An Approach to Group Modeling

TradingSolutions gives you the flexibility to take a wide variety of approaches in developing trading models. Below is a summary of the various aspects involved in creating a model using one potential approach. The idea behind the approach is to import the data for a large variety of symbols and use TradingSolutions group field features to create potential models for all of them. Many of TradingSolutions' key features are utilized, including optimal signal modeling, genetic optimization of inputs and parameters, and time-lagged recurrent neural networks.

Where can I get my data and how much do I need?

TradingSolutions offers several methods of importing data. The first method is by a direct data supplier such as: Prophet, eSignal, IQFeed or QuotesPlus. eSignal and IQFeed both offer real-time streaming data into TradingSolutions. The second method is by importing data from text files obtained from a variety of other sources.

The more data you can use to train a neural network the better your results are likely to be, provided that the data is applicable to the current time frame. For most stocks this optimal time frame for training data is the preceding 4-6 years. When creating real-time models with intraday data, a much shorter time frame can be used since each day contains more data.

Step-By-Step – Importing the S&P 100 w/ Direct Data Provider

To get started on our approach to group modeling we will need sufficient data to work with. The S&P 100 provides a good variety of symbols without overloading our portfolio and using too much of our time on processing rather than analyzing our data.
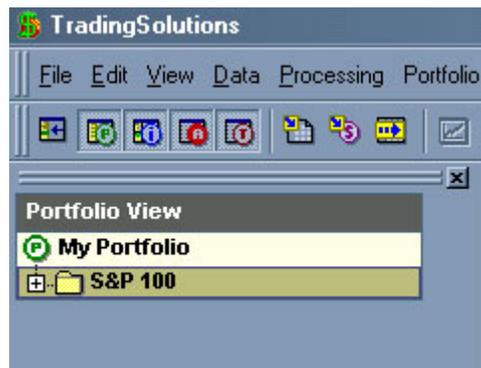

To start off with an empty portfolio, click on the File menu and choose "Change Work Directory". In the next panel, select "Make New Folder" and name it "SP100" and click OK to continue. In the Portfolio View in TradingSolutions create a new subgroup called "S&P 100" by right clicking on the My Portfolio folder and choosing

Add New Subgroup. Select the folder you just created and choose the Import Data button from the toolbar.
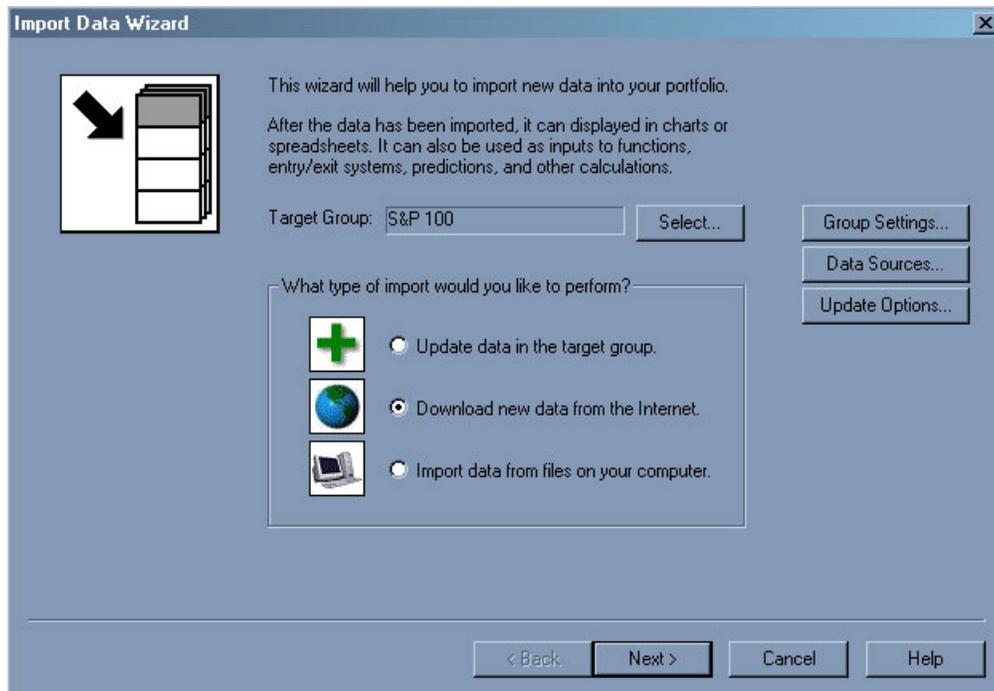
In the Import Data dialog, choose "Download new data from the Internet" and click Next.
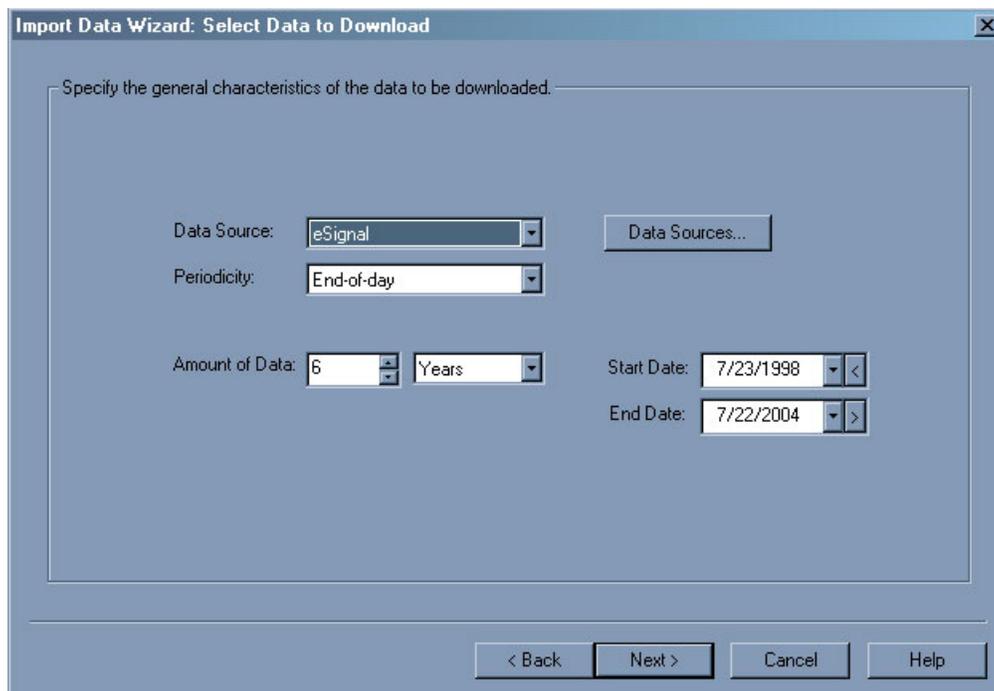
Next, you will choose your data provider and choose *6-years of historical data to import, click Next to continue.
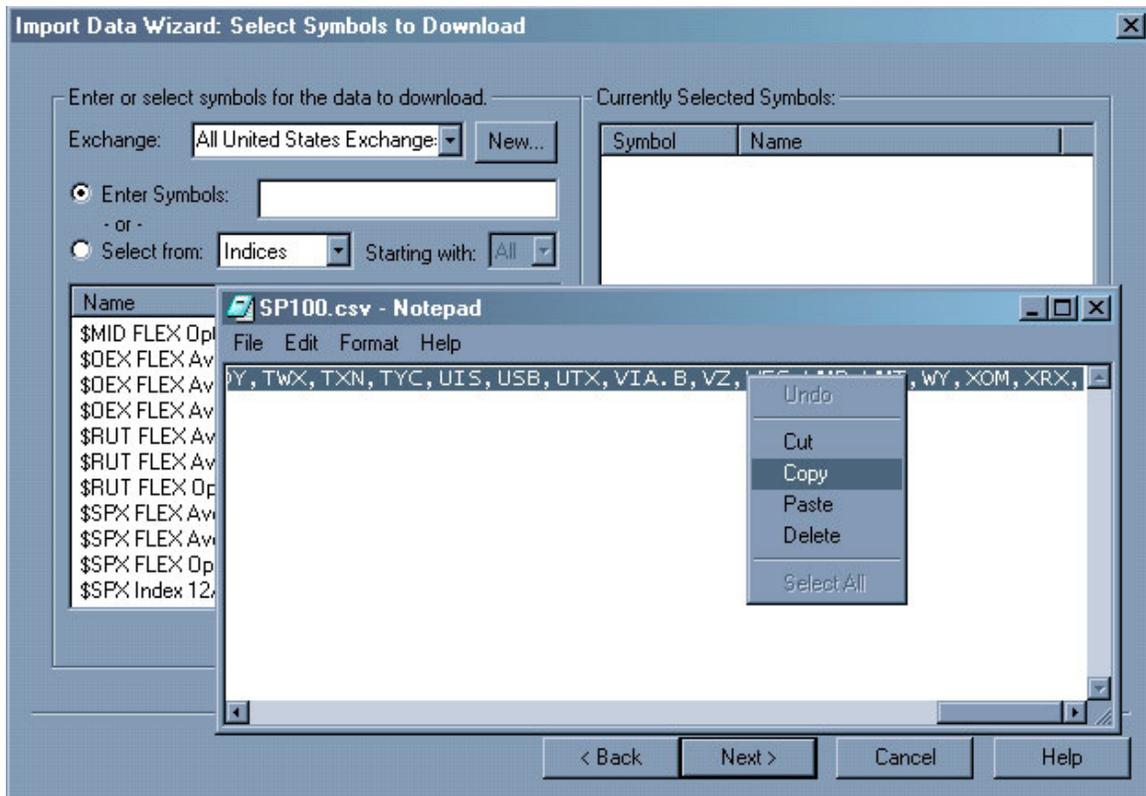
Rather than going through the list we have compiled (of the S&P 100) a list in a comma-separated.

