that the days showing an RSI crossover 40 are only 4% of the entire dataset.

While the prediction accuracy for days showing an entry pattern is 58% in both confusion matrix and in the hit rate% performance summary, things change if we look at what happen with days not showing the entry pattern, where the prediction accuracy drops to 37%.

This implies that a pattern recognition algorithm should be assessed by considering both scenarios: when trades are executed and when they aren't. Take the RSI strategy, for instance, which displays an acceptable performance summary, good average trade, high hit rate, and favorable

The behavior of traders, influenced by AI, will exert an influence on prices and trading volumes, potentially altering the makeup of future datasets.

risk-reward ratios. Despite these positive metrics, it fails to meet the scrutiny of machine learning evaluation due to its limited predictive capability. This suggests that in scenarios where trades aren't executed based on its predictions, the strategy performs poorly. This discrepancy raises concerns that the strategy might not yield favorable results when applied to new, unseen data.

There's a concern that the positive performance observed could be a result of backtesting the strategy specifically during a bullish market period for AAPL. This could have artificially inflated the apparent success of the strategy, making it appear effective when applied to historical data but potentially unreliable in different market conditions or with other assets.

Let's further our research into validating a trading strategy through a machine learning lens. We'll calculate a confusion matrix using TradeStation (Python is not required for this) for the following trading techniques applied to the 30 stocks in the Dow Jones Industrial Average (Figure 5):

1. RSI cross over 40
2. RSI below 40
3. Close above 200 days moving average
4. Close above 200, OR close above 50 days moving averages
5. Close above 200, OR close above 50 days moving average OR close above 20 days moving averages

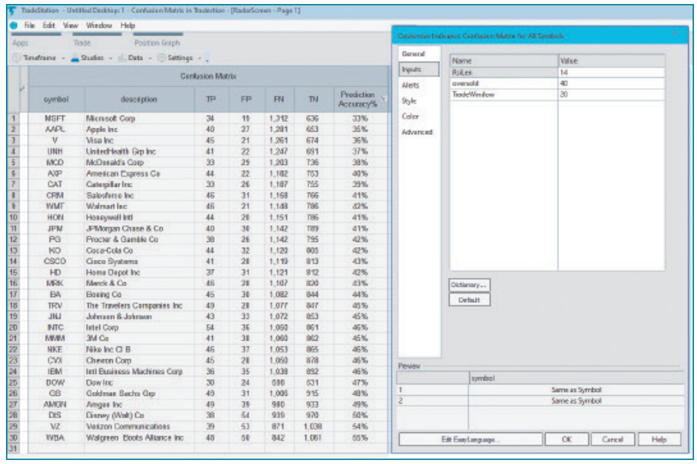
In Figures 6–10 you can see the confusion matrix results.

In Figure 11 there is a comparison of the five different trading strategies evaluated. Figures 12 and 13 isolate two of the metrics: prediction accuracy and total trades.

- The first observation is that a simple RSI crossover-based strategy makes 2,194 trades on 30 stocks in 10 years, which is not a lot for that time period with that many stocks, and shows a 43% prediction accuracy, which is really poor.
- Using an entry signal based on an RSI below 40 trades five times the RSI crossover 40 and the prediction accuracy increases from 43 to 46. It means that the crossover technique filters too much and makes the algorithm lose good opportunities.

Let's move to a different technical indicator: simple moving averages.

A 200-day simple moving average (SMA) is a widely used technical analysis tool that calculates the average price of a security over the past 200 trading days. It's a



Confusion Matrix

	symbol	description	TP	FP	FN	TN	Prediction Accuracy%
1	MSFT	Microsoft Corp	34	19	1,312	636	33%
2	AAPL	Apple Inc	40	27	1,281	653	35%
3	V	Visa Inc	45	21	1,261	674	36%
4	UNH	UnitedHealth Grp Inc	41	22	1,247	691	37%
5	MCD	McDonald's Corp	33	29	1,203	736	38%
6	AXP	American Express Co	44	22	1,182	753	40%
7	CAT	Caterpillar Inc	33	26	1,187	755	39%
8	CRM	Salesforce Inc	45	31	1,168	766	41%
9	WMT	Walmart Inc	46	21	1,148	786	42%
10	HON	Honeywell Intl	44	20	1,151	786	41%
11	JPM	JPMorgan Chase & Co	40	30	1,142	789	41%
12	PG	Procter & Gamble Co	38	26	1,142	795	42%
13	KO	Coca-Cola Co	44	32	1,120	805	42%
14	CSCO	Cisco Systems	41	28	1,119	813	43%
15	HD	Home Depot Inc	37	31	1,121	812	42%
16	MRK	Merck & Co	46	28	1,107	820	43%
17	BA	Boeing Co	45	30	1,082	844	44%
18	TRV	The Travelers Companies Inc	49	28	1,077	847	45%
19	JNJ	Johnson & Johnson	43	33	1,072	853	45%
20	INTC	Intel Corp	54	36	1,050	861	46%
21	MMM	3M Co	41	38	1,060	862	45%
22	NKE	Nike Inc Cl B	46	37	1,053	865	46%
23	CVX	Chevron Corp	45	28	1,050	878	46%
24	IBM	Intl Business Machines Corp	36	35	1,038	892	46%
25	DOW	Dow Inc	30	24	596	631	47%
26	GS	Goldman Sachs Grp	49	31	1,006	915	48%
27	AMGN	Amgen Inc	49	39	980	933	49%
28	DIS	Disney (Walt) Co	38	54	939	970	50%
29	VZ	Verizon Communications	39	53	871	1,038	54%
30	WBA	Walgreen Boots Alliance Inc	48	50	842	1,061	55%
31							

FIGURE 5: CONFUSION MATRIX. Machine learning techniques can be used in the validation of a trading strategy. The confusion matrix seen here was created in TradeStation for the example RSI trading system applied to the 30 stocks in the DJIA. A confusion matrix is a grid that allows visualization of the model's performance by comparing predicted classes against actual classes. It prioritizes prediction accuracy, akin to the approach used in machine learning.

RSI(14) cross over 40

symbol	description	TP	FP	FN	TN	Right Predictions	Wrong Predictions	Total Trades	Prediction Accuracy
		1,260	934	32,559	24,457	25,717	33,493	2,194	43%
MSFT	Microsoft Corp	35	20	1,311	635	670	1,331	55	33%
AAPL	Apple Inc	39	28	1,280	654	693	1,308	67	35%
V	Visa Inc	45	21	1,259	676	721	1,280	66	36%
UNH	UnitedHealth Grp Inc	41	22	1,247	691	712	1,289	63	37%
MCD	McDonald's Corp	34	29	1,200	738	772	1,229	63	39%
CAT	Caterpillar Inc	33	26	1,185	757	790	1,211	59	39%
AXP	American Express Co	44	22	1,180	755	799	1,202	66	40%
CRM	Salesforce Inc	46	31	1,156	768	814	1,187	77	41%
JPM	JPMorgan Chase & Co	39	30	1,141	791	830	1,171	69	41%
HON	Honeywell Intl	44	20	1,150	787	831	1,170	64	42%
WMT	Walmart Inc	46	21	1,149	785	831	1,170	67	42%
PG	Procter & Gamble Co	37	26	1,143	795	832	1,169	63	42%
HD	Home Depot Inc	37	31	1,119	814	851	1,150	68	43%
KO	Coca-Cola Co	44	32	1,118	807	851	1,150	76	43%
CSCO	Cisco Systems	41	28	1,117	815	856	1,145	69	43%
MRK	Merck & Co	45	29	1,106	821	866	1,135	74	43%
BA	Boeing Co	44	30	1,081	846	890	1,111	74	44%
JNJ	Johnson & Johnson	43	33	1,070	855	898	1,103	76	45%
TRV	The Travelers Compan	49	28	1,075	849	898	1,103	77	45%
MMM	3M Co	40	38	1,059	864	904	1,097	78	45%
NKE	Nike Inc Cl B	46	37	1,053	865	911	1,090	83	46%
INTC	Intel Corp	54	37	1,048	862	916	1,085	91	46%
CVX	Chevron Corp	43	29	1,050	879	922	1,079	72	46%
IBM	Intl Business Machines	36	35	1,036	894	930	1,071	71	46%
DOW	Dow Inc	30	24	596	531	561	620	54	48%
GS	Goldman Sachs Grp	50	31	1,003	917	967	1,034	81	48%
AMGN	Amgen Inc	49	39	978	935	984	1,017	88	49%
DIS	Disney (Walt) Co	39	54	938	970	1,009	992	93	50%
VZ	Verizon Communicatic	39	53	871	1,038	1,077	924	92	54%
WBA	Walgreen Boots Alliar	48	50	840	1,063	1,111	890	98	56%

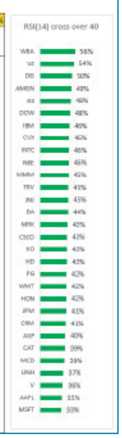


FIGURE 6: CONFUSION MATRIX, RSI CROSSOVER STRATEGY. Here is an example machine learning analysis using a confusion matrix on a trading strategy that gives trading signals when the RSI crosses over the 40 level.

RSI(14) below 40

symbol	description	TP	FP	FN	TN	Right Predictions	Wrong Predictions	Total Trades	Prediction Accuracy
		5,983	4,083	27,837	21,308	27,291	31,920	10,066	46%
MSFT	Microsoft Corp	95	75	1,251	580	675	1,326	170	34%
AAPL	Apple Inc	169	102	1,150	580	749	1,252	271	37%
V	Visa Inc	134	69	1,170	628	762	1,239	203	38%
UNH	UnitedHealth Grp Inc	153	60	1,135	653	806	1,195	213	40%
CRM	Salesforce Inc	173	154	1,029	645	818	1,183	327	41%
MCD	McDonald's Corp	166	107	1,068	660	826	1,175	273	41%
CAT	Caterpillar Inc	195	115	1,023	668	863	1,138	310	43%
HON	Honeywell Intl	198	132	996	675	873	1,128	330	44%
AXP	American Express Co	194	97	1,030	680	874	1,127	291	44%
PG	Procter & Gamble Co	184	124	996	697	881	1,120	308	44%
HD	Home Depot Inc	195	151	961	694	889	1,112	346	44%
JPM	JPMorgan Chase & Co	184	112	996	709	893	1,108	296	45%
WMT	Walmart Inc	190	77	1,005	729	919	1,082	267	46%
NKE	Nike Inc Cl B	208	190	891	712	920	1,081	398	46%
BA	Boeing Co	200	148	925	728	928	1,073	348	46%
MRK	Merck & Co	199	111	952	739	938	1,063	310	47%
KO	Coca-Cola Co	209	106	953	733	942	1,059	315	47%
CSCO	Cisco Systems	236	131	922	712	948	1,053	367	47%
JNJ	Johnson & Johnson	207	142	906	746	953	1,048	349	48%
CVX	Chevron Corp	198	141	895	767	965	1,036	339	48%
INTC	Intel Corp	238	165	864	734	972	1,029	403	49%
MMM	3M Co	264	184	835	718	982	1,019	448	49%
TRV	The Travelers Compan	195	87	929	790	985	1,016	282	49%
DOW	Dow Inc	133	103	494	452	585	597	236	49%
GS	Goldman Sachs Grp	217	163	836	785	1,002	999	380	50%
AMGN	Amgen Inc	231	194	796	780	1,011	990	425	51%
IBM	Intl Business Machines	256	165	816	764	1,020	981	421	51%
DIS	Disney (Walt) Co	211	209	766	815	1,026	975	420	51%
WBA	Walgreen Boots Alliar	272	256	616	857	1,129	872	528	56%
VZ	Verizon Communicatic	279	213	631	878	1,157	844	492	58%

FIGURE 7: CONFUSION MATRIX, RSI CROSSUNDER STRATEGY. Here is an example machine learning analysis using a confusion matrix on a trading strategy that gives trading signals when the RSI crosses under the 40 level.

Close above 200-days Simple Moving Average

symbol	description	TP	FP	FN	TN	Right Predictions	Wrong Predictions	Total Trades	Prediction Accuracy
		21,031	16,473	12,703	8,805	29,836	29,176	37,504	50%
AMGN	Amgen Inc	523	715	504	259	782	1,219	1,238	39%
IBM	Intl Business Machines	469	567	603	362	831	1,170	1,036	42%
DOW	Dow Inc	233	256	308	186	419	564	489	43%
CVX	Chevron Corp	609	614	484	294	903	1,098	1,223	45%
WMT	Walmart Inc	798	700	397	106	904	1,097	1,498	45%
MRK	Merck & Co	737	641	414	209	946	1,055	1,378	47%
JNJ	Johnson & Johnson	677	616	436	272	949	1,052	1,293	47%
PG	Procter & Gamble Co	772	643	408	178	950	1,051	1,415	47%
VZ	Verizon Communicatic	353	491	557	600	953	1,048	844	48%
INTC	Intel Corp	581	521	521	378	959	1,042	1,102	48%
TRV	The Travelers Compan	677	588	447	289	966	1,035	1,265	48%
CAT	Caterpillar Inc	760	567	458	216	976	1,025	1,327	49%
NKE	Nike Inc Cl B	653	576	446	326	979	1,022	1,229	49%
GS	Goldman Sachs Grp	533	498	520	450	983	1,018	1,031	49%
HON	Honeywell Intl	752	574	442	233	985	1,016	1,326	49%
WBA	Walgreen Boots Alliar	213	338	675	775	988	1,013	551	49%
KO	Coca-Cola Co	733	582	429	257	990	1,011	1,315	49%
DIS	Disney (Walt) Co	467	484	510	540	1,007	994	951	50%
MCD	McDonald's Corp	873	628	361	139	1,012	989	1,501	51%
JPM	JPMorgan Chase & Co	792	569	388	252	1,044	957	1,361	52%
AXP	American Express Co	808	534	416	243	1,051	950	1,342	53%
CSCO	Cisco Systems	786	573	372	270	1,056	945	1,359	53%
HD	Home Depot Inc	847	633	309	212	1,059	942	1,480	53%
CRM	Salesforce Inc	857	579	345	220	1,077	924	1,436	54%
BA	Boeing Co	672	451	453	425	1,097	904	1,123	55%
MMM	3M Co	544	349	555	553	1,097	904	893	55%
V	Visa Inc	1,051	589	253	108	1,159	842	1,640	58%
UNH	UnitedHealth Grp Inc	1,049	567	239	146	1,195	806	1,616	60%
AAPL	Apple Inc	1,032	507	287	175	1,207	794	1,539	60%
MSFT	Microsoft Corp	1,180	523	166	132	1,312	689	1,703	66%

FIGURE 8: CONFUSION MATRIX, 200-DAY SMA. Here is an example machine learning analysis using a confusion matrix on a trading strategy that gives trading signals when price closes above the 200-day SMA.

Close above 200-days Simple Moving Average or Close above 50-days Simple Moving Average

symbol	description	TP	FP	FN	TN	Right Predictions	Wrong Predictions	Total Trades	Prediction Accuracy
		24,343	19,055	9,391	6,223	30,566	28,446	41,398	52%
AMGN	Amgen Inc	625	781	402	193	818	1,183	1,406	41%
IBM	Intl Business Machines	652	671	420	258	910	1,091	1,323	45%
VZ	Verizon Communicatic	500	672	410	419	919	1,082	1,172	46%
INTC	Intel Corp	679	657	423	242	921	1,080	1,336	46%
CVX	Chevron Corp	706	690	387	218	924	1,077	1,396	46%
TRV	The Travelers Compan	783	695	341	182	965	1,036	1,478	48%
JNJ	Johnson & Johnson	755	676	358	212	967	1,034	1,431	48%
WBA	Walgreen Boots Alliar	383	528	505	585	968	1,033	911	48%
MRK	Merck & Co	836	707	315	143	979	1,022	1,543	49%
GS	Goldman Sachs Grp	689	656	364	292	981	1,020	1,345	49%
DOW	Dow Inc	353	307	188	135	488	495	660	50%
WMT	Walmart Inc	945	728	250	78	1,023	978	1,673	51%
PG	Procter & Gamble Co	877	672	303	149	1,026	975	1,549	51%
HON	Honeywell Intl	866	645	328	162	1,028	973	1,511	51%
DIS	Disney (Walt) Co	601	596	376	428	1,029	972	1,197	51%
NKE	Nike Inc Cl B	776	646	323	256	1,032	969	1,422	52%
BA	Boeing Co	768	612	357	264	1,032	969	1,380	52%
AXP	American Express Co	913	649	311	128	1,041	960	1,562	52%
MMM	3M Co	691	551	408	351	1,042	959	1,242	52%
CAT	Caterpillar Inc	896	632	322	151	1,047	954	1,528	52%
JPM	JPMorgan Chase & Co	903	662	277	159	1,062	939	1,565	53%
KO	Coca-Cola Co	872	641	290	198	1,070	931	1,513	53%
CRM	Salesforce Inc	928	651	274	148	1,076	925	1,579	54%
CSCO	Cisco Systems	886	636	272	207	1,093	908	1,522	55%
MCD	McDonald's Corp	986	659	248	108	1,094	907	1,645	55%
HD	Home Depot Inc	932	680	224	165	1,097	904	1,612	55%
V	Visa Inc	1,098	627	206	70	1,168	833	1,725	58%
UNH	UnitedHealth Grp Inc	1,102	605	186	108	1,210	791	1,707	60%
AAPL	Apple Inc	1,128	550	191	132	1,260	741	1,678	63%
MSFT	Microsoft Corp	1,214	573	132	82	1,296	705	1,787	65%

FIGURE 9: CONFUSION MATRIX, 200/50-DAY SMA. Here is an example machine learning analysis using a confusion matrix on a trading strategy that gives trading signals when price closes above the 200-day SMA or the 50-day SMA.

long-term moving average that smooths out price data, providing a clearer view of the underlying trend.

