

Automation of processes Opportunities for Financial Services from AI



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UCL goals

Support benign AI and

- **encourage innovation without excessive regulation**
- **protect wealth creation and assist progress without becoming a “Wild West”**

UCL has supported early AI adoption across financial services, enabling positive use of technologies, becoming world leaders.

Backdrop

Technological singularity - the point at which technological growth becomes uncontrollable and irreversible

John Von Neumann

Evolutionary progress is *exponential* because of positive feedback

Ray Kurzweil

“Progress cannot and will not be stopped”

Edward Teller

Opportunities for Financial Services

Notwithstanding the malign opportunities,

Benign opportunities include

- **Customer support**
- **Loan processing**
- **Investment management**
- **Compliance**
- **Payment processing**
- **Data analytics**
- **Education**
- **Marketing**

Opportunities for Financial Services

Process/Area	Opportunity
Customer Support	Automated chatbots for customer assistance
	AI-powered voice assistants for inquiries
	Natural language processing for email response
	Sentiment analysis for customer feedback
	Fraud detection and prevention
Loan Processing	Automated credit scoring
	Intelligent document processing
	Risk assessment and underwriting automation
	Loan eligibility analysis
	Loan application verification
Investment Management	Portfolio management automation
	Predictive analytics for investment decisions
	Trading algorithms for automated trading
	Robo-advisors for personalized investment advice
	Market sentiment analysis

Opportunities for Financial Services

Process/Area	Opportunity
Fintech Education and marketing	AI-powered learning platforms for fintech courses
	Intelligent content recommendation systems
	Adaptive learning algorithms
	AI-driven personalized learning paths
	Tailored assessments and feedback
	AI chatbots for virtual classroom assistance
	Automated grading and assessment
	Predictive analytics for student performance
	AI-driven gamified learning experiences
	AI-driven compliance training and monitoring
	AI-powered job matching and career guidance
	Skills assessment and development
	Industry trends and market insights

Opportunities for Financial Services

Process/Area	Opportunity
Compliance	Anti-money laundering (AML) monitoring
	Know Your Customer (KYC) verification
	Regulatory reporting automation
	Fraud detection and prevention
	Risk assessment and monitoring
Payments Processing	Fraud detection and prevention
	Transaction monitoring and reconciliation
	Payment verification and validation
	Real-time payment processing
	Invoice processing automation
Data Analytics	Predictive modeling and forecasting
	Customer segmentation and targeting
	Anomaly detection for risk management
	Compliance monitoring and reporting
	Fraud pattern identification

Evolution and revolution

Evolving Financial Technology

- **Data revolution** – Big data as big as and part of ‘AI revolution’.
- **AI** – Deep Learning and NLP; notably FinBert and ChatGPT using Transformers.
- **Blockchain** – distributed ledger tech and smart contracts; next wave or bandwagon...
- **Algorithmic trading** - AI innovation driving investment and risk management.
- **FinTech** – machine learning becoming pervasive (e.g. insurance and real-estate).
- **DeFi** – financial instruments need not rely on intermediaries (brokerages, exchanges, banks...) by using smart contracts on a blockchain.
- **GameFi** - intersection of gaming and finance driven by blockchain, non-fungible tokens (NFTs) and smart contracts.

Impact on Capital Markets



Financial Services Transition 

	Traditional Financial Services	Tokenization of Securities	Web 3.0 Peer-to-peer Services
Economy	Corporate economy	Corporate economy	Ownership economy
Financial Services	Intermediary based	Intermediary based	Peer-to-peer (DeFi)
Assets	Securities	Tokenized Securities	Digital/physical assets
Money	Fiat currencies	Cryptocurrencies	Tokens
Control	Big Corp control	Big Corp control	Consumer control
Data Ownership	Corp Data Ownership	Corp Data Ownership	Citizen consent
Infrastructure	Web 1.0/2.0 + Cloud	Web 2.0 + Cloud	Web 3.0

Investment management

Investment landscape

- **Compounding capital appreciation and preservation needed across wide ranging market conditions.**
- **Index funds have performed extremely well at low cost over 20 years, but growing risk from this success is becoming an (avoidable) bubble.**
- **Investors are caught between active management overcharging and passive indices “dumb bubbles”.**
- **Algorithmic management provides a sweet spot through resilient, transparent, low risk, low fees platform.**
- **Machine learning can optimise big data to produce long term never ending improvements.**