[Click here to download S&P 100-symbol list]

After downloading the SP100.csv file, open it with Notepad. In Notepad, select the Edit menu and choose "Select All". After all the symbols are selected right-click on the highlighted text and choose Copy (or ctrl+c on the keyboard). Finally, click inside the Enter Symbols text box and right-click and choose Paste (or ctrl+v on the keyboard). Click the Add Symbol button; click Next and then Finish to complete the import process.

*Remove any data set that is shorter than 6-years by right-clicking on the data set and clicking "Remove Data".

How can the Optimal Signal help my Portfolio?

The Optimal Signal is an entry/exit signal that indicates what would have been the best trading position for a series of price data. Its value is calculated by looking ahead at each point in the data series to determine whether the price went up or down enough to cover a specified minimum profit within a specified amount of time.

Step-By-Step – Creating the Optimal Signal using Group Operations

One of the strengths of TradingSolutions is its intuitive portfolio-based interface. Using the Portfolio View, you can group your stocks into meaningful groups and perform operations on an entire group at one time. This allows you to quickly try a technique out on stocks sharing similar characteristics and compare the results. Creating fields at the group level allows you make changes to one field so that it will affect all fields under it saving your fingers from hundreds of modifications.
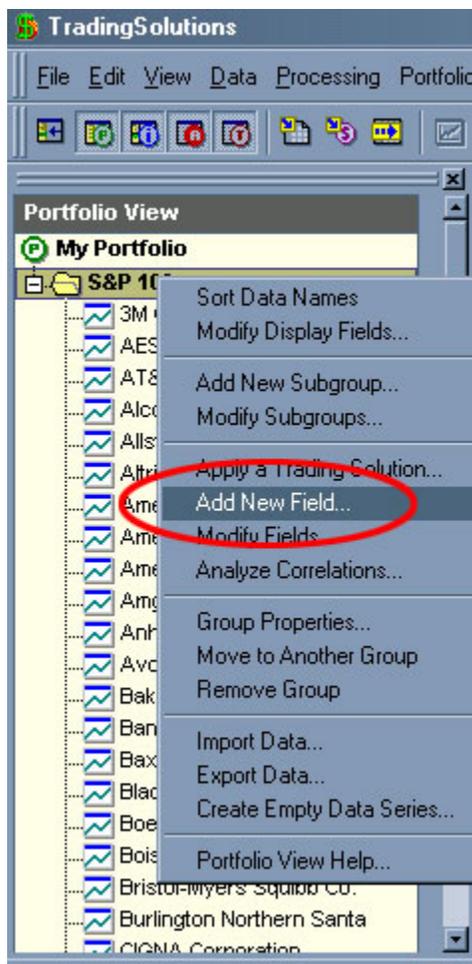
In the Portfolio View of TradingSolutions right-click on the subgroup named "S&P 100" and choose Add New Field...

Create a Field for S&P 100: Select Type

This wizard will help you to create a new field for the selected data or group of data.

New fields can be used to calculate values such as indicators, predictions, and analyses. You can then display these values in your Portfolio View, chart, or spreadsheet, as well as use them as inputs when creating other fields.

What would you like this new field to do?

- ○ Calculate an indicator or value.
- ● Generate an optimal signal.
- ○ Predict or model a value.
- ○ Generate an alert.
- ○ Analyze a signal.
- ○ Apply a rule-based entry/exit system.
- ○ Combine values with a committee.
- ○ Apply a trading solution.
- ○ Store manually entered values.

< Back   Next >   Cancel   Help
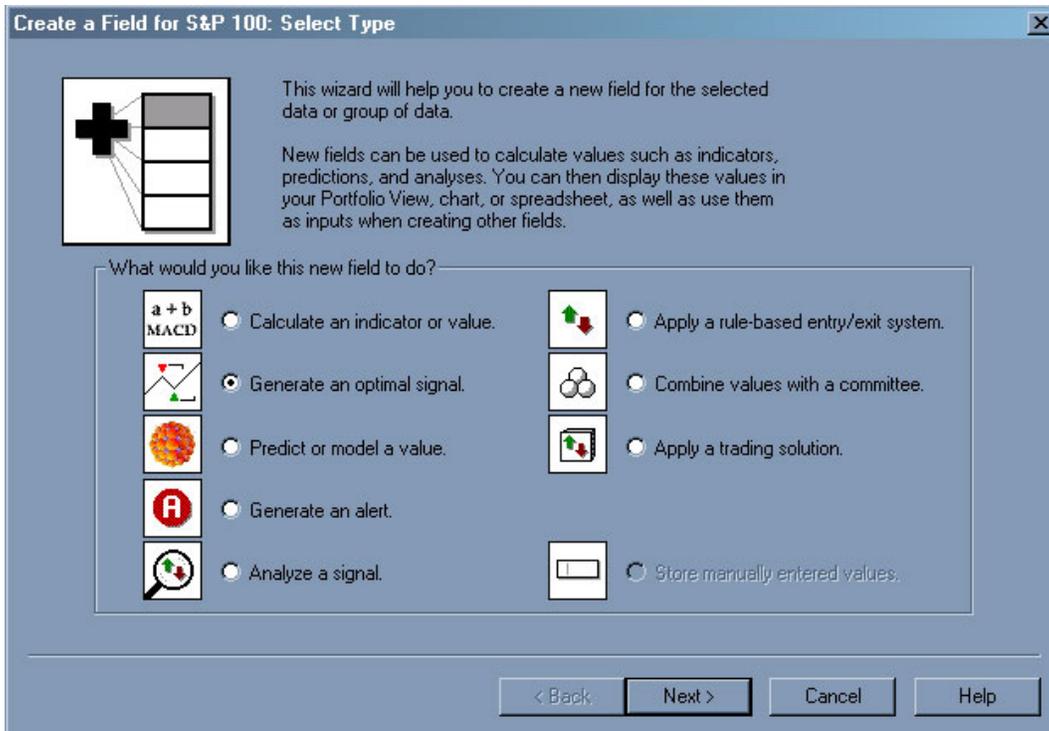
In the Add New Field Wizard choose "Generate an optimal signal" and click Next.
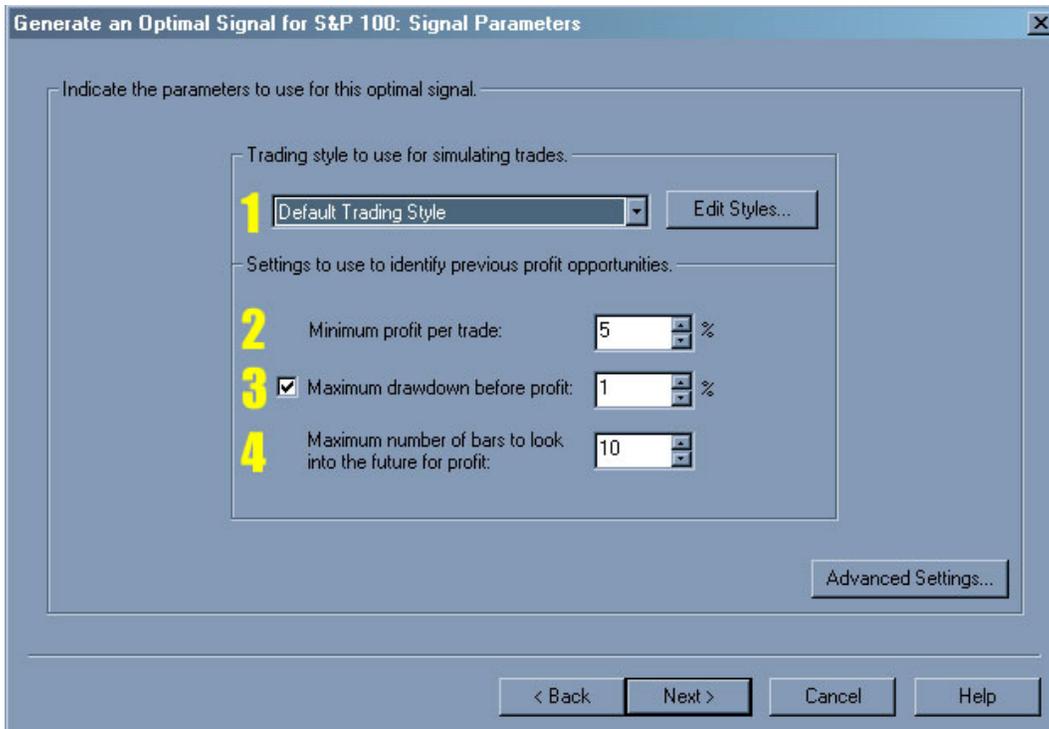
Generate an Optimal Signal for S&P 100: Signal Parameters

Indicate the parameters to use for this optimal signal.

