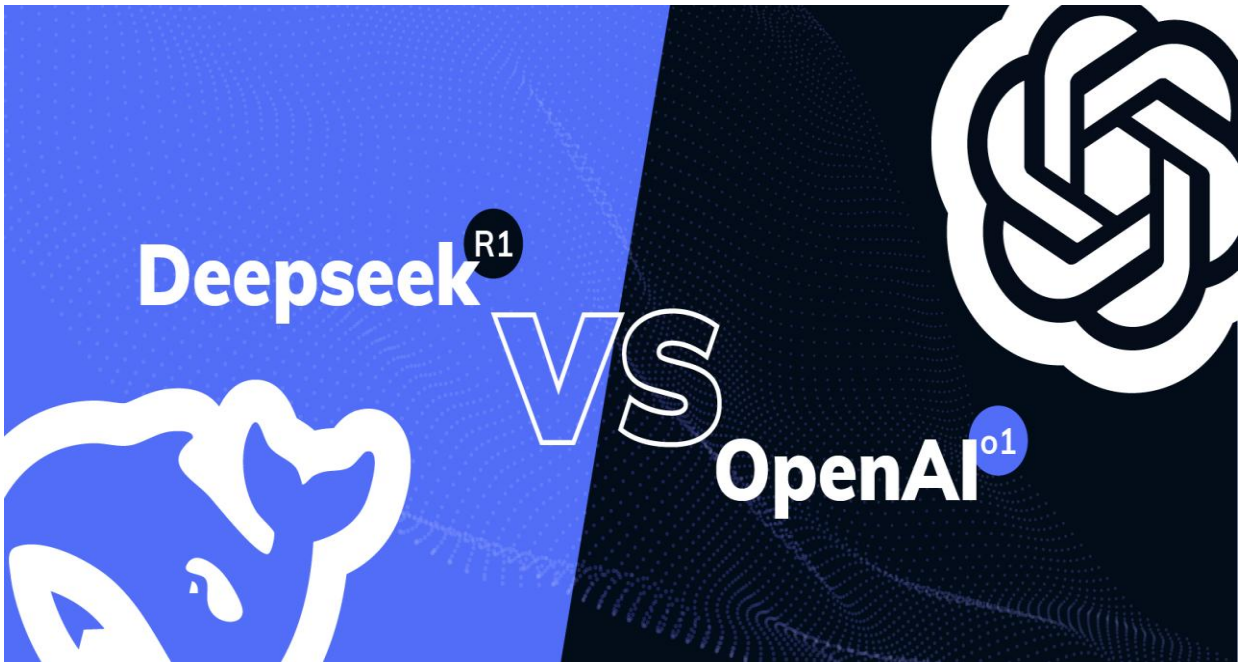
India in the Global AI Race:

Opportunities & Challenges of OpenAI & DeepSeek

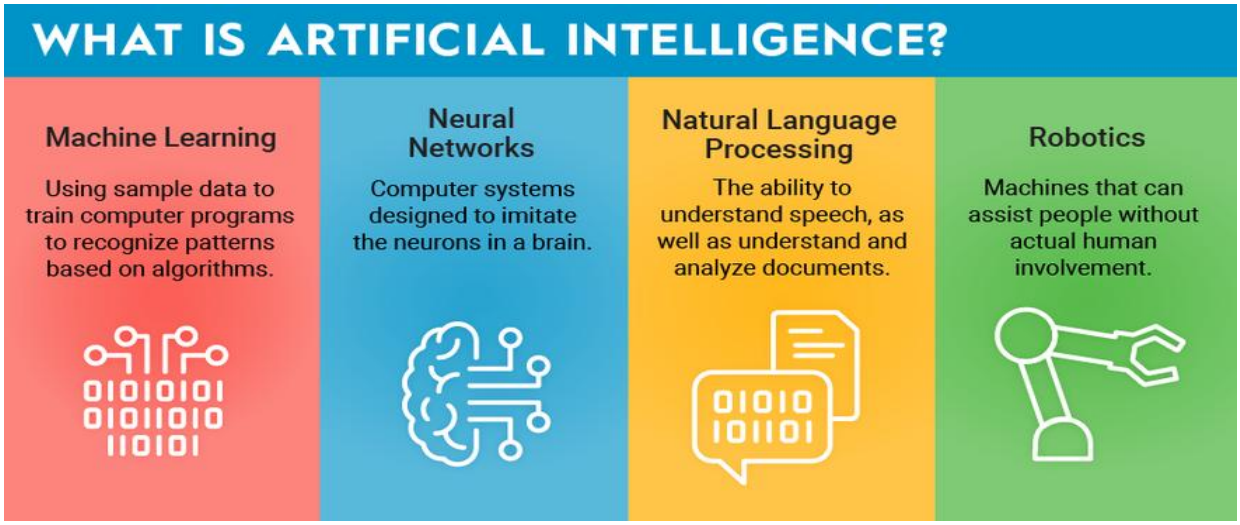


Context:

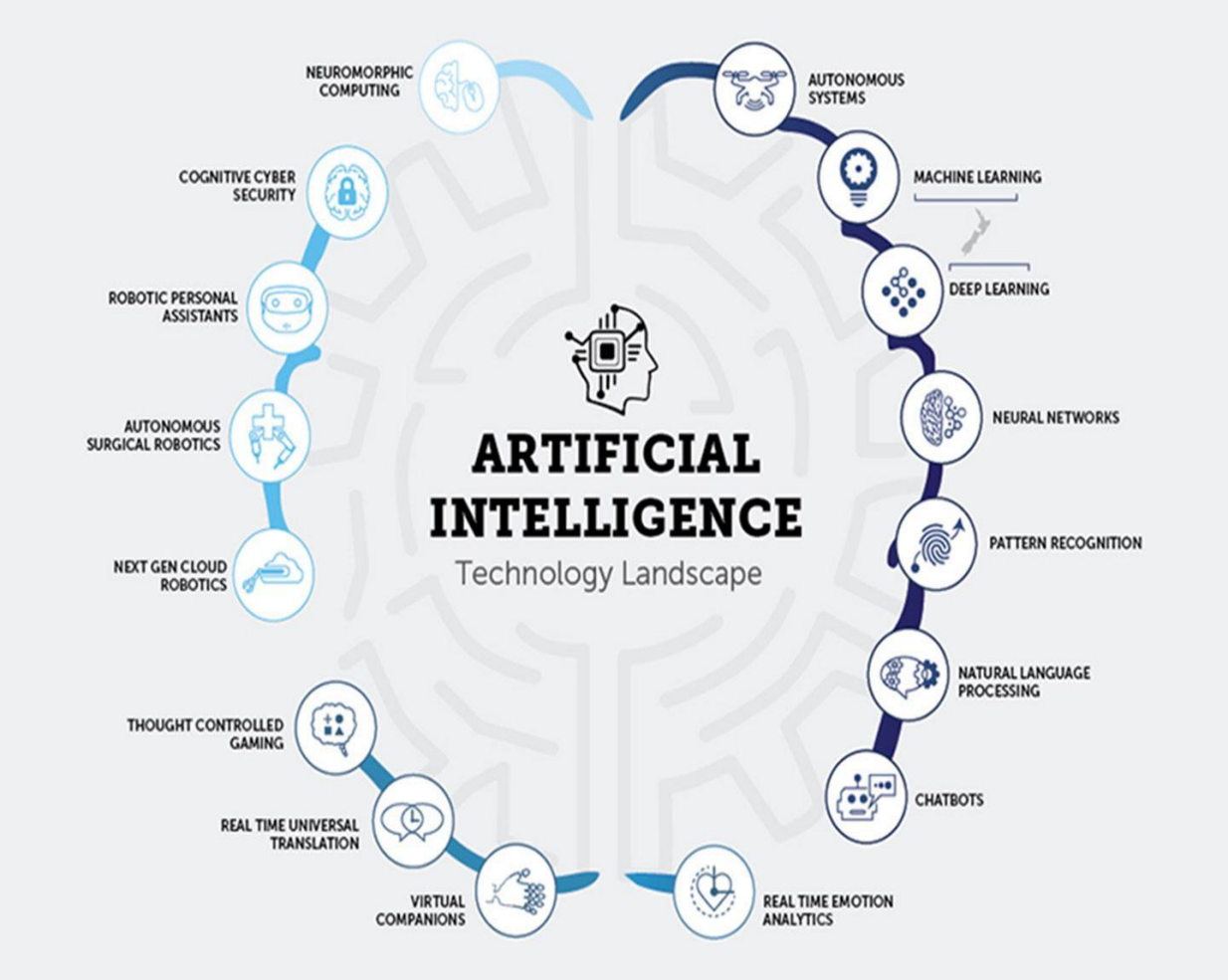
- **Honorable Prime Minister Narendra Modi** called for collective efforts to establish a **global framework for AI t**hat upholds shared values, addresses risks, builds trust and ensures access to all, especially the Global South.

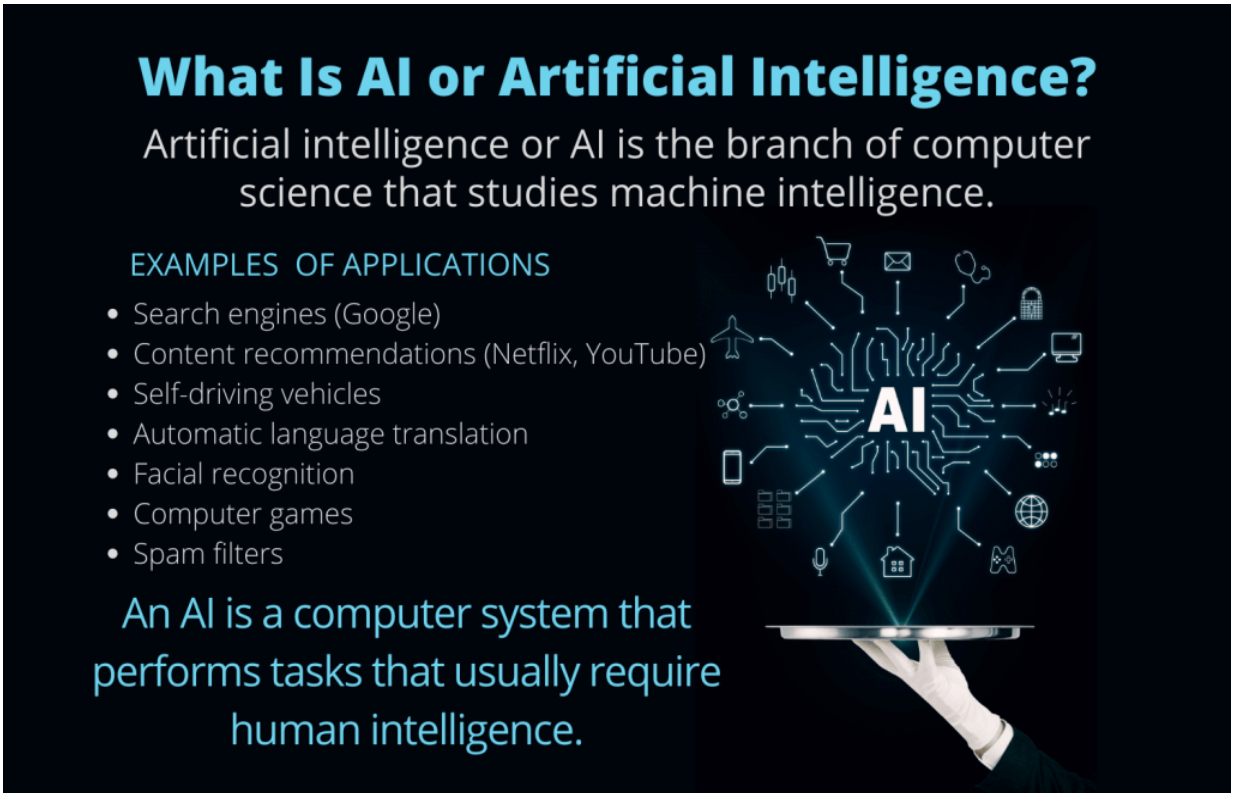
- **Co-chairing the AI Action Summit with French President Emmanuel** Macron in Paris, **PM Modi** underlined the **need for open-source systems that enhance trust and transparency,** and building data sets **"free from biases".**
- Recently, **Chinese startup DeepSeek** has launched **AI models** that **compete with top U.S. models** at a much lower cost.
  - In **December 2024**, the company revealed that training its **DeepSeek-V3 model cost less than $6 million using Nvidia H800 chips.**