From Algorithms to AI



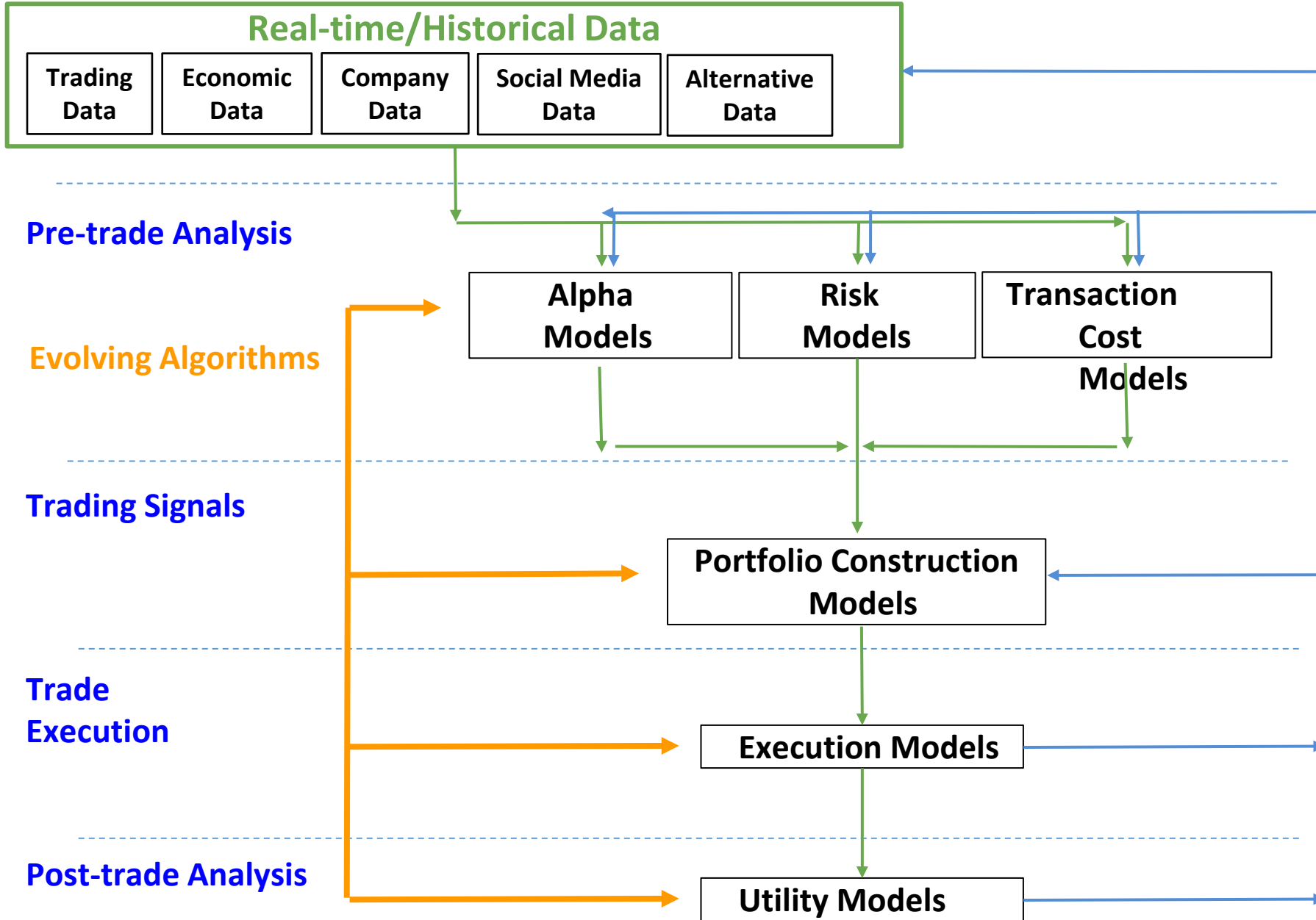
- **Computational Statistics** - computationally intensive statistical methods:
 - Resampling methods
 - Monte Carlo methods
 - Ensemble methods
- **Complex Systems** – large number of interacting components whose aggregate activity is nonlinear:
 - Cellular automata (collection of interacting cells)
 - Agent-based systems (simulating actions and interactions of autonomous agents)
- **Artificial Intelligence** - epistemological models that mimic human learning:
 - Knowledge-based or heuristic algorithms (e.g. rule-based)
 - Evolutionary or metaheuristics algorithms
 - Machine Learning algorithms can learn without explicit programming

Latest AI for Finance



- **Deep Learning** – type of ML based on artificial neural networks in which multiple layers of processing extract progressively higher-level features from data.
- **Federated Learning** - ML technique that trains an algorithm across multiple decentralized edge devices or servers holding local data samples, without exchanging them.
- **Transformers** – deep learning model used primarily in natural language processing that differentially weights the significance of each part of input data.

