

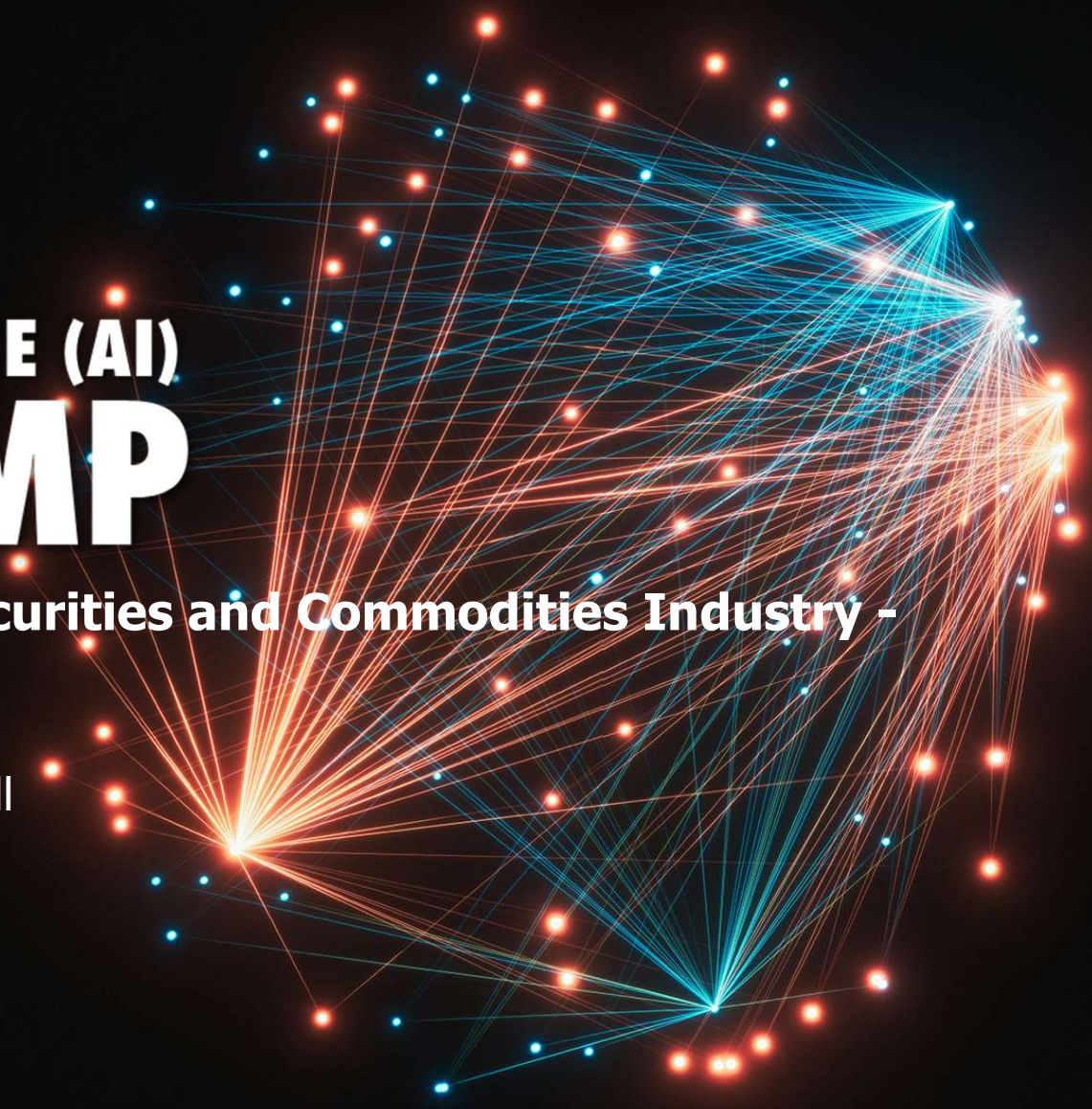
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ARTIFICIAL INTELLIGENCE (AI) BOOT CAMP

**Artificial Intelligence in the Securities and Commodities Industry -
A Primer**

January 17, 2023

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Host



Andrew J. Gray IV

Presenters



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Sarah V. Riddell

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Agenda

- **Overview of Artificial Intelligence Technology**
- **Components of Artificial Intelligence Applications**
- **Applications in the Securities and Commodities Industries**
- **Regulatory Uses, Considerations, and Perspectives**
- **Compliance Considerations**

Overview of Artificial Intelligence Technology

What is Artificial Intelligence?

- “applications of technology to perform tasks that resemble human cognitive function and is generally defined as “[t]he capability of a machine to imitate intelligent human behavior.” Merriam Webster
- “[t]he theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.” Oxford English Dictionary
- **Turing Test/Imitation Game:** a test of a machine's ability to exhibit intelligent behavior equivalent to, or indistinguishable from, that of a human.
 - Can a human tell the difference?