Let's evaluate the following strategy:

- Enter when the daily close is above the 200-day simple moving average
- Exit after 20 days.

This model would make 37,504 trades in 10 years on the 30 DJIA stocks, showing a prediction accuracy of 50%.

In equity markets, initiating a long trade as prices rise tends to yield better results than entering when prices decline.

While attempting to capture a trend, have you ever found yourself waiting endlessly for the price to reach your limit order level, only to witness the market moving in your intended direction without your participation? This precisely echoes what the confusion matrix conveys about

Close above 200-days or 50-days or 20-days Simple Moving Average

symbol	description	TP	FP	FN	TN	Right Predictions	Wrong Predictions	Total Trades	Prediction Accuracy
		26,233	20,423	7,501	4,855	31,088	27,924	46,656	53%
VZ	Verizon Communicatic	542	769	368	322	864	1,137	1,311	43%
AMGN	Amgen Inc	716	808	311	166	882	1,119	1,524	44%
WBA	Walgreen Boots Alliar	474	680	414	433	907	1,094	1,154	45%
IBM	Intl Business Machines	740	727	332	202	942	1,059	1,467	47%
CVX	Chevron Corp	787	730	306	178	965	1,036	1,517	48%
INTC	Intel Corp	778	703	324	196	974	1,027	1,481	49%
JNJ	Johnson & Johnson	817	726	296	162	979	1,022	1,543	49%
GS	Goldman Sachs Grp	757	718	296	230	987	1,014	1,475	49%
DIS	Disney (Walt) Co	668	696	309	328	996	1,005	1,364	50%
TRV	The Travelers Compan	862	741	262	136	998	1,003	1,603	50%
MRK	Merck & Co	900	724	251	126	1,026	975	1,624	51%
BA	Boeing Co	838	673	287	203	1,041	960	1,511	52%
HON	Honeywell Intl	931	686	263	121	1,052	949	1,617	53%
MMM	3M Co	783	633	316	269	1,052	949	1,416	53%
DOW	Dow Inc	407	331	134	111	518	465	738	53%
WMT	Walmart Inc	998	746	197	60	1,058	943	1,744	53%
CAT	Caterpillar Inc	955	678	263	105	1,060	941	1,633	53%
NKE	Nike Inc Cl B	849	691	250	211	1,060	941	1,540	53%
JPM	JPMorgan Chase & Co	958	712	222	109	1,067	934	1,670	53%
KO	Coca-Cola Co	922	686	240	153	1,075	926	1,608	54%
PG	Procter & Gamble Co	957	698	223	123	1,080	921	1,655	54%
CSCO	Cisco Systems	933	691	225	152	1,085	916	1,624	54%
AXP	American Express Co	983	673	241	104	1,087	914	1,656	54%
CRM	Salesforce Inc	974	670	228	129	1,103	898	1,644	55%
HD	Home Depot Inc	980	719	176	126	1,106	895	1,699	55%
MCD	McDonald's Corp	1,053	677	181	90	1,143	858	1,730	57%
V	Visa Inc	1,146	634	158	63	1,209	792	1,780	60%
UNH	UnitedHealth Grp Inc	1,135	634	153	79	1,214	787	1,769	61%
AAPL	Apple Inc	1,161	576	158	106	1,267	734	1,737	63%
MSFT	Microsoft Corp	1,229	593	117	62	1,291	710	1,822	65%

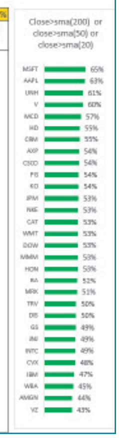


FIGURE 10: CONFUSION MATRIX, 200/50/20-DAY SMA. Here is an example machine learning analysis using a confusion matrix on a trading strategy that gives trading signals when price closes above the 200-, 50-, or 20-day SMA.

Entry Signal	Total Trades on DJ30 stocks	Prediction Accuracy
Rsi(14) cross over 40	2,194	43%
RSI(14) below 40	10,066	46%
Close above sma(200)	37,504	50%
Close above sma(200) or close above sma(50)	43,398	52%
Close above sma(200) or close above sma(50) or close above sma(20)	46,656	53%

FIGURE 11: COMPARISON OF THE FIVE EXAMPLE TRADING STRATEGIES. Here you can compare the number of total trades among the five trading strategies and also see the prediction accuracy reported.

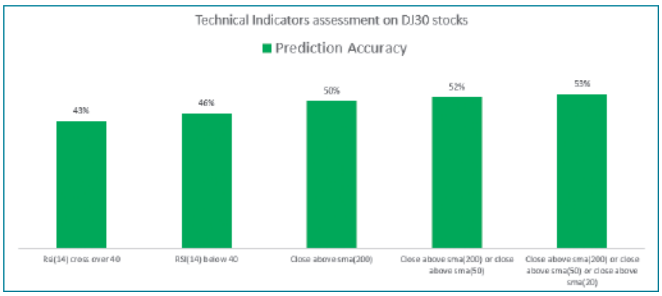


FIGURE 12: PREDICTION ACCURACY. For each of the five example trading strategies based on some traditional technical indicators, here you can see the metrics for the reported prediction accuracy.

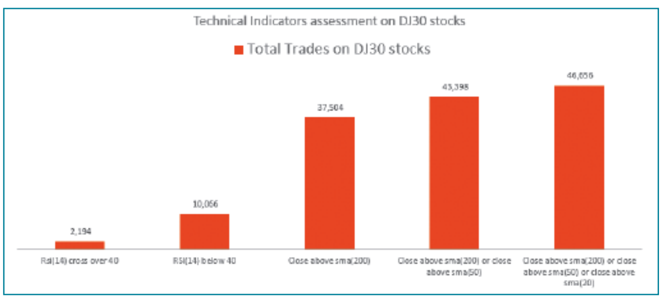


FIGURE 13: TOTAL TRADES. For each of the five example trading strategies based on some traditional technical indicators, here you can see a comparison of the number of total trades.

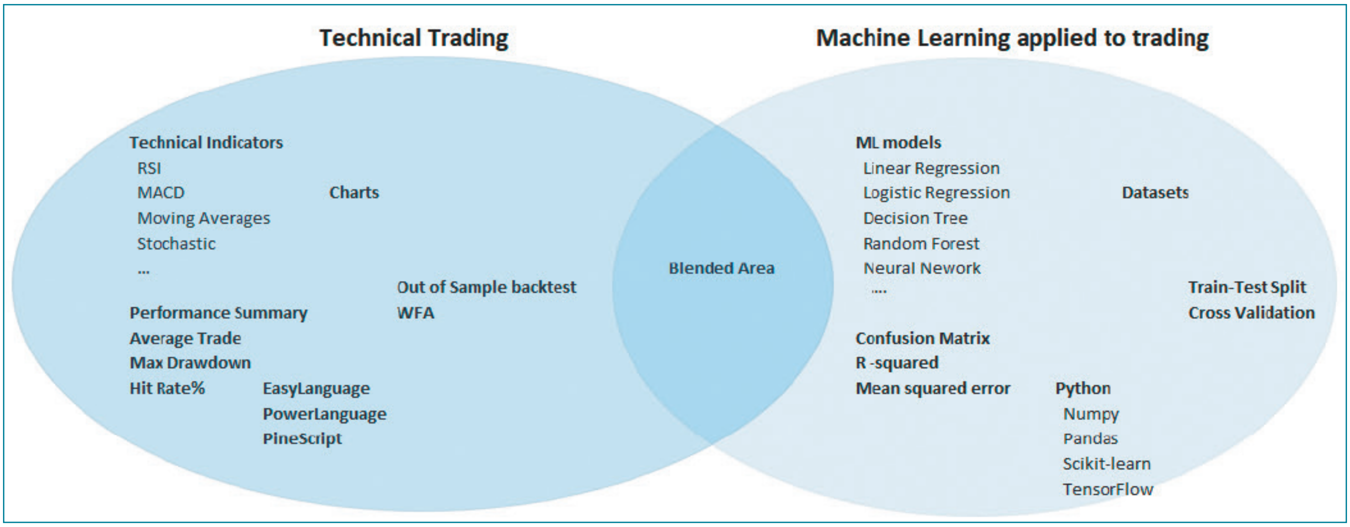


FIGURE 14: TRADITIONAL TECHNICAL ANALYSIS VS. MACHINE LEARNING ANALYSIS. What can the field of machine learning add to traditional analysis?

Some common misunderstandings between traders and data scientists

Traders	What you mean by ...?	Data Scientists
A Target is a price level indicating a successful trade.	Target	A Target is a column in a dataset representing the expected outcome or the variable to predict.
A Pattern is a price-chart configuration for trade entry or exit.	Pattern	A Pattern is combination of 2 things: features and target
A Confusion Matrix is a "state of mind" during drawdowns	Confusion Matrix	A confusion Matrix is a table to evaluate the performance of a classification algorithm
Performance means making money	Performance	Performance means achieving high accuracy in predictions.
Charts are Analysis tools influencing trading decisions.	Charts	Charts are Tools for visual communication rather than decision-making.
Prediction is often related to future market movements. Predictions are often viewed skeptically	Prediction	There various types of predictions, not solely future-related (e.g., image classification). Predictions are a core aspect of machine learning for pattern recognition.
Too many numbers and too few charts.	What they think of each other?	Too many charts and too few numbers.

FIGURE 15: TRADERS VS. DATA SCIENTISTS. How do they differ in their thought processes? And what can each contribute to good analysis? Traditional technical analysts and data scientists, who may take a machine learning approach, both have very useful skills, metrics, and techniques for evaluating systems. However, traditional technical analysts could benefit by harnessing aspects of machine learning, and learning to think more like a data scientist, to improve the way they evaluate technical trading models.

the approach to trends.

Let's go further and add an "OR" condition to the previous entry signal: the price above the SMA(50).

Traders and analysts use the 50-day SMA to assess short to medium-term trends in the market.

Its assessment should prioritize prediction accuracy, akin to the approach used in machine learning.

So now our strategy will be:

- Enter any time the daily close is above the 200-day SMA *OR* above the 50-day SMA
- Exit after 20 days.

Trades increase to 43,398 and prediction accuracy goes up to 52%. The reason is that price goes above the 50-day moving average before going up the 200-day moving average, so we are adding some early stage trend entry.

Similarly, when utilizing the 20-day moving average strategy to capture smaller market movements, there's a slight increase in both the number of trades and prediction accuracy, reaching 46,656 trades with an accuracy of 53%.

However, counting on such technical indicators alone, especially with an accuracy marginally better than a coin toss, isn't a reliable foundation for a trading system. Despite any encouraging signs in the performance summary, this scenario could signal a path toward potential drawdowns. We require more comprehensive research and improvements in our approach to ensure reliability.

CONCLUDING THOUGHTS

In conclusion, I'd suggest that the application of AI in trading is poised to become a battleground dominated by major players, and individual traders might be better off staying on the sidelines, unless they possess extensive expertise in handling big data. Furthermore, the current AI enthusiasm is expected to subside eventually, revealing the true essence of the trading world—a battlefield.

Algorithmic traders need not fear AI. Substantial investments in big data or extensive teams specializing in mathematics and statistics might not be necessary to navigate the market successfully. Technical analysis is expected to remain a valuable tool. However, it's crucial not to overlook the importance of familiarizing oneself with the terminology (Figure 14) and adopting the data scientist's approach (Figure 15). Understanding these aspects is essential for harnessing the insights provided by machine learning, especially in the validation of technical trading models.

Domenico D'Errico is a quant developer for professional investors. He is an EasyLanguage specialist and a two-time winner of the 2011 TradeS-

Continued on page 25

PROFIT IMAGE/SHUTTERSTOCK

A Primer On Using The Moving Average Convergence-Divergence

MACD 101

You see it on charts, but do you understand what goes into the calculation of it? Here's a guide to using and interpreting the MACD.

by Jeffrey Gibby

The MACD, or moving average convergence-divergence, was created by Gerald Appel in the 1970s. It has been a popular indicator over the decades, used in charts by many traders and technical analysts.

I have been surprised over the years by how many traders use this indicator but do not fully understand it. In this article, I'll provide a guide for using the MACD based on my years of experience.

First, I'll review how this important indicator and its components are calculated, and then I'll provide three easy ways use it.

Calculation of the MACD, the signal line, and the histogram

The MACD is calculated by subtracting the value of a 0.075 exponential moving average from a 0.15 exponential moving average. The numbers that Gerald Appel used do not line up with whole numbers but the closest that would line up with these numbers are the 26-period and 12-period exponential moving averages. For illustrative purposes, I will use the 12 and 26 exponential moving averages (EMAs) from this point out.

Figure 1 shows an example of the MACD on a chart in the top pane. In the bottom pane you see 26-period and 12-period EMAs on a stock chart. For this article, I will be using the MetaStock platform to produce the images and charts.

The calculation of MACD is actually very simple. You are subtracting a shorter-term moving average from a longer-term moving average. This calculation can also be referred to as a *price oscillator*. Since you are comparing two moving averages, the MACD can be a good determination of trend and momentum.

As an example, META (Facebook) had a very strong uptrend from January until July 2023 (see Figure 2). As a result, the 12-period EMA stayed above the 26-period EMA during this time. This gave us a positive MACD reading for this entire period. After META started to go sideways in late July 2023, we got lower MACD readings and crosses of the zero level. Similarly, if prices trend *down* for long periods of time, the result will be MACD readings below zero.

The MACD can also help you identify momentum moves. On February 2, 2023, META gapped over 30 points from the previous day's close. As a result, the 12 EMA quickly moved away from the 26-period EMA. This resulted in a spike in momentum, seen as a subsequent spike in MACD (see Figure 3).

The *signal line* is simply a 9-period EMA of the MACD (see Figure 4). If the MACD is trading above its signal line, MACD is bullish. Similarly, If MACD is below its signal line, it is considered bearish.

The *MACD histogram* is calculated by subtracting the MACD signal line from the MACD. The resulting values are usually plotted as a histogram (Figure 5), hence its name. When viewed as a histogram, you can easily see if the MACD is above or below its signal line. You can also easily see the distance between the MACD histogram and its signal line.

FIGURE 1: MACD, EMA, AND PRICE. An example of the MACD indicator is plotted in the top pane. A 26-period and 12-period exponential moving average (EMA) are plotted over price in the price pane.

FIGURE 2: UPTREND. META (Facebook) stock had a very strong uptrend from January–July 2023. As a result, the 12-period EMA stayed above the 26-period EMA, producing a positive MACD reading for the period. When META started to go sideways in late July 2023, that produced lower MACD readings and produced crosses of the zero level.

METASTOCK

FIGURE 3: MOMENTUM. The MACD can help identify momentum moves. On February 2, 2023, META gapped over 30 points from the previous day's close. As a result, the 12 EMA moved away from the 26-period EMA quickly, resulting in a spike in the MACD.

INTERPRETING MACD

There are countless ways to use MACD in your trading. I'll discuss using it to determine trend, identify overbought/oversold conditions, and look for divergence.

Since you are comparing two moving averages, the MACD can be a good determination of trend and momentum.

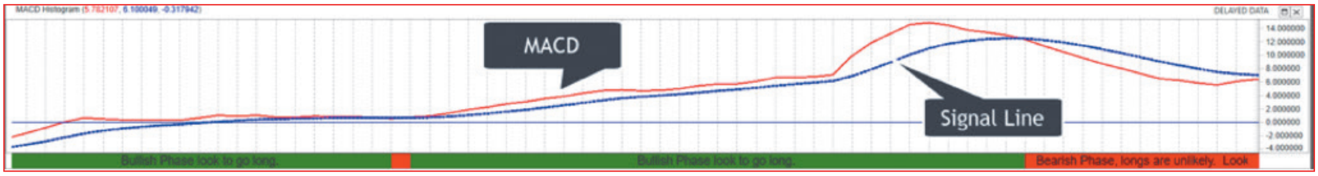


FIGURE 4: SIGNAL LINE. The signal line is a 9-period EMA of the MACD. If the MACD is trading above its signal line, MACD is bullish. Similarly, If MACD is below its signal line, it is considered bearish.

