



Greetings from Mike Barna at Trading System Lab®

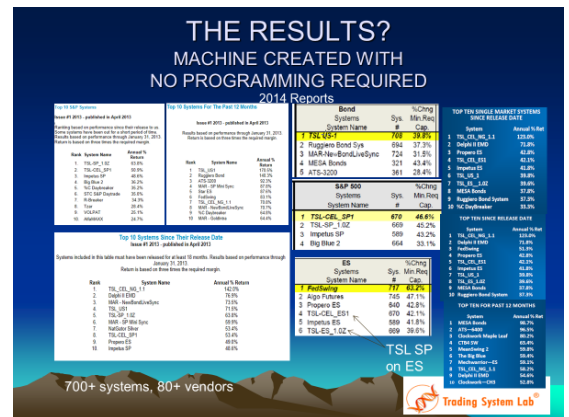
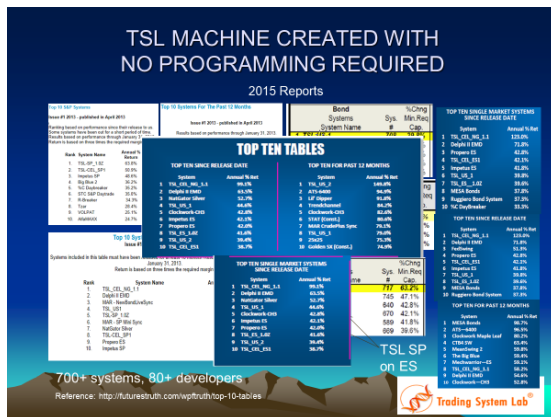
Creating a Machine Learning based Trading Strategy designer that creates Trading Systems with no programming required was our original main goal.

We feel we met and exceeded that and other goals within the first few years.

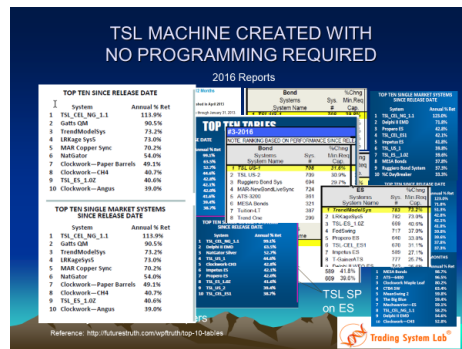
A Trading Algorithm that writes itself with no programming required.

Please note all results are hypothetical - reference disclaimer below.

In 2005, TSL first connected the RML LAIMGP to a simple trading simulator and showed that a Machine Learning algorithm can communicate with a trading simulator to automatically design a Trading System and then produce its own code. In the beginning, many people said it could not be done: that the Machine would overfit the data; that the Machine would not produce usable material and most certainly that the Machine's created systems would not hold up into the future. Those of us who saw the early code and equity curves knew better. Finally, we had an engine that could produce better strategies than we could produce by hand. In 2008 we submitted code to Futures Truth on several systems for forward tracking. What we did not know was that the world would soon be rocked by a massive collapse of the financial system impacting the markets the likes of which the world had never been seen before. Surely this Sequestered Data test would stress the TSL Machine Designed systems into failure! We were concerned, however we started seeing that the systems adapted and continued to perform. Futures Truth, having the code in their house for their own testing and reporting on their computers, saw the same results. To the naysayers who said Machine Learning would overfit the data: many years of being #1 or top rated by Futures Truth proved them wrong.

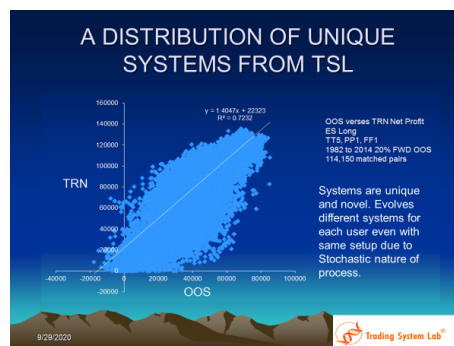


TSL Futures Truth Ratings Based on hypothetical results.
Past performance is not necessarily indicative of future results.