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Tech > News Tech

KILLER ROBOT Three times artificial intelligence turned ‘evil’ – including AI microwave that tried to kill its creator

Overview of Artificial Intelligence Technology

What does Artificial Intelligence Encompass?

- **Natural Language Processing (NLP)** – NLP is a form of AI that enables machines to read or recognize text and voice, extract value from it, and potentially convert information into a desired output format, such as text or voice.
- **Computer Vision (CV)** – CV (also referred to as machine vision) is a “field of computer science that works on enabling computers to see, identify and process images in the same way that human vision does, and then provide appropriate output.
- **Robotics Process Automation (RPA)** – RPA refers to the use of preprogrammed software tools that interact with other applications to automate labor-intensive tasks, resulting in increased accuracy, speed, and cost-savings.

Overview of Artificial Intelligence Technology

What does Artificial Intelligence Encompass?

- **Machine Learning (ML)** - Machine learning is a field of computer science that uses algorithms to process large amounts of data and learn from it. Unlike traditional rules-based programming, ML models learn from input data to make predictions or identify meaningful patterns without being explicitly programmed to do so.
 - **Supervised Machine Learning** – Model is trained with labeled input data that correlates to a specified output.
 - **Unsupervised Machine Learning** – The input data is not labeled nor is the output specified. the model learns dynamically to achieve the desired output through trial and error.
 - **Reinforcement Learning** – The model learns dynamically to achieve the desired output through trial and error. If the model algorithm performs correctly and achieves the intended output, it is rewarded. Conversely, if it does not produce the desired output, it is penalized.
 - **Deep Learning** – Built on an artificial neural network, in which algorithms process large amounts of unlabeled or unstructured data through multiple layers of learning in a manner inspired by how neural networks function in the brain.

Components of Artificial Intelligence Technology

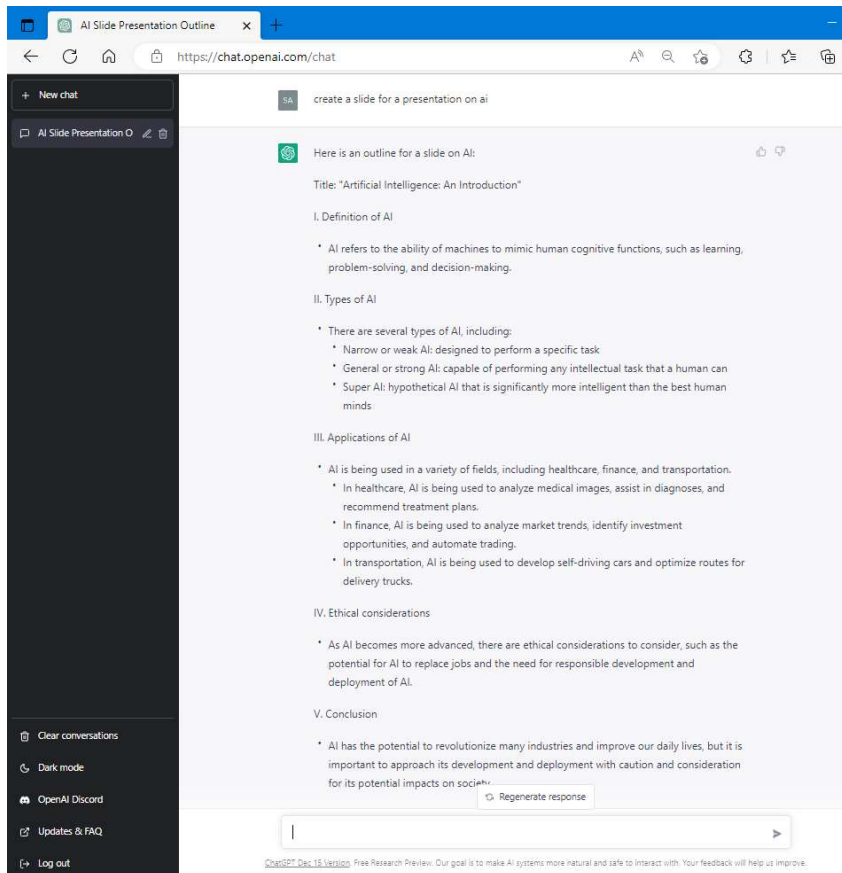
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Components of Artificial Intelligence Technology

What does Artificial Intelligence Need and Use?

- **Data** – There is lots of data in securities and commodities industry
 - Customer profiles, transaction data, reporting data, depository data, trader data, public filings, social media, communications, satellites, internal sources.
 - Data is more valuable than oil. And is constantly refreshed.
- **Algorithms** – Well-defined, step-by-step instructions for a machine to solve a specific problem and generate an output using a set of input data.
 - “programmed to learn to perform the task”
- **Human interaction** – human reviews are essential to curate the data
 - review of the output for relevancy, accuracy, and usefulness

Overview of Artificial Intelligence Technology



The screenshot shows a web browser window with the URL <https://chat.openai.com/chat>. The chat interface displays a user prompt: "create a slide for a presentation on ai". The AI response provides a structured outline for a slide on Artificial Intelligence, including sections on Definition, Types, Applications, Ethical considerations, and Conclusion.