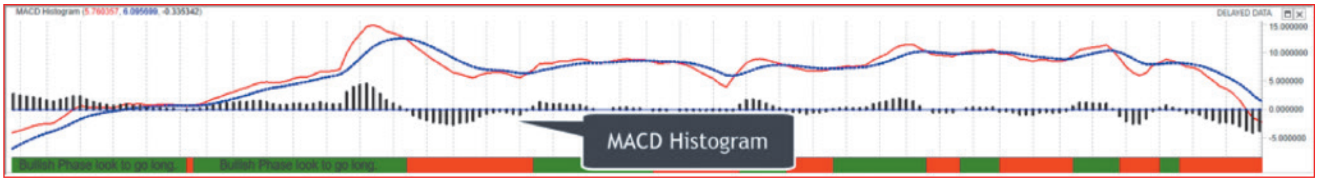


FIGURE 5: MACD HISTOGRAM. The MACD histogram is calculated by subtracting the MACD signal line from the MACD. The resulting values can be plotted as a histogram. Viewed this way, you can easily see if the MACD is above or below its signal line as well as the distance between the MACD and its signal line.

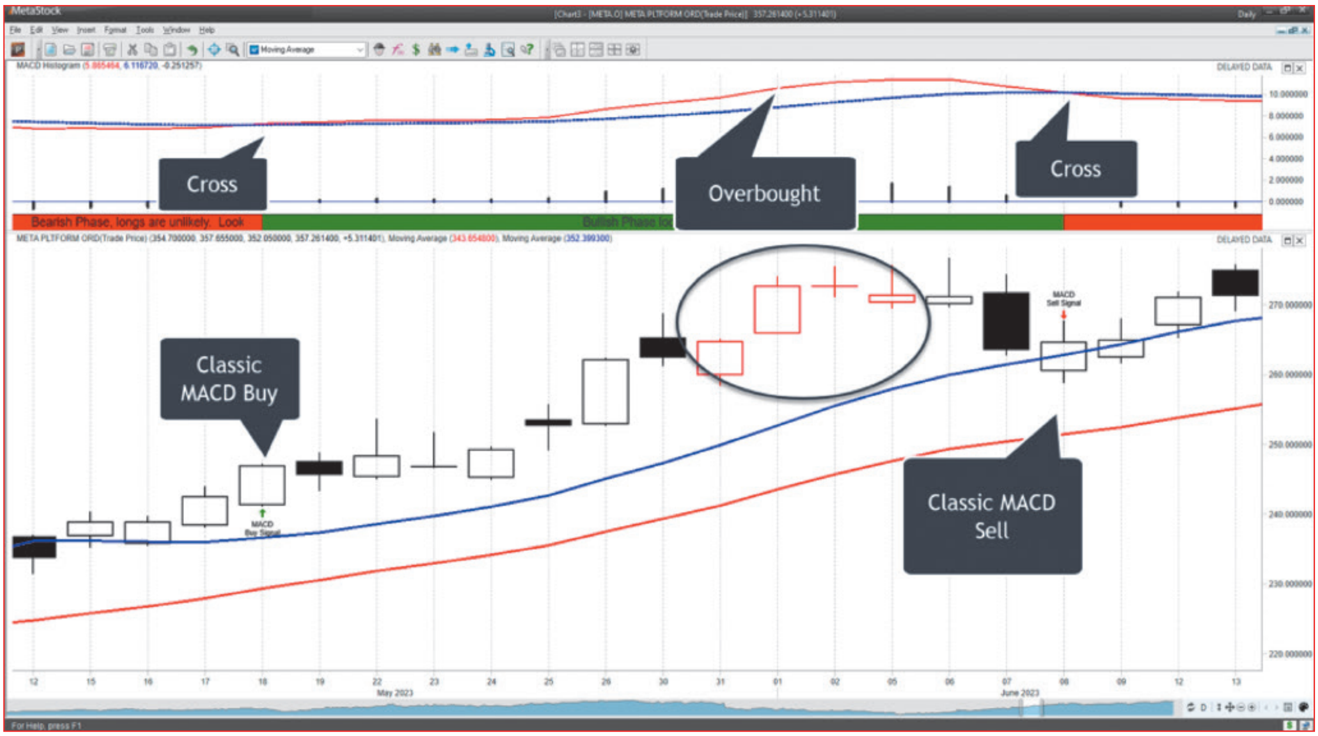


FIGURE 6: BUY/SELL SIGNALS. When the MACD moves from a bearish phase to a bullish phase by crossing above its signal line, a buy signal is seen in the MACD. When MACD moves from a bullish phase to a bearish phase by crossing below its signal line, a sell signal is seen.

Trend. The trend of the MACD is determined by MACD and its relationship to its signal line. If the MACD is above its signal line, then the MACD histogram will be above zero. This indicates that the MACD is in a bullish phase. Conversely, if the MACD is below its signal line, then the MACD histogram will be below zero. This would indicate that the MACD is in a bearish phase. When the MACD moves from a bearish phase to a bullish phase by crossing above its signal line, this is a classic MACD buy signal (thus, the name "signal line").

See Figure 6 for an example of an MACD buy signal and MACD sell signal on a chart.

It can provide some powerful indications, and there are many ways to use it.

Overbought/oversold. Overbought/oversold readings happen when price moves very quickly in a given direction (Figure 6). This causes a peak (or trough) in value and indicates a potential reversion to the mean. Stocks

FIGURE 7: DIVERGENCE. An example of a bearish divergence can be seen here, where price makes a new high while the MACD histogram fails to make a higher high. A bullish divergence would be the opposite case, where price sets a new low while MACD does not.

in trends can stay overbought or oversold for some time. As such, it is advisable to wait for a confirmation that the prices are reversing when using overbought/oversold indicators.

Divergence. In his book *The New Trading For A Living*, Alexander Elder, M.D., states, "Divergences are among the most powerful signals in technical analysis."

In the example of a bearish divergence shown in Figure 7, META (Facebook) rallies into a peak around the "A" area during mid-June 2023, causing the MACD histogram to climb to a peak as well. After that, META sells off into the "B" area in late July 2023, causing a trough in the MACD histogram. Following this, META rallies again into a high around "C." While this high is higher than the high found at "A," the MACD histogram fails to make a higher high. This is a bearish divergence.

A bullish divergence would be the opposite of this pattern. You would be looking for price to set a new low while MACD does *not* also set a new low.

While MACD divergence does not always accompany a market top or bottom, it is a powerful signal that a reversal may be coming.

A useful indicator

There's good reason that the MACD has been a favorite of traders and technical analysts since it was developed. It can provide some powerful indications, and there are many ways to use it. Here, I've shown how the MACD can be a useful tool in determining trend, identifying overbought or oversold conditions, and looking for divergence. These are three methods that traders use to gain strong insights into price.

Jeffrey Gibby works to enable people to trade and to learn to better utilize the features of the MetaStock platform (MetaStock.com), which offers tools for scanning, system backtesting, explorations, expert advisers, real-time alerts, and the testing of ideas. He is currently in charge of the sales and business development teams at MetaStock, managing new products and services and creating new business partnerships. Gibby has given talks and led training groups for traders around the world.

Further reading

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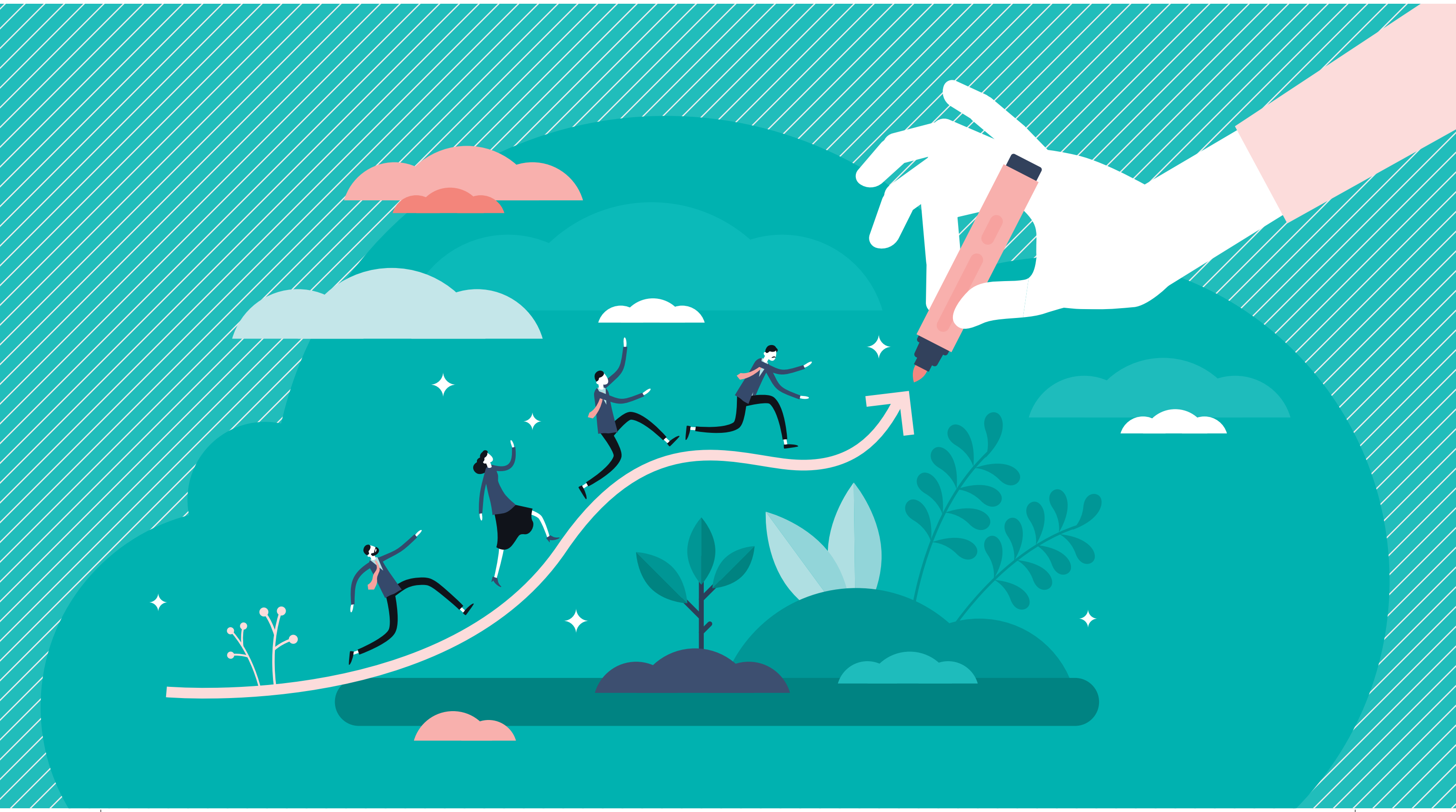


VECTORMINE/SHUTTERSTOCK

A Clear Trend

Pros And Cons Of Daily Versus Weekly Trend Following

Weekly data is smoother than daily data. So should we be using weekly data for trend-following signals? Here's a test to find out.

by Perry J. Kaufman

A lot of us are trend followers. We believe that long-term trends reflect the way the economy moves. Those moves are most often orchestrated by the Federal Reserve's interest rate policy, which tends to be repetitious: steady increases to fight inflation, steady decreases to stimulate the economy.

Let's combine that with the idea that a trend is easier to see on a weekly chart than on a daily one. By skipping the mid-week price moves, the chart looks smoother. We should already know that intraday data is best for mean reversion and fast breakouts rather than trying to find a trend. As we step further away from price moves, the trend becomes clearer.

If weekly data is smoother, shouldn't we be using it for our trend-following signals? To find out, we need to run some tests.

Testing the trend

To include enough market patterns, we will use data from 2000 to June 2023, or from inception if there is not that much data. We will test a small sample of stocks, but they should be different enough to draw conclusions. They are:

1. SPY (the S&P ETF)
2. QQQ (the NASDAQ ETF)
3. TSLA (Tesla)
4. AAPL (Apple)
5. NVDA (Nvidia)
6. BA (Boeing)
7. BAC (Bank of America)

We will only test a 100-day moving average of daily data, which is representative of a macrotrend period used by many funds. We will compare that with a 20-week moving average of the same data.

We enter a long position on the next open after the moving average trendline turns up and we exit on the next open after it turns down. The position size is $10,000 divided by the closing price on the day the trend changes. Positions are long only.

We will test a 100-day moving average of daily data, which is representative of a macrotrend period used by many funds.

The moving average calculation period

If anyone objects to using the 100 daily and 20 weekly trend periods, the charts presented in this article show the full test of calculation periods for both daily and weekly systems. The 100-day choice was not the best, it was simply picked as a long-term trend, knowing from experience that a range of 80 to 120 days avoids many false signals due to price noise.

The net profits of the daily and weekly strategies for SPY (the S&P ETF) are shown side-by-side in Figure 1. You can see that the choice of a 100-day average and 20-week average was not based on the best results. You may also notice from the left scale that the weekly results are generally better than the daily results.

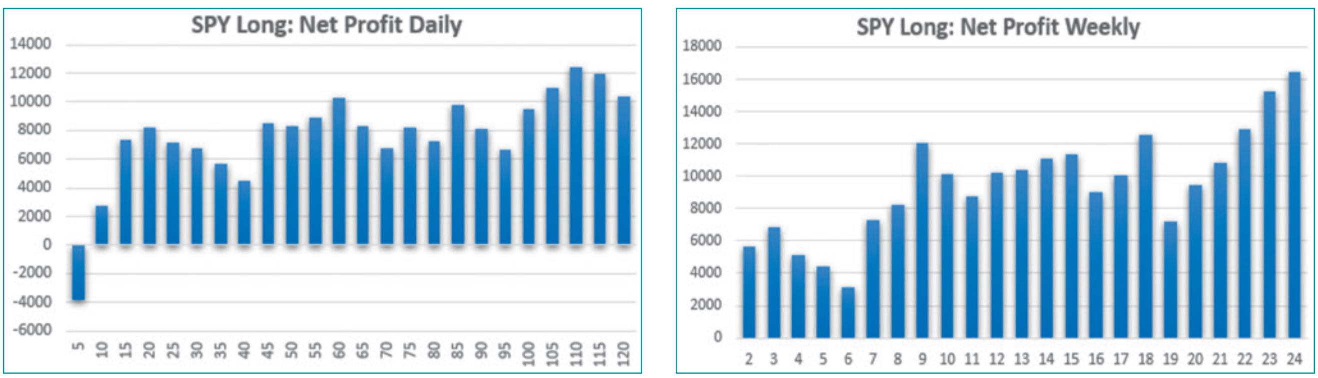
I find that the best way to judge results is to use the average of all tests rather than looking for the single best result. For SPY, the average daily net profit was $7,724 and the weekly $9,513. Had we not chosen a 100-day daily system, most other choices would also have shown that the weekly results outperformed the daily.

QQQ tests

NASDAQ net profits are much bigger than the S&P's. Figure 2 shows the test results. It may appear that the pattern of profits for the daily system are stronger at the right, but the average profit of all daily tests was $14,722 compared to the average weekly profit of $17,181.

NVDA tests

Skipping ahead to NVDIA, which is often in the news as a leader in the artificial intelligence revolution, Figure 3 shows that test results have similar patterns. However, the average daily test, $84,356, is better than the average weekly test of $80,364.



MICROSOFT EXCEL

FIGURE 1: MOVING AVERAGE TESTS WITH DAILY AND WEEKLY DATA, SPY. The net profits of the daily and weekly strategies for SPY (the S&P ETF) are shown side-by-side.

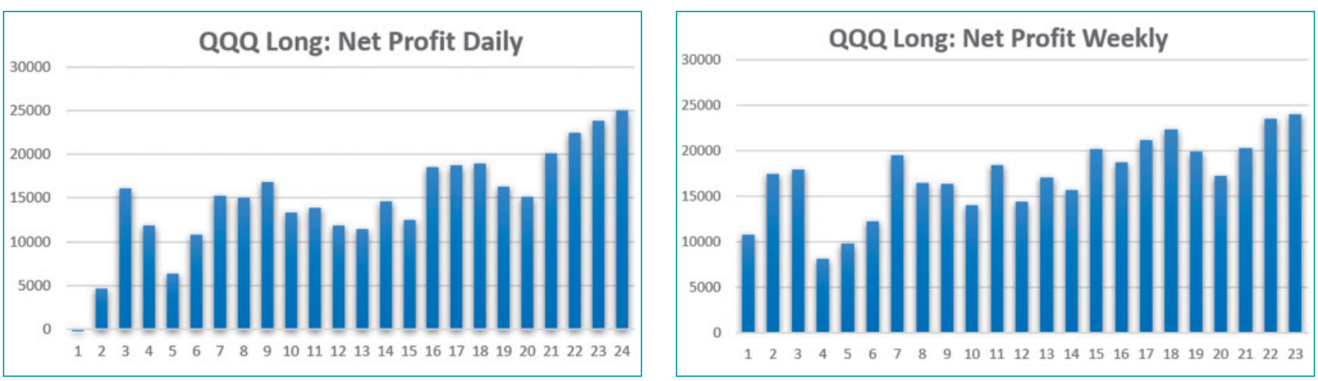


FIGURE 2: MOVING AVERAGE TESTS WITH DAILY AND WEEKLY DATA, QQQ. The net profits of the daily and weekly strategies for QQQ (the NASDAQ ETF) are shown side-by-side.

