# Crystal-Ball Gazing: the Future with AI

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# AI

- Artificial Intelligence
- Ability for robots/machines to emulate human intelligence

# Various levels

- Artificial Narrow Intelligence (ANI): “Weak AI”
  - Trained for specific tasks such as pattern recognition
  - The current status of AI
- Artificial General Intelligence (AGI): "Strong AI"
  - Human-like cognitive capabilities
  - Does not exist at present
- Artificial Super Intelligence (ASI): “Sci-Fi AI”
  - Surpasses human intelligence

# How does Weak AI work?

- Emulates the human brain
  - Millions of neurons
  - Millions of synapses, connections (signals) between neurons, which are weighted
  - Neurons can be arranged in layers, with usually multiple inputs and one output (Deep AI)
  - Neural nets produce an answer
  - In training the answer is compared to the real world and, if out, the neural net is adjusted to give a better answer (Back Propagation)
- Training is an essential part of the technology, usually on masses of real data

# Examples of Weak AI 1

- Pattern recognition
  - High level of accuracy
    - Used for medical scans, analysis of images
    - Captcha (recognising shapes) has had to be adapted
    - Self-driving systems
- Games (Chess playing/AlphaGo):
  - Can beat any human
  - Computer power for looking many moves ahead
  - Fixed rules and common strategies

# Examples of Weak AI 2

- Document Research
  - Large Language Models (LLM/OpenAI’s GPT) leading to generative AI
  - Fast processing of gigabytes (and more) of data
  - Language translation
  - Drug research – AlphaFold from Google DeepMind (protein structure database)
  - Pose query
    - ChatGPT, Google’s Gemini, Microsoft’s Copilot, Apple’s Siri, Amazon’s Alexa
    - Get an intelligible answer
      - Yes or no
      - Some explanation
      - Whole document
  - Can have chat with the AI tool
    - Social implications

# Examples of Weak AI 3

- Generative AI
  - Explore the Internet or other collections
    - Produce new images, documents or videos
    - Based on existing contributions
    - Serious problems with Intellectual Property, copyright, including moral copyright.

# Earlier Tech Boom/Crash

- The 2000 dotcom boom/crash

# Implications

- The dotcom boom was driven
  - By a feeling among investors that the Internet would become the essential tool for all businesses
- The dotcom crash was driven
  - By some fraudulent/unrealistic constructions
  - By a feeling among investors that the Internet companies were ridiculously over-valued

# But

- Today the Internet as a technology is universally adopted and approved
  - Basis for e-commerce, email, info systems, social sites, academia, etc: almost all computer to computer communications.
  - The surviving companies from the crash have done very well on all financial measures:
    - The Magnificent Seven
    - Alphabet - Google, Amazon, Apple, Meta, Microsoft, Nvidia, Tesla (founded 2003)
- It was not the technology itself that caused the crash but unrealistic expectations at the time

