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AGENDA:

- History of AI in Finance
- AI Trends
- "Use Case": Manager Due Diligence
- AI Techniques in Portfolio Management
- Opportunities and Challenges
- Conclusion

Rise of AI in Finance: History

- ❑Early Excitement and Automation in Finance
- ❑Early Adoption of AI in Finance
- ❑AI Winter
- ❑Expert Systems

THE NEW YORK TIMES, SUNDAY, FEBRUARY 26, 1928. XX 3

MARCH OF THE MACHINE MAKES IDLE HANDS

Prevalence of Unemployment With Greatly Increased Industrial Output Points to the Influence of Labor-Saving Devices as an Underlying Cause

By EVANS CLARK.

A FEW days ago the General Motors Corporation reported the largest peace-time earnings ever made by a single concern in the history of America. Three days later Governor Smith made public a report from the New York Industrial Commissioner which called public attention to serious unemployment throughout the State; not since the depression of 1921, it was disclosed, have conditions been as bad.

The people of the United States—in the shadow of a Presidential election—are presented with a social

have gone far to make construction a machine industry instead of a collection of hand trades. One gasoline crane takes the place of ten or twelve laborers. The hod-carrier has disappeared before the invasion of the material hoist. In concrete construction building materials are mixed, like dough, in a machine and literally poured into place without the touch of a human hand. The Ohio figures record these results: with 21 per cent. fewer men employed, contractors put up 11 per cent. more square feet of finished buildings last year than in 1923.

Coal Mined by Machines.

Source: Harvard University

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TRADITIONAL VS GENERATIVE AI

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	TRADITIONAL "PREDICTIVE" AI	GENERATIVE AI
What It Is	• Algorithmic processes that identify patterns and trends in structured, time series data sets that might predict future behavior • Rules-based programs to perform specific tasks	• The application of foundation models in order to create original content • Uncovers hidden patterns that may not be evident through predictive AI
AI Strengths	• Classification, anomaly detection, prediction • Solve analytical tasks faster • Predictable, traceable, controllable	• Unstructured data, which is then classified • Creating new content • No/few-shot training
Applications	• Quantitative analysis • Risk modeling • Predictions • Portfolio optimization • Robotic Process Automation (RPA) • (Rules-based) Conversational AI	• Question answering • Sentiment analysis • Information extraction and search • Content generation • Object recognition • Summarization

Source: Bain Capital Ventures

AI Trends

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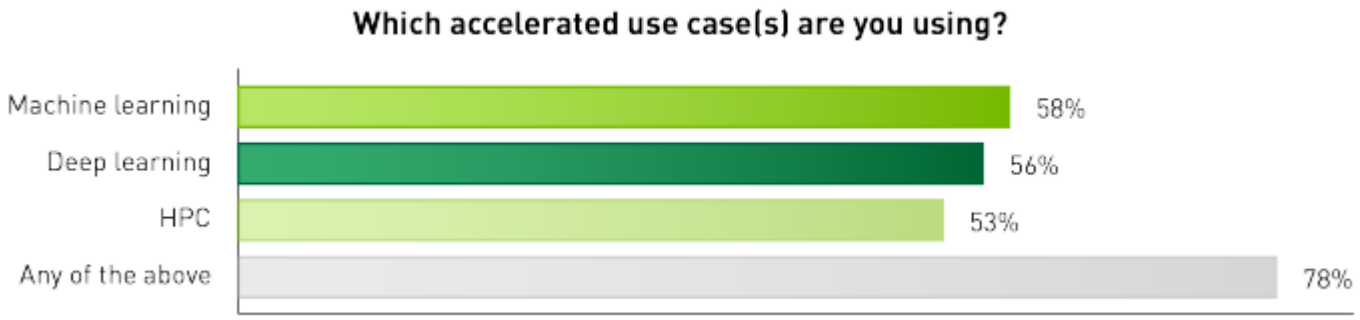