1. What is Artificial Intelligence (AI)?

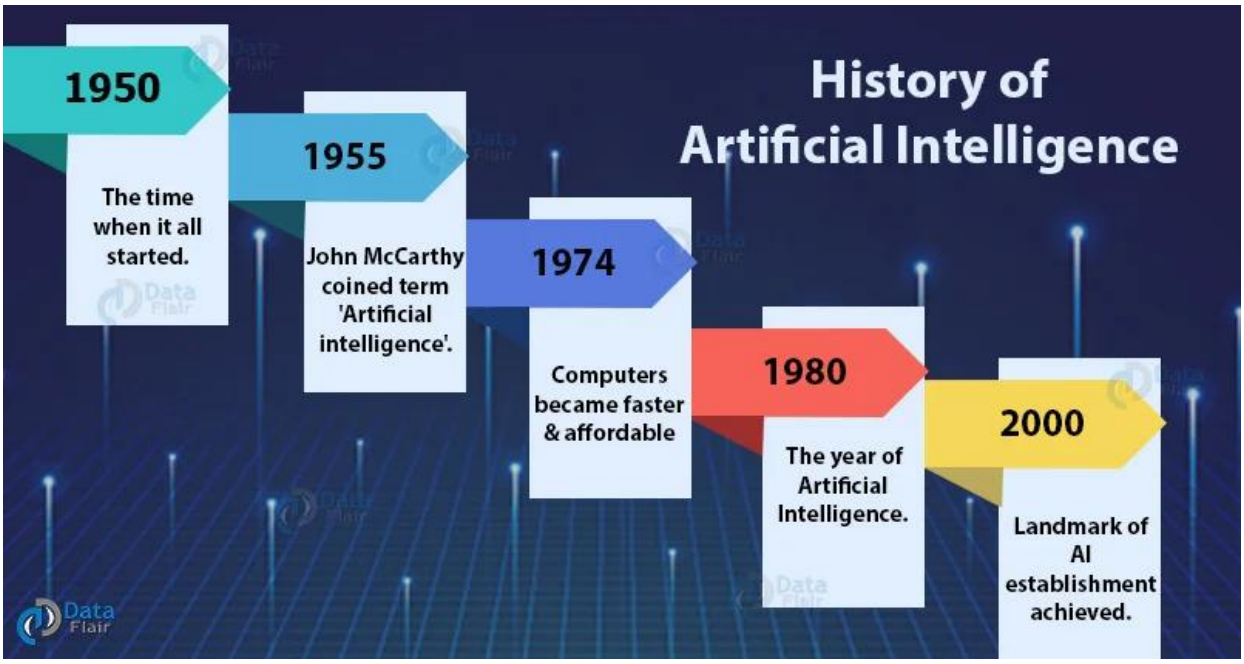


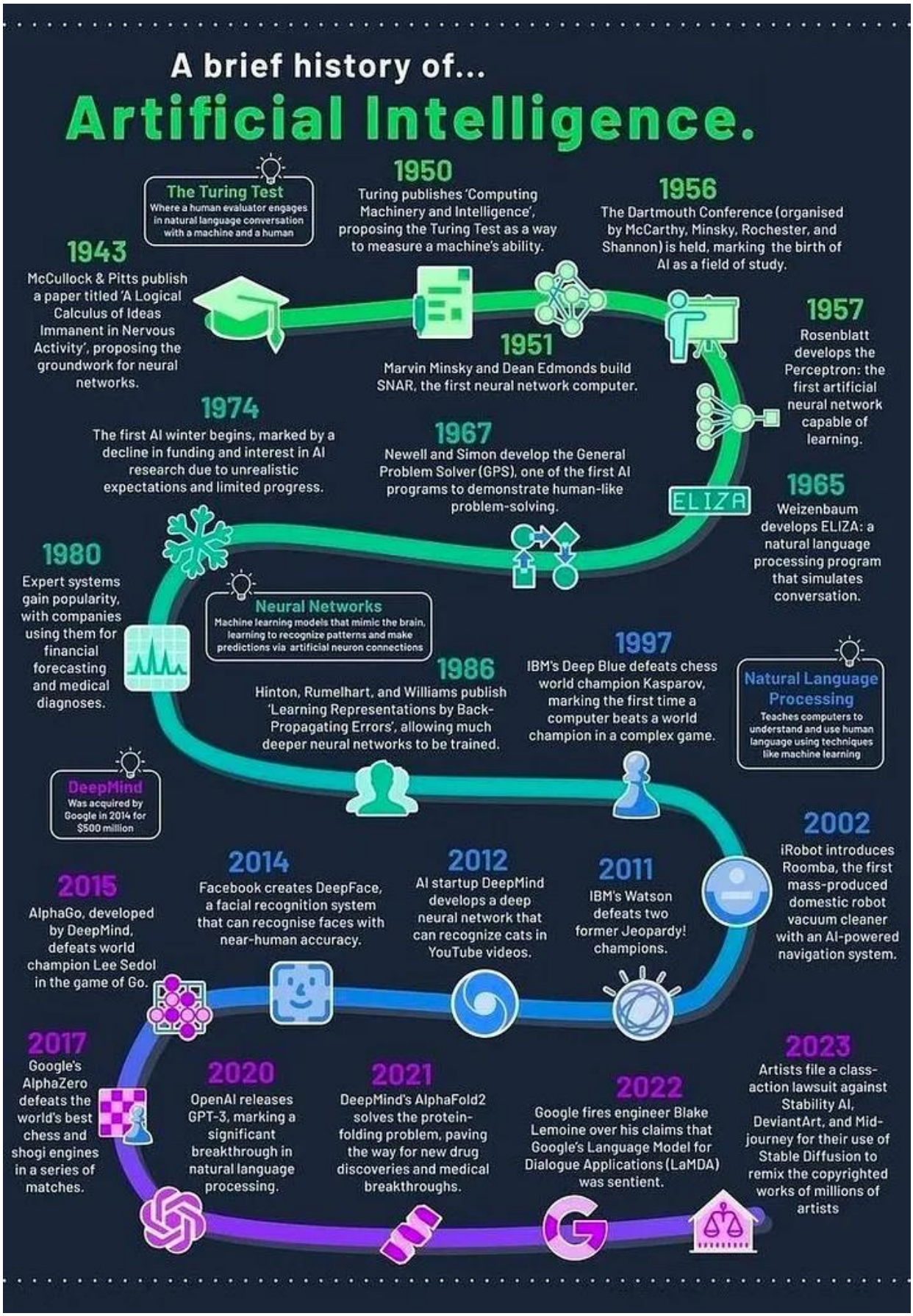
- **Artificial intelligence (AI) i**s the **theory and developmen**t of computer systems **capable of performing tasks** that historically required human intelligence, such as **recognizing speech, making decisions, and identifying patterns**.
- **AI is an umbrella term** that encompasses a wide variety of technologies, including **machine learning, deep learning, and natural language processing (NLP).**