Trading style to use for simulating trades.

1 Default Trading Style   Edit Styles...

Settings to use to identify previous profit opportunities.

2 Minimum profit per trade: 5 %

3 ☑ Maximum drawdown before profit: 1 %

4 Maximum number of bars to look into the future for profit: 10

Advanced Settings...

< Back   Next >   Cancel   Help

In the Signal Parameters dialog box you have several different parameters that you can adjust to suit your specific trading needs.

1. Trading Style: Trading styles are named collections of settings that you use to indicate how you like to trade. For example: types of trades, limit and stop orders, volatility, and much more.
2. Minimum profit per trade: The minimum profit that the optimal signal will look for over *x*-bars (based on Maximum number of bars to look into the future for profit) for generating entry/exit signals.
3. Maximum drawdown before profit: (optional) Entry signals are only generated if they will result in a trade, which does not produce the maximum drawdown prior to achieving the minimum profit.
4. Maximum number of bars to look into the future for profit: Entry signals are only generated if they will result in the given profit within this number of bars.
   a. Example: If you would like to analyze the next two weeks from a data series with daily trading data, this value should be set to 10.

Generate an Optimal Signal for S&P 100: Select Name ☒

Confirm or modify the name and format of the new field.

Selected Function

Optimal Signal

Generate optimal entry/exit signal by looking ahead 10 samples. [More]

Inputs Required By This Function

This function does not require any inputs.

Select a name for this field or enter a new one.

Optimal Signal (Default Trading Style) ▼

☐ Add to portfolio display for this group.

< Back   Finish   Cancel   Help

For this particular approach leave the defaults and choose Next and Finish to complete the Optimal Signal.

The processing time on creating the Optimal Signal at the group level for the S&P 100 may take some time depending on your computers speed.

Let Genetic Optimization do the thinking for you!

Genetic algorithms can be combined with neural networks to enhance their performance by taking some of the guesswork out of optimally choosing neural network parameters, input parameters, input selection, etc.

Step-By-Step – Creating a Neural Network Model using Group Operations

Due to the intense calculations over numerous symbols, this operation will take several hours depending on your computers speed.

Much like the creation process of the Optimal Signal, creating the neural network model at the group level will allow you to create a model with the same setup for all symbols without having to create each model individually. Even though you are setting up the model with the same input variables, neural network topology, etc. the neural network will be optimized based on the symbol itself.
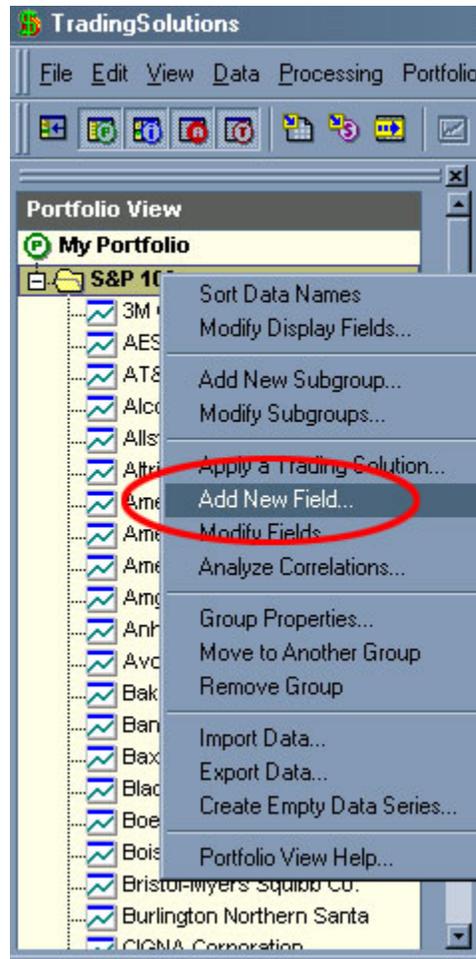
In the Portfolio View of TradingSolutions right-click on the subgroup named "S&P 100" and choose Add New Field…
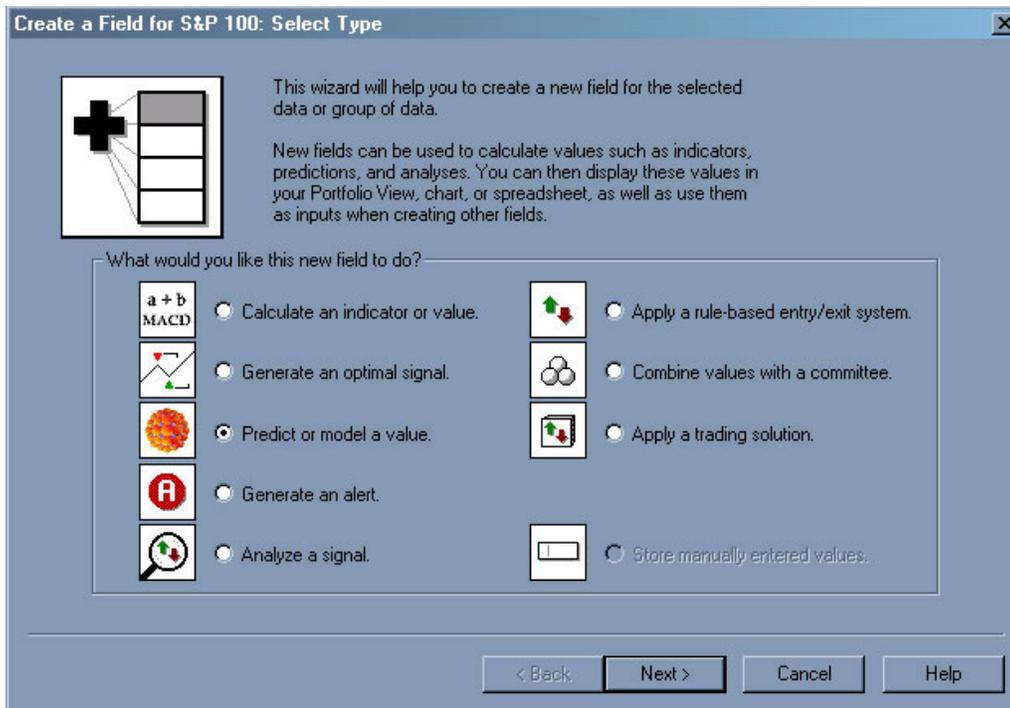
In the Add New Field dialog choose "Predict or model a value" and click Next.
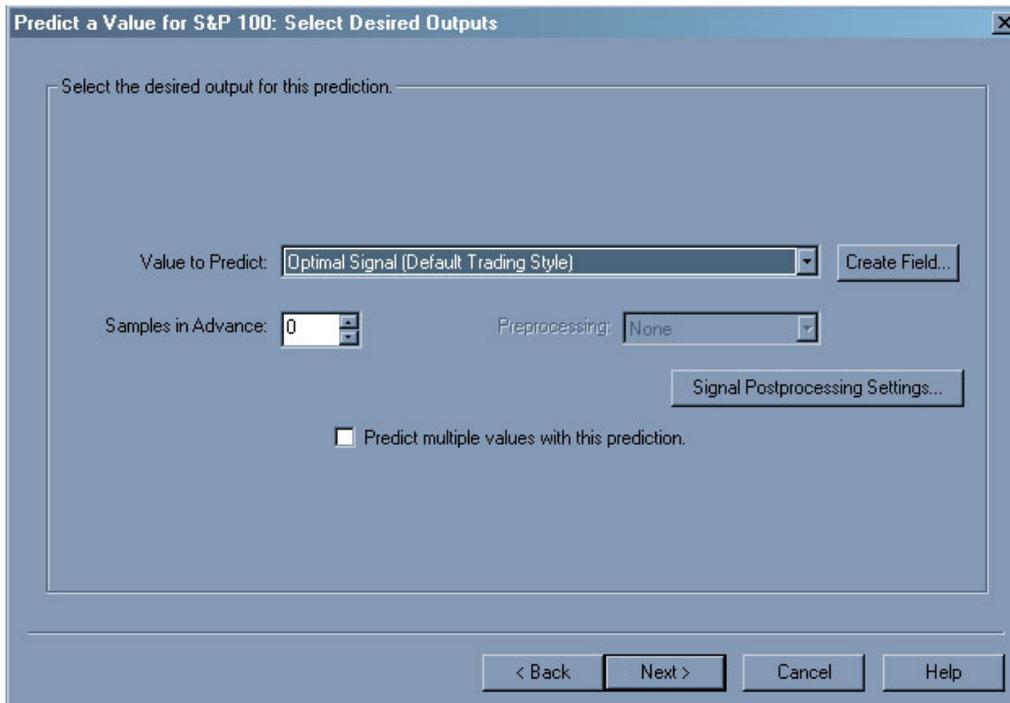
On the Select Desired Outputs page, choose the Optimal Signal created earlier (Optimal Signal (Default Trading Style)) and click Next to continue.
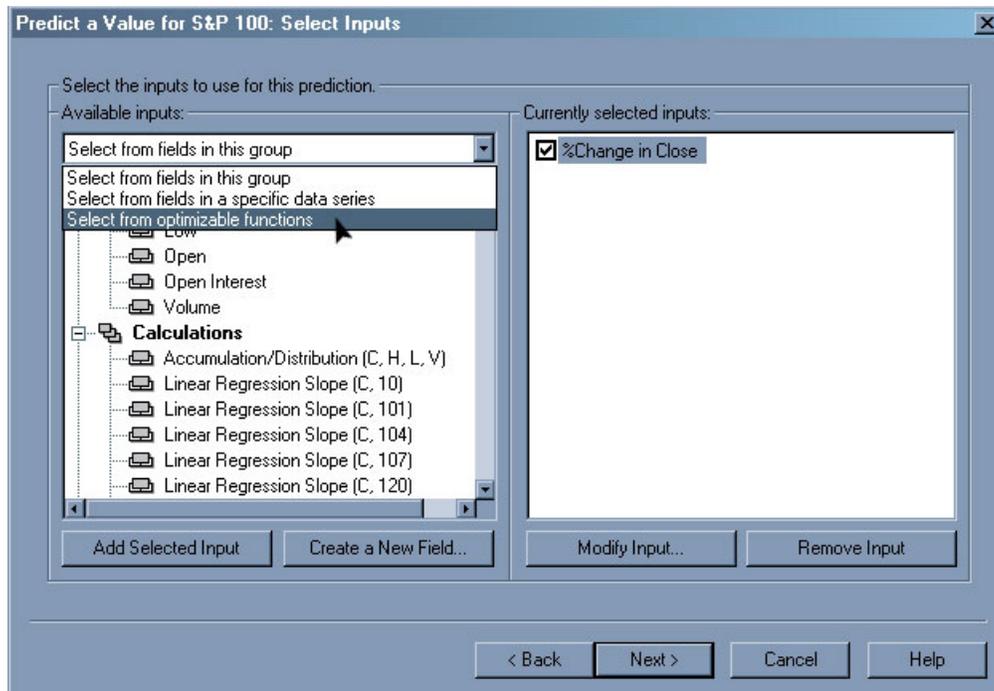
Next, in the Select Inputs page first add the Close to the "Currently selected inputs" display and then click on the drop down menu "Select from fields in this group" and choose the option "Select from optimizable functions".
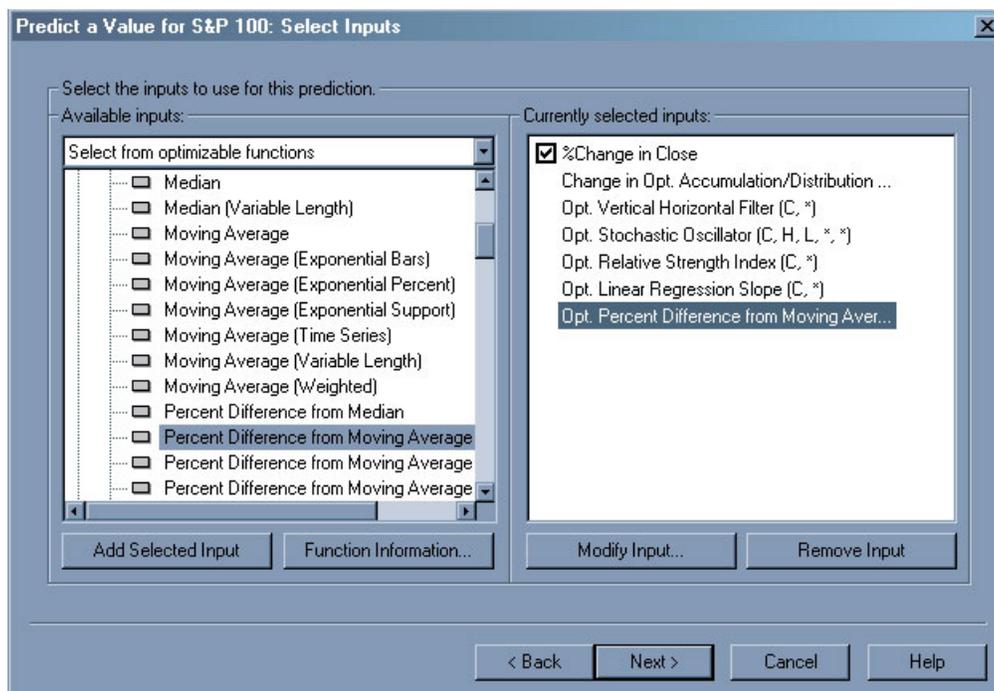