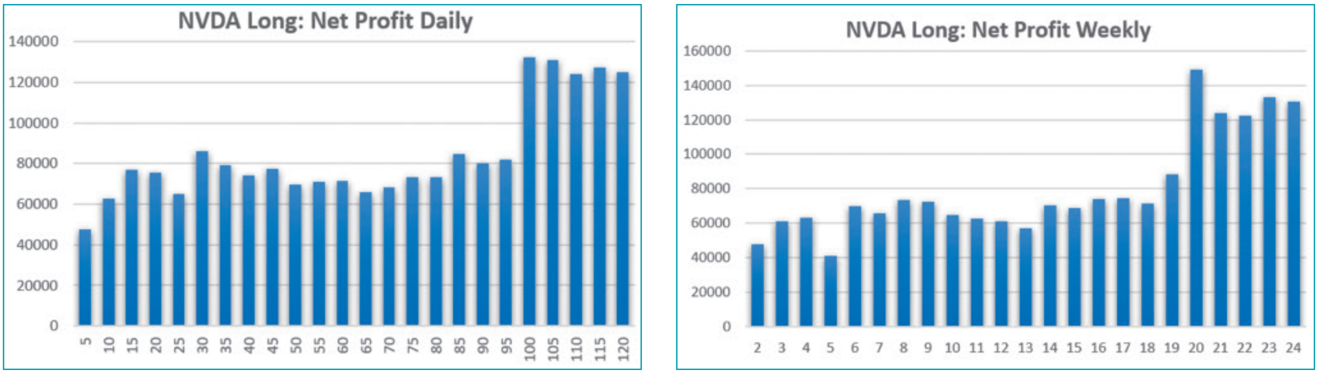


FIGURE 3: MOVING AVERAGE TESTS WITH DAILY AND WEEKLY DATA, NVDA. The net profits of the daily and weekly strategies for Nvidia stock (NVDA) are shown side-by-side.

Summary of tests with daily and weekly data

We can compare the results of the optimizations in the table in Figure 4. Because all positions were sized the same way, you can consider these results similar to a risk-adjusted portfolio. If we average both columns in Figure 4, the weekly test results are better than the daily results by 5%. While that is not a dramatic difference, it points to the consistency of the weekly results.

	DAILY	WEEKLY
	Average	Average
SPY	7,724	9,513
QQQ	14,722	17,181
AAPL	65,965	69,376
NVDA	84,357	80,365
TSLA	87,282	102,224
BA	27,837	22,485
BAC	8,614	9,931

FIGURE 4: SUMMARY OF DAILY AND WEEKLY TEST RESULTS. Averaging both columns in Figure 4, the weekly test results are better than the daily results by 5%. While not a dramatic difference, it points to the consistency of the weekly results.

Comparing the NAVs

If we plot the net asset values (NAVs) of our stocks, we get a better understanding of whether the results of using weekly data vary from daily data. Figure 5 shows the two SPY NAVs. While you can find differences, the charts are very similar. Had I removed the titles, you might not know which was the daily and which was the weekly.

Now let's look at TSLA, which has had extreme moves over its price history. The optimization table shows that it had the biggest difference between the daily and weekly averages. Figure 6 compares the daily and weekly NAVs, still using the 100-day and 20-weekly calculation periods. As strange as the charts appear, both are very similar. Except for the scale on the left, we would have difficulty telling them apart.

These two charts were to show that, visually, the performance of a simple trend-following system using daily and weekly data are much the same.

Figure 7 shows a summary of returns using the 100-day and 20-week moving averages. The information ratio at the right is the AROR divided by the annualized risk. The weekly ratios are better except for BAC.

Hidden risk

From these sample results it would be easy to conclude that using weekly data is better than daily. It also means trading only on Monday, less costs, less slippage, less time. Those are all good.

But caveat emptor! I may be overstating this, but any performance that is not daily has hidden risk. As an extreme example, Figure 8 shows the cash S&P (SPX) for 1987. Some published performance tables will show

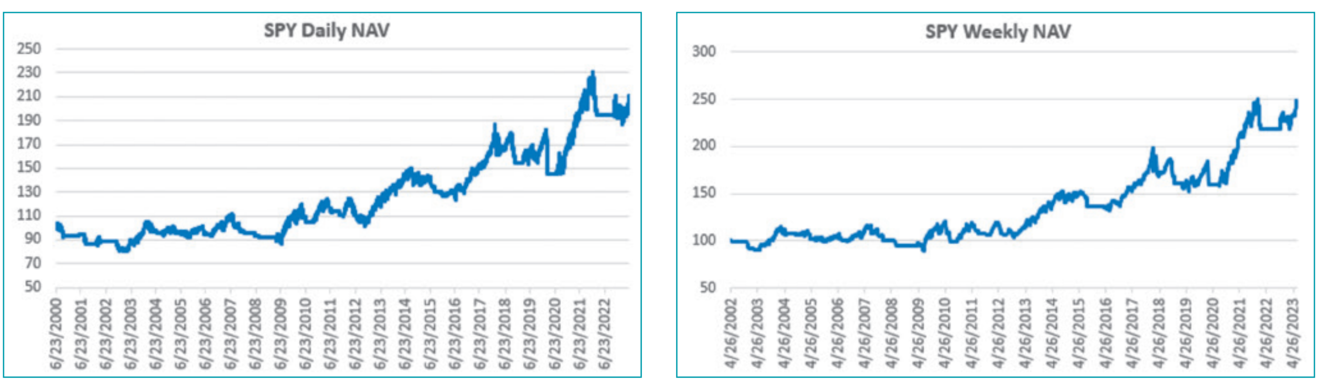


FIGURE 5: DAILY VS. WEEKLY, SPY. If you plot the net asset values (NAVs), you can get a better understanding of whether the results of using weekly data vary from using daily data. Here, the daily and weekly SPY NAVs using 100-day and 20-week moving averages are shown for comparison. The charts are very similar.

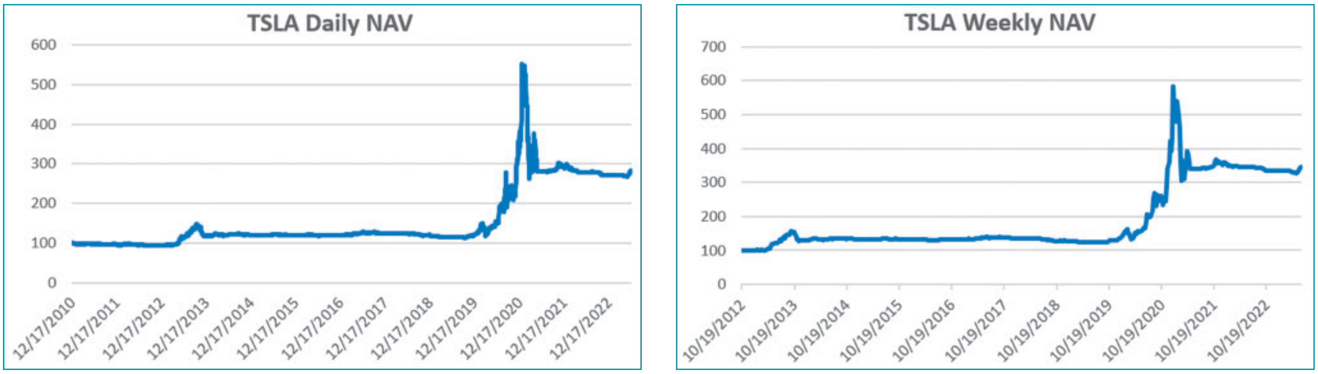


FIGURE 6: DAILY VS. WEEKLY, TSLA. TSLA has had extreme moves over its price history, much more so than a stock index. This compares the daily and weekly NAVs using the 100-day and 20-week moving averages.

	DAILY			WEEKLY			Information Ratio	
	NAV	AROR	Risk	NAV	AROR	Risk	Daily	Weekly
SPY	209.42	3.27	11.8	248.08	4.38	11.69	0.277	0.375
QQQ	365.67	5.81	18.92	717.71	9.74	17.92	0.307	0.544
AAPL	283.00	8.69	23.61	346.12	12.33	24.75	0.368	0.498
NVDA	22013	26.51	45.77	19119.39	28.13	43.97	0.579	0.640
TSLA	372.21	5.89	9.41	465.80	7.50	10.29	0.626	0.729
BA	984.05	10.48	27.13	1673.84	14.22	26.39	0.386	0.539
BAC	160.92	2.09	23.72	142.45	1.68	24.55	0.088	0.068

FIGURE 7: SUMMARY OF RETURN AND RISK FOR DAILY AND WEEKLY MOVING AVERAGE TESTS. Here you see a summary of returns using the 100-day and 20-week moving averages. The information ratio at the right is the AROR divided by the annualized risk. The weekly ratios are better except for BAC.

FIGURE 8: WEEKLY RETURNS OF THE CASH S&P (SPX) DURING 1987. By viewing a weekly chart of the market during 1987, a year that saw one of the worst declines in stock market history, you can clearly see the October drop. If you instead viewed returns by year, you would not see this drawdown of 36%.

returns only by year. Then 1987 will show a gain of 2.02%. The drop of 36% would not appear anywhere, although it was one of the worst declines in stock market history.

If we look at monthly returns, there is a similar problem. We see a decline of 21% in October although the drawdown mid-month was more than 30%.

If we trade weekly signals and a dramatic sell-off occurs on Monday, as it did in 1987, we cannot change our positions until the next Monday. That could result in a large loss. On the other hand, as we saw in 1987, it could allow a recovery. There is no way to know, but the risk is still there.

Accepting risk is part of investing

If you have decided to invest in the stock market, or trade your own system, you are already aware of the risks. There are good periods and bad periods. The more experience you have, the easier it is to be philosophical about the bad periods. I know. I used to get frustrated with lengthy drawdowns. Actually, I still do, but I accept them as part of netting a good return. A weekly system may be the answer.

Perry J. Kaufman is a trader and financial engineer. He is the author of many books on trading and market analysis, including the sixth edition (2020) of Trading Systems and Methods *(with the first edition published in 1978 as a seminal book in the field of technical analysis), as well as* Kaufman Constructs Trading Systems *(2020), and* Learn To Trade *(2022). For questions or comments, please go to www.kaufmansignals.com.*

Further reading

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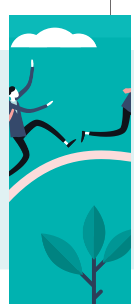
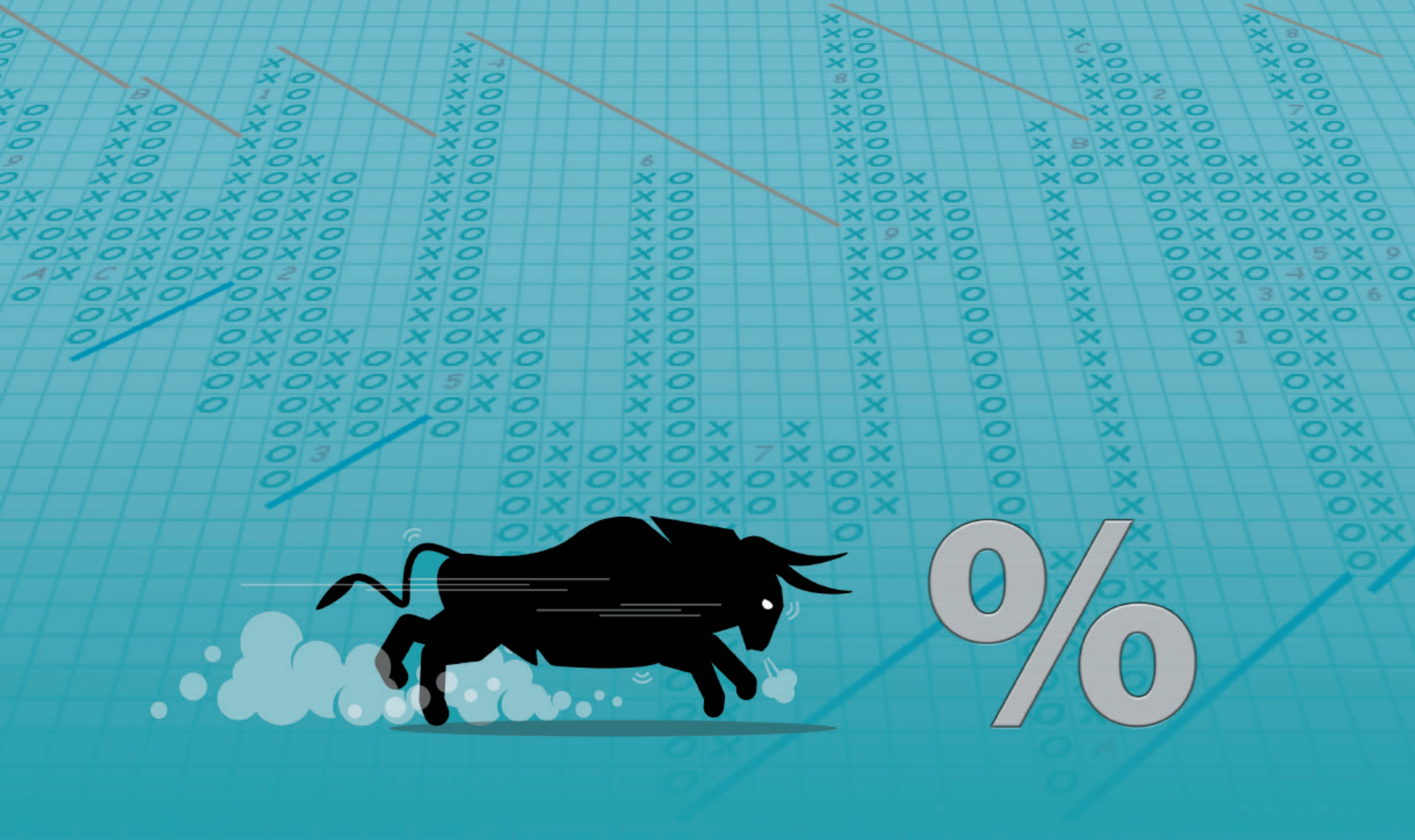
I find that the best way to judge results is to use the average of all tests rather than looking for the single best result.





LEREMY/SHUTTERSTOCK

A Scale Of Bullishness Or Bearishness

Understanding The Bullish Percent Index

How bullish or bearish is the market at any point? Is a current market trend likely to continue or reverse? Comparing the current number of buy signals to the current number of sell signals in a market of stocks provides an easy indication of the general bullishness or bearishness of that market, as well as whether that market is reaching an overbought or oversold saturation point. And using a percentage-based scale such as the one discussed here gives you an index with levels you can read and interpret. Here's how to use this indicator.

by Stella Osoba, CMT, Esq.

The bullish percent index is a simple way to get a snapshot of the overall health of the market. It is a breadth indicator that was first developed by Abe Cohan in the 1950s. It uses buy and sell signals in point-and-figure (P&F) charts to determine the general bullishness or bearishness of the components in a market index, and by extension, the market generally.

There is an advantage to using P&F charts to ascertain the buy and sell signals that are used as inputs to the bullish percent index. The advantage is that P&F charts are either on a buy or a sell signal. There is no ambiguity.

On P&F charts, if a column of Xs breaks above a previous column of Xs, that creates a buy signal. A column of Os breaking below a previous column of Os creates a sell signal.

How the bullish percent index is formulated

The bullish percent index (BPI) is created by calculating the total number of sell or buy signals formed by the components in the stock index being studied. Here, we are using buy and sell signals given by P&F charts.

Many analysis programs and platforms will calculate the bullish percent index for you. Here, I am using StockCharts.com. StockCharts will calculate the BPI for the major indexes, all 11 sectors and even some industry groups. These are updated at the end of the trading day. In the case of StockCharts, once you have selected P&F charts as the chart style, you enter the index/sector/group you wish to analyze by entering $BP followed by the ticker in the search box. So if, for example, you want the BPI for the S&P 500, you would enter $BPSPX.