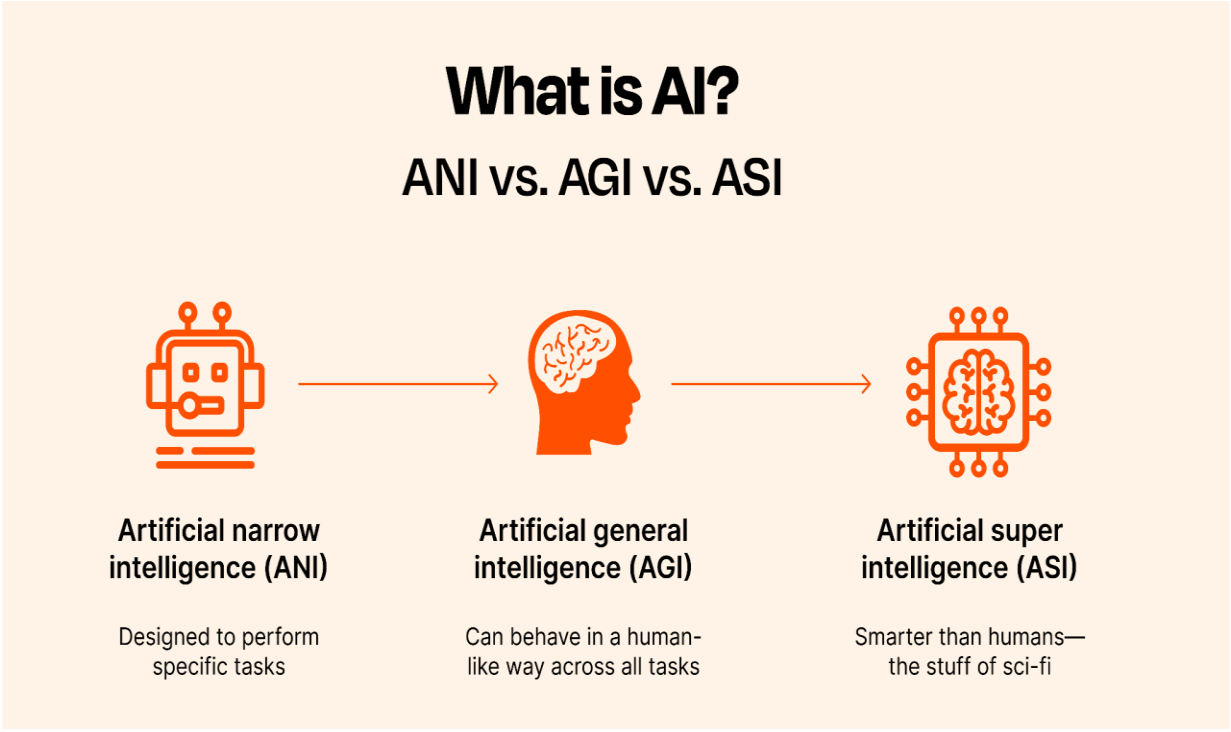
2. What is the history of AI?