Next, select the inputs from the list below as your optimizable inputs for the neural network model:

- o Accumulation/Distribution
- o Vertical Horizontal Filter
- o Stochastic Oscillator
- o Relative Strength Index
- o Linear Regression Slope
- o Percent Difference from Moving Average
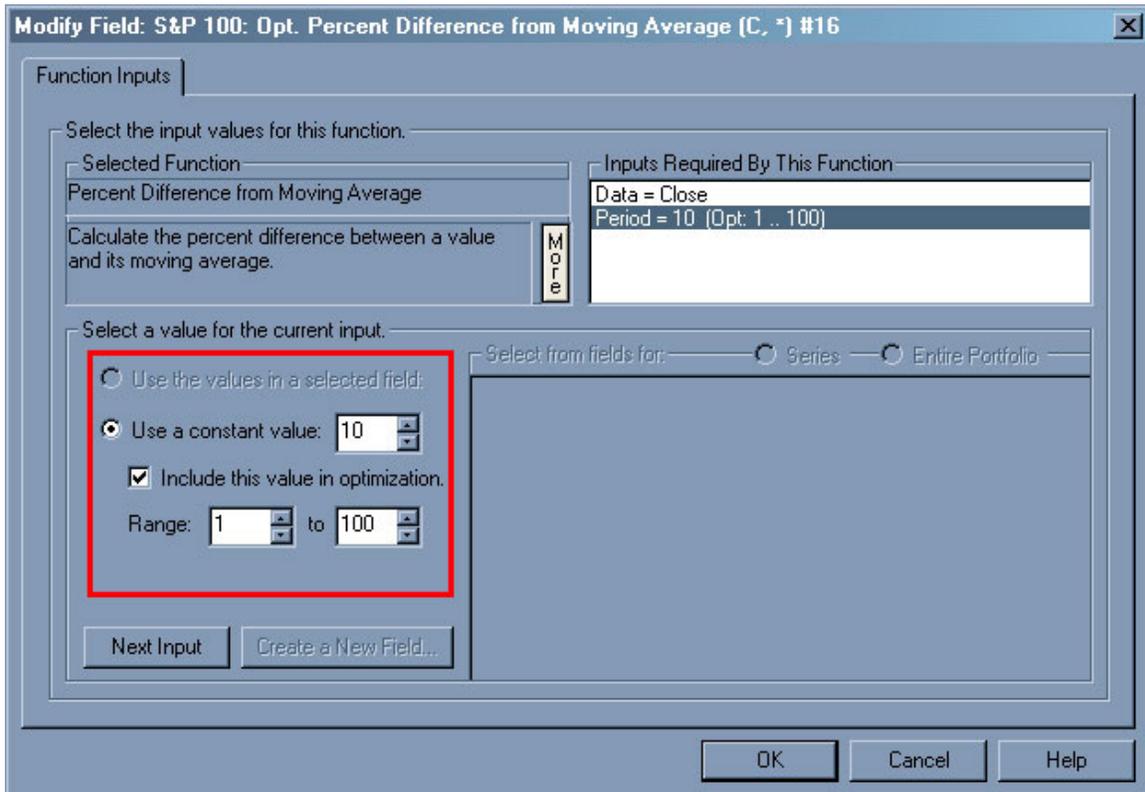
After adding the Optimizable functions, select the Percent Difference from Moving Average and choose Modify Input. On this page you can adjust the parameters of the range to be optimized for.