How to interpret it

Interpreting the BPI is fairly straightforward. The BPI can fluctuate between 0 and 100. When the BPI is above 50 it is generally considered bullish; anything below 50 is considered bearish. In addition, anything above 70 is considered overbought and below 30 it is considered oversold.

How it is used

We'll use the S&P 500 index to study using the BPI.

Figure 1 shows a weekly chart of the SPX. From its bullish rise in 2021, SPX formed a high in January 2022 (pointed out by the green arrow) and spent the rest of the year in a downtrend. It began to recover in 2023 but failed to surpass the highs of 2021 (see the second green arrow). At that point it is trading down. We want to know if this market weakness will continue. Can the BPI help us understand the level of weakness in the market?

The BPI is based on the percentage of stocks in the stock index that have bullish charts, in this case, bullish point & figure charts. Indications given by the BPI rely on where the columns of Xs and Os are on the chart. A rising column of Xs that has successfully created a buy signal results in a *bull confirmed signal*, while a falling column of Os that creates a sell signal results in a *bear confirmed signal*.

When the BPI is above 70 and a new column of Os is formed bringing the BPI below BPI 70, then a *bear alert* is signaled. If, however, the BPI is below 30 and a column of Xs forms bringing the BPI above 30, then a *bull alert* is signaled.

A buy or sell signal is not negated until the opposite signal forms. Therefore, if a buy signal is still in effect but a column of Os has formed, then a bullish correction signal is formed. If a sell signal is still in effect but a column of Xs has formed, then a bearish correction signal is formed.

Figure 2 shows the BPI of the SPX in a P&F chart. A sell signal (the column of descending Os) formed in September 2023. When a column of Xs formed, the sell signal was not negated. The last column of Os on the chart at the far right has created another sell signal. The status of the BPI at that point continues to be *bear signal confirmed*. The interpretation is that fewer than 30%

FIGURE 1: S&P 500 INDEX. In this weekly chart of the SPX, you see a bullish rise in 2021 with a high forming in January 2022 (see down arrow), and then it spent the rest of the year in a downtrend. It began to recover in 2023 but failed to surpass the highs of 2021 (see the second down arrow) and traded down. Will this market weakness continue? The BPI demonstrated in Figure 2 can provide an indication.

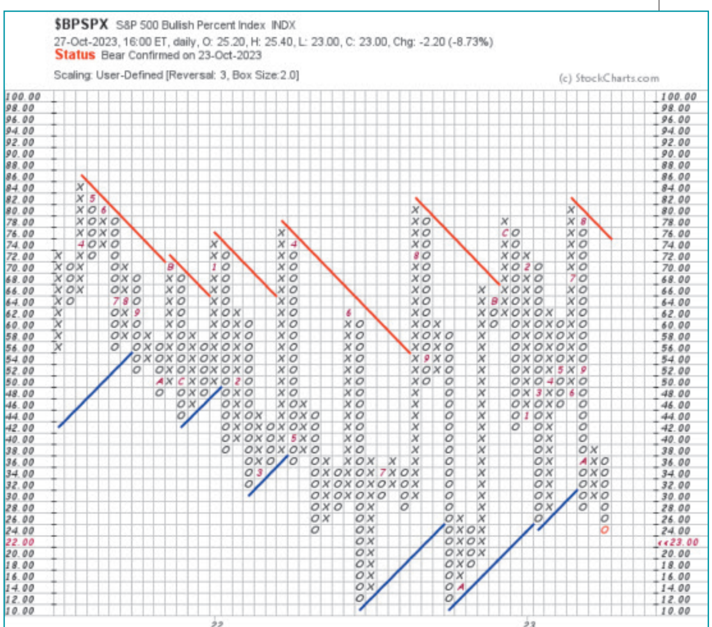


FIGURE 2: POINT & FIGURE CHART. The bullish percent index (BPI) is a breadth indicator that indicates the general bullishness or bearishness of the market based on the buy and sell signals seen on a point-and-figure (P&F) chart. When the BPI is above 70 and a new column of Os is formed sending the BPI below BPI 70, then a bear alert is signaled. When the BPI is below 30 and a column of Xs forms sending the BPI above 30, then a bull alert is signaled.

of the components in the index have formed buy P&F signals, pointing to continuing market weakness.

Confirming indicator: VIX

Figure 3 shows the market volatility index (VIX), which is an inverse indicator of volatility. When the VIX rises it means there is increasing bearishness and when it falls it points to increasing bullishness. Very low numbers in the single digits can point to complacency. In this case, we can see that the VIX is rising and is at 22, showing increasing market bearishness. This serves to confirm the BPI's signals.

The indicator's signal stays in effect until it is replaced by another one.

In this case, one of two things could happen next. The first is that a rising column of Xs could trigger a *bull alert*. This could signal that price has reached a bottom, since at 24, it is in oversold territory. The alert, if it comes, would simply be a signal to pay attention to price. Remember that the BPI is not a price chart. The bearish signal is not reversed until a new P&F buy signal is made, which would be a breakout of the new X column to one row above the previous X column.

The second thing that could happen is the BPI could stay in the O column and continue to decline for some period of time. Remember that for an X column to be formed on a three-box reversal P&F chart, with default values of 2 points per box, the rise would need to exceed 6 points. In this example, with the BPI at 24, it would have to move to 30 for a new column of Xs to form, thereby switching the signal to *bull confirmed*.

In summary

The bullish percentage index is one of the more straightforward indicators to use and is a useful addition to your toolkit. The BPI indicates the general bullishness or bearishness of a stock market and also indicates whether it has reached an oversold level—which would suggest a market bottom may be forming—or has reached an overbought reading, which would suggest a market top may be forming.

The BPI is calculated from the total number of buy and sell signals in a market. Buy and sell signals from point & figure charts have traditionally been used as inputs for the BPI. (Other types of quantifiable buy and sell signals might also be used.)

FIGURE 3: VOLATILITY INDEX (VIX). Other indicators such as the VIX, shown here, can be used to confirm indications from the BPI. Here, the VIX is rising and at this point is at 22, indicating increasing market bearishness, serving to confirm the signals from the BPI.

The BPI fluctuates on a scale of 0 to 100. When the BPI is above 50 it is considered bullish, and when it is below 50, it is considered bearish. Further, a reading above 70 is considered overbought and a reading below 30 is considered oversold. When the BPI is above 70 and a new column of Os is formed bringing the BPI below BPI 70, then a *bear alert* is signaled. If, however, the BPI is below 30 and a column of Xs forms bringing the BPI above 30, then a *bull alert* is signaled.

The bullish percent index (BPI) is a simple way to get a snapshot of the overall health of the market.

Stella Osoba, CMT, Esq., is an attorney, trader, and financial writer in New York, NY. Her work in financial litigation involving regulatory bodies and large multi-national corporations led to an interest in the financial markets, then technical analysis, and the psychological aspects of market behavior. She earned a CMT charter in 2013 and was a director-at-large on the board of the CMT Association for four years. She frequently writes on the topic of recognizing and applying technical chart patterns for better decision-making in trading. She can be reached at stellaosoba@gmail.com.

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Masonson, Leslie N. [2022]. "A Conversation With Tom Dorsey," interview, *Technical Analysis of* STOCKS & COMMODITIES, Volume 40: February.

When the BPI is above 50 it is generally considered bullish; anything below 50 is considered bearish.

D'ERRICO/MACHINE LEARNING

Continued from page 13

tation developers. Domenico lauched TradingAlgo.it, an Algorithmic Trading School project with the aim to equip participants with the knowledge, skills, and practical experience necessary to understand, develop, and implement algorithmic trading strategies in financial markets with the help of machine learning techniques. He can be reached at domderrico@gmail.com or through TradingAlgo.it.

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D'Errico, Domenico [2024]. "Artificial Intelligence Applied To Technical Trading," *Technical Analysis of* STOCKS & COMMODITIES, Volume 42: January.

‡TradeStation

‡*See Editorial Resource Index*

INTERVIEWS

Continued from page 43

person how well he is doing. Some don't know where their strength is; they try to be all things, or trade everything. Those people who constantly talk about their success lack confidence."—*J. Peter Steidlmayer, June 1988*

"People are people, and they'll always be that way. That's why I figure they follow some kind of pattern. That's the best thing I learned from my father. There'd be six or seven guys trading commodities. They'd all be standing around grinning at the screen, and the market was going up. My dad called it the 'grin indicator,' and he'd call up one of the other brokers and say, 'Get me out now.' He wouldn't tell the other guys. He'd just walk back and watch the prices tumble. The market doesn't move like that because people are right, it moves because people are wrong and everybody is doing the exact same thing.

"Actually, the contrary opinion situation only exists in two places: when everybody's long, looking for the moon, or everybody's short, thinking the floor's going to fall out. In between you go with the trend and wait until the consensus hits an extreme."

… "I talk to people all the time and all I hear from the people that lose is 'They got me.' The turning point is when you say, 'Hey, it's me and not them.'"

… "I think you have to have a system that gives you probabilities. And you have to have faith in your system. I believe in my system and I can make predictions as to where the market is going to go. There are probabilities that change. I can change along the way. When a crash comes along, it's very simple, I can tell you we're not going to 3600 anymore. I'm allowed to change my opinion. You have to look at the probabilities when they change. We might still go to 3600, but the market would tell me. I watch the probabilities."—*Peter Hackstedde, July 1988*

"I've never been an outright advocate of blindly performing optimization. It's very tricky business that most traders and even many software developers don't fully understand. Too often software is designed with so many trading rules or indicators that the models get curve-fitted to the historical data. In other cases, traders ignore basic statistical principles and use a testing window that is too short to generate enough trades for a valid model. The end result is that optimization as a concept is blamed, when in fact it's the way that the procedure is performed or faulty conceptual design in the software that contributes to the problem."—*Lou Mendelsohn, August 1988*

KHUNKORNSTUDIO/SHUTTERSTOCK

Trends In Artificial Intelligence

Testing ChatGPT's Potential For Systematic Trading

Traders want to know: How can the new AI technologies be harnessed for their trading? Can they be used to help you create effective trading strategies? Here's a look.

by Andrea Unger

ChatGPT and similar AI products are undoubtedly the most talked-about tools of the moment, and they offer valuable and capable support in many ways. Artificial intelligence seems to have been dominating the scene of late, offering itself as a solid ally for solving all kinds of problems.

In this article, we'll examine whether ChatGPT can also be used to create effective trading systems.

We must preface this by saying that ChatGPT is a versatile tool that can provide us with information on all areas of human knowledge. We can ask it how to bake a strawberry cake, how to create a drawing in axonometry, what workout it suggests to improve our physical state, and much more.

It is certainly not a tool specifically designed to create trading systems, but given its almost limitless ability to provide us with information and solutions, we shouldn't be surprised if it could develop trading systems, following our starting indications.

Artificial intelligence applied to trading

The first question we can ask ourselves is how "comfortable" ChatGPT is with creating trading systems or how much this topic might make it hesitate. The easiest thing we can do is ask!

If we type in "artificial intelligence applied to trading," we get this information:

> Applying artificial intelligence (AI) to trading is a strategy that has gained popularity in recent years. Here are the pros and cons of using AI in trading, followed by a strategic long-term solution:

Pros:

1. Data processing: AI can quickly analyze vast amounts of data, making it well-suited for trading, where timely information is crucial.
2. Pattern recognition: AI algorithms can identify patterns and trends in market data that are difficult for humans to spot.
3. Risk management: AI can implement risk management strategies, including stop-loss orders, to protect investments.
4. Emotionless trading: AI has no emotions, eliminating the risk of impulsive or emotional decisions.
5. Continuous monitoring: AI can monitor the markets 24/7, ensuring no trading opportunities are missed.
6. Adaptability: AI can adapt to changing market conditions and adjust trading strategies accordingly.

Cons:

1. Complexity: AI trading systems can be complex and costly to develop and maintain.
2. Overfitting: AI models can be prone to overfitting, where they perform well on historical data but poorly on new data.
3. Blackbox: Some AI models operate as "black boxes," making it difficult to understand their decision-making processes.
4. Market uncertainty: AI models can struggle in highly unpredictable or unprecedented market conditions.
5. Technical failures: Technical issues or inaccurate data can disrupt AI trading systems.
6. Regulatory risks: AI trading may be scrutinized by regulators, and regulations are evolving.

This list of advantages and disadvantages sounds quite familiar to those involved in systematic trading. It is all those aspects that a trader takes into account to take advantage of the operation delegated to a machine, on the one hand, and to keep an eye on all the possible risks that may arise from it on the other.

Although generic, the response we received from ChatGPT bodes well for the creation of real trading systems or, at least, it can be considered a very knowledgeable tool on the subject.

Creating a simple system

So, let's break the buck and ask it directly to write a trading system coded in EasyLanguage by giving it these simple instructions:

Given its almost limitless ability to provide us with information and solutions, we shouldn't be surprised if it could develop trading systems, following our starting indications.

"Give me a trend-following trading system for gasoline futures, coded in EasyLanguage, with a stop-loss of $500 and a 120-minute time frame"

to which ChatGPT responded as follows:

Certainly! Here's an example of a trend-following trading system on gasoline futures in EasyLanguage with a 120-minute time frame and a stop-loss of $500:

```
Inputs:
    FastLength(20),
    SlowLength(50),
    StopLoss(500);

Variables:
    PositionSize(0),
    EntryPrice(0),
    TradeType(0),
    ExitPrice(0);

// Calculate the moving averages
FastMA = Average(Close, FastLength);
SlowMA = Average(Close, SlowLength);

// Determine the trend direction
UpTrend = FastMA > SlowMA;

// Enter long position when the trend is up
If UpTrend and TradeType <> 1 Then
    Begin
        TradeType = 1; // Buy
        EntryPrice = Close;
        PositionSize = IntPortion(AccountSize * 0.01 / StopLoss);
        Buy(PositionSize) next bar at market;
    End;

ExitPrice = EntryPrice - StopLoss;

// Exit the position when the stop loss is hit
If TradeType == 1 Then
    Begin
        Sell(PositionSize) next bar at ExitPrice stop;
        SetStopLoss(StopLoss);
    End;
```

This system uses two moving averages (FastMA and SlowMA) to determine the trend direction. If the fast-moving average (FastMA) is above the slow-moving average (SlowMA), we consider it an uptrend and enter a long position.

We set the stop-loss for the long position at a fixed value of $500. We calculate the position size based on a fixed dollar amount for the stop-loss using the IntPortion function. In this example, we assume that the account size is available as a variable called AccountSize.

We set the exit price for the long position based on the entry price and the stop-loss value.

Note that we use a 120-minute time frame in this system. You can adjust the input parameters as necessary for your desired trading strategy and time frame.

At first glance, we might be satisfied: ChatGPT seems to have understood our request and has provided us with code that appears to be complete with inputs, variables, and entry and exit orders. It has also given us a brief description of the code logic that includes position sizing, that is, a variable number of contracts.

Assessing the goodness of ChatGPT's trading system

We are eager to test this system and see what results it can deliver, but lo and behold, something goes wrong: The software used to compile the code warns us of errors!

At this point, we don't know what to do. Should we ask ChatGPT questions so it can help us? Or should we try to find out what kind of error the code contains? Or should we change our original query until we find code that our software accepts? Not knowing which direction to take, our initial enthusiasm is replaced by a feeling of hopelessness.

Let's assume that we want to stick with creating the source system and that we can correct the syntax errors in the code provided by ChatGPT. This requires programming knowledge, as ChatGPT was unable to fix these errors on its own.

All resolved, then? Unfortunately, no!

Apart from the syntax errors in the code, there are other far more severe "logical" errors, such as, for example, the exit price level being blatantly miscalculated, with the $500 stop-loss being confused with the difference between entry and exit price. This error could only be avoided if the human trader knows the basic logic of trading systems, the programming language, and the key features of financial instruments such as futures.

Conclusions derived from our tests

Despite these limitations and the fact that we had to correct the code in several places, ChatGPT has provided a system design that could become a real trading system.

So, could ChatGPT be a handy tool for writing trading systems for those familiar with programming languages and the main financial instruments?

Unfortunately, no: We find there are aspects that ChatGPT completely ignores and that even a trader with some experience can miss.

Back to our original question: We had asked ChatGPT to formulate a trading system for gasoline futures with a stop-loss of $500 and a 120-minute timeframe. To trade gasoline, a stop-loss of $500 is totally insufficient for the chosen timeframe and we would need to use a value that is at least three times higher.

Using stop-loss values that are too low will lead to errors when backtesting a strategy and show completely distorted results. If we don't know these aspects, we risk paying dearly for them when we take our strategy live with real money!

This kind of check can be done by any software, and from a system with artificial intelligence, we would have expected at least a warning regarding the value of the stop-loss, which was inappropriate for the chosen market. We can say that in this case, ChatGPT proved to be very artificial and not very intelligent.