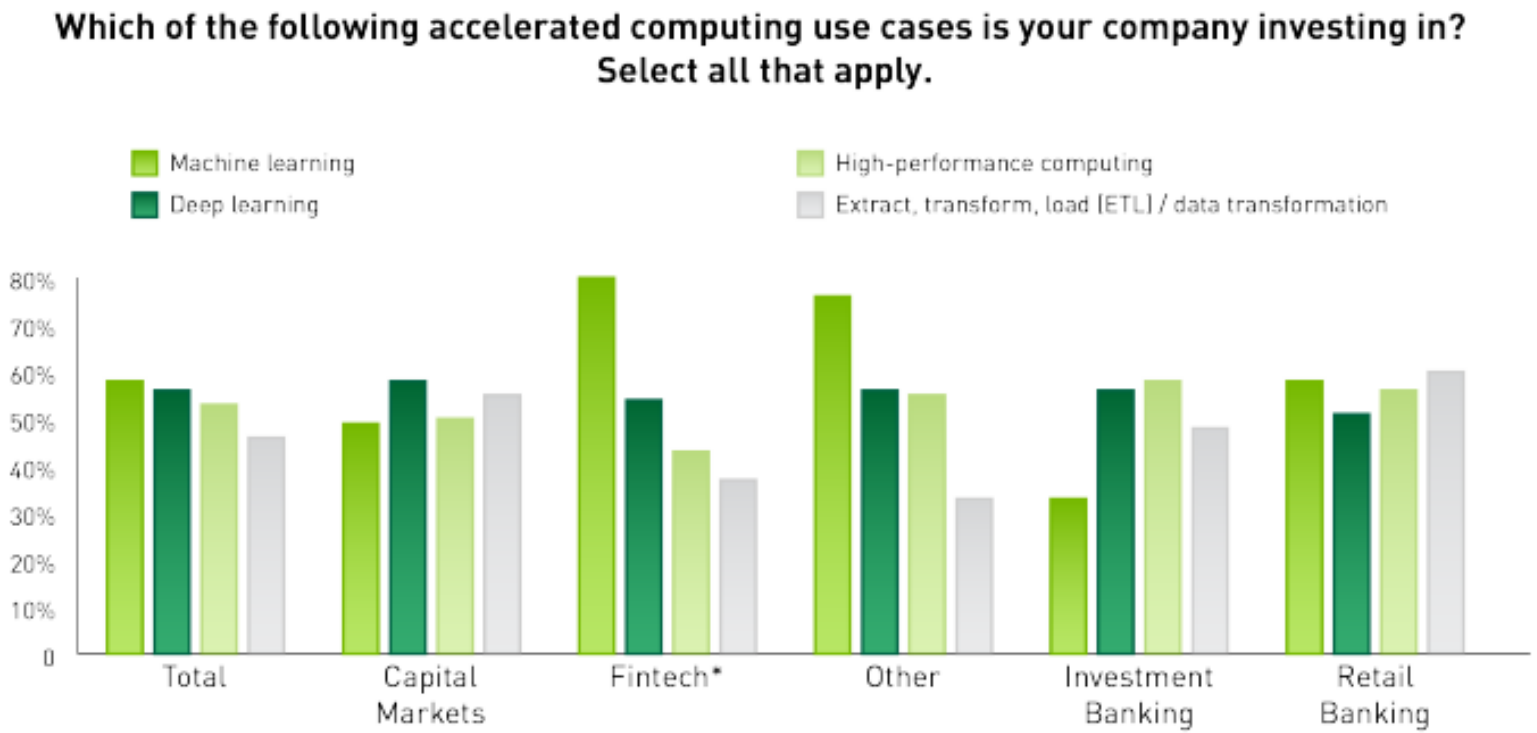

Source: NVIDIA Annual State of AI

AI TRENDS

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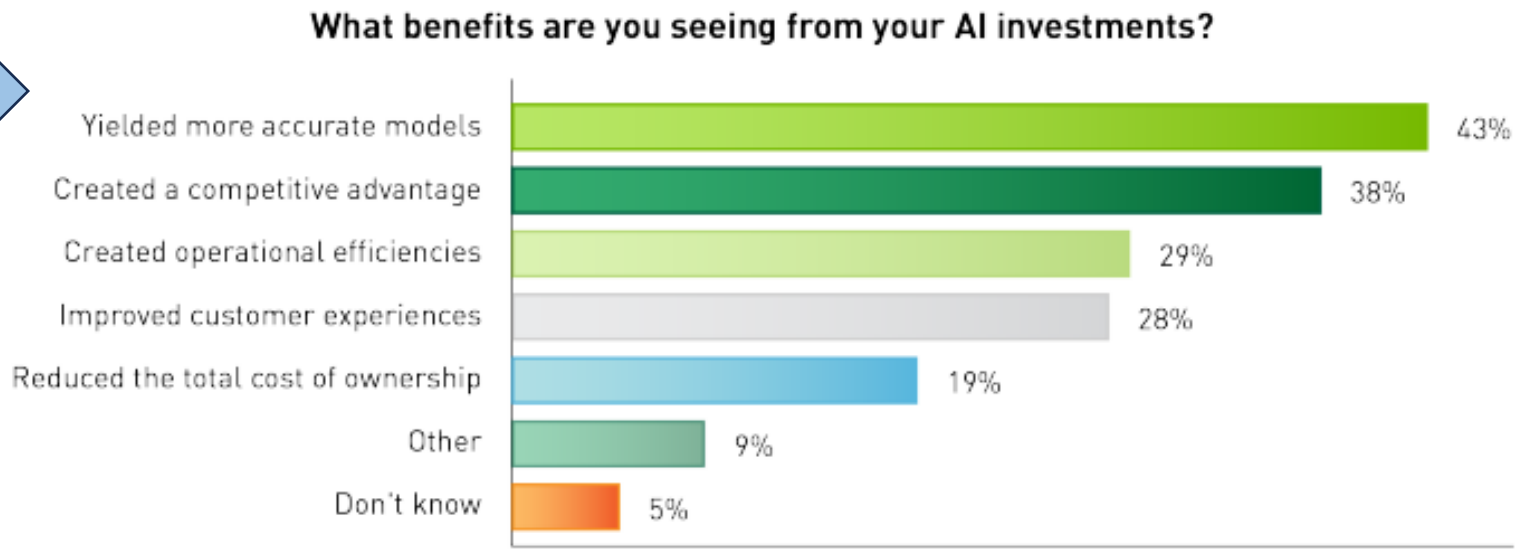