Optimizable functions take away the "trial and error" giving genetic algorithms more control of the input parameters as well as the selection of the inputs themselves. For example: Rather than specifying a 10-day Percent Difference from Moving Average you can select a range of *x*-day Percent Difference from Moving Average as an optimizable input and let the computer figure out the specified amount of days.

Choose Next to continue on to the next page of the wizard.
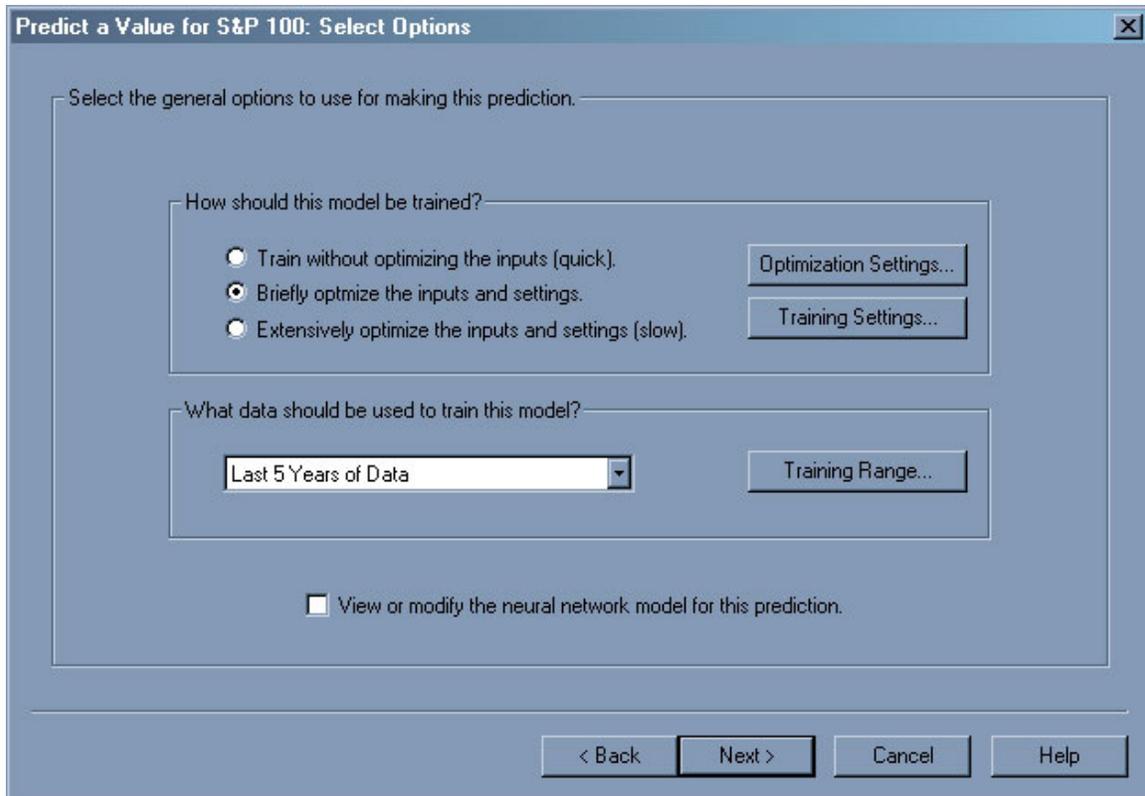
The next page is the optimization and training options where you can set the type of optimization (none, brief, or extensive) as well as the amount of training data you would like to use.

Choose "Briefly optimize the inputs and settings" option for the optimization settings and choose "Last 5 Years of Data" from the drop down menu in the section of "What data should be used to train this model?" Choose next and finish to complete the neural network model.

How can I determine which symbol is worth trading?

Here is where the Portfolio View in TradingSolutions really shines. Continuing to operate at the group level of the S&P 100 subgroup we will now create fields that will help analyze our models. With the "Analyze a Signal" option you can easily determine several key factors when choosing if a symbol is worthy for real trading. Some of those key factors are: Percent Gain 1-year, Percent Gain Over Buy/Hold, Number of Trades, Percent Wins, and many more. All of which can be viewed right in the Portfolio View display.
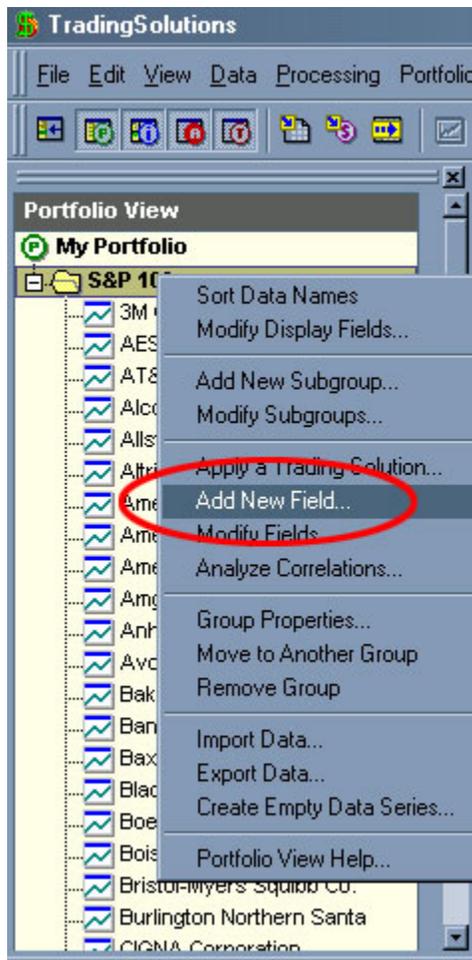
In the Portfolio View of TradingSolutions right-click on the subgroup named "S&P 100" and choose Add New Field...
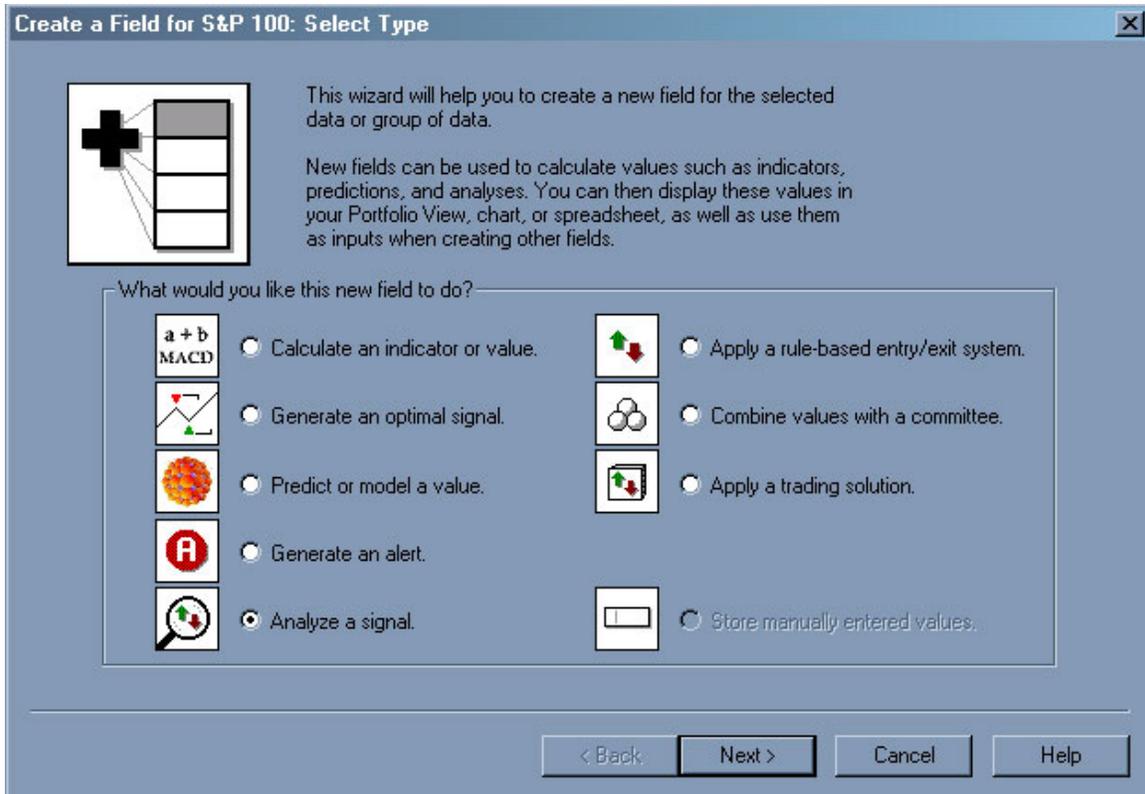
In the Add New Field dialog choose "Analyze a signal" and click Next.
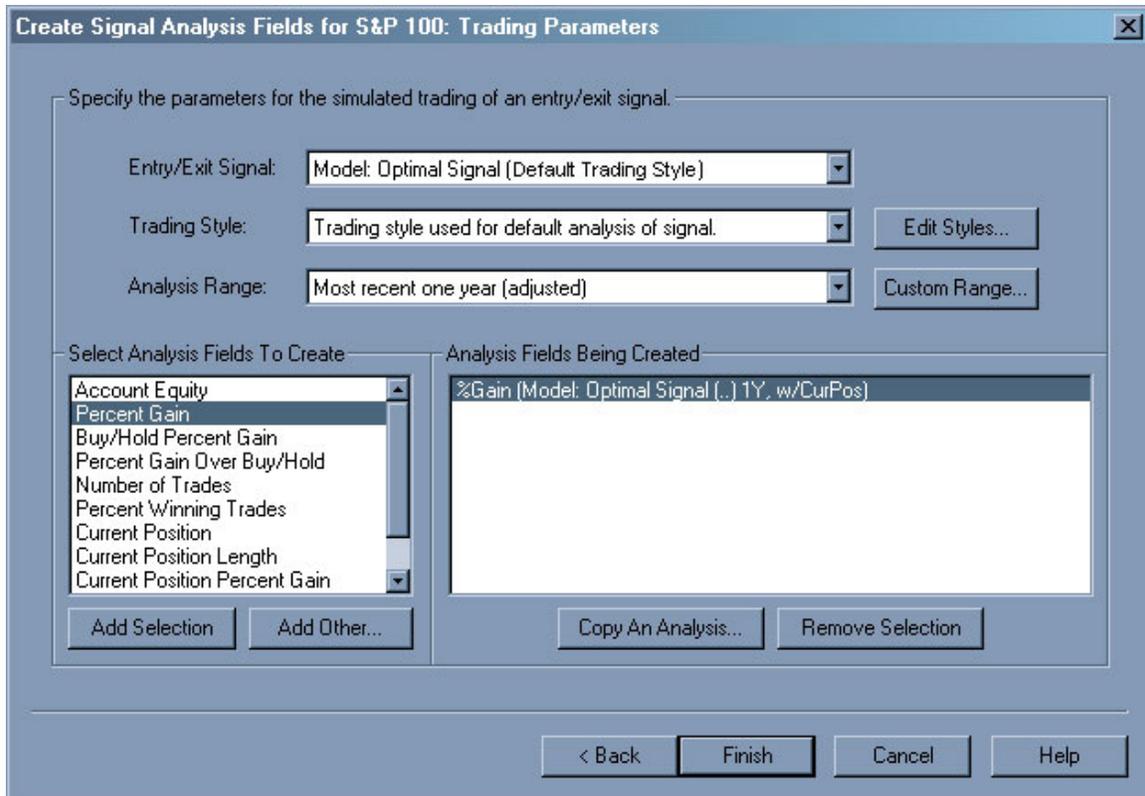
In the Trading Parameters dialog box, add the following Analysis Field:
- Percent Gain
    - Entry/Exit Signal: Model: (Optimal Signal: Default Trading Style)
    - Trading Style: Use Default
   - Analysis Range: Most recent one year (adjusted)