More generally, there is much more to know before venturing into the markets: You need to know the characteristics of financial instruments, the guidelines for trading systems, how to recognize possible errors in backtests, and much more.

The case presented in this article serves to warn us about "smart" systems that can charm us by answering our every request. ChatGPT can be seen as a tool to create a trading system from scratch, but only if those who use it have the expertise to recognize the errors that ChatGPT can produce. Developing a trading system can be extremely easy if you have acquired the necessary knowledge. Still, it can be equally dangerous if you rely solely on automated systems to do so. A chatbot doesn't have any actual expertise in this area, as they weren't expressly designed to develop trading systems.

Andrea Unger is a full-time professional trader, president of The Unger Academy, and author of The Unger Method. He is a four-time World Trading Champion (2008, 2009, 2010, and 2012), an honorary member of SIAT (Italian Society of Technical Analysis, a branch of IFTA), and speaks throughout Europe, America, Australia, and Asia. He may be reached at Andrea@UngerAcademy.com. The Unger Academy provides services to traders, including individuals, to help them improve their approach to trading (more information can be found at https://autc.pro/tasc12).

2024 Readers' Choice Awards

We are pleased to present the *Technical Analysis of* STOCKS & COMMODITIES magazine 2024 Readers' Choice Awards (RCA). Each year, we put before our readers a ballot of products and services related to technical analysis and trading. The following pages present the products and services you and your peers chose this year as your favorites.

The Readers' Choice Awards begins each year with a list of products gathered by the editors of STOCKS & COMMODITIES, with space for write-in votes (given that our list doesn't claim to be complete). Then, to find out what our readers find to be the most useful for their trading, we ask them to choose their favorite products or the ones they find most useful from various categories by going to our website, **Traders.com**, and filling out the survey there. After that, we compile the results, just in time for the Bonus Issue you hold in your hands.

Products are categorized by their primary purpose. Just because a service or product is not listed does not necessarily mean that the product does not have features germane to the category. In addition, some categories are divided by cost so that the comparisons can be made on a more level playing field.

The winners in the Readers' Choice Awards are almost always the dominant players in their niche, and rightfully so. You may have special needs for your trading, however, so you should keep in mind those products that are not the big names in the category of your interest before you make your final decision. The RCA is designed to be an aid for you when you are deciding on which of the numerous products and services currently available to use for your trading and investing. With that in mind, we think you'll find the Readers' Choice a terrific guide to products and services that you'll be interested in.

READERS' CHOICE INDEX

Real-time/delayed data	29
End-of-day data	30
Stock brokerages	30
Futures brokerages	30
Forex brokerages	30
Institutional trading platforms	31
Professional trading platforms	31
Online analytical platforms	31
Mobile trading app	32
Standalone analytical software, $$$	32
Standalone analytical software, $$	33
Standalone analytical software, $	33
Software plug-ins	33
A.I. software (expert, neural)	34
Portfolio management software	34
Options analysis software	34
Futures trading systems	35
Options trading systems	35
Stock trading systems	35
Trading centers / schools / training	36
Technical analysis websites	36
Favorite S&C article	37

CATEGORY	AWARD	PRODUCT	COMPANY	WEBSITE
REAL-TIME / DELAYED DATA (CONTINUOUS FEED)	**Winner**	**TradeStation**	**TradeStation**	**www.TradeStation.com**
This category included data services that provide a continuous stream of information, whether the transmission is instantaneous or delayed for 15 to 30 minutes.	First Runner Up	**TC2000**	Worden Brothers, Inc.	**www.TC2000.com**
	Finalist	**MetaStock XENITH**	MetaStock	**www.metastock.com**
	Semi-Finalist	**eSignal**	eSignal, an Interactive Data company	**www.esignal.com**
	Honorable Mention	**DTN.IQ**	DTN	**www.interquote.com**
	Honorable Mention	**Bloomberg Professional Service**	Bloomberg	**www.bloomberg.com**
	Honorable Mention	**Kinetick**	NinjaTrader Group, LLC	**www.ninjatrader.com**
	Honorable Mention	**CQG Integrated Client**	CQG, Inc.	**www.cqg.com**

2024 Readers' Choice Awards

CATEGORY	AWARD	PRODUCT	COMPANY	WEBSITE
END-OF-DAY DATA (DOWNLOAD ON DEMAND)	Winner	Yahoo! Finance	Yahoo! Finance	finance.yahoo.com
	First Runner Up	**Norgate Data**	Norgate Data	**norgatedata.com**
	First Runner Up	**TC2000**	Worden Brothers, Inc.	**www.TC2000.com**
In this category, we included data services for which the user initiates the download of data to the user's computer, even if the data is 15–30 minutes old.	Finalist	**DataLink**	MetaStock	**www.metastock.com**
	Semi-Finalist	**My Barchart**	Barchart	**www.barchart.com**
	Honorable Mention	**eSignal**	eSignal, an Interactive Data company	**www.esignal.com**
STOCK BROKERAGES	Winner	Interactive Brokers	Interactive Brokers	www.interactivebrokers.com
	First Runner Up	**TradeStation**	TradeStation	**www.TradeStation.com**
Some stock brokerages have been around for a long time and have names entrenched in Wall Street; others are products of the modern era or even of various mergers that have taken place over the years. This category includes both full-service and discount stock brokerages.	Finalist	**thinkorswim**	thinkorswim, Inc.	**www.thinkorswim.com**
	Semi-Finalist	**Charles Schwab**	Charles Schwab	**www.schwab.com**
	Honorable Mention	**TD AMERITRADE**	TD AMERITRADE, Inc.	**www.tdameritrade.com**
FUTURES BROKERAGES	Winner	Interactive Brokers	Interactive Brokers	www.interactivebrokers.com
	First Runner Up	**TradeStation**	TradeStation	**www.TradeStation.com**
The choice of futures broker can sometimes make the difference between a good and bad fill. Here are some of the futures brokerages you told us you are using and like.	Finalist	**TD AMERITRADE**	TD AMERITRADE, Inc.	**www.tdameritrade.com**
	Semi-Finalist	**NinjaTrader Brokerage**	NinjaTrader Group, LLC	**www.ninjatrader.com**
	Honorable Mention	**AMP Global Clearing**	AMP Global Clearing LLC	**www.ampclearing.com**
FOREX BROKERAGES	Winner	Interactive Brokers	Interactive Brokers	www.interactivebrokers.com
	First Runner Up	**TradeStation**	TradeStation	**www.TradeStation.com**
When selecting a forex brokerage, it is important to	Finalist	**FOREX.com**	FOREX.com	**www.FOREX.com**

CATEGORY	AWARD	PRODUCT	COMPANY	WEBSITE
know what their spreads are, the research tools they offer, the types of accounts available, leverage options, and that they are backed by a reliable institution.	Semi-Finalist	**TD AMERITRADE**	TD AMERITRADE, Inc.	**www.tdameritrade.com**
	Semi-Finalist	**OANDA**	OANDA	**www.oanda.com**
	Honorable Mention	**NinjaTrader Brokerage**	NinjaTrader Group, LLC	**www.ninjatrader.com**
	Honorable Mention	**FXCM**	Forex Capital Markets LLC	**www.fxcm.com**
INSTITUTIONAL PLATFORMS	**Winner**	**Interactive Brokers**	**Interactive Brokers**	**www.interactivebrokers.com**
InteractiveBrokers The trading platform offers real-time access to domestic and foreign markets, multiple news sources, and fundamental data resources. Sophisticated analytics are often available for more esoteric instruments.	First Runner Up	**TradeStation**	TradeStation	**www.TradeStation.com**
	Finalist	**Bloomberg Professional Service**	Bloomberg	**www.bloomberg.com**
	Semi-Finalist	**MetaStock Pro**	MetaStock	**www.metastock.com**
	Honorable Mention	**NinjaTrader**	NinjaTrader Group, LLC	**www.ninjatrader.com**
PROFESSIONAL PLATFORMS	**Winner**	**TradeStation**	**TradeStation**	**www.TradeStation.com**
TradeStation Not as all-encompassing as the institutional platform but still top level for the professional trader, these may include many of the same features: hardware, software for charting and analysis, and real-time data. News access and options analysis are often available.	First Runner Up	**Interactive Brokers**	Interactive Brokers	**www.interactivebrokers.com**
	First Runner Up	**thinkorswim**	thinkorswim, Inc.	**www.thinkorswim.com**
	Finalist	**Tradingview.com**	Tradingview	**tradingview.com**
	Semi-Finalist	**AmiBroker Standard**	AmiBroker.com	**www.amibroker.com**
	Semi-Finalist	**NinjaTrader**	NinjaTrader Group, LLC	**www.ninjatrader.com**
	Semi-Finalist	**MultiCharts**	MultiCharts, LLC	**www.multicharts.com**
	Honorable Mention	**TC2000**	Worden Brothers, Inc.	**www.TC2000.com**
	Honorable Mention	**MetaTrader 5**	MetaQuotes Software Corp.	**www.metatrader5.com**
ONLINE ANALYTICAL PLATFORMS	**Winner**	**Tradingview.com**	**Tradingview**	**tradingview.com**

2024 Readers' Choice Awards

CATEGORY	AWARD	PRODUCT	COMPANY	WEBSITE
TradingView This category includes products that retrieve and present data from remote servers (as well as the Internet) and offer many of the analytical tools found in standalone software. Data is supplied as part of the service.	First Runner Up	**TradeStation**	TradeStation	**www.TradeStation.com**
	First Runner Up	**thinkorswim**	thinkorswim, Inc.	**www.thinkorswim.com**
	Finalist	**Interactive Brokers**	Interactive Brokers	**www.interactivebrokers.com**
	Semi-Finalist	**StockCharts.com**	StockCharts.com, Inc.	**www.stockcharts.com**
	Honorable Mention	**AmiBroker Standard**	AmiBroker.com	**www.amibroker.com**
	Honorable Mention	**NinjaTrader**	NinjaTrader Group, LLC	**www.ninjatrader.com**
MOBILE TRADING APP	**Winner**	**Interactive Brokers**	**Interactive Brokers**	**www.interactivebrokers.com**
InteractiveBrokers Trade and chart on-the-go with these mobile apps.	First Runner Up	**thinkorswim**	thinkorswim, Inc.	**www.thinkorswim.com**
	Finalist	**Tradingview.com**	Tradingview	**tradingview.com**
	Semi-Finalist	**TradeStation**	TradeStation	**www.TradeStation.com**
	Honorable Mention	**Schwab Mobile**	Charles Schwab	**www.schwab.com**
STANDALONE ANALYTICAL SOFTWARE, $$$	**Winner**	**MetaStock Pro**	**MetaStock**	**www.metastock.com**
MetaStock These packages provide the tools for charting markets and indicators, performing technical and sometimes fundamental analysis, and some include advanced system development capabilities. Some packages may focus on a particular area of technical analysis, such as cycles.	First Runner Up	**MultiCharts**	MultiCharts, LLC	**www.multicharts.com**
	First Runner Up	**NinjaTrader**	NinjaTrader Group, LLC	**www.ninjatrader.com**
	Finalist	**AbleTrend**	AbleSys Corporation	**www.ablesys.com**
	Finalist	**NeuroShell Trader Professional**	Ward Systems Group, Inc.	**www.neuroshell.com**
	Finalist	**eSignal, Advanced GET Edition**	eSignal, an Interactive Data company	**www.esignal.com**
	Finalist	**VectorVest 7 RealTime/ IntraDay**	VectorVest, Inc.	**www.vectorvest.com**
	Semi-Finalist	**VisualTrader**	Nirvana Systems, Inc.	**omnitrader.com**
	Semi-Finalist	**TradeNavigator Platinum**	Genesis Financial Technologies	**www.tradenavigator.com**

CATEGORY	AWARD	PRODUCT	COMPANY	WEBSITE
	Honorable Mention	**Fibonacci Trader 4 Real Time**	Fibonacci Trader Corporation	**www.fibonaccitrader.com**
	Honorable Mention	**TradeGuider**	TradeGuider	**www.tradeguider.com**
STANDALONE ANALYTICAL SOFTWARE, $$	**Winner**	**MetaStock**	**MetaStock**	**www.metastock.com**
MetaStock	First Runner Up	**NinjaTrader**	NinjaTrader Group, LLC	**www.ninjatrader.com**
These products will provide charting and technical analysis. Some will include system development, ready-to-go trading systems, or may focus on a particular style of technical analysis.	First Runner Up	**AmiBroker Standard**	AmiBroker.com	**www.amibroker.com**
	Finalist	**OmniTrader**	Nirvana Systems, Inc.	**omnitrader.com**
	Finalist	**VectorVest 7 EOD**	VectorVest, Inc.	**www.vectorvest.com**
	Semi-Finalist	**Wealth-Lab**	Wealth Lab	**www.wealth-lab.com**
	Honorable Mention	**Sierra Chart**	Sierra Chart	**www.sierrachart.com**
	Honorable Mention	**TradeNavigator Gold**	Genesis Financial Technologies	**www.tradenavigator.com**
STANDALONE ANALYTICAL SOFTWARE, $	**Winner**	**Tradingview.com**	**Tradingview**	**tradingview.com**
TradingView	First Runner Up	**TC2000**	Worden Brothers, Inc.	**www.TC2000.com**
Here, technically based software may be part of a data subscription service aimed at the introductory level participant, or offer a special product at a good price. Some of these products have rich feature sets that technical analysts can utilize.	First Runner Up	**NinjaTrader**	NinjaTrader Group, LLC	**www.ninjatrader.com**
	First Runner Up	**AmiBroker Standard**	AmiBroker.com	**www.amibroker.com**
	Finalist	**OmniTrader**	Nirvana Systems, Inc.	**omnitrader.com**
	Semi-Finalist	**eSignal**	eSignal, an Interactive Data company	**www.esignal.com**
	Honorable Mention	**Chaikin Power Gauge Reports**	Chaikin Stock Research, LLC	**www.chaikinpowertools.com**
SOFTWARE PLUG-INS	**Winner**	**VectorVest ProTrader 7**	**VectorVest, Inc.**	**www.vectorvest.com**
	First Runner Up	**Bollinger Band System for MetaStock**	MetaStock	**www.metastock.com**

2024 Readers' Choice Awards

CATEGORY	AWARD	PRODUCT	COMPANY	WEBSITE
VectorVest® If you need a specific function that your software doesn't already include, a third-party developer may fit the bill with a software plug-in. Listed here is just a sampling of third-party software that complements some of the major technical analysis packages.	Finalist	**John Murphy's Chart Pattern Recognition**	MetaStock	**www.metastock.com**
	Semi-Finalist	**Bollinger Band Toolkit for MetaStock**	MetaStock	**www.metastock.com**
	Semi-Finalist	**MESA for NeuroShell Trader**	MESA Software	**www.mesasoftware.com**
	Honorable Mention	**Dr. Elder Trading Room for MetaStock**	MetaStock	**www.metastock.com**
	Honorable Mention	**Top Dog Trading**	Top Dog Trading	**www.topdogtrading.com**
ARTIFICIAL INTELLIGENCE SOFTWARE (EXPERT, NEURAL) NeuroShell Trader® Trading Software for Stocks, Commodities, Futures and Forex! An expert system designed by the vendor provides the trader with signals. A neural network trains itself on the data and creates its own rules. These packages are best suited for traders with an analytical bent.	**Winner**	**NeuroShell Trader Professional**	**Ward Systems Group, Inc.**	**www.neuroshell.com**
	First Runner Up	**OmniTrader**	Nirvana Systems, Inc.	**omnitrader.com**
	Finalist	**AIQ TradingExpert Pro**	AIQ Systems	**www.aiqsystems.com**
	Semi-Finalist	**Adaptrade Builder**	Adaptrade Software	**www.Adaptrade.com**
	Semi-Finalist	**VantagePoint Trading Software**	VantagePoint AI	**vantagepointsoftware.com**
	Honorable Mention	**NeuralWorks Predict**	NeuralWare	**www.neuralware.com**
	Honorable Mention	**Gene Hunter**	Ward Systems Group, Inc.	**www.neuroshell.com**
PORTFOLIO MANAGEMENT VectorVest® Portfolio management software automates the analysis of returns, cash flow, tax impacts, and profit & loss.	**Winner**	**VectorVest 7 RealTime/ IntraDay**	**VectorVest, Inc.**	**www.vectorvest.com**
	First Runner Up	**GainsKeeper**	Wolters Kluwer Financial Services	**www.gainskeeper.com**
	Finalist	**Market System Analyzer**	Adaptrade Software	**www.Adaptrade.com**
	Semi-Finalist	**TradeLog**	TradeLog Software	**www.tradelogsoftware.com**
	Honorable Mention	**THE TRADER'S ASSISTANT**	TradersCoach.com	**www.TradersCoach.com**
OPTIONS ANALYSIS SOFTWARE	**Winner**	**thinkorswim**	**thinkorswim, Inc.**	**www.thinkorswim.com**
	First Runner Up	**Interactive Brokers**	Interactive Brokers	**www.interactivebrokers.com**

