Arcesium

A Hedge Fund's Toolkit for AI Models

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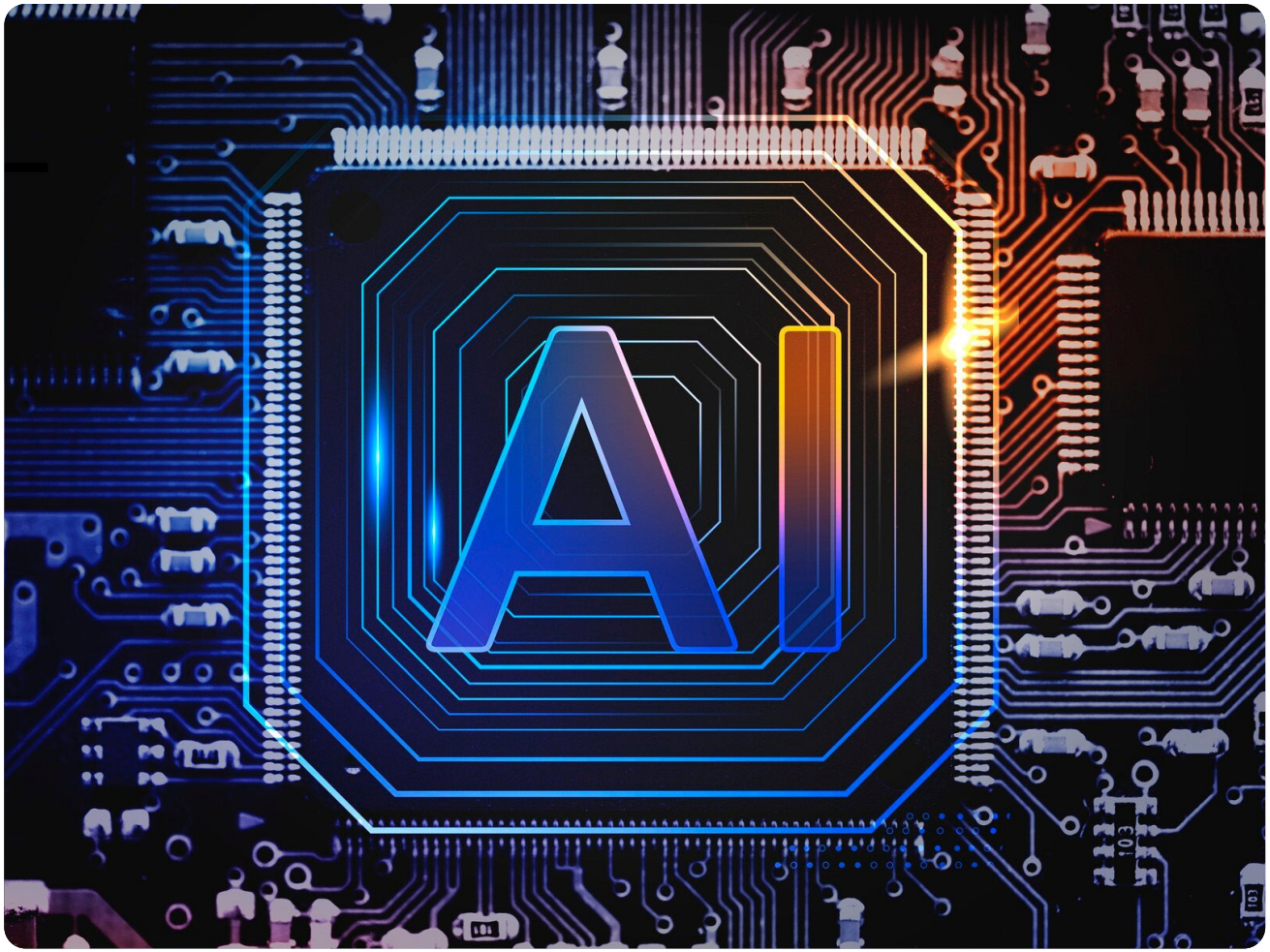
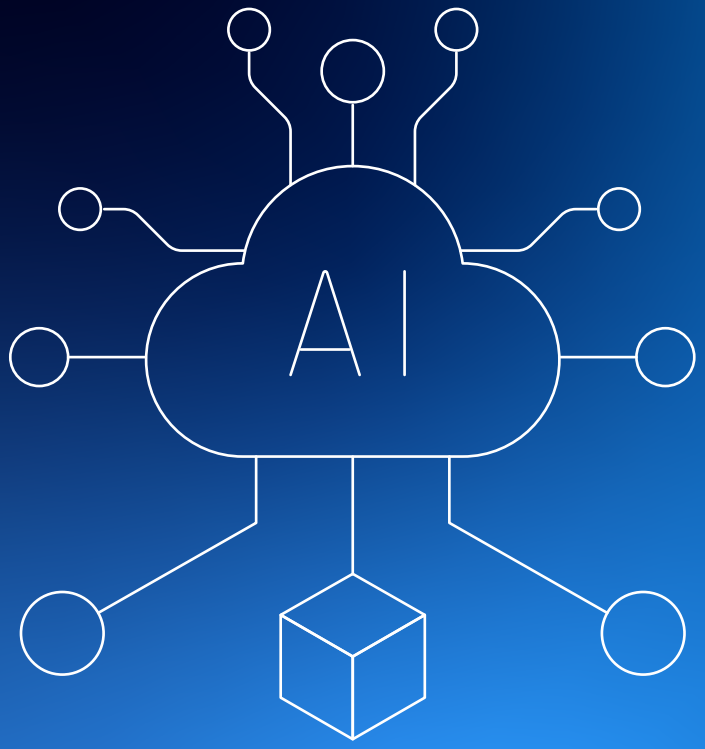
Introduction