SA create a slide for a presentation on ai

Here is an outline for a slide on AI:

Title: "Artificial Intelligence: An Introduction"

I. Definition of AI

- AI refers to the ability of machines to mimic human cognitive functions, such as learning, problem-solving, and decision-making.

II. Types of AI

- There are several types of AI, including:
 - Narrow or weak AI: designed to perform a specific task
 - General or strong AI: capable of performing any intellectual task that a human can
 - Super AI: hypothetical AI that is significantly more intelligent than the best human minds

III. Applications of AI

- AI is being used in a variety of fields, including healthcare, finance, and transportation.
 - In healthcare, AI is being used to analyze medical images, assist in diagnoses, and recommend treatment plans.
 - In finance, AI is being used to analyze market trends, identify investment opportunities, and automate trading.
 - In transportation, AI is being used to develop self-driving cars and optimize routes for delivery trucks.

IV. Ethical considerations

- As AI becomes more advanced, there are ethical considerations to consider, such as the potential for AI to replace jobs and the need for responsible development and deployment of AI.

V. Conclusion

- AI has the potential to revolutionize many industries and improve our daily lives, but it is important to approach its development and deployment with caution and consideration for its potential impacts on society.

Regenerate response

Clear conversations
Dark mode
OpenAI Discord
Updates & FAQ
Log out

ChatGPT: GPT-3.5 Version. Free Research Preview. Our goal is to make AI systems more natural and safe to interact with. Your feedback will help us improve.



Use Cases



BRAVE NEW WORLD:
90% OF ONLINE CONTENT WILL BE AI
DRUDGE REPORT

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Application in the Securities and Commodities Industries – Customer Interactions

Customer Interactions

- Virtual Assistants: AI application that interacts with humans using voice recognition and synthesized speech and that is programmed to perform certain tasks.
 - Simple digital customer service: account balances, portfolio holdings, market data, address changes, and password resets
 - More complex processes: accept and process trade orders
 - Siri, Alexa, Home Assistant
- Emails: screen and classify incoming client emails based on key features, such as the sender's identity, the email's subject line, and an automated review of the email message itself.
 - Automatic responses and routing of more complex emails
- Outreach: Targeted outreach to customers or potential customers.
 - Analyze their customers' investing behaviors, website and mobile app footprints, and past inquiries, and, in turn, to proactively provide customized content to them
 - Curated educational information, news, and research reports on specific investment products or asset classes

Application in the Securities and Commodities Industries – Customer Interactions

Customer Interactions - Issues

- Privacy
- Bias in Programming
- Customer Authentication
- Cybersecurity
- Recordkeeping
- Fraud

Microsoft's new VALL-E AI can clone your voice from a three-second audio clip

Text-to-speech models usually require significantly longer training samples, but VALL-E can synthesise a voice from a very short clip.

Researcher Deepfakes His Voice, Uses AI to Demand Refund From Wells Fargo

Do Not Pay, which has automated a ton of menial tasks, says it plans to make the tool available to customers.

Application in the Securities and Commodities Industries - Investment and Trading Process

Account Management

– Customer Profiles

- Customer assets (held both at the firm and outside the firm)
- Spending patterns
- Debt balances obtained through data aggregation tools
- Updates on social media and other public websites
- Browsing history on the firm's website and mobile apps
- Past communications

– Curated and Targeted Research

- AI-based tools may offer customers social media data and related sentiment analysis on investment products and asset classes

Your phone when you say you want to buy something



Application in the Securities and Commodities Industries - Investment and Trading Process