CATEGORY	AWARD	PRODUCT	COMPANY	WEBSITE
Software packages have been developed to handle option analysis. Many packages offer both analytics as well as an education in option trading.	Finalist	**tastyworks**	tastyworks	**tastyworks.com**
	Semi-Finalist	**OptionStation**	TradeStation	**www.TradeStation.com**
	Honorable Mention	**TC2000**	Worden Brothers, Inc.	**www.TC2000.com**
FUTURES TRADING SYSTEMS	**Winner**	**TradeStation**	**TradeStation**	**www.TradeStation.com**
Software in this category is aimed at providing you with a more systematic approach to the futures markets. Some packages are a trading system, while others include analytical capabilities.	First Runner Up	**thinkorswim**	thinkorswim, Inc.	**www.thinkorswim.com**
	Finalist	**AbleTrend**	AbleSys Corporation	**www.ablesys.com**
	Semi-Finalist	**OmniTrader**	Nirvana Systems, Inc.	**omnitrader.com**
	Honorable Mention	**eSignal, Advanced GET Edition**	eSignal, an Interactive Data company	**www.esignal.com**
	Honorable Mention	**MESA9**	MESA Software	**www.mesasoftware.com**
OPTIONS TRADING SYSTEMS	**Winner**	**thinkorswim**	**thinkorswim, Inc.**	**www.thinkorswim.com**
While many traders may track the underlying security to generate signals for the options, there are packages that generate signals based on the options activity itself.	First Runner Up	**TradeStation**	TradeStation	**www.TradeStation.com**
	Finalist	**tastyworks**	tastyworks	**tastyworks.com**
	Finalist	**eSignal, Advanced GET Edition**	eSignal, an Interactive Data company	**www.esignal.com**
	Finalist	**AbleTrend**	AbleSys Corporation	**www.ablesys.com**
	Semi-Finalist	**OPTIONETICS**	OPTIONETICS, Inc.	**www.optionetics.com**
	Semi-Finalist	**OptionsPro**	VectorVest, Inc.	**www.vectorvest.com**
	Honorable Mention	**Consistent Options Income**	Consistent Options Income	**ConsistentOptionsIncome.com**
STOCK TRADING SYSTEMS	**Winner**	**TradeStation**	**TradeStation**	**www.TradeStation.com**
	First Runner Up	**thinkorswim**	thinkorswim, Inc.	**www.thinkorswim.com**

2024 Readers' Choice Awards

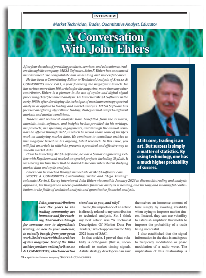
CATEGORY	AWARD	PRODUCT	COMPANY	WEBSITE
TradeStation A disciplined technical approach is also applicable to your stock portfolio. Make sure the package employs a method that you are comfortable with. In addition, check the data format requirements to ensure that your own database is compatible.	Finalist	**OmniTrader**	Nirvana Systems, Inc.	**omnitrader.com**
	Finalist	**VectorVest 7 RealTime/ IntraDay**	VectorVest, Inc.	**www.vectorvest.com**
	Finalist	**AbleTrend**	AbleSys Corporation	**www.ablesys.com**
	Semi-Finalist	**GorillaTrades**	GorillaTrades, Inc.	**www.GorillaTrades.com**
	Semi-Finalist	**eSignal, Advanced GET Edition**	eSignal, an Interactive Data company	**www.esignal.com**
	Honorable Mention	**Chaikin Power Tools**	Chaikin Stock Research, LLC	**www.chaikinpowertools.com**
TRADING CENTERS, SCHOOLS, TRAINING KJ TRADING SYSTEMS When you're just starting out in trading or taking your trading to the next level, some professional training helps, whether it's the support provided by a daytrading center, courses, or tutoring.	**Winner**	**Strategy Factory Workshop**	**KJ Trading Systems**	**kjtradingsystems.com**
	First Runner Up	**TradeStation Training**	TradeStation	**www.TradeStation.com**
	Finalist	**thinkorswim**	thinkorswim, Inc.	**www.thinkorswim.com**
	Semi-Finalist	**FREE Worden Training**	Worden Brothers, Inc.	**www.TC2000.com**
	Semi-Finalist	**The Chicago Board Options Exchange**	The Chicago Board Options Exchange	**www.cboe.com**
	Honorable Mention	**VectorVest Educational Services**	VectorVest, Inc.	**www.vectorvest.com**
	Honorable Mention	**TopDogTrading.com**	Top Dog Trading	**www.topdogtrading.com**
	Honorable Mention	**CMT Program**	Market Technicians Association	**cmtassociation.org**
	Honorable Mention	**LearnMetastock.com**	Breakaway Training Solutions, Inc.	**www.learnmetastock.com**
TECHNICAL ANALYSIS WEBSITES TradingView Some websites provide a wealth of technical information, indicators, charts, sentiment, and opinion.	**Winner**	**tradingview.com**	**Tradingview**	**tradingview.com**
	First Runner Up	**barchart.com**	Barchart	**www.barchart.com**
	Finalist	**stockcharts.com**	StockCharts.com, Inc.	**www.stockcharts.com**
	Finalist	**finviz.com**	finviz.com	**finviz.com**
	Semi-Finalist	**BollingerBands.com**	Bollinger Capital Management, Inc.	**www.BollingerBands.com**

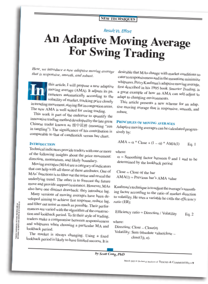
2024 Readers' Choice Awards

CATEGORY	AWARD	PRODUCT	COMPANY	WEBSITE
	Honorable Mention	**thinkorswim**	thinkorswim, Inc.	**www.thinkorswim.com**

CATEGORY	AWARD	ARTICLE TITLE	AUTHOR	ISSUE
FAVORITE S&C ARTICLE FROM 2023	**Winner**	**Matching The Markets To Your Trading Style**	**Perry J. Kaufman**	**January 2023**
	First Runner Up	**Algo Q&A**	Kevin J. Davey	**January 2023**
	Finalist	**Interview: A Conversation With John Ehlers**	Kevin J. Davey	**April 2023**
	Semi-Finalist	**Futures For You**	Carley Garner	**January 2023**
	Honorable Mention	**An Adaptive Moving Average For Swing Trading**	Scott Cong, PhD	**March 2023**

We asked readers to vote for their favorite Stocks & Commodities article from the past year. Find them all at our website at Traders.com!





Subscribers can revisit past articles online in the archives at our website, www.traders.com. If you are not a subscriber, you can purchase individual articles from the Stocks & Commodities online store at **store.traders.com**.

SUBSCRIPTION GIVEAWAY RECIPIENTS

Congratulations to the following 10 subscribers of *Technical Analysis of* Stocks & Commodities magazine who voted in this year's Readers' Choice Awards poll and won our drawing for a complimentary subscription. Thanks to everyone who took the time to vote!

1. Daniel Colombi
2. Ray Burkholder
3. Gary Cox
4. Tim Felmington
5. David Evans
6. Matthias Behrens
7. David Jaeger
8. David Ballard
9. Terry Mossbarger
10. Stefano Pozzoli

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2023 S&C ARTICLES

If you weren't subscribing to Technical Analysis of STOCKS & COMMODITIES, The Traders' Magazine, *throughout 2023, you missed out on a lot of information. Here is some of what you missed:*

TIPS This article is the basis for Traders' Tips this month.

JANUARY 2023

- **Q&A** Explore Your Options
  by Jay Kaeppel
- Boost Your Strategy Development Part 2: The SMAC Optimizer
  by René Koch, PhD
- Matching The Markets To Your Trading Style
  by Perry J. Kaufman
- **TIPS** True Range Adjusted Exponential Moving Average (TRAdj EMA)
  by Vitali Apirine
- **INTERVIEW** A Conversation With Peter Eliades
  by Leslie N. Masonson
- The Savvy Technician
  by Stella Osoba, CMT, Esq.
- The Metaverse's Rosy Future Lies Ahead, Or Does It?
  by Leslie N. Masonson
- **Q&A** Algo Q&A
  by Kevin J. Davey
- Swing Trading 52-Week Low Pivots
  by Ken Calhoun
- **Q&A** Futures For You
  by Carley Garner
- Market Rap
  by Emilio Tomasini
- Trading Perspectives
  by Rob Friesen
- **TRADERS' RESOURCE** Trading Systems

FEBRUARY 2023

- Day Trading the 10am Reversal
  by Ken Calhoun
- Trade High-Yield Bond Funds Using EMAs—From Simple To Complex
  by Ken Huck & Nelson Huck
- **Q&A** Algo Q&A
  by Kevin J. Davey
- The Outside Bar: A Rare And Powerful Filter
  by Andrea Unger
- Market Rap
  by Emilio Tomasini
- Do Small Price Changes Matter Or Are They Just Noise?
  by Perry J. Kaufman
- **Q&A** Futures For You
  by Carley Garner
- Improving Trading Systems By Counting Events
  by David Bergstrom
- Cryptocurrencies And Seasonality: Crypto Winter (Part 2)
  by Azeez Mustapha
- The Savvy Technician
  by Stella Osoba, CMT, Esq.
- **Q&A** Explore Your Options
  by Jay Kaeppel
- Trading Perspectives
  by Rob Friesen
- **TRADERS' RESOURCE** Online Trading Services

MARCH 2023

- The Savvy Technician
  by Stella Osoba, CMT, Esq.
- An Adaptive Moving Average For Swing Trading
  by Scott Cong, PhD
- **TIPS** Every Little Bit Helps
  by John F. Ehlers
- Can Volume Predict Price?
  by Perry J. Kaufman
- Trading Contracts For Differences
  by Gregory Aharonian
- **INTERVIEW** A Conversation With Charles Kirk
  by Leslie N. Masonson
- Market Rap
  by Emilio Tomasini
- **Q&A** Futures For You
  by Carley Garner
- Swing Trading 90-Day 25-SMA Pivots
  by Ken Calhoun
- **Q&A** Explore Your Options
  by Jay Kaeppel
- Cannabis's Promising Future Lies Ahead, or Does It?
  by Leslie N. Masonson
- **Q&A** Algo Q&A
  by Kevin J. Davey
- Trading Perspectives
  by Rob Friesen
- **TRADERS' RESOURCE** Exchanges

BONUS ISSUE 2023

- Choosing A Trading Method
  by Jeffrey Gibby
- For Success In Trading, Keep Tomorrow In Your Sights
  by Emilio Tomasini
- Do ESG Funds Rate A Place In Your Portfolio?
  by Matt Blackman

2023 S&C Articles

- Using Price Channels
  by Stella Osoba, CMT
- Is Candlestick Analysis Effective?
  by Stephen W. Bigalow
- A Retrospective: Interviews
  by Technical Analysis, Inc.
- 2023 Readers' Choice Awards
- 2022 Traders.com Advantage Articles
- 2022 S&C Articles
- **TRADERS' RESOURCE** Software For Traders

APRIL 2023

- **Q&A** Explore Your Options
  by Jay Kaeppel
- **TIPS** Just Ignore Them
  by John F. Ehlers
- Repatriation
  by Perry J. Kaufman
- Mining Patent Documents For Trading Ideas
  by Gregory Aharonian
- Trading GLD In The Age Of Zero Commission, Part 1
  by Massoud Metghalchi, PhD, and Linda A. Hayes, PhD
- **INTERVIEW** A Conversation With John Ehlers
  by Kevin J. Davey
- Market Rap
  by Emilio Tomasini
- **Q&A** Futures For You
  by Carley Garner
- The "Day Drop" Pattern
  by Andrea Unger
- Average True Range Breakouts
  by Ken Calhoun
- **Q&A** Algo Q&A
  by Kevin J. Davey
- **TRADERS' RESOURCE** Forex Brokerages

MAY 2023

- **Q&A** Algo Q&A
  by Kevin J. Davey
- Risk, Volatility, & Position Sizing
  by Alfred François Tagher
- The Inside Bar: The Calm Before The Storm
  by Andrea Unger
- Market Rap
  by Emilio Tomasini
- Trading SLV In The Age Of Zero Commission, Part 2
  by Massoud Metghalchi, PhD, and Peggy A. Cloninger, PhD
- Swingtrading News Breakouts
  by Ken Calhoun
- The Savvy Technician
  by Stella Osoba, CMT, Esq.
- **INTERVIEW** A Conversation With Gail Dudack
  by Leslie N. Masonson
- **Q&A** Futures For You
  by Carley Garner
- **Q&A** Explore Your Options
  by Jay Kaeppel
- Travel And Entertainment ETFs: About To Take Off, Or Crash?
  by Leslie N. Masonson
- Trading Perspectives
  by Rob Friesen
- **TRADERS' RESOURCE** Advisory Services

JUNE 2023

- **Q&A** Explore Your Options
  by Jay Kaeppel
- Pinpointing Turning Points With The ChanLun Method
  by Scott Cong, PhD
- Market Rap
  by Emilio Tomasini
- **TIPS** The Stochastic Distance Oscillator
  by Vitali Apirine
- Protecting Your Wealth While Making A Profit
  by Perry J. Kaufman
- The Daily Factor: A Volatility Filter
  by Andrea Unger
- The Kicker Signal
  by Stephen W. Bigalow
- Swingtrading Downtrend Reversals
  by Ken Calhoun
- What I Learned When I Looked At Minute-By-Minute Stock Option Data, Part 1
  by Gregory Aharonian
- **Q&A** Futures For You
  by Carley Garner
- The Savvy Technician
  by Stella Osoba, CMT, Esq.
- **Q&A** Algo Q&A
  by Kevin J. Davey
- Trading Perspectives
  by Rob Friesen
- **TRADERS' RESOURCE** Data Services

JULY 2023

- **Q&A** Explore Your Options
  by Jay Kaeppel
- **Q&A** Algo Q&A
  by Kevin J. Davey
- **TIPS** Stay On Track WithThe Supertrend Indicator
  by Barbara Star, PhD

2023 S&C Articles

- Wide-Range Gap Continuations
  by Ken Calhoun
- Looking At Minute-By-Minute Stock Option Data, Part 2: Short Margins
  by Greg Aharonian
- **Q&A** Futures For You
  by Carley Garner
- Hedging In Swing Trading
  by Azeez Mustapha
- **INTERVIEW** A Conversation With Brian Shannon
  by Leslie N. Masonson
- The Savvy Technician
  by Stella Osoba, CMT, Esq.
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  by Leslie N. Masonson
- Market Rap
  by Emilio Tomasini
- Trading Perspectives
  by Rob Friesen
- **TRADERS' RESOURCE** Publications For Traders

AUGUST 2023

- **Q&A** Algo Q&A
  by Kevin J. Davey
- Portfolio Risk Dilemma: Let It Run Or Rebalance?
  by Perry J. Kaufman
- **Q&A** Futures For You
  by Carley Garner
- The Weekly Factor Pattern
  by Andrea Unger
- The Beneish M-Score
  by Greg Aharonian
- Market Rap
  by Emilio Tomasini
- An Introduction To Options Part 1: Form And Function
  by John Devcic
- The Market Structure Shift Strategy
  by Azeez Mustapha
- Breakouts Using Green:Red Candle Ratio
  by Ken Calhoun
- **Q&A** Explore Your Options
  by Jay Kaeppel
- The Savvy Technician
  by Stella Osoba, CMT, Esq.
- Trading Perspectives
  by Rob Friesen
- ChatGPT: Are We There Yet?
  by Perry J. Kaufman
- The Predictability Of Patterns
  by Greg Aharonian
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REVIEW

- 0DTE Options Trading Workshop Part 1
  by John A. Sarkett

SEPTEMBER 2023

- **Q&A** Futures For You
  by Carley Garner
- VAcc: A Momentum Indicator Based On Velocity And Acceleration
  by Scott Cong, PhD
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  by Ken Calhoun
- Extend Your Analysis Capabilities With R
  by Guy Brys and Luc Van Hof
- Switching Into Futures In Down Markets To Enhance Performance
  by Massoud Metghalchi, PhD, and Xavier Garza-Gomez, PhD
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  by John Devcic
- **INTERVIEW** A Conversation With Meb Faber
  by Leslie N. Masonson
- **Q&A** Algo Q&A
  by Kevin J. Davey
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  by Leslie N. Masonson
- The Savvy Technician
  by Stella Osoba, CMT, Esq.
- **Q&A** Explore Your Options
  by Jay Kaeppel
- Market Rap
  by Emilio Tomasini
- Trading Perspectives
  by Rob Friesen
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REVIEW

- 0DTE Options Trading Workshop Part 2
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OCTOBER 2023

- **Q&A** Explore Your Options
  by Jay Kaeppel
- **TIPS** Backwardation, Positioning, And Momentum: A Recipe For High-Conviction Trades
  by Alfred François Tagher
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  by Michael S. Lowery

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  by Andrea Unger
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  by Kevin J. Davey
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  by John Devcic
- Small/Large Candle Pair Sequences
  by Ken Calhoun
- Confluence Trading
  by Azeez Mustapha
- Market Rap
  by Emilio Tomasini
- The Savvy Technician
  by Stella Osoba, CMT, Esq.
- Trading Perspectives
  by Rob Friesen
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NOVEMBER 2023

- **Q&A** Futures For You
  by Carley Garner
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  by Perry J. Kaufman
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  by Leslie N. Masonson
- Market Rap
  by Emilio Tomasini
- **Q&A** Explore Your Options
  by Jay Kaeppel
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DECEMBER 2023

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  by Carley Garner
- **TIPS** Growth Or Value?
  by Markos Katsanos
- **Q&A** Algo Q&A
  by Kevin J. Davey
- A Strategy For Trading Seasonal And Non-Seasonal Markets
  by Perry J. Kaufman
- Building A Trend-Following System
  by Dillon Figueredo
- Market Rap
  by Emilio Tomasini
- A Directional Pattern To Ride The Wave
  by Andrea Unger
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A RETROSPECTIVE: INTERVIEWS

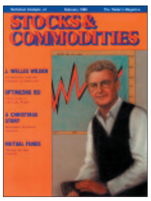
A LOOK BACK AT SOME EARLY S&C INTERVIEWS

In this 2024 Bonus Issue of *Technical Analysis of* STOCKS & COMMODITIES magazine, we wanted to take a look back at some of the wisdoms and insights offered by those we've interviewed for this magazine, going back to the very early days of this magazine. Over our four decades of publishing this magazine, we've presented interviews with hundreds of analysts, technicians, traders, and educators—people who have a lot to teach us about trading and market analysis, from years ago up through the present. Such an extensive slate of interviews over the years has captured some of the best trading and investing wisdoms to be found.