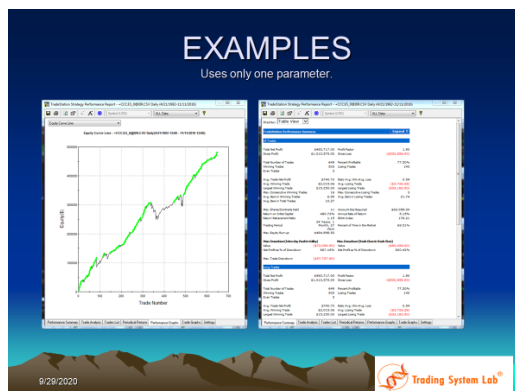
TSL Futures Truth Ratings Based on hypothetical results.
Past performance is not necessarily indicative of future results

Later, feedback and suggestions from live trading users as well as the addition of analytics like the Wilcoxon, proper Parsimony Pressure usage and parameter counts enhanced the overfit avoidance even further. Scatter plots showed us what many unique strategies look like with OOS verses TRN data plotting.



TSL Futures Truth Ratings Based on hypothetical results.
Past performance is not necessarily indicative of future results

TSL was even finding strategies that use only one parameter.



TSL System that uses only one parameter. Based on hypothetical results.
Past performance is not necessarily indicative of future results.

Allow the Machine to use a few more parameters and what we believe to be superior systems may emerge.



TSL Generated Trading System. Based on hypothetical results.
Past performance is not necessarily indicative of future results.

As soon as the commercial product was ready for shipment, License orders from all over the world began to show up. At times we could barely keep up with the pace.

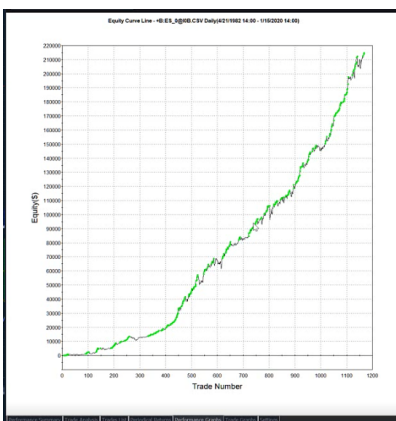
Over the next 15 years we have made breakthrough after breakthrough in the feature set, preprocessors, trade types, fitness functions, overfit avoidance and many other components and code sets within TSL. Some tried to copy our feature set and approach. Still, to this date, there is nothing like TSL in the industry. Perhaps because of the original patents

on the “RML register” LAIMG, the difficulty in working with many different languages and component types or the overall issues to be overcome in a non-event based, Expectation Based Modeling Approach, TSL remains unique.

We also found that proper design procedures are important or poor results can happen. We learned about subsystem analysis, Trade-To-Parameter Ratios, Regime switching in preprocessors, Trade Type impacts. DNA modifications, use of higher-level Register Outputs, etc.

We recently released the capability to launch multiple instances of TSL on **one PC**. We tested as many as 40 simultaneous instances of TSL running with each looking at a different setup of Preprocessors, Trade Types and Fitness functions and other parameters. Each instance produces its own reports and each instance will produce as many as 300 system code sets. See [DEMO70](#).

Additional cousins to TSL have been developed along the way such as the TSL Seasonal Strategy Code Writer which creates specialized variants of seasonal based Trading Systems. Client feedback on these additional tools has been excellent so we are now testing an integrated Seasonal feature in the base TSL Platform.



TSL Seasonal Code Writer. Based on hypothetical results. Past performance is not necessarily indicative of future results.

See [DEMO71](#)

Now, with the proven integration into advanced platforms such as QuantHouse, Deltix, Systematics and other C# Trading packages, as well as TradeStation and MultiCharts, TSL's capabilities are available to almost everyone.

Packages like QuantConnect who charge \$8 to \$40 per month for their platform in C# may also take advantage of this technology, however we have not integrated with every known platform in the world as there are simply too many of them. Some will still require some programming to integrate the TSL preprocessor and trade tactics, however that programming path is well known and generally straight forward and inexpensive. And if enough clients request a particular platform to be integrated, we will do the integration. QuantHouse for example was partially integrated in just a few hours of programming. See the end to end, 8-minute demo on QuantHouse here: [DEMO72](#).

Now, onto the next generation of TSL!

Leveraging off of what we have learned along the way with TSL version 1.x we are now developing the next generation of Trading System Lab® code named:

QUANT SYSTEMS LAB™

QSL employs a 64-bit Genetic Program architecture with substantial features and industry leading anti-overfit features. Here are a few of the features of QSL:

TSL 2018-2019 WORK

- **QUANT SYSTEM LAB™**
- 1. Scalable to number of Cores
- 2. Highly parallelized at a low level
- 3. 64 Bit GP Architecture (AIMCA)
- 4. Large Class Structure
- 5. Excellent Metric Tradeoff approach
- 6. Outstanding proprietary over-fit avoidance algorithm
- 7. Portfolio Based as baseline. Single markets possible.
- 8. Low level control of exported programs
- 9. Ground up rewrite of Trading Simulation
- 10. Incorporates techniques and features discovered in TSL over the past 15 years
- 11. QSL is 10 to 100 times faster than TSL

9/29/2020

 Trading System Lab®

As we move forward and work with various clients and investors, QSL is at the forefront of our plans. However, we continue to make feature improvements, enhancements, bug fixes as well as perform research tasks with the current TSL Platform.