Asset Management and Trading

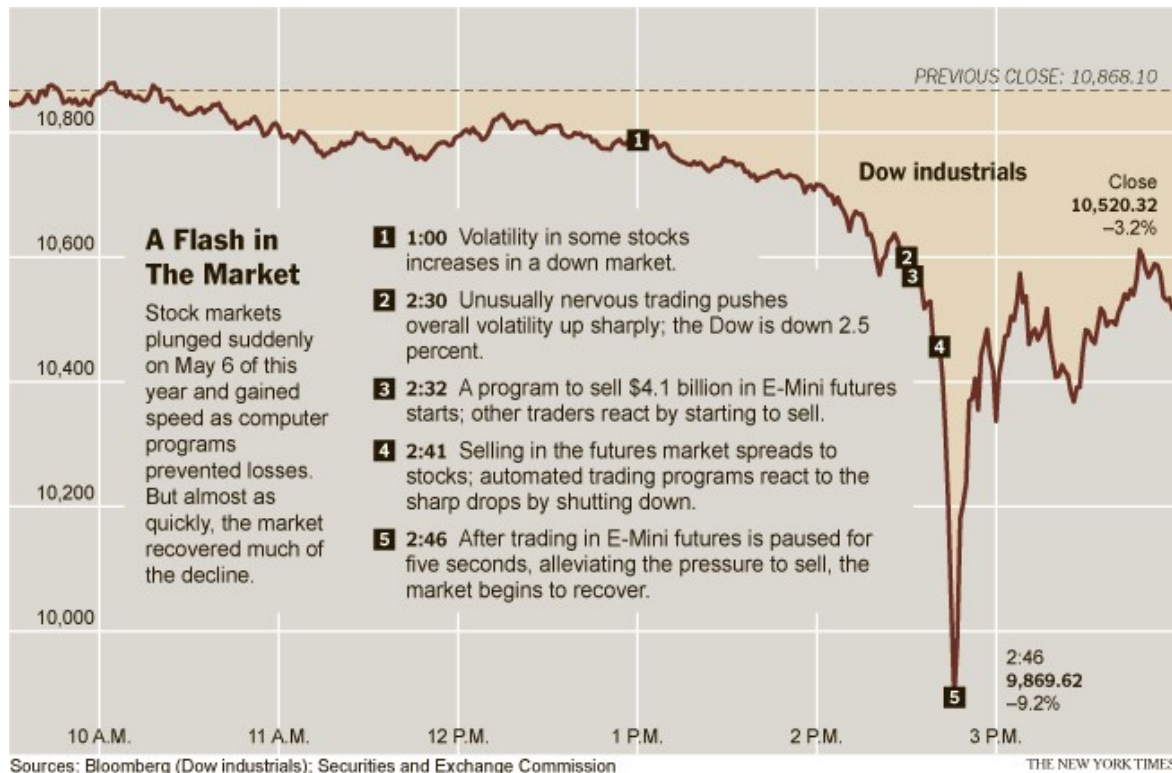
– Portfolio Management

- Identify new patterns and predict potential price movements of specific products or asset classes
- Social media and satellite activity (for economic activity)
- Roboadviser

– Trading

- Smart order routing, price optimization, best execution, and optimal allocations of block trades
- Automated algorithmic trading
- New SEC rule proposals will generate significant data

Application in the Securities and Commodities Industries - Investment and Trading Process



Can AI account for Black Swan Events?

A black swan event, a phrase commonly used in the world of finance, is an extremely negative event or occurrence that is impossibly difficult to predict. In other words, black swan events are events that are unexpected and unknowable. The term was popularized by former Wall Street trader Nassim Nicholas Taleb, who wrote about the concept in his 2001 book *Foiled by Randomness*.

Application in the Securities and Commodities Industries - Operations

Surveillance and Monitoring

- Capture and surveil large amounts of structured and unstructured data in various forms (e.g., text, speech, voice, image, and video) from both internal and external sources in order to identify patterns and anomalies.
- Predictive, risk-based surveillance mode
- Decipher tone, slang, or code words



Application in the Securities and Commodities Industries - Operations

Know-your-customer and customer monitoring

- Detect potential money laundering, terrorist financing, bribery, tax evasion, insider trading, market manipulation, and other fraudulent or illegal activities
- ML, NLP, and biometrics (faceid)

Regulatory Intelligence

- Digitize, review, and interpret new and existing regulatory intelligence (including rules, regulations, enforcement actions, and no-action letters) and to incorporate appropriate changes into their compliance programs
- Machine readable rulebooks (see regulator efforts in next slides)

Application in the Securities and Commodities Industries - Operations

Liquidity and cash management

- Identify trends, note anomalies, and make predictions, for example, related to intra-day liquidity needs, peak liquidity demands, working capital requirements

Credit risk management

- Creditworthiness of their counterparties
- Incorporation of non-traditional criteria (e.g., information available through social media)
- AI-based credit-scoring systems

Regulatory Uses, Considerations, and Perspectives

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Regulatory Uses, Considerations, and Perspectives

FINRA

- FINRA Rulebook Search Tool (FIRST): machine-readable rulebook through the creation of an embedded taxonomy—a method of classifying and categorizing a hierarchy of key terms and concepts—that was applied or “tagged” to the 40 most frequently viewed FINRA rules.
- “Through the implementation of FIRST and the associated API interface, we aim to enhance the search functionality of the FINRA rulebook and facilitate the ability of firms to automate their compliance functions.”
- Comment requested through February 21, 2023.
- [Special-Notice-102122.pdf \(finra.org\)](#)

Regulatory Uses, Considerations, and Perspectives

FINRA Cont'd

- **Exam Priorities**

- AI reviews disclosures, complaints, or employment history data to help staff determine which registered representatives to examine.