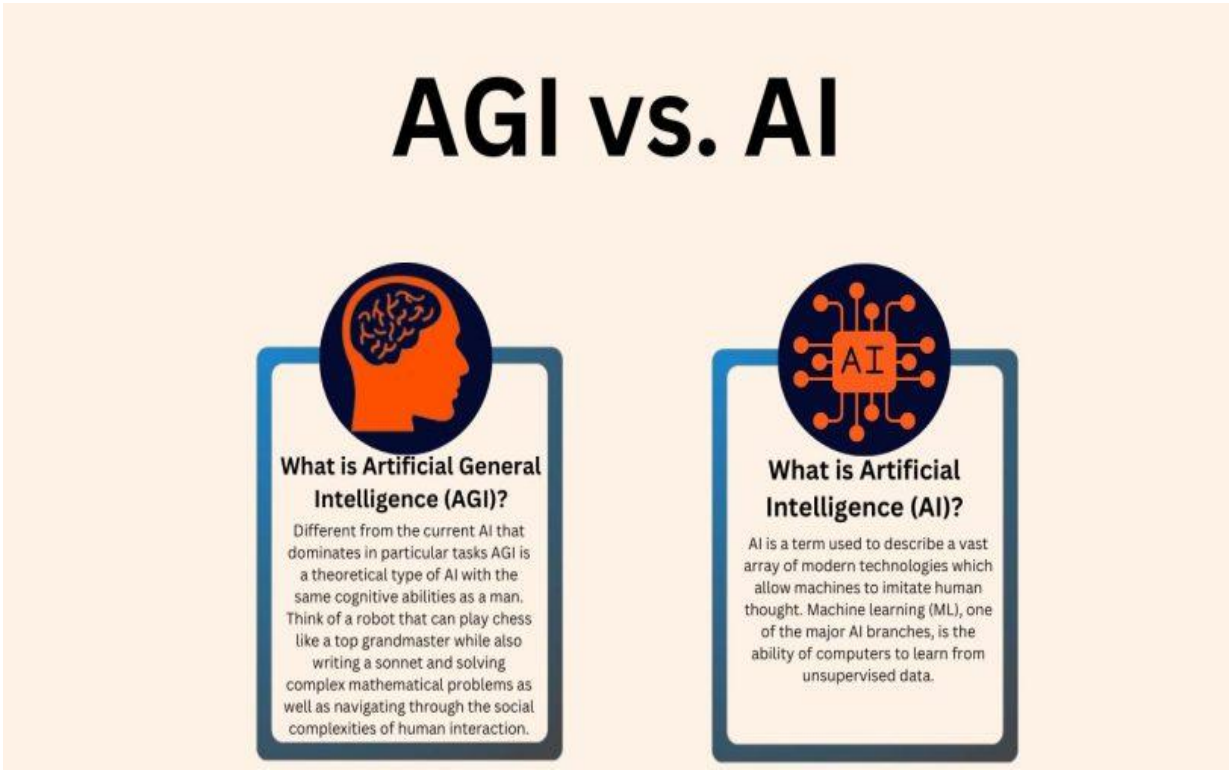


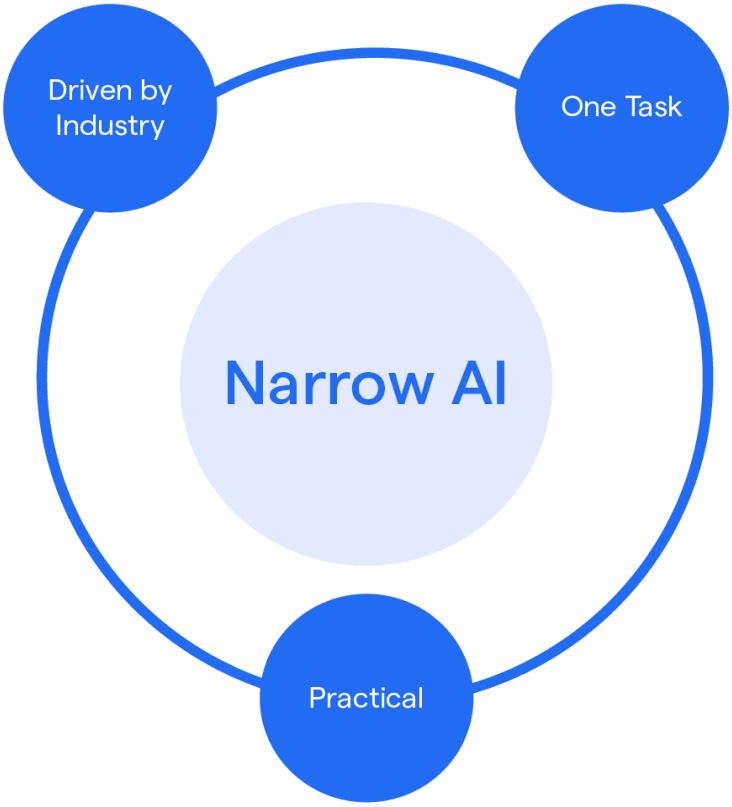

A brief history of...
Artificial Intelligence.
1943
McCullock & Pitts publish a paper titled 'A Logical Calculus of Ideas Immanent in Nervous Activity', proposing the groundwork for neural networks.
The Turing Test
Where a human evaluator engages in natural language conversation with a machine and a human
1950
Turing publishes 'Computing Machinery and Intelligence', proposing the Turing Test as a way to measure a machine's ability.
1951
Marvin Minsky and Dean Edmonds build SNARC, the first neural network computer.
1956
The Dartmouth Conference (organised by McCarthy, Minsky, Rochester, and Shannon) is held, marking the birth of AI as a field of study.
1957
Rosenblatt develops the Perceptron: the first artificial neural network capable of learning.
1965
Weizenbaum develops ELIZA: a natural language processing program that simulates conversation.
ELIZA
1967
Newell and Simon develop the General Problem Solver (GPS), one of the first AI programs to demonstrate human-like problem-solving.
1974
The first AI winter begins, marked by a decline in funding and interest in AI research due to unrealistic expectations and limited progress.
1980
Expert systems gain popularity, with companies using them for financial forecasting and medical diagnoses.
Neural Networks
Machine learning models that mimic the brain, learning to recognize patterns and make predictions via artificial neuron connections
1986
Hinton, Rumelhart, and Williams publish 'Learning Representations by Back-Propagating Errors', allowing much deeper neural networks to be trained.
1997
IBM's Deep Blue defeats chess world champion Kasparov, marking the first time a computer beats a world champion in a complex game.
Natural Language Processing
Teaches computers to understand and use human language using techniques like machine learning
DeepMind
Was acquired by Google in 2014 for $500 million
2002
iRobot introduces Roomba, the first mass-produced domestic robot vacuum cleaner with an AI-powered navigation system.
2011
IBM's Watson defeats two former Jeopardy! champions.
2012
AI startup DeepMind develops a deep neural network that can recognize cats in YouTube videos.
2014
Facebook creates DeepFace, a facial recognition system that can recognise faces with near-human accuracy.
2015
AlphaGo, developed by DeepMind, defeats world champion Lee Sedol in the game of Go.
2017
Google's AlphaZero defeats the world's best chess and shogi engines in a series of matches.
2020
OpenAI releases GPT-3, marking a significant breakthrough in natural language processing.
2021
DeepMind's AlphaFold2 solves the protein-folding problem, paving the way for new drug discoveries and medical breakthroughs.
2022
Google fires engineer Blake Lemoine over his claims that Google's Language Model for Dialogue Applications (LaMDA) was sentient.
2023
Artists file a class-action lawsuit against Stability AI, DeviantArt, and Mid-journey for their use of Stable Diffusion to remix the copyrighted works of millions of artists

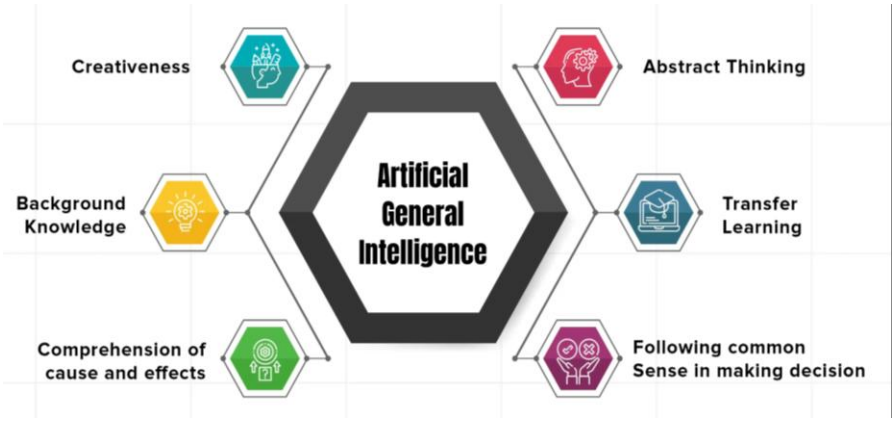
3. Mention different types of AI?