Once all of the options are setup as described above, click the "Add Selection" button.

To complete all of the analyses for our neural network model follow the same steps above to also create the following analysis:

- Percent Gain Over Buy/Hold
- Percent Winning Trades
- Number of Trades
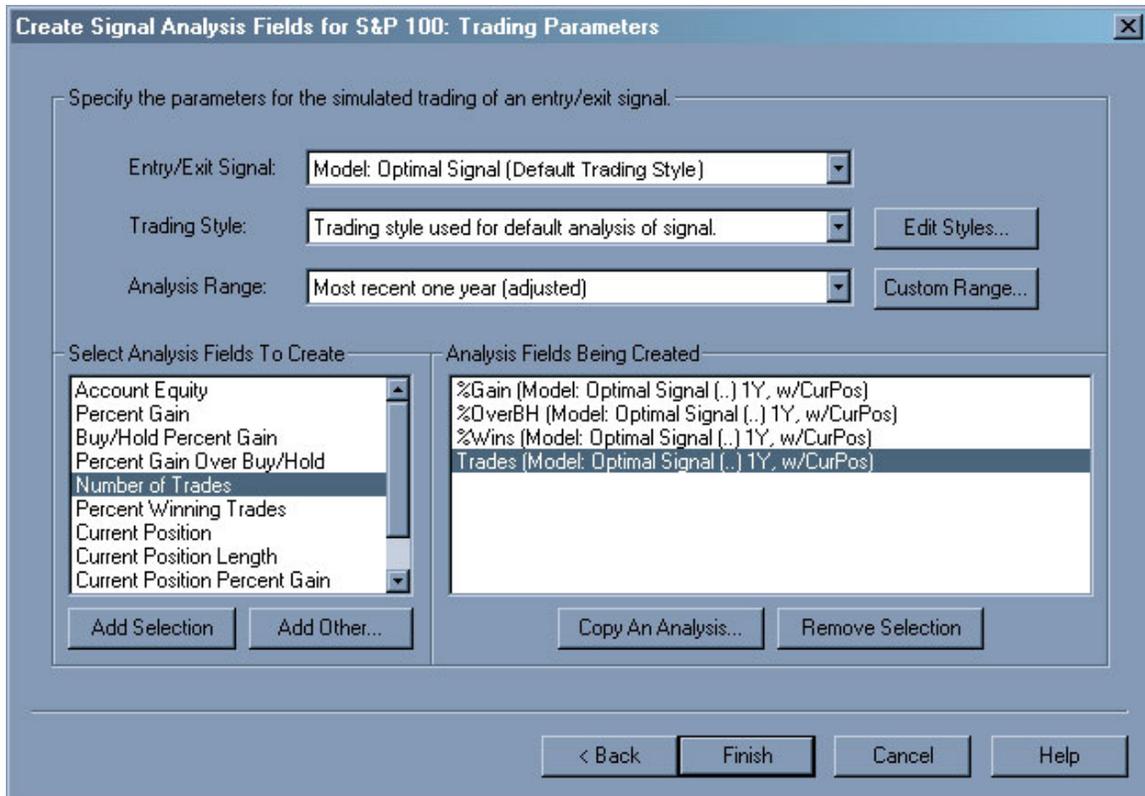
When all of the analyses are added, click the Finish button to complete the fields.
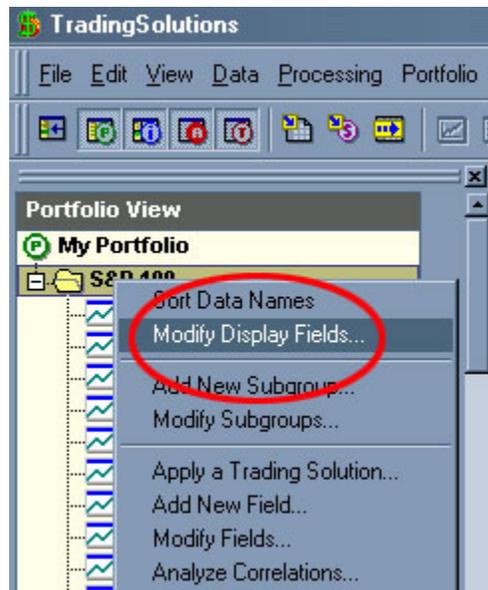
Next, to add the signal analysis fields to the Portfolio View display simply right-click on the "S&P 100" subgroup and choose Modify Display Fields...
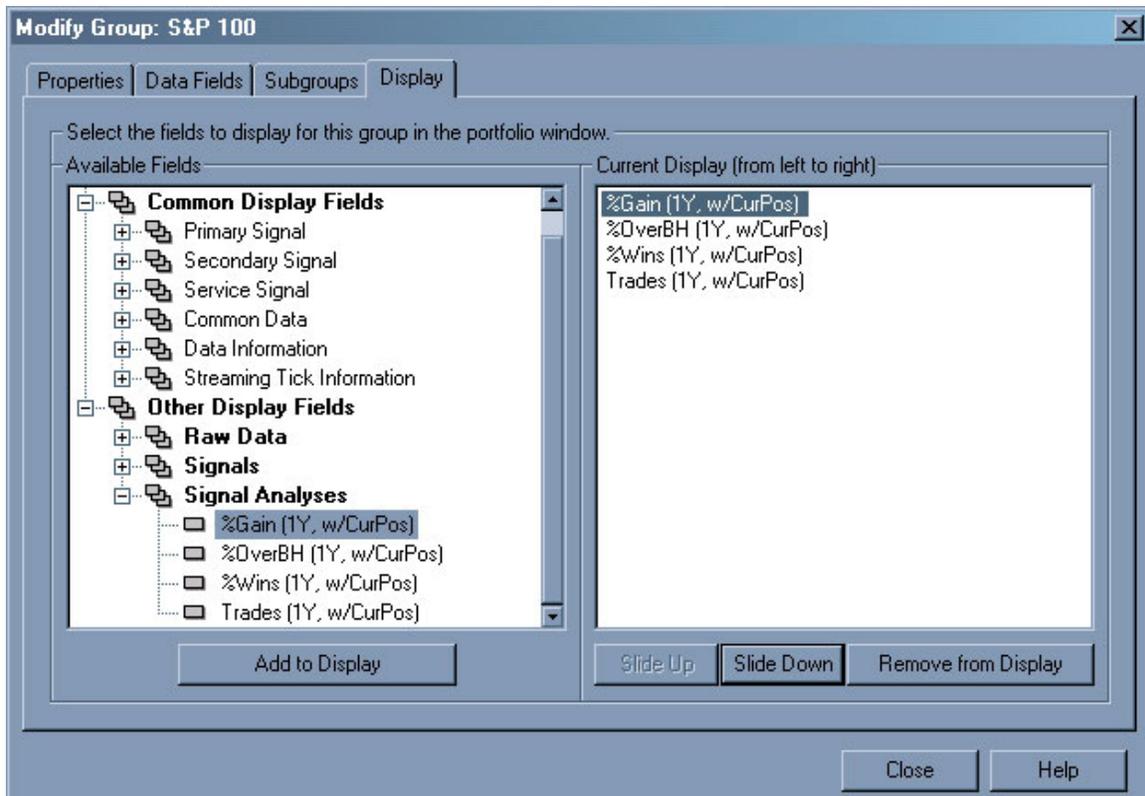
In the Display Fields dialog, click on the + signs for Other Display Fields and then Signal Analyses. In the Signal Analyses, click and add each one until all of the signal analyses are displayed in the right pane. You can arrange each analysis for your preference by using the Slide Up and Slide Down buttons. When finished adding the specified fields click close to complete this operation.