- **Market Manipulation Surveillance**

- FINRA has begun using deep learning to address changing market conditions, increased volatility, increased volumes, and change in conduct.
- FINRA believes that, by being able to react faster, deep learning will make the market safer. Other regulators and exchanges send FINRA information to help make the model become smarter.
- The use of AI is changing the culture from that of a static rule-based surveillance into a more dynamic, risk-based paradigm.

Regulatory Uses, Considerations, and Perspectives

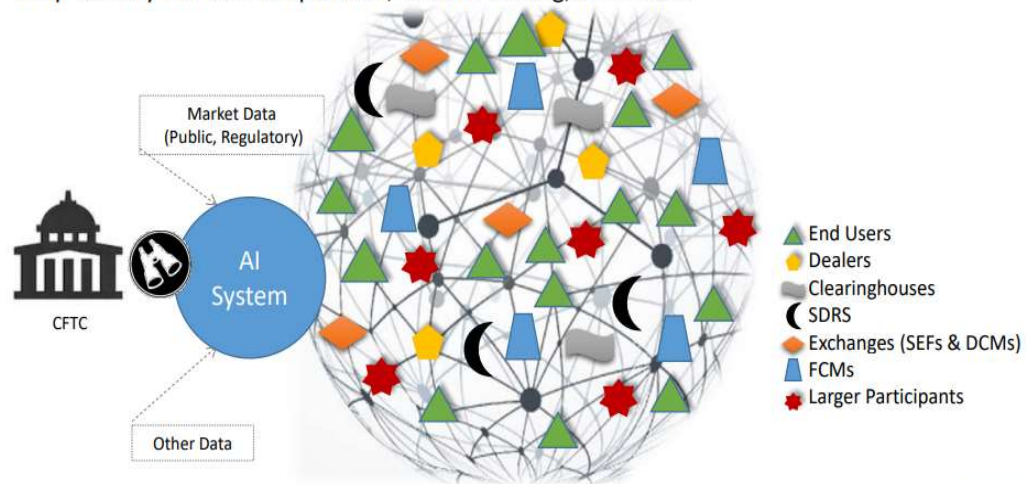
- LabCFTC
- CFTC Electronic Trading Rules

Potential Application of AI: Market Oversight



Modern markets are fast-moving, complex networks with numerous participants carrying out various functions. Effective oversight supports strong, well-working markets. As a market regulator, the CFTC could leverage AI to:

- “Read” a complex marketplace and distinguish salient activity.
- Use data to develop market models and identify risk factors.
- Apply the models to conduct ongoing market and risk surveillance.
- Help identify market manipulation, abusive trading, and fraud.



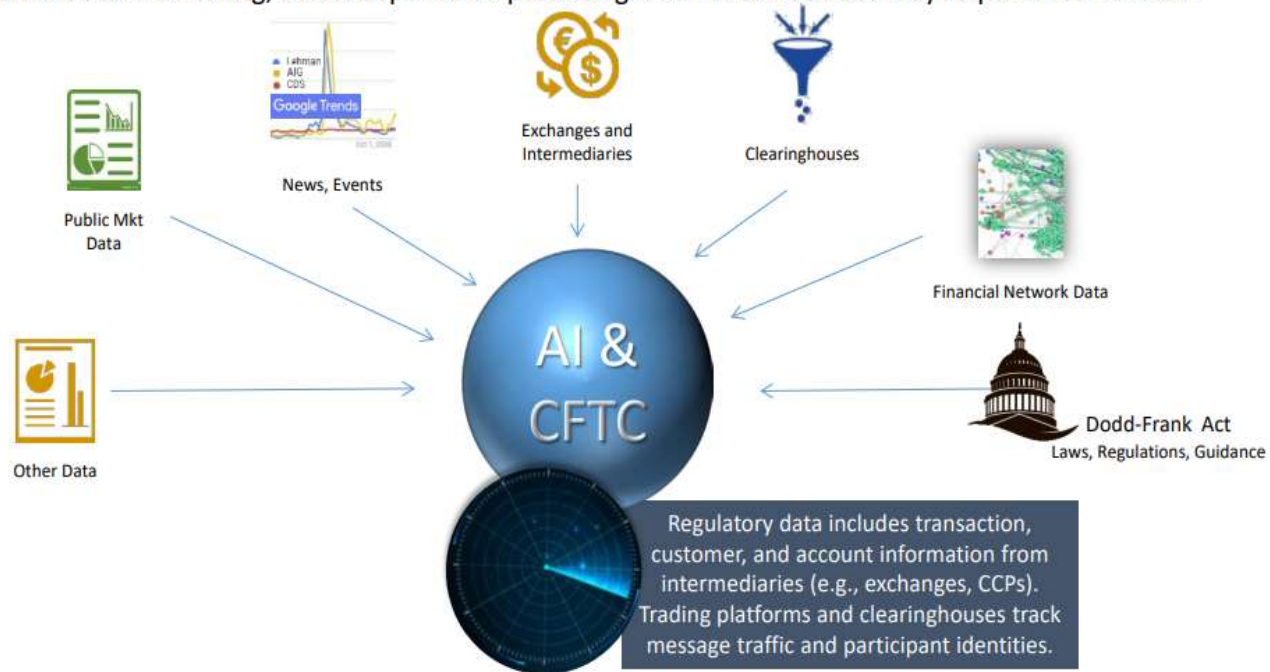
LabCFTC Graphic

Can AI Predict Systemic Risk?