Artificial Intelligence (AI) is no longer a CTO's pipe dream. AI is everywhere, especially as firms look to beat out the competition. For hedge funds, AI is not new and continues to present a profitable opportunity. In a recent report, funds that leveraged AI for trading "...generated better long-term risk-adjusted returns compared to other funds (Pensions & Investments)."

This toolkit focuses on two key areas: understanding the basics of the different types of AI models available for hedge funds and highlighting the important role of data, and how to implement a strong data management strategy to support AI initiatives.



The basics of AI models



Section 02

The basics of AI models

According to Workmind, thousands of AI tools exist with over 14,000 startups operating in the United States alone. Here is a narrowed-down list of four major AI models being used in the Hedge Fund space.

1. Machine Learning

Machine learning (ML) is a program that finds patterns or makes decisions from datasets. ML and AI are often grouped together but are not the same thing. ML is considered a subset of AI, where AI enables "...a machine or system to sense, reason, act, or adapt like a human" and ML "...is an application of AI that allows machines to extract knowledge from data and learn from it autonomously (Google Cloud)."

Three different types of ML exist, including:

Supervised learning: Uses labeled data to predict outcomes or make decisions (e.g., linear regression, decision tress, etc.)

Unsupervised learning: Identifies patterns and structures in unlabeled data (e.g., clustering)

Reinforcement learning: Models learn through trial and error, receiving rewards or penalties for actions (e.g., robotics)

How do hedge funds use ML?

Hedge funds use ML for predictive analytics, risk management, and trading strategies. Some use cases include:

Predictive analytics: Analyzes historical and real-time data to forecast market trends, asset prices, and economic shifts (Radient Analytics)

Algorithmic trading: Suggests trades based on patterns identified in large datasets, enabling high-frequency trading and uncovering inefficiencies (Digitaldefynd)

Risk assessment: Continuously monitors portfolios to identify risks and suggest adjustments in real time (Digitaldefynd)

The basics of AI models

2. Natural Language Processing

According to IBM, Natural Language Processing (NLP) is a subfield of computer science and AI that uses ML to enable computers to understand and communicate with human language.

NLP can be used in a variety of ways, including:

Machine translation: Translates text or speech from one language to another

Sentiment analysis: Analyzes the emotion or sentiment behind text or speech

Chatbots and virtual assistants: Develops intelligent conversational interfaces

Text summarization: Summarizes long texts, distilling the most important points

Spelling and grammar checkers: Finds typos and grammatical errors in written text

How do hedge funds use NLP?

