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## Thought Leadership

# Can AI Comply to Transparency Standards?

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Risk-related regulatory compliance spending is expected to reach \$72 billion annually by 2019. Technology expenditures are increasing as financial institutions strive to meet evolving regulatory standards such as MiFID II and to exploit advancements made possible by improvements in processing, memory, and distributed computing.

One such advancement is the ability to apply machine learning and artificial intelligence to regulatory problems. Banks are using machine learning for trade surveillance and transaction monitoring. Regulators themselves are using machine learning to parse filings and detect anomalous patterns. Early adopters of machine learning and AI for regulatory purposes include The Securities Exchange Commission (SEC) and Financial Regulatory Authority (FINRA).

Machine learning is the use of use of algorithms and statistical methods to progressively improve the performance of computers on specific tasks without human intervention. Common problems include minimizing the distances among objects to form clusters or recognizing patterns by reweighing inputs until an

optimal combination is found that correctly identifies a large percentage of outputs. Machine learning is a subset of artificial intelligence (AI), the development of computer algorithms able to perform tasks that usually require human intelligence. Deep learning is a specific type of artificial intelligence that uses neural networks to mimic the human thought and decision-making process. For regulators who require a clear audit trail, deep learning is challenging given that neural networks include hidden layers that don't provide the level of transparency usually required by regulators.

## Future vision: Achieving Transparency

To satisfy regulators, deep learning needs to provide the rules used to transform a set of inputs into a set of outputs, including the relationships among input variables and outputs. Neural networks include layers of nodes that apply functions to input data to derive outputs that are used in additional layers of the neural network until a final layer of nodes produces a single output. The primary problem posed by neural networks is the lack of a clear audit trail. Neural networks don't provide regulators with a clear description of the ways that variables used in the neural network reach conclusions.

Another challenge facing deep learning is its compatibility (or incompatibility) with the bank model review process. Model review committees assess the inputs, outputs, and architectures of models currently in use. Something as simple as changing a Python library can trigger a model review process. The review process can take several months or even a year for a model to be approved. This example illustrates the difficulty faced by a neural network with multiple layers and potentially thousands of nodes that pass on data to further layers of the network without revealing the weightings used in the process of deciding to pass on (or restrict) the data.

The industry is developing solutions to the lack of transparency inherent to neural networks. At Synechron we're working on making neural networks more transparent, starting with feeding variations of input data to neural networks and measuring the sensitivity of its outputs, a process which provides a relationship between inputs and outputs even if not as granular as the coefficients on a statistical regression model. The benefits of deep learning to finance and regulation and the early adoption of machine learning by regulators are promising trends that point to continued adoption of machine learning and AI in the finance industry by both practitioners and regulators alike.