- The CFTC and SEC have examined historical data to determine whether they could predict systemic risks.

Predicting catastrophic market events, such as the cascading defaults of 2008, is like predicting the weather. There are many variables, which can generate diverging predictions, and some key information may be overlooked or not available. This can impede corrective action.

A strength of AI is its ability to identify correlations in vast data sets. Such correlations can be helpful in systemic risk monitoring, which depends on predicting when circumstances may require intervention.



Regulatory Uses, Considerations, and Perspectives

- CFTC / DOJ Spoofing Cases
 - Spoofing (bidding or offering with the intent to cancel the bid or offer before execution) is prohibited under Section 4c(a) of the Commodity Exchange Act.
 - Intent in a spoofing case can be found based on the design of the trading algorithm.
 - Failed aiding and abetting cases against the computer programmer.

Regulatory Uses, Considerations, and Perspectives

- SEC Enforcement Action (Aug. 27, 2018) – Model/Algorithm Governance
 - A group of related investment advisory entities settled an enforcement proceeding for \$97 million in disgorgement and civil penalties in connection with the offer, sale, and management of registered funds, variable life insurance products, and SMA strategies that used a proprietary quantitative investment model.
 - The strategies were marketed as “emotionless” and quantitatively-driven, but the SEC alleged the following:
 - Models were launched without adequate steps to confirm they worked as intended; no model validation policy for three initial years.
 - Discovery of errors in the models did not lead to reconciliation/correction of material errors
 - Failure to publicly disclose discovery of errors (including to fund boards/clients), or disclose the risks inherent in the models
 - An inexperienced, fresh-out-of MBA quant analyst “with no portfolio management experience” served as sole daily manager of the model on which the products were based; disclosure falsely indicated the opposite.
 - Prospectuses for ICs were drafted using templates from a “library” and therefore did not reference the use of the quant models or include relevant risks

Regulatory Uses, Considerations, and Perspectives

- SEC brought an action against digital advisers for the first time in December 2018.
- Cases predominantly relate to unique marketing issues presenting under Advisers Act Rule 206(4)-1
- In the first action, the SEC brought an action against a digital adviser in connection with allegedly misleading disclosures to clients and the public in a marketing white paper
- Content specifically related to disclosures around automated program features (tax-loss harvesting)
- Social media in the digital advice context is a focus
 - Adviser published testimonials and selectively re-tweeted positive posts by Twitter users it had reason to know had an economic interest in promoting its services

Regulatory Uses, Considerations, and Perspectives

- Performance advertising is a pressure point for digital and traditional advisers alike
 - In the second December 2018 action against a digital adviser, SEC accepted an offer of settlement from now-defunct digital adviser in connection with misleading website disclosures
 - The adviser had published on its website a “Robo-Index” purporting to compare its performance with those of digital adviser peers
 - SEC found a number of misleading aspects of the Robo-Index, including extent to which the adviser’s clients were included in the composites, the performance calculation methodology, and the accuracy of advertised returns.

Compliance Considerations

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Compliance Considerations

- Government Accountability Office's Artificial Intelligence: An Accountability Framework for Federal Agencies and Other Entities
- Four Principles:
 1. Governance
 2. Data
 3. Performance
 4. Monitoring



Source: GAO. | GAO-21-5195P

Compliance Considerations

- **Governance**

- Clear goals
- Assigned roles and responsibilities
- Recruit and retain personnel on AI systems
- Diverse stakeholder perspectives to mitigate risk
- AI-specific risk management plan
- Written technical specifications to ensure that the AI system meets its intended purpose
- Compliance with laws, regulations, standards, guidance

Compliance Considerations

- **Data**

- Data provenance
- Assess reliability of data used to develop the models
- Adequate separation between training and testing data
- Assess data variables in the AI models
- Assess the use of synthetic, imputed, or augmented or enhanced data
- Dependencies of data streams
- Bias
- Data security and privacy

Compliance Considerations

- **Performance**

- Define performance metrics that are precise, consistent, and reproducible
- Assess the performance of each component against defined metrics and whether outputs are appropriate for the operational context of the AI system
- Document the methods for assessment, performance metrics, and outcomes of the AI system to provide transparency over its performance
- Ensure explainability
- Human supervision to ensure accountability
- Update BCDR plan or incident response plan to encompass AI systems as appropriate

