

# FMI Technologies LLC

## Innovation Award in Field Machine Intelligence 2019

After a vast leap in technical advancement over the last decade, the potential uses for artificial intelligence has become practically limitless, branching out across a plethora of industries and fields. Yet, scientists and mathematicians around the world are still learning more about AI every single day – from its strengths to its limitations. In the meantime, a group of revolutionaries are spearheading a charge to implement artificial intelligence into trading institutions around the globe. To learn more about this tremendously exciting leap forward, we profiled the firm FMI Technologies LLC.

Beginning as an idea in the mind of a Princeton student, Field Machine Intelligence (FMI) has quickly become one of the most exciting developments in the world of artificial intelligence and machine learning today. FMI Technologies is a firm dedicated to providing algorithmic service, through the power of FMI, a proprietary technology developed by a team of Princeton physicists. Aiding trading institutions everywhere, FMI technology enables them to make trading decisions based on a combination of highly nonlinear and complex signals that are discovered by the algorithm.

FMI Technologies began as an attempt to provide a stronger and more transparent alternative to artificial intelligence for time series forecasting and classification, anomaly detection, and correlation analysis. Developed to aid hedge funds - and by extension anyone interested in time series forecasting- FMI is the culmination of developments in chaos theory, AI, field theory, and control theory. Arbitrarily nonlinear and non-stationary, the technology is built to root out

anomalies whilst accounting for sudden shifts that can leave investors blind-sided.

Looking for ways to help discover trade signals within nonlinear time series, Princeton professor Alexander Polyakov and then-student Revant Nayar began to apply AI to turbulent fluid dynamics. They found a striking similarity to financial time series, with sets of time series in finances and turbulent fluid dynamics being equally chaotic and nonlinear making it hard to identify any sort of pattern. They are, in a word, noisy by nature with little in the way of a strong, definable pattern or signal. However, from that initial difficulty, Polyakov and Nayar then set about creating what would eventually become FMI. Whilst many other forms of artificial intelligence have fared very poorly dealing with financial time series, FMI represents a significant step in the right direction.

After a period of intense research and trial, Nayar and his team then built advanced risk management into the proprietary version of FMI. Upon seeing it in action for the first time, one NYU professor

commented that FMI is akin to "AI on steroids".

Retaining the power of neural networks without the numerous shortcomings, FMI represents the latest techniques developed by physicists in modelling nonlinearity in fluid dynamics and particle physics. In constant communication with research teams at Princeton, NYU, and Cornell, the team of Nayar, Polyakov and other notable members at FMI Technologies continue to develop the exceptional potential alongside the world's foremost physicists and researchers.

For hedge funds, the industry has been crying out a technology such as FMI for a while. With more sophisticated hardware working to take advantage of the slightest trading opportunity, it has become increasingly difficult to remain profitable. The search for anomalies is unfruitful. Regime changes meant that previously overfit neural networks could not handle the large amount of training data necessary to capture transient anomalies. FMI continues to prove that it can capture all possible market anomalies in the most robust manner possible, regardless of nonlinearity or transience.

This remains a prime distinguishing factor for FMI – it represents, above all else, a changing paradigm. A turning tide. Where other AI has previously failed, for one reason or another, to generate meaningful return for hedge funds in terms of identifying trading signals and anomalies, FMI Technologies continues to push the boundaries of its capabilities. Developed by some of the world's foremost thinkers, physicists, mathematicians, and skilled researchers, the excitement for FMI is certainly justified, and is certainly 'one to watch' heading into a new decade of innovation and advancement.

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