If You Can't Write Code

For the Trading system developer or for those who wish to design their own Trading System but who can't write code, TSL is a perfect fit. We provide substantial one on one training and education into this new and exciting world of Machine Learning as applied to Trading System design. TSL has already done the heavy lifting so you can focus on running the Machine and creating your own Systems. Your focus can now be on determining what markets, time frames and setups allow the Machine to design the best systems for you. We have seen clients have many Systems live trading or running in forward testing within the first month of part time use of TSL. Once you begin to use TSL it is really hard to NOT use it to design your Trading Systems. Initial Training will have clients designing end to end Systems usually within the first hour. I have personally trained beginner traders to use this technology.

With TSL, you will quickly learn how important a sufficient amount of good data is in this work which is why we teamed up with CSI Data Inc., and created a special TSL Data Portfolio available as a download directly from the CSI Data Platform. If you use data from another vendor, we have instructional videos that show you how to import that data into Platforms such as TradeStation so you can design Systems on your special data sets per your needs. Do you have a Special Project you would like to evaluate in TSL such as consuming trading signals from another indicator or strategy? We have instructional videos that show you how to modify the fully customizable TSL Preprocessor to incorporate your special "DNA". As always, all of the code in TSL is fully open code in Easy Language or Power language and other languages as employed in the trading platform used.

Training also includes additional programming done by myself for the benefit of your work such as Preprocessor modifications, which is perhaps the most requested.

We welcome any discussion regarding this amazing technology and if you have a "Dream List" of ideas you would like to see in our Platform, please contact us. This short email cannot come close to reviewing all of the features of TSL, and the demonstration videos only touch the surface in each area.

We have greatly appreciated the support and encouragement over the years.

Stay safe!

Sincerely,
Mike Barna
President,
Trading System Lab®



Trading Strategies designed by Machine Learning

www.TradingSystemLab.com

New Web site:

<https://tradingsystemlabS.com/>

408-356-1800

SKYPE: miketsl1

Please join our MeetUp Group!

<http://www.meetup.com/Silicon-Valley-Machine-Learning-for-Trading-Strategies/>

All performance results which follow are hypothetical.

HYPOTHETICAL PERFORMANCE RESULTS HAVE MANY INHERENT LIMITATIONS, SOME OF WHICH ARE DESCRIBED BELOW. NO REPRESENTATION IS BEING MADE THAT ANY ACCOUNT WILL OR IS LIKELY TO ACHIEVE PROFITS OR LOSSES SIMILAR TO THOSE SHOWN. IN FACT, THERE ARE FREQUENTLY SHARP DIFFERENCES BETWEEN HYPOTHETICAL PERFORMANCE RESULTS AND THE ACTUAL RESULTS SUBSEQUENTLY ACHIEVED BY ANY PARTICULAR TRADING PROGRAM. ONE OF THE LIMITATIONS OF HYPOTHETICAL PERFORMANCE RESULTS IS THAT THEY ARE GENERALLY PREPARED WITH THE BENEFIT OF HINDSIGHT. IN ADDITION, HYPOTHETICAL TRADING DOES NOT INVOLVE FINANCIAL RISK, AND NO HYPOTHETICAL TRADING RECORD CAN COMPLETELY ACCOUNT FOR THE IMPACT OF FINANCIAL RISK IN ACTUAL TRADING. FOR EXAMPLE, THE ABILITY TO WITHSTAND LOSSES OR TO ADHERE TO A PARTICULAR TRADING PROGRAM IN SPITE OF TRADING LOSSES ARE MATERIAL POINTS WHICH CAN ALSO ADVERSELY AFFECT ACTUAL TRADING RESULTS. THERE ARE NUMEROUS OTHER FACTORS RELATED TO THE MARKETS IN GENERAL OR TO THE IMPLEMENTATION OF ANY SPECIFIC TRADING PROGRAM WHICH CANNOT BE FULLY ACCOUNTED FOR IN THE PREPARATION OF HYPOTHETICAL PERFORMANCE RESULTS AND ALL OF WHICH CAN ADVERSELY AFFECT ACTUAL TRADING RESULTS.