



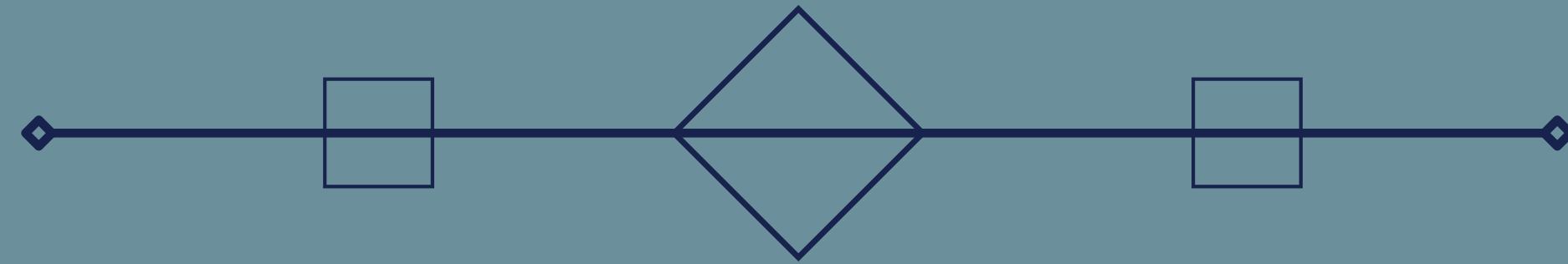
# Delivering Enterprise-AI: Challenges, Learnings and Opportunities

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## Abstract



While AI-driven computational systems like AlphaGo and AlphaFold has attracted wide media attention in achieving super-human level of performance in their target domain, reports of successful demonstrations of Enterprise AI, i.e., general AI-automation engines at enterprise scale and complexity, has been lacking. This lecture reports on the deployment of a general, scalable automated decision-engine configured to fight financial crime at a leading global bank that outperformed the effectiveness and efficiency of the bank's own incumbent system comprising 100 complex siloed risk models and 1000 human experts. The success of our approach hinged critically in being able to automatically, scalably and dynamically score risk at different levels of hierarchies within the bank and offering a practical yet principled way to integrate and manage risk within and across these levels in a transparent fashion.

To fight financial crime and comply with the 2001 USA Patriot Act, modern global banks may process up 10B transactions per day where each transaction can trigger any one of 100s of siloed models and hard-coded rules. This results in a deluge of potentially false positive compliance alerts which are then threshold-controlled to manage the volume of caseload requiring human investigative effort and related compliance paperwork. Constrained to a finite number of human experts, banks are thus exposed to uncontrolled compliancy risk at the institutional level. We enabled the bank to advance to a dynamic behavior risk framework that proactively and automatically learns, scores and promotes new cases, risks, and outcomes in real time. Our AI-automation software system, deployed in one quarter within the bank's regulated infrastructure, tollgate practices, and secure IT policies, helped the bank to modernize with a unified model consolidation framework that was compatible with the bank's existing processes and IT framework in a "plug and play" fashion.

This lecture retraces some of the key challenges and learnings in delivering AI-automation software to enterprises and outlines potential opportunities ahead. It is our belief that every business, including the vast majority of small businesses, will need AI-automation to help them think, build and grow their businesses. Indeed, our mission is to deliver Enterprise AI for All.

## Brief Bio-Sketch

Indian-born Rajarshi discovered his love for exploring patterns in nature at an early age. After graduating from Loyola High School in Jamshedpur, he earned a bachelor's degree in Electrical Engineering from Indian Institute of Technology (KGP) in 1987 as a Jagadis Bose National Science Scholar and a doctorate in Computer Science from Colorado State University with a graduate fellowship from the Santa Fe Institute. Rajarshi continued his inter-disciplinary research in complex systems as a Director's PostDoctoral Fellow at the Center for Nonlinear Studies at Los Alamos National Laboratory.

Motivated by Nobel laureate Phil Anderson's "More is Different" call to action for new ways of thinking to understand complex natural and social systems, Rajarshi's postgraduate research provided insights into relations between pattern formation, information processing and computation that may spontaneously arise at multiple levels in a complex system and which may be subject to natural or artificial selection and evolutionary population dynamics (think Turing patterns).

Rajarshi joined IBM Watson Research Center in 1996 where he helped run the first-ever competition between software agents and human agents in a continuous double-auction market which showed unexpected nonequilibrium market dynamics arising from the bounded rationality among human graduate students. At IBM, Rajarshi's group led the research into autonomous and multiagents systems while innovating new tools and techniques for nonlinear dimensionality reduction, deep learning, reinforcement learning, cognitive neuroscience, decision theory and game theory. These efforts culminated in the development of a series of autonomous multiagent systems that learned to dynamically allocate computational resources – commercially available IBM systems from multicore processors to multitiered webservers to the entire data center – to minimize energy cost while maximizing service performance under time-varying computational workload and energy price regimes.

Rajarshi has played a key role in leading AI research and its applications at Verdande Finance, Persistent Systems and FatBrain.ai while developing and delivering scalable AI solutions to many Fortune 100 companies. Rajarshi is an inventor with 20+ patents. He has published over 60+ peer-reviewed articles at leading conferences/journals. His work has been featured in The New York Times, The Telegraph and The Economist.

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