

PROBLEM

Current models for classifying financial market regimes for specific instruments are not able to capture different or multiple asset classes across a broad time window.

PROJECT

The Darwin® automated machine learning product was used to create a predictive model for market regime based on historical financial metrics.

RESULTS

The Darwin product created a solid, investment-grade regime model capable of predicting next-day market state across multiple assets, all in less than an hour of training.

THE PROBLEM: UNCERTAINTY IN FINANCIAL MARKETS

Leading academics believe that prevailing sentiment about the financial market has roughly four states: complacent, balanced, anxious, and bipolar. This sentiment classification is known as the market sentiment meter, and while it provides invaluable information about the current state of a market, it has not yet been successfully tied to predictive models that operate across asset classes for a sustained time window.

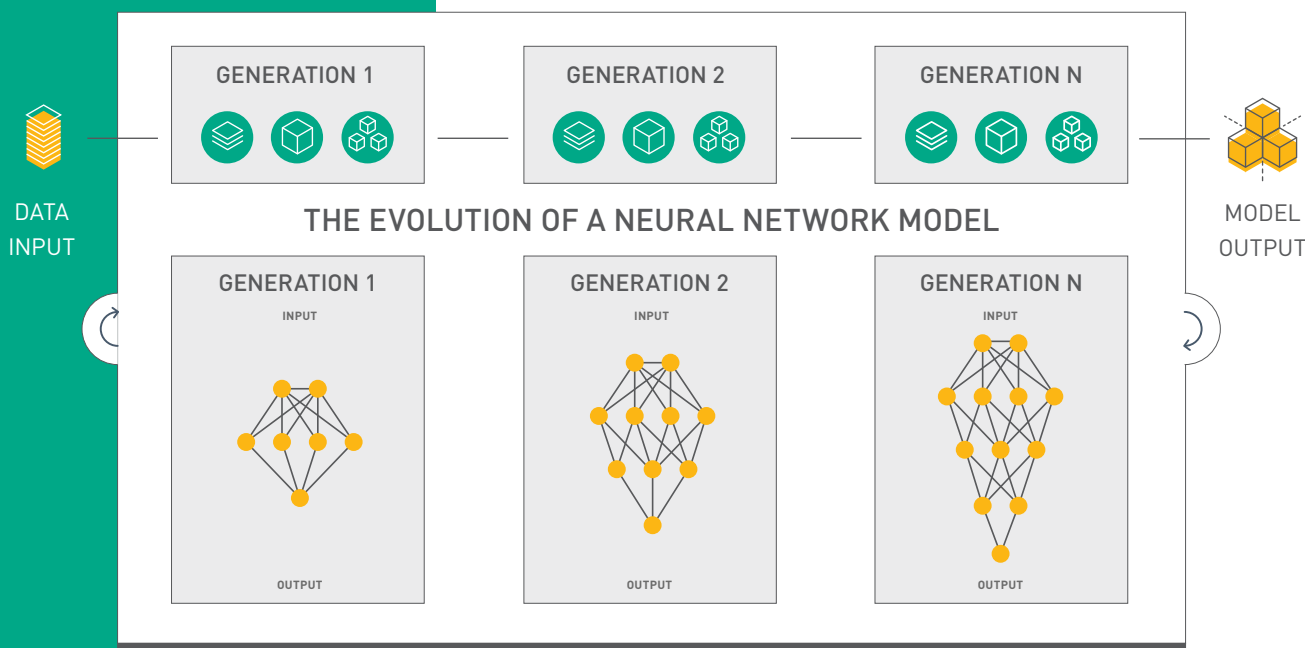
The ability to more accurately predict market volatility, price changes, and price change directions gives asset managers a massive advantage over competitors, and increased long-run stability in unpredictable conditions. A leading global investment and trading company decided to search for a way to predict the market sentiment meter in order to make better predictions about asset selection and portfolio positioning.

THE SOLUTION: AUTOML FOR MARKET REGIME PREDICTION

To find the best possible methodology, the investment and trading company staged an internal competition, with multiple teams each attempting to build a machine learning model that would be able to predict market trends based on historical financial metrics. Each team selected a different model-building platform or data analysis tool from the currently available solutions, including those from the world's top software companies. One of the model building platforms used in this competition SparkCognition's Darwin product.

The Darwin product automated the major steps in the data science process for that team:

- **Data cleaning:** Data sets were automatically prepared and processed for algorithm development
- **Feature generation:** The Darwin product automatically generated new features from the categorical data to drive towards a better solution
- **Model building:** Through neuroevolution, the Darwin product built a deep neural network and optimized its topology to fit the data considered. This included mutating and spawning multiple neural networks over several generations to find a pseudo-optimal combination of nodes, layers, activation functions, and more.



THE RESULTS: A NEW MODEL FOR CHANGING MARKETS

In under an hour, the Darwin product was able to create a solid, investment-grade regime model to predict next-day market state across multiple assets. This model had strong predictive ability across the various market regimes. In particular, it was able to forecast the steep drawdown periods that are most worrisome for investors. The model that the Darwin product created proved to have the best predictive power and its team was deemed the winner of the competition.

The Darwin product provided its team with a number of advantages. One was speed to insight; the time the Darwin product took to produce a model was remarkably short as compared to hand-crafted models, and allowed for rapid prototyping and improvement on the data transformation. Another was its ease of use. The Darwin team consisted of a mix of data scientists and non-technical subject matter experts, but all team members were equally able to make use of the Darwin product, allowing them to more effectively pool their different skill sets to create a winning solution.

This predictive model for market regime will have far-reaching implications. Using this technology, the investment and trading company will be able to make better investment decisions, supported by factual data analysis based on expected market sentiment. In the very near future, this ability will become a necessity for investors looking to thrive in the changing asset management space.

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