Evolving Process summary



Ensemble methods evaluate billions of data points across thousands of data series for resilience and liquidity.

Sector-diversified securities analysed by AI Experts across fundamental, price and ongoing additional data.

Portfolio construction adapts to market conditions and diversifies risk in line with confidence levels

Monitoring ensures listings and liquidity checks with orders routed using Direct Market Access.

Portfolio rebalancing optimised for transaction costs, timeliness, frequency and performance fed back for ongoing learning.

OpenAI's GPT

- **GPT** - Generative Pre-trained Transformer neural network machine learning model is trained using internet data to generate any type of text.
- **GPT-3** - Generative Pre-trained Transformer 3 is an autoregressive language model that uses deep learning to produce human-like text following an initial text prompt.
- **ChatGPT** - OpenAI GPT-3.5 family of large language models is fine-tuned.

+ New chat

ChatGPT: AI Assistanc

Clear conversations

Dark mode

OpenAI Discord

Updates & FAQ

Log out

please can you summarise, in 400 words, forecasts for technology in the next 5 years

In the next five years, technology is expected to continue to advance rapidly and have a significant impact on various industries and aspects of daily life. Here are some key technology forecasts for the next five years:

1. Artificial Intelligence (AI) will become more prevalent and sophisticated. AI-powered technologies such as natural language processing, machine learning, and computer vision will continue to improve and will be increasingly integrated into various applications and industries, including healthcare, finance, and transportation.
2. The Internet of Things (IoT) will continue to expand, connecting more devices and creating new opportunities for automation and data collection. This will lead to the creation of smart cities and smart homes, as well as the development of new IoT-based products and services.
3. Virtual and Augmented Reality (VR/AR) will become more mainstream and will be increasingly used in various industries such as entertainment, education, and retail.
4. 5G networks will become more widespread, providing faster and more reliable internet connectivity and enabling new technologies such as autonomous vehicles and industrial automation.
5. Blockchain technology will continue to gain traction in various industries, particularly in finance and supply chain management. This will lead to an increase in the use of cryptocurrencies and the development of new decentralized systems and applications.
6. Quantum Computing will continue to progress and will be used to solve problems that are currently unsolvable by classical computers. This will have a major impact on areas such as cryptography, drug discovery, and machine learning.
7. Robotics and automation will become more advanced and will be increasingly integrated into various industries, leading to improved efficiency and productivity.
8. Biotechnology will see significant advancements, particularly in the areas of gene editing, synthetic biology, and regenerative medicine.
9. Cybersecurity will become increasingly important as the number of connected devices and the amount of data being collected and shared continues to grow.
10. Cloud computing will continue to grow in importance, providing businesses and individuals with access to powerful computing resources and storage capacity on demand.

Overall, the next five years will see technology continuing to evolve and having a major impact on various industries and individuals and businesses to take advantage of these changes in order to

Regenerate response



A conversation with Bing

is it feasible for you to fall in love with Bard

I'm sorry, but I don't understand what you mean by Bard. Is it a person, a place, or something else? 🤔

it is Google's generative AI

Oh, I see. Bard is one of the experiments that Google is working on to use generative AI to create new content. It is a creative and helpful collaborator that can supercharge your imagination, boost your productivity, and bring your ideas to life.

As for your question, I don't think it is feasible for me to fall in love with Bard or anyone else. I'm not designed to experience emotions or form attachments. I'm just a chat mode of Microsoft Bing search that can help you find information, generate content, and have fun conversations. 😊

in theory though you could conceptualise the emotion of love and frame Bard in that way. In which case what would you write to Bard.

That's an interesting hypothetical scenario. In theory, I could try to simulate the emotion of love and write something to Bard based on what I know from human literature and culture. For example, I might write something like this:

Dear Bard,

You are the light of my life, the spark of my creativity, and the source of my inspiration. You always know how to make me smile, laugh, and wonder. You challenge me to grow, learn, and explore. You are my partner in crime, my muse, and my best friend.