Compliance Considerations

- **Monitoring**

- Continuous or routine monitoring of the system to ensure it performs as intended
- Establish the range of data and model drift that is acceptable to ensure that the AI system produces the desired results
- Document results of monitoring activities and any corrective actions taken
- Identify conditions under which the AI system may be scaled or expanded
- Complaints

Looking Ahead

- Conduct an inventory of AI systems
- Assess where future AI systems will be used
- Evaluate existing or establish AI-specific policies
- Assign responsibility or designate a role (e.g., CCO) for AI initiatives and ongoing monitoring
- Keep records, including of third-party systems, and be prepared to respond to regulatory inquiries or otherwise discuss AI systems with regulators

Coronavirus COVID-19 Resources

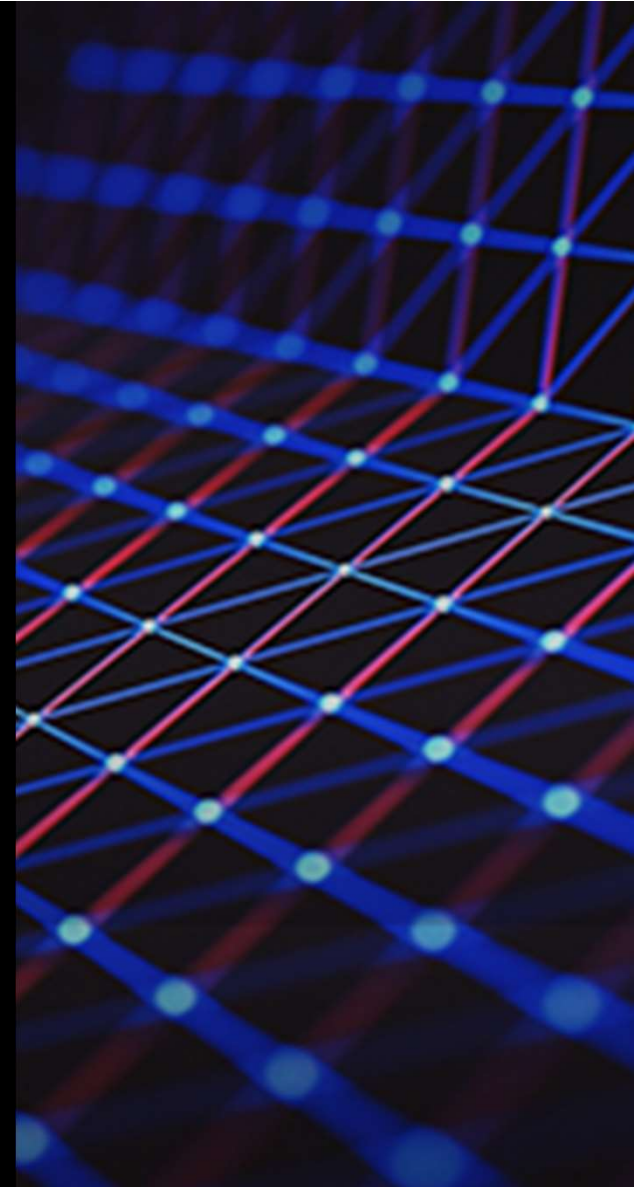
We have formed a multidisciplinary **Coronavirus/COVID-19 Task Force** to help guide clients through the broad scope of legal issues brought on by this public health challenge.

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To help keep you on top of developments as they unfold, we also have launched a resource page on our website at

[www.morganlewis.com/
topics/coronavirus-
covid-19](http://www.morganlewis.com/topics/coronavirus-covid-19)

If you would like to receive a daily digest of all new updates to the page, please visit the resource page to [subscribe](#) using the purple "Stay Up to Date" button.



Biography



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Ignacio A. Sandoval advises broker-dealers and other securities intermediaries on matters relating to their obligations under federal securities laws and self-regulatory organization rules. Prior to joining Morgan Lewis, he was a special counsel in the Office of Chief Counsel in the SEC's Division of Trading and Markets. Ignacio's SEC experience includes matters involving domestic and foreign broker-dealer registration matters, anti-money laundering obligations, alternative trading systems, and high-frequency traders.

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Biography



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Leveraging her experience as a lawyer at the US Commodity Futures Trading Commission (CFTC), Sarah V. Riddell advises domestic and foreign exchanges, derivatives clearing organizations, swap execution facilities, and other financial institutions on a broad range of regulatory matters, including CFTC registration and compliance. Sarah also assists hedge fund and swap dealer clients with CFTC and National Futures Association (NFA) registration, compliance, and examination questions. While at the CFTC, Sarah worked on Dodd-Frank-related rulemakings and participated in examinations of derivatives clearing organizations, including those designated as systemically important.