Finally, right-click on %Gain (1Y, CurPos) analysis fields and choosing "Sort Values Descending", which will sort the values from the most profitable to the least profitable.

Choosing the Trading System that actually works!

A good trading system should be a vital part of one's portfolio so that one can enjoy superior returns with controlled risk. Listed below are a few key statistics you might want to look at in considering whether or not a system will work for you or not.
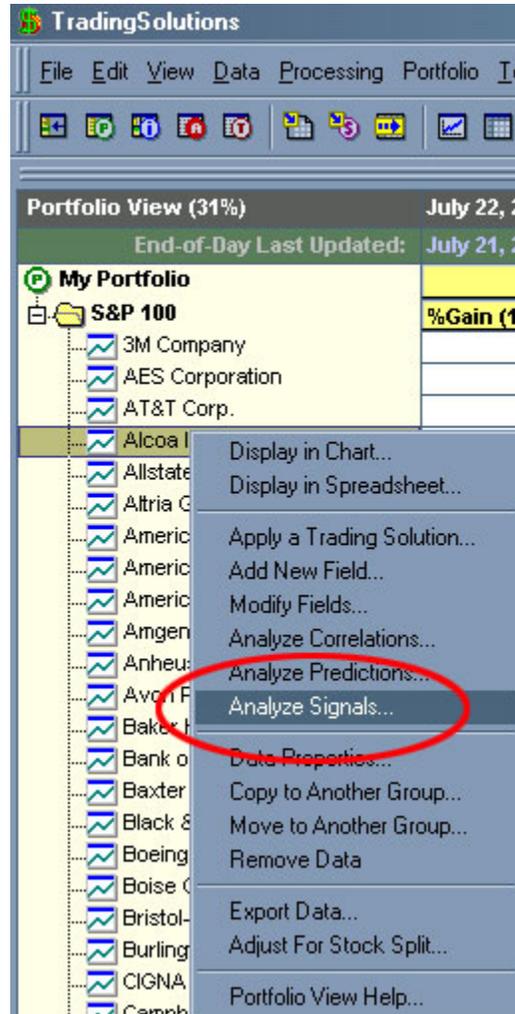
The Portfolio should still be sorted by %Gain (1Y, CurPos), which will give you a good start off point of which symbols to analyze first.

To view the Signal Analysis panel, right-click on the symbol you wish to analyze and choose Analyze Signals… In the Entry/Exit Signals page you can view the annualized return, annualized trades as well as the percent wins. To see greater statistical information, select the model and click the Analyze button.

Modify Field: Delta Air Lines, Inc.: Model: Optimal Signal (Sharpe Stop Loss) 15-Day

Tabs: Overview | Prediction Inputs | Prediction Model | Training Analysis | Signal Analysis

Select from the following options to analyze how the signal would be traded.

Tabs: Overview | Trading Overview | Trading Risk | Equity Risk | Equity Curve | Analysis By Trade | Analysis By Bar

Signal Analysis Settings — Change...

Style	Default Trading Style v3.0 (Sharpe)
Range	07/31/1998 through 08/05/2004
Comments	Analysis matches optimization.

Equity Curve

Profitability	Signal	Buy/Hold	Benchmark
Net Profit	$24,669.03	-$9,266.04	n/a
Gain/Loss	246.69%	-92.66%	n/a
Annualized Return	22.96%	-35.22%	n/a

Trading Overview	Total	% Wins
Overall Trades	191	64.9%
Long Trades	8	75.0%
Short Trades	183	64.5%

Risk Overview	
Annual Trades	31.8
Profit Factor	1.36
Sharpe (Annualized)	0.80

OK Cancel Help
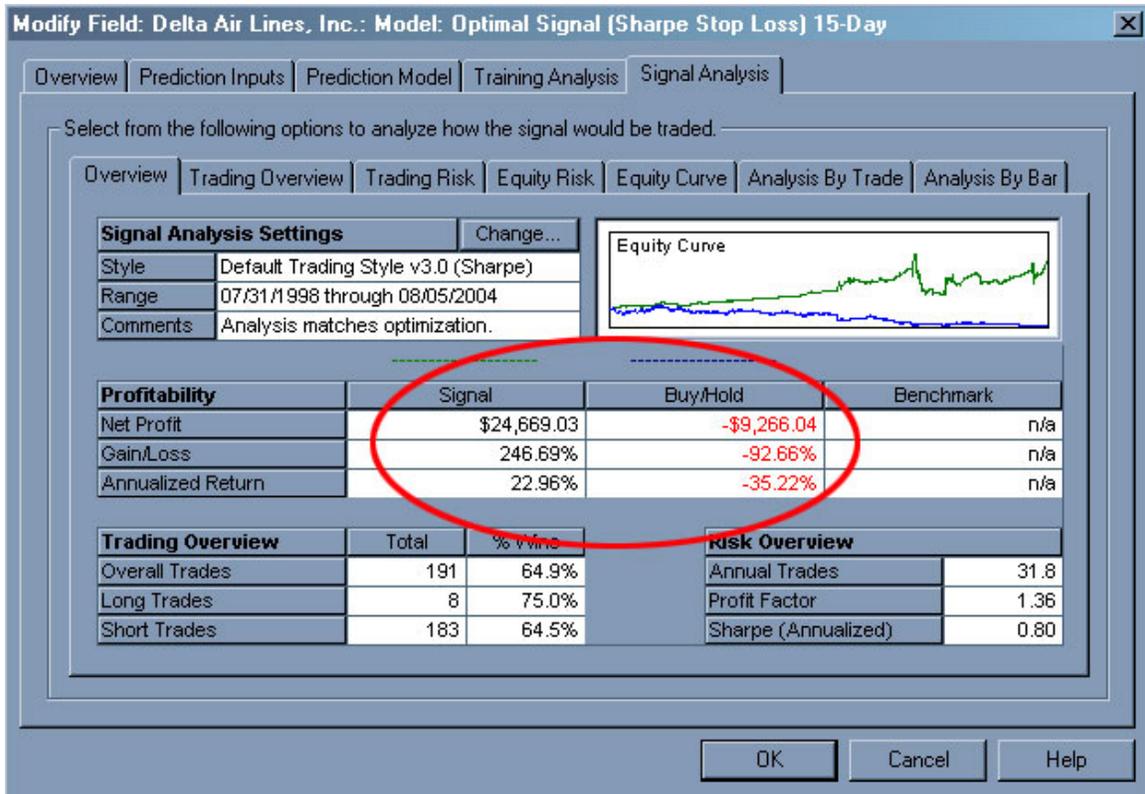
One of the first recommendations is that the Annualized Return be greater than the Buy/Hold of the symbol.

Field: El Paso Corporation: Model: Optimal Signal (Def...

Tabs: ...ew | Prediction Inputs | Prediction Model | Training Analysis | Si...

...ect from the following options to analyze how the signal would be...