NLP helps hedge funds analyze unstructured data such as news articles, social media sentiment, and earnings reports. Applications include (Arrotah):

Sentiment analysis: Evaluates market sentiment to inform trading decisions

Automated parsing: Processes financial documents like earnings calls to extract actionable insights

The basics of AI models

3. Generative AI

Generative AI or GenAI generates text, images, and other media based on learned patterns. GenAI differs from NLP as NLP interprets, whereas GenAI generates. These two tools are often combined to optimize processes, using Large Language Models (LLMs) to provide context during the generation process (Algolia).

GenAI has several applications including:

Content creation: Generating articles, blog posts, social media content, and more

Art and design: Creating unique images, illustrations, and other visual content

Music and audio: Composing music, generating sound effects, and replicating voices

Product development: Creating 3D models and designs

How do hedge funds use GenAI?

Hedge funds adopt GenAI tools for:

Data discovery: Helps with exploring data logs, such as identifying relevant data on performance returns or creating SQL queries on your top ten earnings to date

Market predictions: Analyzes historical data and current conditions to forecast market movements

The basics of AI models

4. Agentic AI

Agentic is a newer AI concept combining several models such as LLMs and ML, with the potential to disrupt multiple industries across several functions, including customer service, software engineering, and more. Agentic AI should not be confused with an 'AI agent', which is a specific component of Agentic AI used to work on tasks. As Nvidia describes, Agentic AI "...ingest[s] vast amounts of data from multiple data sources and third-party applications to independently analyze challenges, develop strategies and execute tasks."

Potential use cases for Agentic AI include:

Autonomous trading bots: Make trading decisions based on stock prices and economic indicators, but require human monitoring to spot risky or questionable trades (IBM)

Supply chain management: Serves several potential uses such as inventory management and logistics optimization (Integrail)

How do hedge funds use Agentic AI?

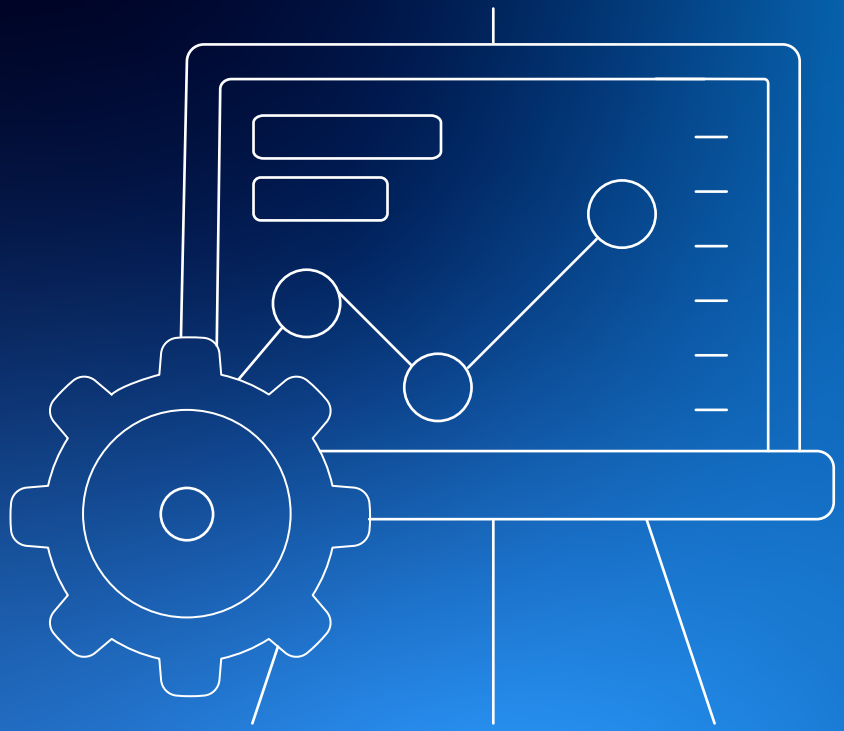
Agentic AI provides several opportunities for hedge funds including (Moody's):

Autonomously monitoring markets and detecting non-obvious correlations: Monitors financial markets, identifying complex and non-obvious correlations that human analysts might miss

Portfolio allocation optimization: Uses real-time data analysis for adjusting portfolio allocations to optimize returns while managing risks

Pre-screening potential deals and highlighting strategic risks in M&A advisory: Assists with due diligence process for mergers and acquisitions (M&A) by pre-screening potential deals and identifying strategic risks

A strong data management strategy



Section 03

A strong data management strategy

A strong data management strategy provides the foundation for training AI models to perform at their best. Accurate, complete, and consistent data leads to generating reliable insights and accelerates informed decision-making. Hedge funds can ask the following questions to ensure AI initiatives will be sustainable and scalable over time.