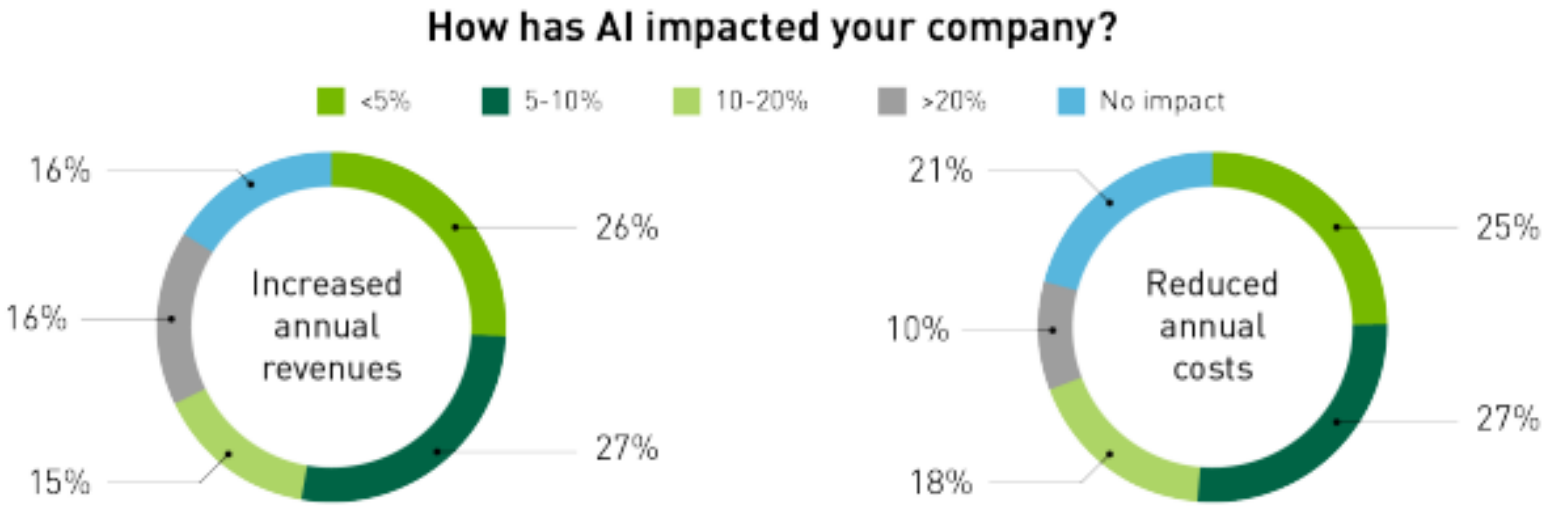

Source: NVIDIA Annual State of AI

AI Trends

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Use Case	2022	2021	YoY Change
Fraud detection: transactions and payments	31%	10%	310%
Conversational AI	28%	8%	350%
Algorithmic trading	27%	13%	208%
Fraud detection: AML and KYC	23%	7%	329%
Recommender systems / next-best action	23%	10%	230%
Portfolio optimization	22%	14%	157%
Default prediction	19%	6%	316%
Marketing optimization	19%	7%	271%
Compliance	17%	6%	283%
Underwriting and acquisition	12%	3%	400%
Creating synthetic data for model creation and optimization	11%		n/a
Claims processing	10%	4%	250%
Other	10%	3%	333%
Robo advisory	9%	4%	225%
Don't know	7%	4%	175%

Source: NVIDIA Annual State of AI

"Use Case": Investment Manager Due Diligence

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- ❑Data Complexity
- ❑Proactive Data Utilization
- ❑Leveraging Emerging Technologies for Efficiency

Source: Northern Trust

AI Techniques in Portfolio Management

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- ❑Artificial Neural Networks
- ❑Decision Trees
- ❑LASSO
- ❑Support Vector Machines
- ❑Cluster Analysis
- ❑Natural Language Processing