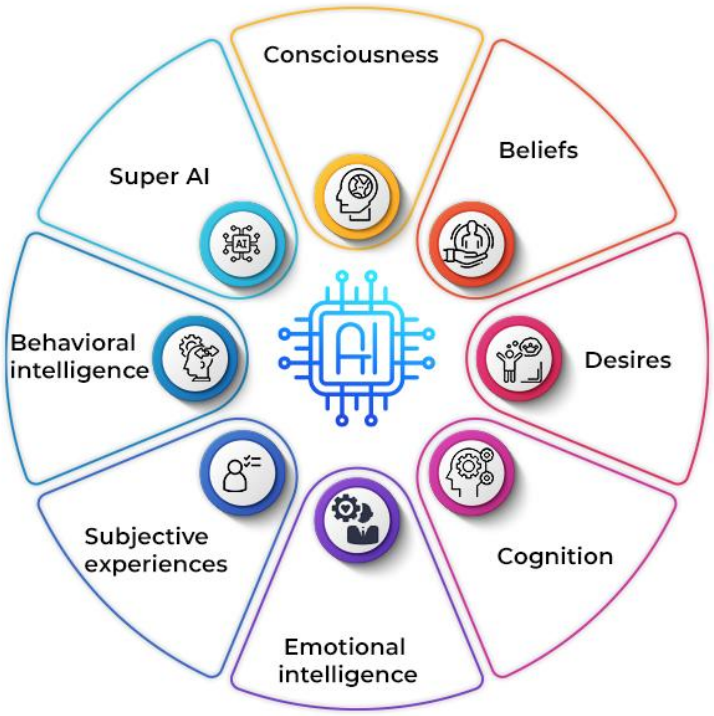
- There are **three kinds of AI based on capabilities:**





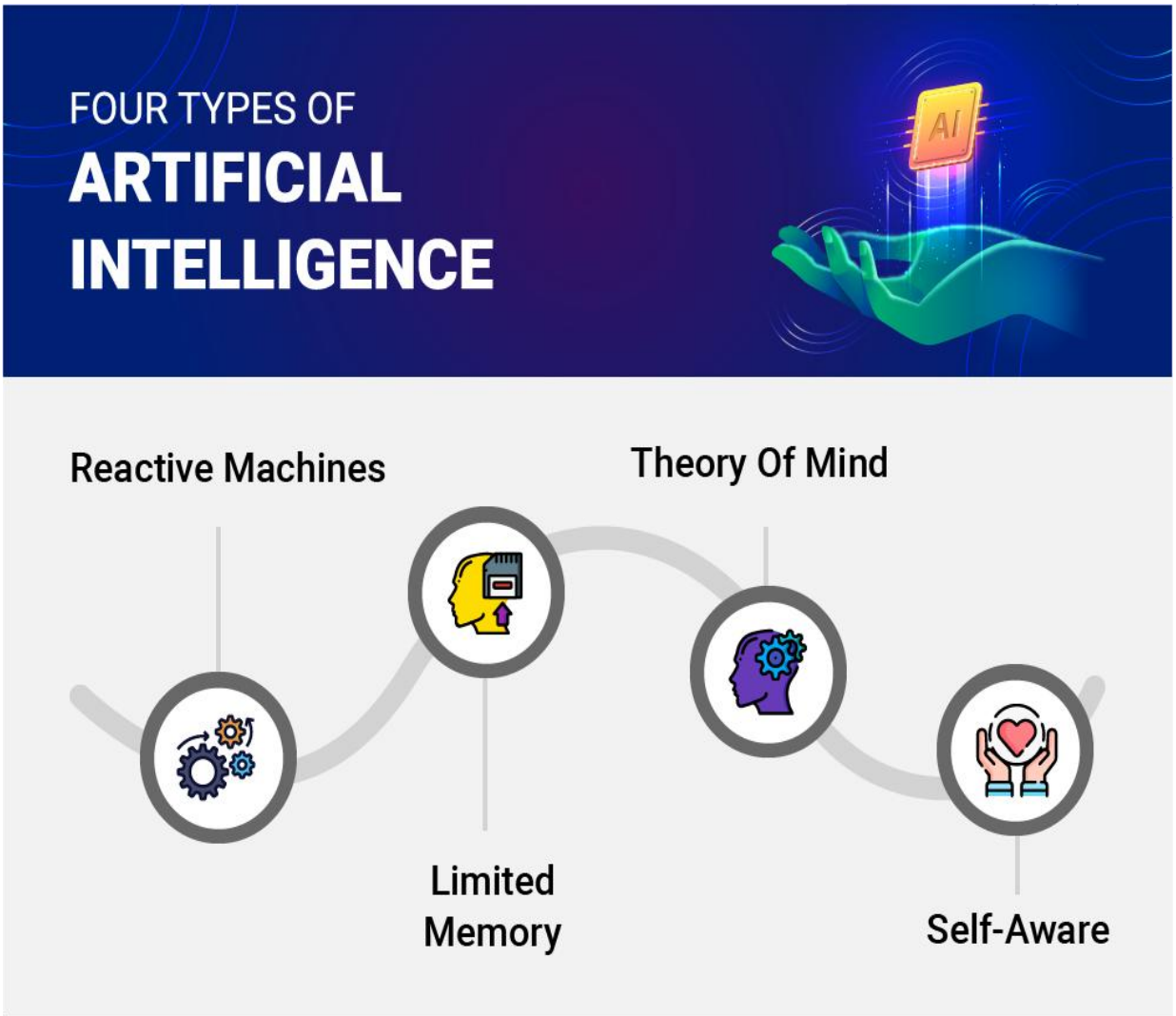
Types of AI	Analysis
Narrow AI	• **Artificial Narrow Intelligence**, also known as **Weak AI** (what we refer to as Narrow AI), is the **only type of AI** that exists today. • It can be **trained to perform a single or narrow task**, often far **faster and better** than a human mind can. • However, **it can't perform outside of its defined task.**  • **Siri, Amazon's Alexa and IBM Watson®** are examples of **Narrow AI**. Even **OpenAI's ChatGPT** is considered a **form of Narrow AI** because it's **limited to the single task of text-based chat.**

General AI	• **Artificial General Intelligence (AGI),** also known as **Strong AI**, is today **nothing more than a theoretical concept.**  • With **more resemblance to human capabilities**, general artificial intelligence is a more advanced form that **can involve visual and language processing, contextual understanding,** and the ability to adapt to a range of tasks. • **AGI** can use **previous learnings and skills to accomplish** new tasks in a different context without the **need for human beings to train the underlying models.** • **It's considered to be far off in the future.**
Artificial super AI	• **Artificial superintelligence** is still **only a theory,** but advances in **nascent AI** are **raising interesting and troubling questions** for the future of humanity.