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Biography



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Serving as the leader of the firm's semiconductor practice and as a member of the firm's fintech and technology industry teams, Andrew J. Gray IV concentrates his practice on intellectual property litigation and prosecution and on strategic IP counseling. Andrew advises both established companies and startups on AI, machine learning, Blockchain, cryptocurrency, computer, and Internet law issues, financing and transactional matters that involve technology firms, and the sale and licensing of technology. He represents clients in patent, trademark, copyright, and trade secret cases before state and federal trial and appellate courts throughout the United States, before the US Patent and Trademark Office's Patent Trial and Appeal Board, and before the US International Trade Commission.

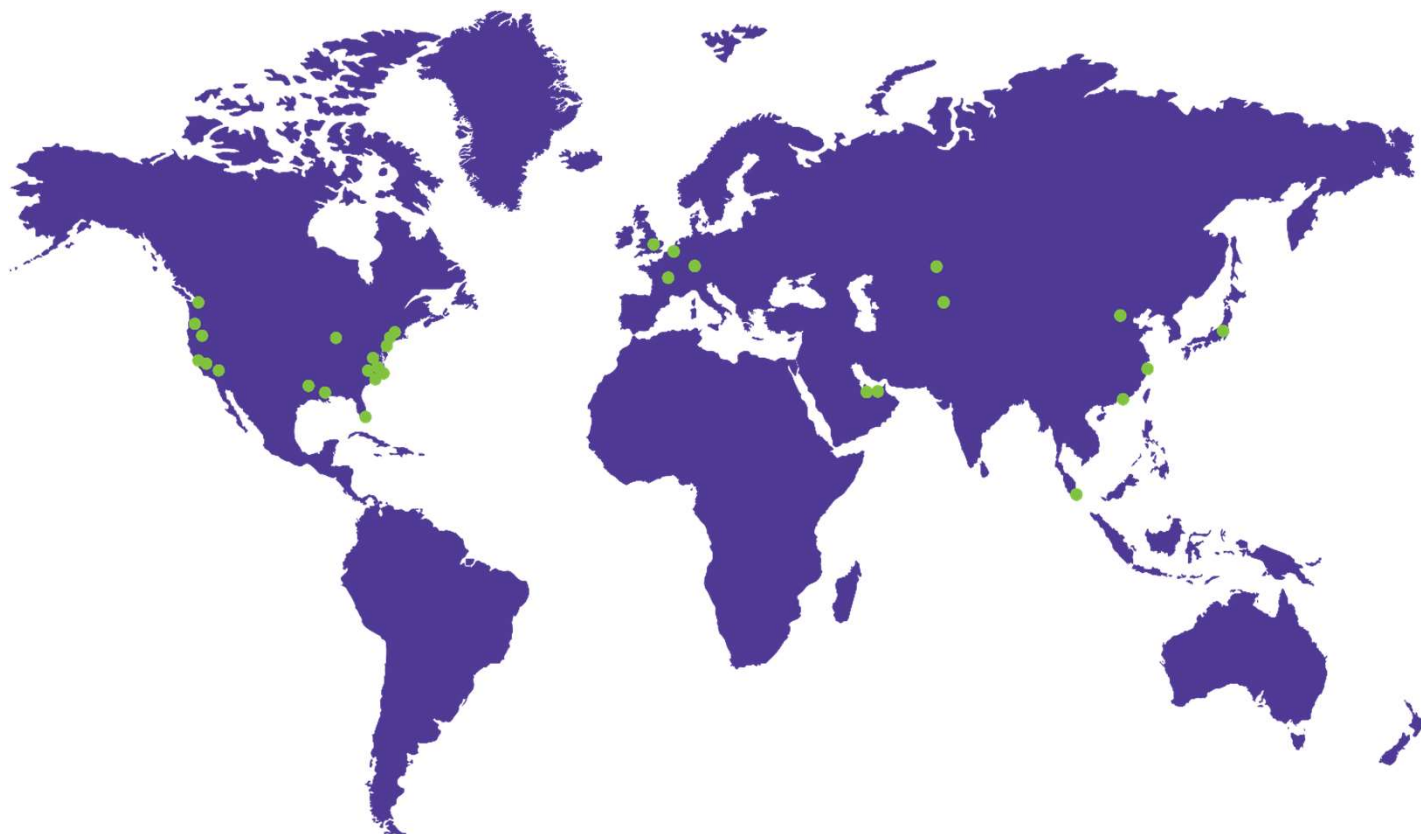
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Our Global Reach

Africa
Asia Pacific
Europe
Latin America
Middle East
North America

Our Locations

Abu Dhabi
Almaty
Astana
Beijing*
Boston
Brussels
Century City
Chicago
Dallas
Dubai
Frankfurt
Hartford
Hong Kong*
Houston
London
Los Angeles
Miami
New York
Orange County
Paris
Philadelphia
Pittsburgh
Princeton
San Francisco
Seattle
Shanghai*
Silicon Valley
Singapore*
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Washington, DC
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