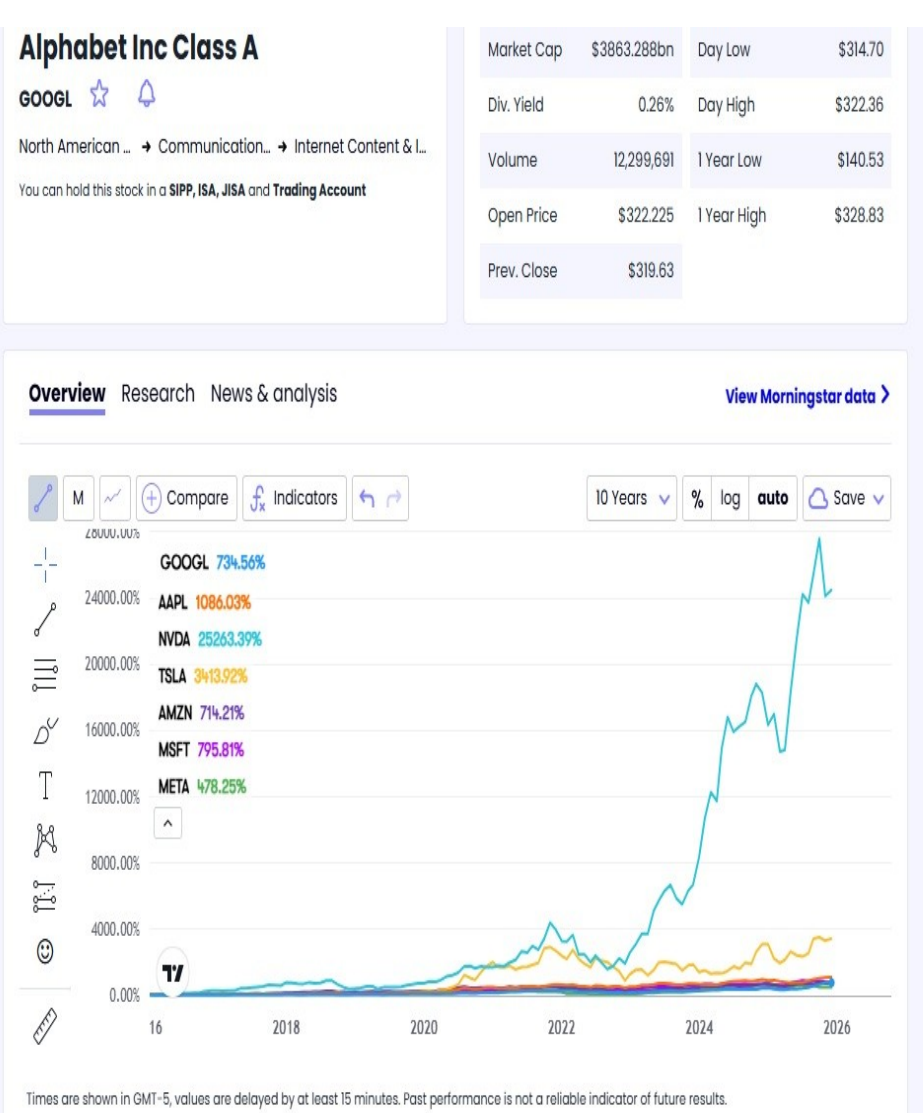
Look at Tech Valuations Over last 10 years

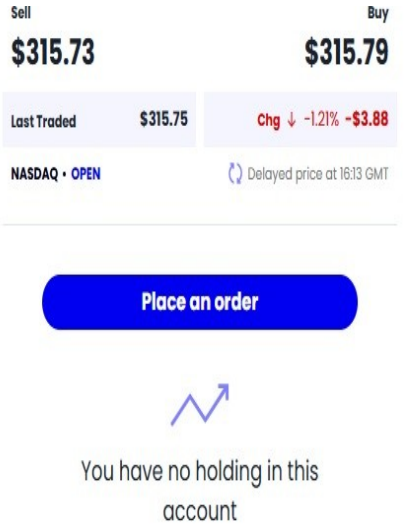
## NASDAQ

National Association of

Securities Dealers

Automated Quotations




One stock is riding high

The Magnificent Seven.
Also the Ten Titans:
Add
Broadcom,
Oracle, and Netflix,
holding (for all 10)
40% of value of
S&P 500

# Nvidia – the AI ‘darling’

- 1993 Founded by Jensen Huang. Was a little known maker of graphical processing units (GPU), mainly for games
- 2006 CUDA (Compute Unified Device Architecture)
  - Adapted GPU to general data
  - Able to build massively parallel processing units
    - Simultaneous processing of vast amounts of data
- Now has become the stock-market darling for Weak AI
  - Market Capitalisation at recent peak $5 trillion (UK GDP $3.6 trillion; Exxon cap $0.5 trillion; Shell cap $0.2 trillion)
  - Are competitors beginning to emerge?
    - Google also becoming interested

# Is it a bubble?

- No idea!
- But even if the share price dives:
  - It will not affect the technology for Weak AI
  - Which will continue to advance:
    - Ever faster processors mean more data can be handled and machine-intensive training will increase accuracy.