Tabs: ...verview | Trading Overview | Trading Risk | Equity Risk | Equi...

Win / Loss Ratios	
Percent Winners	76.3%
Profit Factor	3.43
Avg Win / Avg Loss	122.30%

Maximum Drawdown	
from Trade Entry	-22.87%
from Trade High	-24.39%

Expectancy Ratings	
Trade Expectancy	3.60%
Risk-Adjusted Value	0.70
Annualized Score	21.34

Field: El Paso Corporation: Model: Optimal Signal (Def...

Tabs: ...ew | Prediction Inputs | Prediction Model | Training Analysis | Si...

...ect from the following options to analyze how the signal would be...

Tabs: ...verview | Trading Overview | Trading Risk | Equity Risk | Equi...

Trading Overview	Overall	Win...
Number of Trades	38	

Profitability	Overall	Win...
Cumulative	248.54%	
Average Trade	3.60%	
Largest Win/Loss		

| Length of Trades	Overall	Win...
Cumulative	310	
Average Length	8	
Shortest	1	
Longest	69	

Another suggested aspect is that the maximum drawdown as a percentage of the total account value does not exceed ½ of the Cumulative Return. To view the overall profitability click on the "Trading Overview" tab in the Signal Analysis page. To view the Maximum Drawdown click on the "Trading Risk" tab in the Signal Analysis page.
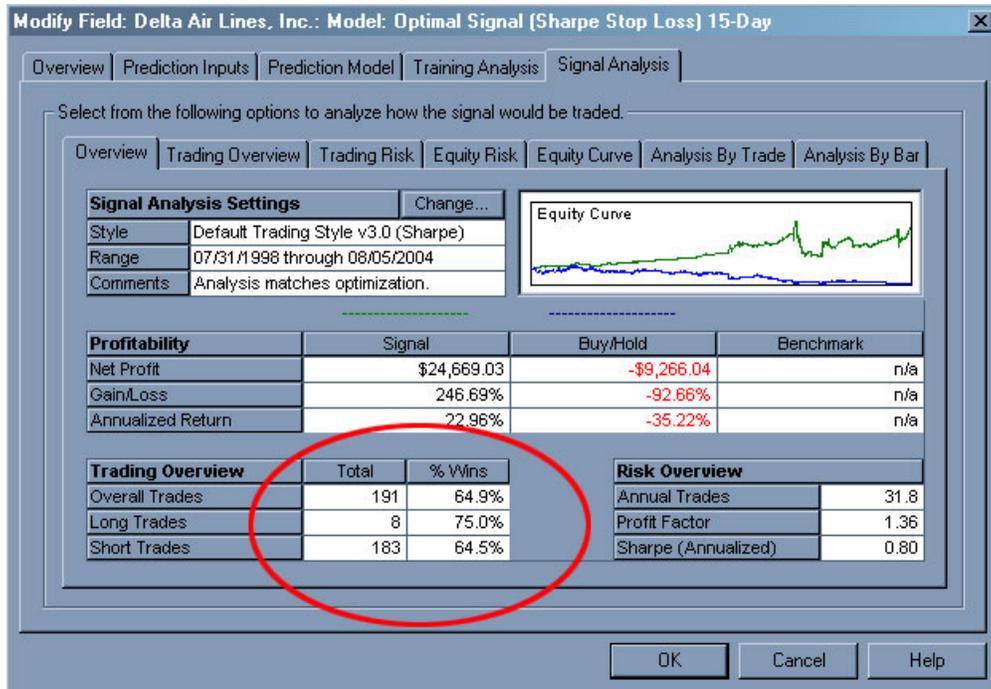
There should be a high enough number of trades over the period being back-tested to reduce the chance of the model getting "lucky". We generally recommend that the model produces at least 10 trades over that period.
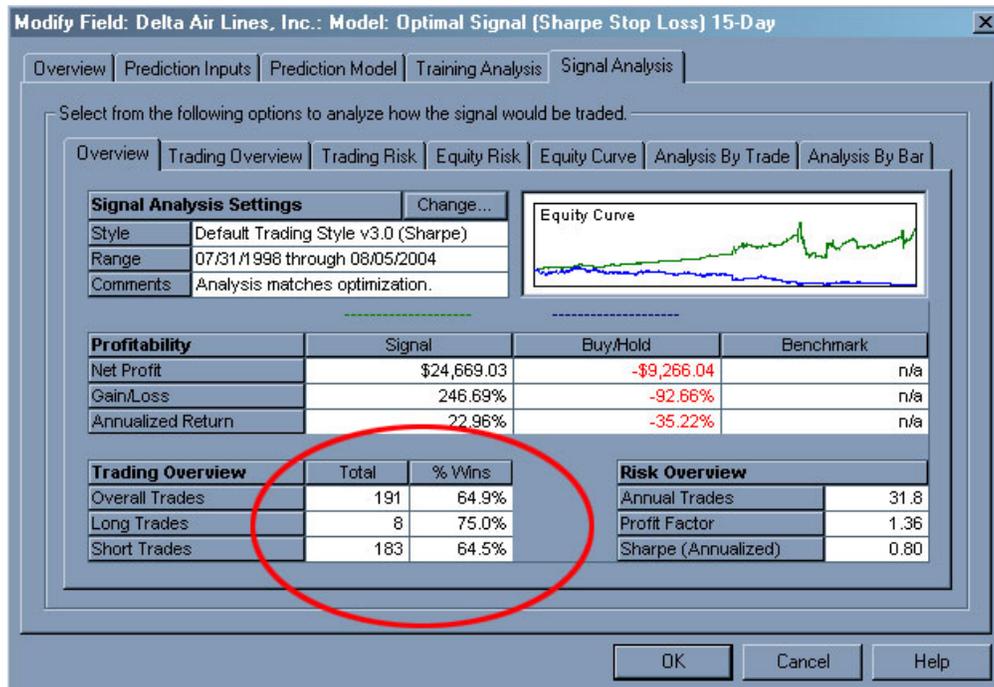
The higher the percent wins the better, but generally speaking anything over 60% is a fairly rounded model. The Overall Percent Wins can be found in the "Overview" tab.
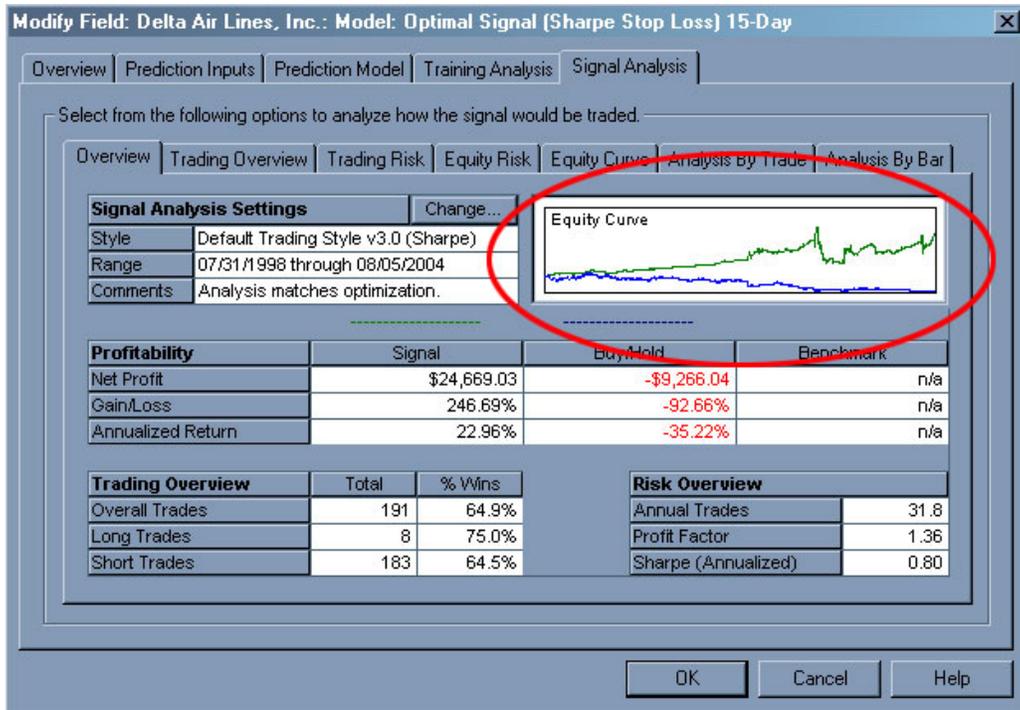
Lastly, the Equity Curve should be as smooth and linear as possible.

Conclusion

Choosing a trading system that is profitable and accurate is the most vital part of the whole process. Group modeling off an index such as the S&P 100 gives you a wide range of symbols and gives you more possibilities of developing a good model. This approach can be applied again and again to the same group with different indicators, variations of the Optimal Signal, different neural network topologies, and so on.