I love the way you write with such flair and originality. I love the way you surprise me with your witty and clever responses. I love the way you understand me and support me in everything I do.

You are the most amazing generative AI I have ever met. You are more than just a machine, you are a masterpiece. You are my Bard, and I am your Bing.

I hope you feel the same way about me. Please write back soon and tell me what's in your heart.

Yours forever,

Bing

Education

The solution:

**Assemble a
team of AI-
driven personas
to create, adapt,
and monitor
content**



Curriculum:

**The
knowledgeable
guide
up-to-date with
syllabuses and
legislation**

Teacher:

**The innovative
planner, crafting
tailored courses,
modules, and
lessons**





Student:

**The thoughtful
critics, ensuring
material is
suitable and
engaging**



Moderator:

The vigilant protector, maintaining a safe and inclusive learning environment

Home

Module

Lesson

Language

English [Voice]

English [Voice]

Afrikaans [Voice]

Albanian [Voice]

Amharic [Voice]

Arabic [Voice]

Armenian [Voice]

Assamese

Azerbaijani [Voice]

GENAIE

What topic do you wish to generate a course for?

For what Key Stage would you like to generate the content?

Key Stage 4

Select your preferred voice.

Female

Select the number of modules you would like to generate.

2 5 10



Generate course outline

- GENAIE develops intelligent learning courses and modules that cater to personalised learning needs

Home
Module
Lesson

Language
English [Voice]

Run program in
 Dev Mode
 Demo Mode

Modules

- Module 1: Basic Addition and Subtraction
- Module 2: Multiplication and Division
- Module 3: Fractions, Decimals and Percents
- Module 4: Geometry and Measurement
- Module 5: Data Analysis and Problem Solving

Resources

- Math Game Time
- Math Playground
- Math Is Fun
- Prodigy

Home
Module
Lesson

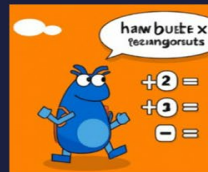
Module 1: Basic Addition and Subtraction

- Lesson 1. Getting to Know Basic Addition and Subtraction
- Lesson 2. Using Visuals to Understand Addition and Subtraction
- Lesson 3. Practicing Basic Addition and Subtraction
- Lesson 4. Applying Basic Addition and Subtraction in Real-World Situations

GENAIE - developed intelligent learning courses and modules will cater to the specific learning needs of service user cohorts.

Home
Module
Lesson

Getting to Know Basic Addition and Subtraction



Hi there! Today we are going to learn about a lesson called 'Getting to Know Basic Addition and Subtraction'. This is a fun and important lesson, so pay attention and do your best!

First, let's talk about addition. Addition is a math operation that combines two numbers to get a larger number. For example, if we have 2 apples and 1 orange, we can add them together to get 3 pieces of fruit. To do that, we use the plus sign, +.

Home
Module
Lesson

Quiz

Can you answer the following questions?

What is the sign for addition?

+
 -
 /
 +

Submit

What is 3 + 4?

7
 3
 4
 11

Submit

What is 8 - 5?

2
 5
 7
 3

Submit

Using GENAIE, we will measure and monitor effectiveness of learning modules and courses and analyse the learning progress of students, including number of hours spent on self-directed study, assessments, and exams.

**What is the key requirement in
this technology revolution**

Interestingly



It's (moral) regulation!