The interviews we're quoting here date back to the years 1986 through 1988. This retrospective is both a glimpse into a past trading era (some comments may or may not sound dated!) as well as a demonstration of how well some of their wisdoms have stood the test of time and are truly meaningful, even today. The people we're quoting here have been very influential in the trading world, and for good reason.

Perhaps they would hold some different views today. Trading evolves. Markets change, and traders change with them. We build on the past.

To read the full text of any of the interviews quoted here or for more inspiration, visit our article archives at Traders.com.



"I've found that the most important thing in trading is always doing the right thing whether or not you win or lose, and that is market-savvy money management. Actually, I would go so far as to say that whether one makes money in the markets depends on whether or not one uses the proper money management—how much money you make depends on where you enter and exit the markets."

"… [Money management rules] have got to become second nature to you so you do them automatically without even thinking of them. Things like always using a stop—and a relatively close stop, never averaging down; not trying to pick tops and bottoms; never, ever allowing a small loss to turn into a big loss, and never stepping in front of a freight train—or a market that's moving like one."

"… I always liked the directional movement concept and the parabolic time/price system and I also like the swing index approach. Probably putting those three together would give the best results."—*J. Welles Wilder, February 1986*

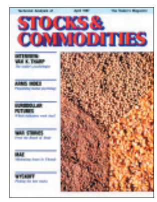
"Probably what distinguishes me from most people who work with cycles is my theory that cycles are fixed entities. A lot of people who do cycle analysis talk about the 20-week cycle that can range anywhere from 18 to 22 weeks, or a 10-week cycle that goes from 8 to 11 or 12 weeks. My work is different and insists on consistency."

"… If there is a cycle, first of all, it has to be consistent and, secondly, when it apparently disappears at times, as all of them do, I have to find a good explanation for it from other cycles. Also, if it apparently disappears, it should reappear at some time to be heeded as a legitimate cycle."—*Peter Eliades, December 1986*

"The real problems with the fundamental approach, not to knock it, is that it's practicability to trading is limited. First, there's no timing factor. In other words, no matter how good your fundamental model is there's no way it tells you to buy today or sell today vs. doing the same thing a month from now. So even if you have a fundamental model, you still need something to give you the timing—and that falls back into the technical sphere."

"… If you try 100 parameter sets in a computer run, what you should expect to see in the future, realistically, is the *average* of the parameter sets in that particular run. What people do is they take the top one and say that's what's going to happen. No matter what system we're testing, I assume that the best I'm going to get is the average of all parameter sets on the run."

"… The only realistic way is to develop or find some sort of trading system that has a reasonable chance of doing well over time and just making sure you have the diversification and the loss control to enhance your survival."— *Jack Schwager, February 1987*



"One of the big ones is whether or not someone is in the markets to make money, which is not significant by itself. Many, many investors invest for reasons other than to make money and it sets them up for a high potential for conflict. People with a lot of conflict, like those who invest to make money and for the excitement, tend to be losers. The behaviors that produce excitement are not necessarily the same as the behaviors that produce winning trades."

"… There are two ways in which stress is important. The average investor invests consciously. All the decisions are made consciously, the investor is totally aware of everything that goes on. Our conscious minds have a very limited processing capacity, like seven plus or minus two chunks of information. When we're under stress, that capacity is reduced considerably. Superb investors tend to invest unconsciously in the sense that most of what they do is automatic."
—*Van K. Tharp, April 1987*

A RETROSPECTIVE: INTERVIEWS

"I'm a real believer that you've got to go where the liquidity is and where the volatility is. People who are still trading the hard commodities of years ago and the metals of eight years ago haven't caught up! They've fallen in love with one market."

"… My central thesis of the market is that trend is a function of volatility whereas most people—and I in the past—have focused on finding the trend. So we would try to monitor when the trend is reversing then say 'Aha! It's a buy!' Now we're saying volatility has been down and there's been a substantial change in volatility to the upside. That will identify a trend change. And that trend change will stay in effect until there's an equal and opposite volatility change to the downside."

"… Never confuse intelligence with a bull market! I'd like to think it's the culmination of 20-some years of trading, that I've mastered a little bit of my craft. I don't think it's an emotional peak because I'm a system trader. Occasionally I may buck the system but that's a real rarity. It may be a natural evolution—you hang around anything this long, you're bound to learn a little bit about how it operates."

"… One of the important things for me is the realization in the last 10 months that you can never be 'right' trading commodities. I've always wanted to be 'right' and you're never going to be right. You're not going to get the high. You're not going to get the low. Once I realized that, I felt much more relaxed."—*Larry Williams, June 1987*

"I just want to measure the stuff that's atypical or different, stuff that we don't expect. When you get a large non-seasonal volume, it's more significant than just a big volume. It may be that you're moving into the harvest period, and you know there's going to be a large open interest then. Why add that in? It's only going to distort your results.

By the same token, I make a calculation for open interest to identify the percentage of new traders coming into the market. I have had three things: price, non-seasonal volume and the percentage of traders who were entering the market every day. Those three parameters all work together and they are weighted according to the effects that they contribute to future market direction. In other words, if price goes up on a probability basis and non-seasonal volume goes up on a probability basis, then those two things combined suggest that the market is going to sustain its upward movement. The same thing is done with the percentage of newcomers to the market. The PDI (probable direction indicator) calculation is always measuring effects and looking at what conceivably could have been identified as the cause after the fact on a day-by-day basis."

"… It's an approach I picked up at General Electric when I was dealing with radar and signal processing. Anybody in that field would probably recognize it. It's what we use to predict the position of a missile or an airplane in the future at some delta *t* (time) It is a method of trying to predict where that elusive object is going to be a few moments hence." —*Bob Pelletier, February 1988*

"I really don't feel that more complexity makes better systems. I think that people expect the market to be more consistent than it actually is. Complicated systems are usually the first sign that there has been a lot of computer work to find rules to fit every occasion.

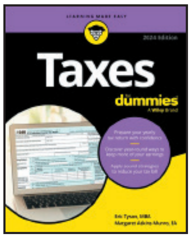
The extreme of the situation is what some researchers called 'pattern recognition'—the artificial intelligence approach when it first appeared. I don't know if it's gotten more sophisticated, but pattern recognition was being used on a computer to find patterns that were too complex to locate visually. When a repeated pattern was found they'd say 'Aha! It did this, therefore I can now expect it to do what it did the last time this pattern occurred.' The more you alter the program to accommodate specific historic price moves, the farther you take it from being general—from being successful in an unknown environment, that is, the future. The simpler programs will not work as well in the past, but their future performance is more reliably represented by their past performance. Unfortunately, most traders want that spectacular historic success rather than real-life profits."

"… Using fundamentals also adds anticipation to forecasting, while most technical systems lag the changes in pattern. Technical analysis is very important in timing because you can't enter a position using fundamentals alone. If the U.S. economy is strong, when will bond prices go down? When do you take a position? When do you decide not to take long bond positions which fight the underlying economic situation?"—*Perry Kaufman, April 1988*

"Good traders learn to trade within their own capabilities. A trader who stays within his capabilities and tries to improve on that ability will, over a long timeframe, make money. A good trader knows he can do well and doesn't have to show the next

Continued on page 25

The following selection of book descriptions represents a sampling of recent book releases in the investing field. Books described here may be from some of the major book publishers or from independent book publishers. These are not critical reviews or editorial evaluations, but rather a brief look at the book marketplace to help keep readers up to date on new or recent book offerings.



Taxes For Dummies, 2024 Edition (640 pages, print edition $26.99, ISBN 978-1-394-22645-0, ebook $16, ISBN 978-1-394-22646-7, November 2023) by **Eric Tyson** and **Margaret A. Munro**, published by Wiley. This book covers filing US tax returns while maximizing deductions and potential credits. It offers insights on making smarter financial decisions year-round to help minimize taxes (with or without the help of an advisor), including topics such as retirement accounts, small businesses, investments, real estate, dependents, and estate planning. It covers how to correct or revise a return should you need to. It discusses IRS audits and how to respond to one should you encounter one. It discusses getting your financial information organized, and it walks you through all the main forms for federal tax returns. This latest edition provides updates on all the latest changes to the US tax system.
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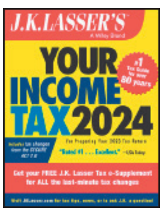

J.K. Lasser's Your Income Tax 2024: For Preparing Your 2023 Tax Return (928 pages, print edition $26.99, ISBN 978-1-394-22349-7, ebook $16, ISBN 978-1-394-22350-3, November 2023) by **J.K. Lasser**, published by Wiley. This guide offers practical advice for anyone getting ready to file their personal tax return in the US for the 2023 calendar year. It includes information, news, and updates about changes in the US tax code. It also includes worksheets and forms to make tax preparation easier, and it offers insights on how to maximize credits and deductions, with the goal of helping people to understand how to legally keep as much money as possible. It discusses US tax court decisions that may have occurred in the past year, any recent legislation by the US Congress that could affect federal taxes, and any IRS rulings that might affect deductions and credits. The book offers tax-planning strategies for saving money, and tips on how to properly file your tax return. A different edition of the book is available for professional tax preparers, as well as an edition for small business owners. Another book by the same author is available on the related subject of finding tax deductions and tax breaks.
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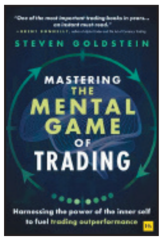

Mastering The Mental Game Of Trading (322 pages, print edition £26.99, ISBN 978-1-804090077, ebook £22.50, 978-1-804090084, January 2024) by **Steven Goldstein**, published by Harriman House. A trading performance coach, Goldstein shares his insights and experience to help traders achieve success in the markets. Prior to becoming a coach, he worked for almost 25 years as a trader at various investment banks. Through personal anecdotes and relatable stories of real traders, he explores how our attitudes and misconceptions can prevent us from achieving our full potential. Goldstein introduces his model, the *performance process cycle*, which teaches traders how to overcome their emotions and biases, improve self-awareness, and make sense of how they are impacted by their interactions with markets and uncertainty. By applying this model, traders can learn to develop calm and objectivity, enabling them to better navigate the markets.
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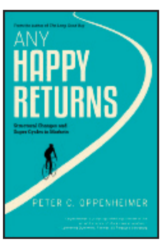

Any Happy Returns: Structural Changes And Super Cycles In Markets (384 pages, January 2024, print edition $32.50, ISBN 978-1-394-21035-0, ebook $26, 978-1-394-21037-4) by **Peter C. Oppenheimer**, published by Wiley. This book is a follow-up to the author's *The Long Good Buy*. *Any Happy Returns* discusses how structural changes in macroeconomic drivers, geopolitics, government policy, and social attitudes all combine to drive secular super cycles that help to explain investor returns. The author focuses on what he calls the post-modern cycle, what it's likely to look like, how it will unfold, and what investors should focus on. The book includes an introduction to the history of cycles and structural "super cycles" and what drives them, and a detailed analysis of super cycles since 1945, including the post-war boom, the Great Moderation, the post global financial crisis, and the pandemic era. The author gives his opinion on how factors such as today's cost of capital, government size, proactive industrial policy, and globalization will contribute to economic cycles. He also discusses developments in technology and AI, and efforts to decarbonize economies and how that might impact financial market returns and opportunities. The author is chief global equity strategist and head of macro research within global investment research at Goldman Sachs in Europe.
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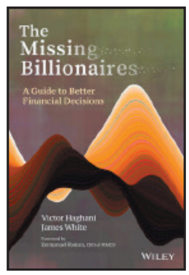

The Missing Billionaires: A Guide To Better Financial Decisions (416 pages, August 2023, hardcover $29.95, ebook $18, ISBN 978-1-119-74792-5) by **Victor Haghani** and **James White**, published by Wiley. This book seeks to offer a framework for making important lifetime financial decisions in a systematic and rational way. It is focused on both investing and spending decisions, since both affect capital. This guide is for readers who already have a baseline level of financial literacy, although advanced knowledge isn't required. The book seeks to fill the gap between personal finance books and academic literature, bringing insights from academic finance to nonspecialists. Topics include optimal investment sizing; the mechanics of choice; risk versus uncertainty; taxes; retirement spending; and estimating the expected return and risk on a broad spectrum of investments. Case studies and anecdotes are included for illustration. The authors draw on their own experiences from their wealth management practice and their years as arbitrage traders.
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In this day and age, the choice of software with which to analyze and interact with the markets is rich, with different packages offering different capabilities, methodologies, and price ranges to fit every style of trader. Are you interested in a basic software package, but also find that you need to write custom indicator formulas? Are you interested in ranking, screening, and producing a list of candidates based on your favorite technical indicators? Or are you a daytrader, a position trader, or a professional trader? Are you looking for software to run from your hard drive, or do you prefer to rely on your Internet connection for interactive analysis?Software packages for each of these needs are out there, but tracking them down can be daunting. To help STOCKS & COMMODITIES readers make the right choices for themselves, we surveyed the industry and collected the responses. The top 10 list is shown here, with expanded information available at our website.In this listing, resellers of software may be included, so software is not always listed by developer.

	Product	Company
1.	NeuroShell Trader Professional	Ward Systems Group, Inc.
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3.	FreeStockCharts.com	Worden Brothers, Inc.
4.	DealBook 360	Global Forex Trading (GFT)
5.	MetaStock	MetaStock
6.	MetaStock Pro	MetaStock
7.	MotiveWave	MotiveWave Software
8.	Adaptive Modeler Professional Edition	Altreva
9.	Jurik Research Software	Jurik Research Software
10.	Ensign Windows	Ensign Software

These are the 10 software listings viewed most often on the Traders' Resource website, where each company is listed in order of clicks received. This is not an editorial rating. For more information on specific products, try checking Traders.com for archived S&C product reviews.

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ninjatrader.com	
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Store.Traders.com, Traders.com	
SOFTWARE	
MetaStock	48
MetaStock.com/TASC	

Advertiser	Page
SOFTWARE	
AbleSys	13
www.ablesys.com/SCM	
Ninjatrader	3
ninjatrader.com	
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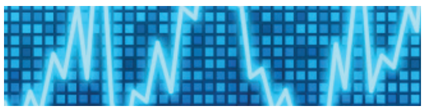

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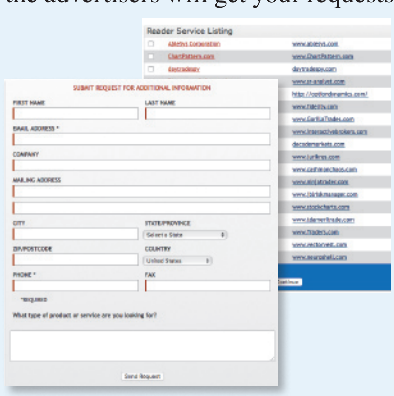

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