Data management checklist for AI initiatives

1. Data quality assessment

- ☑ **Access:** Do you have access to all the data needed to support AI initiatives?
- ☑ **Accuracy:** How clean is the data and does it reflect the real world?
- ☑ **Validity:** Does the data follow business rules, is in the specified format, and can be used with other sources?
- ☑ **Uniqueness:** Have duplicates been eliminated within the dataset?

2. Data governance

- ☑ **Ownership:** Has clear ownership and responsibility for data management been assigned?
- ☑ **Policies:** Have data governance policies been developed and enforced?
- ☑ **Data lineage:** Can the origin and movement of data throughout the organization be tracked?
- ☑ **Data auditing:** Is regular data auditing conducted to ensure compliance and accuracy?

3. Data integration and transformation

- ☑ **Data ingestion:** Has a robust data ingestion framework been implemented to collect data from various sources?
- ☑ **Data transformation:** Are tools available to clean and format data for AI use?
- ☑ **Data consolidation:** Is there a centralized data repository to break down data silos?

4. Data security and privacy

- ☑ **Data encryption:** Is sensitive data encrypted to protect against unauthorized access?
- ☑ **Access controls:** Is there an ability to implement strict access controls so that only authorized personnel can access data?
- ☑ **Compliance:** Do data management practices comply with relevant regulations and standards?

5. Stakeholder engagement

- ☑ **Training and education:** Have training and educational resources been provided to stakeholders on data management best practices?
- ☑ **Collaboration:** Can data teams and business units collaborate to ensure data is used effectively?
- ☑ **User-friendly tools:** Are user-friendly, self-service tools available to decentralize data quality management?

A strong data management strategy

6. Risk management

- ☑ **Risk assessment:** Is there a process to regularly assess and mitigate risks associated with data quality and AI implementation?
- ☑ **Contingency planning:** Have contingency plans been developed to address potential data quality issues?
- ☑ **Security protocols:** Have robust security protocols been implemented to protect against data breaches and other security threats?

7. Performance metrics

- ☑ **KPIs for data quality:** Have key performance indicators (KPIs) for data quality been defined and are they trackable?
- ☑ **Impact analysis:** Is the impact of data quality on AI performance and business outcomes regularly analyzed?
- ☑ **Continuous improvement:** Can performance metrics be used to drive continuous improvement in data management practices?

By following this checklist, hedge funds can build a strong foundation for their AI initiatives, ensuring that their data is clean, reliable, and ready for advanced analytics and machine learning applications.

How Arcesium Can Help

Hedge funds that build a robust foundation for their AI initiatives, to ensure that their data is clean, reliable, and ready for advanced analytics and machine learning applications, are better positioned to improve their investment strategies and operational efficiency. A foundation based on a strong data management strategy provides a single source of truth and allows AI algorithms to more effectively analyze large volumes of data, identify patterns, and generate insights.

This is where a unified platform for optimized middle- and back-office operations and centralized data management can boost AI initiatives. In addition to harmonizing data from various sources, a unified platform ideally offers the following features:

1. **Advanced analytics:** Provides access to advanced analytics tools that can help prepare and analyze data for AI models, potentially identifying patterns and insights that can inform AI-driven decision-making
2. **Industry-specific data models:** Leverages dozens of data models and thousands of attributes specifically designed for investment lifecycle management to help speed up the process of preparing data for AI applications tailored to hedge fund operations
3. **Scalability and performance:** Is designed to be scalable and flexible, handling the massive datasets often required for AI and machine learning applications in hedge funds to adapt to changing market conditions and business
4. **Automated workflows:** Automates multiple repetitive and time-consuming tasks involved in investment management, freeing up resources for more strategic activities

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