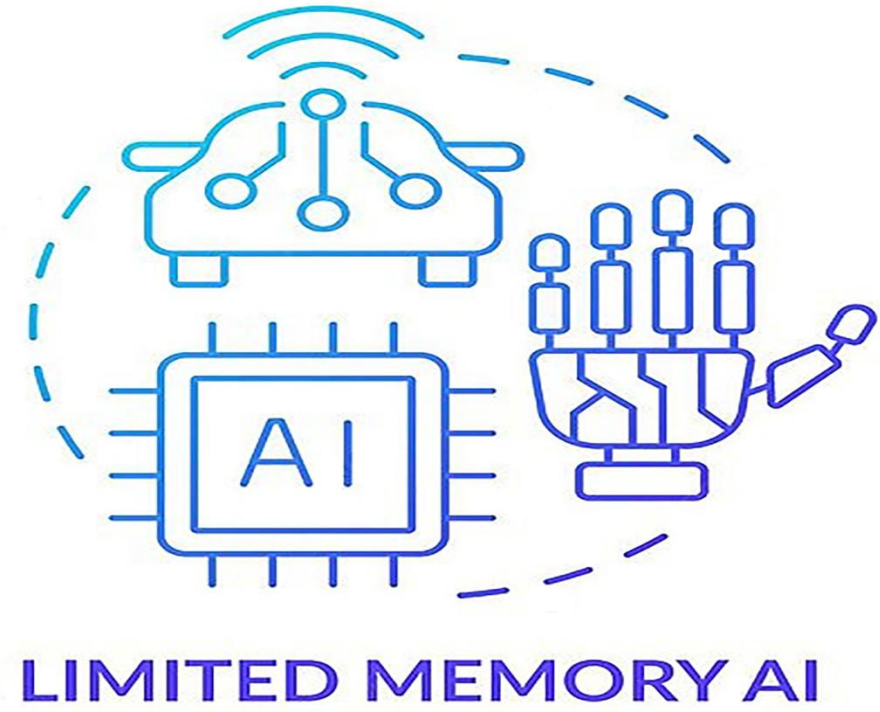


- **Super AI** is commonly referred to as **artificial superintelligence** and, like **AGI, is strictly theoretical.**
- If ever realized, **Super AI would think, reason, learn, make judgements and possess cognitive abilities** that surpass those of human beings.

- There are **four types of AI based on functionalities:**



Type	Analysis
Reactive Machine AI	• **Reactive machines** are **AI systems with no memory** and are designed to **perform a very specific task.** • Since they **can't recollect previous outcomes** or decisions, they **only work with presently available data**. • **Reactive AI stems from statistical math** and can analyze vast amounts of data to **produce a seemingly intelligent output.**

	Examples of Reactive Machine AI: • **IBM Deep Blue: IBM's chess-playing supercomputer AI beat chess grandmaster Garry Kasparov in the late 1990s** by analyzing the pieces on the board and predicting the probable outcomes of each move.
Limited Memory AI	• **Unlike Reactive Machine AI**, this form of AI **can recall past events and outcome**s and monitor specific objects or situations over time. • **Limited Memory AI can use past- and present-moment data** to decide on a **course of action** most likely to help achieve a desired outcome.  • However, **while Limited Memory AI can use past data for a specific amount of time**, it **can't retain that data in a library of past experiences** to use over a long-term period.

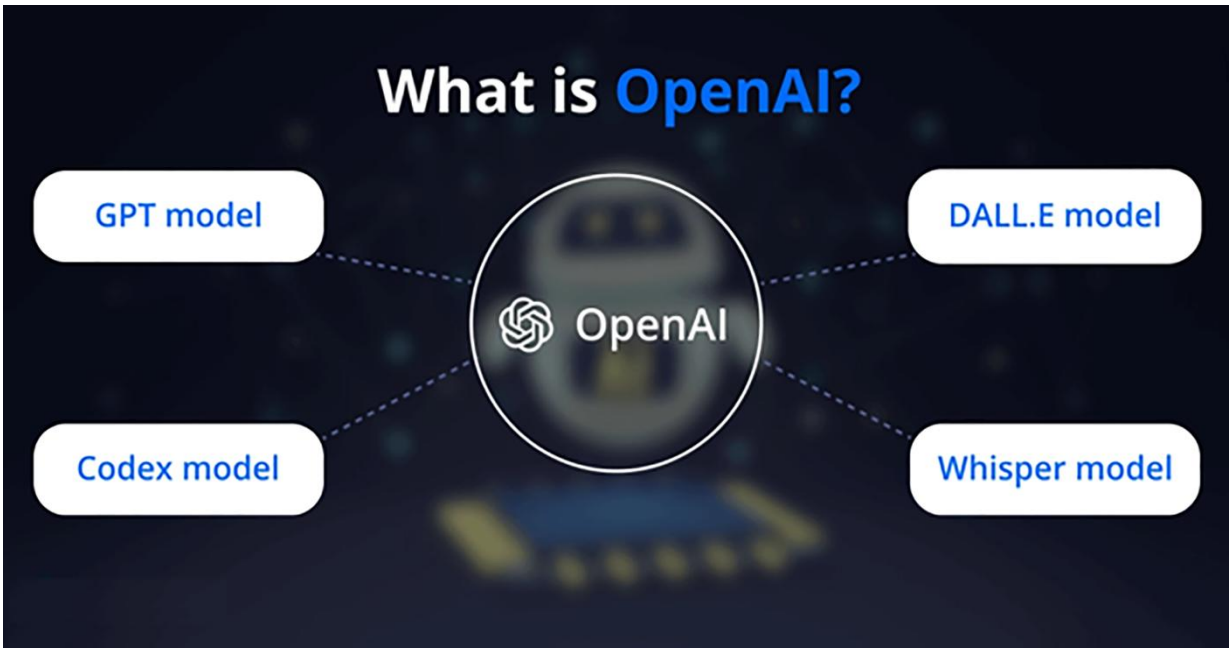
	Examples of Limited Memory AI: • **Generative AI:** Generative AI tools such as **ChatGPT, Bard and DeepAI** rely on **limited memory AI capabilities** to predict the next word, phrase or visual element within the content it's generating. • **Virtual assistants and chatbots: Siri, Alexa, Google Assistant, Cortana and IBM Watson Assistant** combine natural language processing (NLP) and Limited Memory AI to understand questions and requests, take appropriate actions and compose responses.  • **Self-driving cars: Autonomous vehicles** use **Limited Memory AI** to understand the world around them in real-time and **make informed decisions on when to apply speed, brake, make a turn, etc**
Theory of Mind AI	• **Theory of Mind AI** is a functional class of AI that falls underneath the **General AI.** • Though an **unrealized form of AI today, AI with Theory of Mind functionality** would **understand the thoughts and emotions of other entities.**

	• This understanding **can affect how the AI interacts with those around them**.  • In theory, this would **allow the AI to simulate human-like relationships.** • Because **Theory of Mind AI could infer human motives and reasoning**, it would **personalize its interactions with individuals** based on their unique emotional needs and intentions.
Self-Aware AI	▪ **Self-Aware AI** is a kind of **functional AI class** for applications that would **possess super AI capabilities.** 