"Ensemble" approach

Source: CFA Institute

AI in Portfolio Optimization

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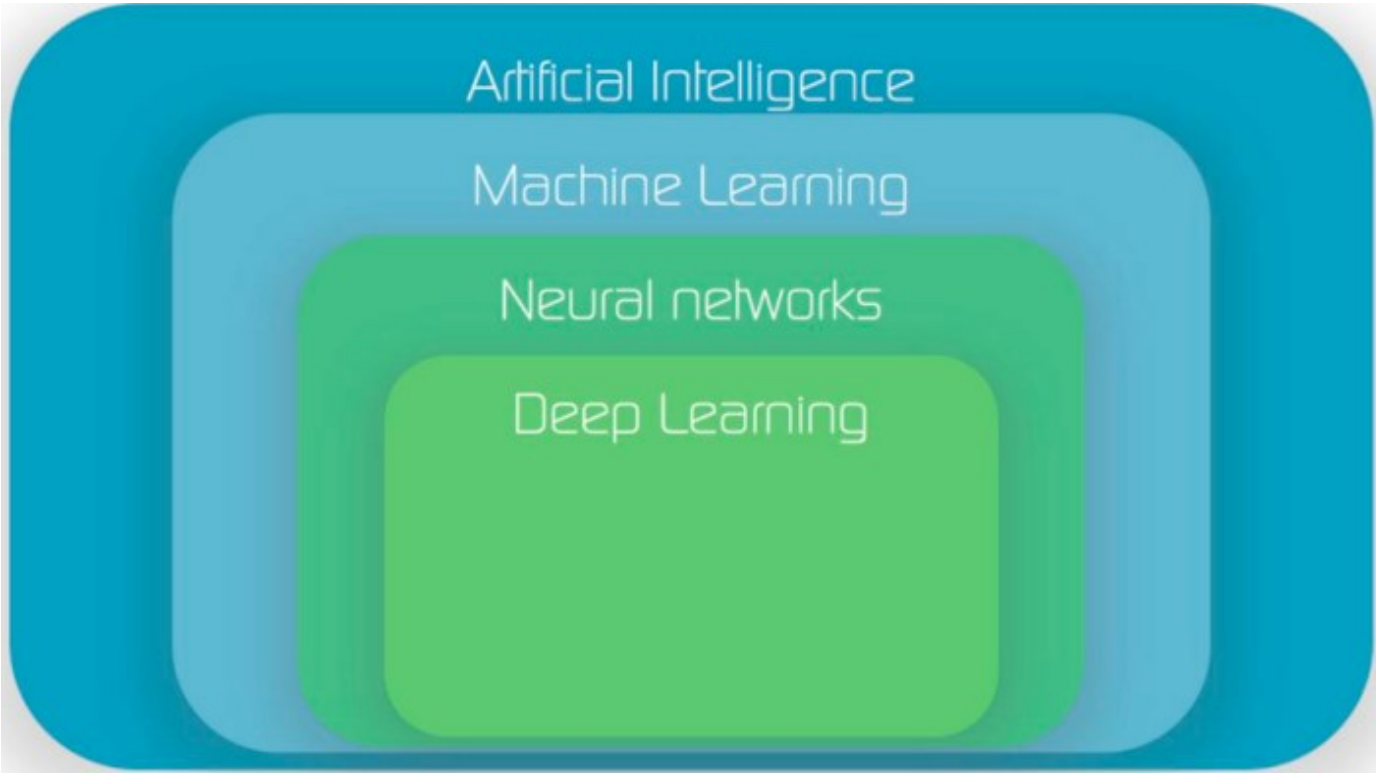

- Optimal asset weights are highly sensitive to estimates of expected returns.
- Estimating the variance-covariance matrix requires a large time series of data and the assumption of stable correlations between asset returns.
- Genetic algorithm optimization process

Source: CFA Institute

AI in Risk Management

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- ❑ Making Use of Qualitative Data for Risk Modeling
- ❑ Producing More Accurate Forecasts of Economic Variables
- ❑ Fraud Detection

Source: CFA Institute

Opportunities And Challenges

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Opportunities

- Centralized data clearing houses and shared data ecosystems
- Low code data ecosystems and real time insights
- Augmentation of human intelligence

Challenges

- Complexity
- Opacity
- Data integrity
- Ethics

Source: Northern Trust

Conclusion

- History & Trends
- Techniques (traditional, generative, machine learning, neural networks, decision trees)
- Portfolio Management (optimization, asset allocation, risks)
- Sources:
  - History- Harvard University
  - Trends- NVIDIA Annual State of AI
  - Portfolio Management – CFA Institute
  - Opportunities & Challenges- Northern Trust