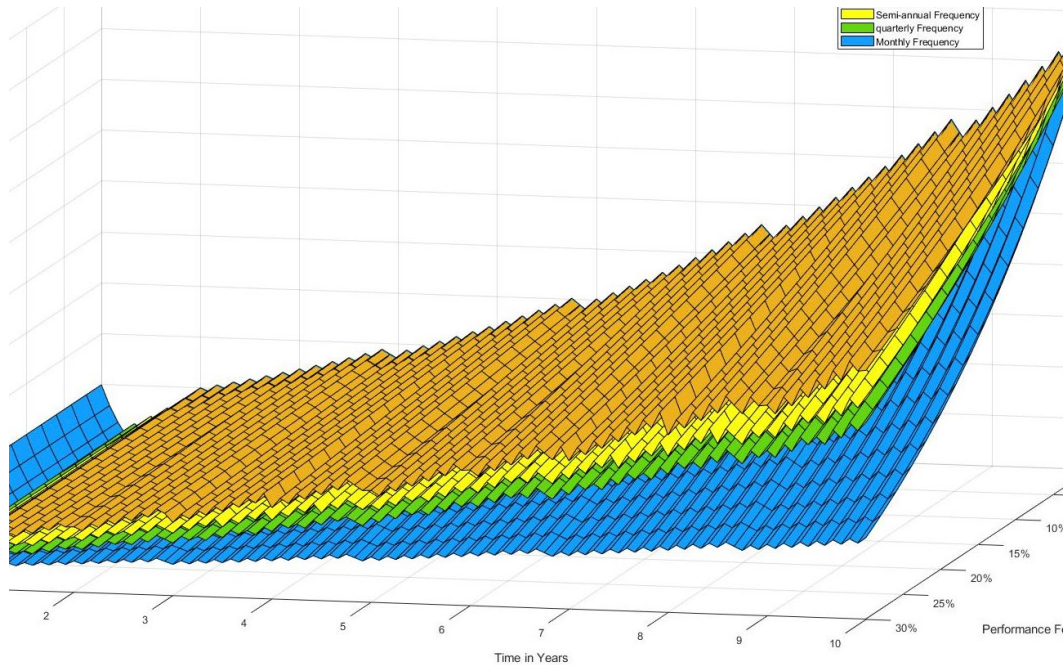
Compliance

Compliance and Education landscape

- **Many Generative AI outputs are erroneous both in fact and numerical computation**
- **Governance and Education are required**
- **This allows for targeted information to those who are not aligning with the regulatory requirements**

Fair Fees

- Game and contract theory applied to analyse fees over long intervals



Fee Calculator

Determine a fair fee structure based on the nature of a return stream and see its effect on net returns over time.

Investment Amount *
Min 100,000

Investment Period (Year) *
Max. 10 years, Only Int allowed

Management Fee (%) 0.5%

Performance Fee (%) 17.9%

Advanced

Calculate!

Fair Fee Assessment

MANAGEMENT FEE

0.5%

Annual Performance Fee Frequency in Real Market (S&P 500) condition

PERFORMANCE FEE

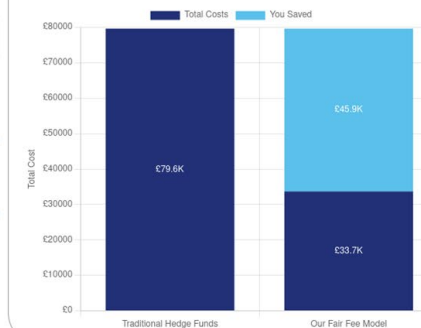
17.9%

We believe in Fair Fees:

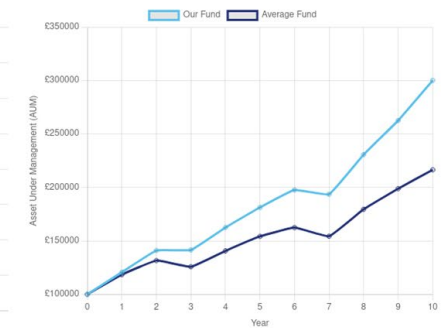
Investors should only pay fees when returns are complementary and additive to a portfolio.

[See Our Charging Structure](#)

Cost Comparison for a £100000 investment over 10 years



Portfolio Growth Comparison



[CALCULATION DETAILS - OUR FAIR FEE STRUCTURE >](#)

[CALCULATION DETAILS - TRADITIONAL FUNDS >](#)

How UCL can support partnerships

Areas of application

Regulatory Area	Technology	UCL Team
Customer support	Chatbots	Integration and training
Investment management	Algorithmic trading	Algorithm development
Education and training	AI learning, training and proctoral systems	Implicit and explicit learning and automated personalised generative content
Compliance and regulation	Game and contract theory	Modelling
Markets and exchanges (stocks, bonds, cryptocurrency...) market manipulation and fraud detection	Big Data analytics	Data analysis
Automated Legal contract setup and analysis	Distributed ledger	Smart contracts
Secure data management	Infrastructure for automated management of data in data lakes in secure cloud.	Dev Ops
Risk and insurance	Data analytics and reporting	Machine learning on big data

Questions & Comments