# Concerns with Weak AI

- Social Implications:
  - Worries about vulnerable people and AI chat
- Accuracy implications:
  - In relatively settled areas such as finance rules, regulations,
    - Weak AI gives sound advice
  - In more controversial areas, such as politics, financial trends
    - Not clear that Weak AI can always cope in weighing up different viewpoints
    - Some feeling that Weak AI tells users what they want to hear
- Copyright violations:
  - Generative AI is causing much alarm with authors, film industry

# Effects on Employment

- Far from negligible:
  - Weak AI can reduce the number of humans employed at help desks, and doing routine tasks in finance and administration
  - Weak AI should also increase the use of robots affecting some manufacturing jobs
  - Impact expected to increase over next 5 years
  - Debate over whether for businesses it’s a J-curve or an S-curve
- The intention is to increase productivity
  - Normally a + point for a country
  - So far businesses are struggling to improve productivity with Weak AI
- There will be additional jobs implementing and controlling the Weak AI
- The structure of businesses will change with less unskilled or low-skilled jobs and more high-skilled jobs

# Effect on Power Supplies

- Vast data centres consume large amounts of electricity
  - Round the clock 24x7 access required to cheap supplies
  - Intermittent sources unsuitable
    - Favoured by UK with highest energy costs in developed world
  - Nuclear power seems particularly suitable
    - Low carbon emissions
    - 24x7 delivery
    - High energy density (low land usage, protects habitat)

# Forecasting Research Institute

- Bloomberg November 2025
- For USA asked 300 AI experts (and some informed public), what would be the share of AI by 2030:
  - 18%: The percentage of US work hours that will be assisted by generative AI in 2030.
  - 25%: The share of sales from newly approved US pharmaceuticals that will come from drugs discovered by AI.
  - 7%: The share of US electricity consumption that will be used for AI by 2030, roughly 1.5x today's total data center use.
  - 15%: The share of adults who will self-report daily use of AI for companionship or emotional support by 2030, compared to 6% today.
  - 20%: The share of all US rideshare trips completed by autonomous vehicles by 2030. (The median member of the public predicted just 12%, one of the larger gaps in the study.)

# Economic Innovation Group

- Reported by Bloomberg, November 2025
- Quizzed workers in USA
  - Eighteen percent of workers who use AI felt it was a threat to their careers, compared to 36% of those who didn’t use it.
    - That result was remarkably consistent across demographics.
    - Take income, for instance. Workers earning less than $50,000 a year are slightly more likely to say that AI is a threat to their career, compared to those making more money. But that divide is much smaller than the one between those who use AI and those who don’t.
  - It could be that “when you use it you start to see its limitations and are less concerned that it’s going to take your job,” he says. Or, it might be that AI users “start to see ways that it could make you better at your job.” Either way, a little time with the tool seems to soothe workers’ worries.

# What about “Strong AI”?

- AI research has a long pedigree
  - Starting with Alan Turing in 1950
    - Cannot tell whether talking to a machine or a human (strong AI)
  - Major effort in the 1980s with neural nets
  - Disillusionment set in when machines were not powerful enough to deliver
  - Ideas of the 1980s finally realised c2015 with Nvidia’s massively-parallel versatile processors
  - But this is “Weak AI”

# Features of Strong AI

- Human-like
  - General intelligence (not just specific tasks)
  - Learning – self-directed, adapting to new environments
  - Autonomy – self-governance
  - Reasoning and problem solving
  - Context-oriented (meaning, emotion, common sense)
  - Efficient command of language
  - Self-awareness or even consciousness

# How close are we to Strong AI

- Some way off
- No accepted theory
- Active areas – many, few examples
  - Incremental from Weak AI – build bigger and faster systems and try to make them more general
    - GPT-3, Google DeepMind (AlphaFold)
  - Neuroscience
    - Exploring structure and function of brain
  - Mathematical
    - AI for maths, partnership with Google DeepMind
    - Category theory -- An emerging area of research that offers a highly abstract and compositional framework for understanding the structure of complex AI systems, such as deep learning architectures and data flow. Researchers hope it can provide a unifying structure for the field and improve model interpretability.

# Artificial Super Intelligence

- Keep watching those films!