	• Like theory of mind AI, **Self-Aware AI is strictly theoretical.** • If ever achieved, **it would have the ability to understand its own internal conditions and traits along with human emotions** and thoughts. • It **would also have its own set of emotions, needs and beliefs.**

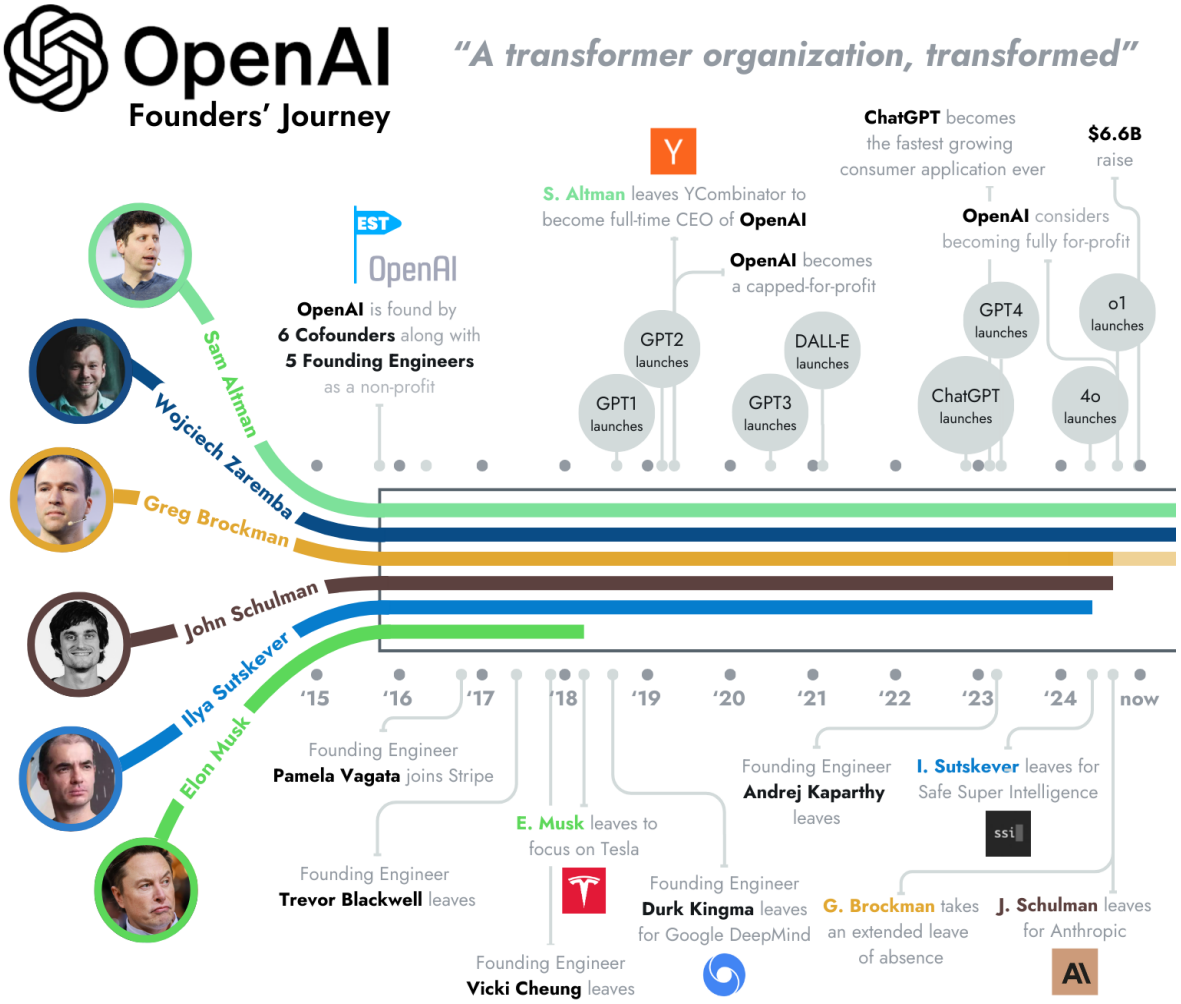
4. What is OpenAI?

- **OpenAI** is an **AI research lab** and company that **aims to develop AI and steer it in ways that "benefit all of humanity."**
- It was **created at first as a non-profit organization** due to its **founders' concerns** about the **potential misuse and catastrophe from AI** being used **"in the wild."**
- Several investors pooled together **$1 billion to deliver research** and resources that remain open to the public.

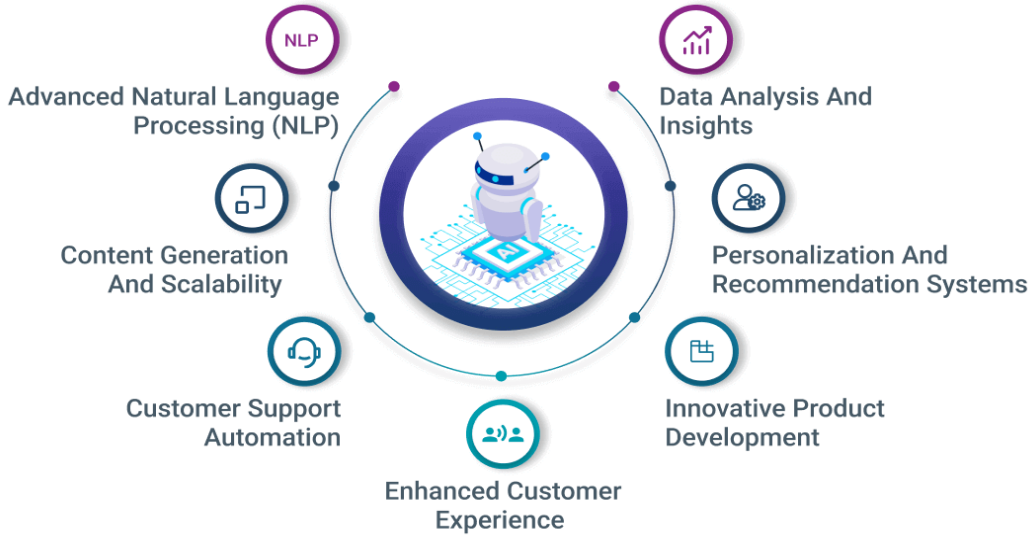


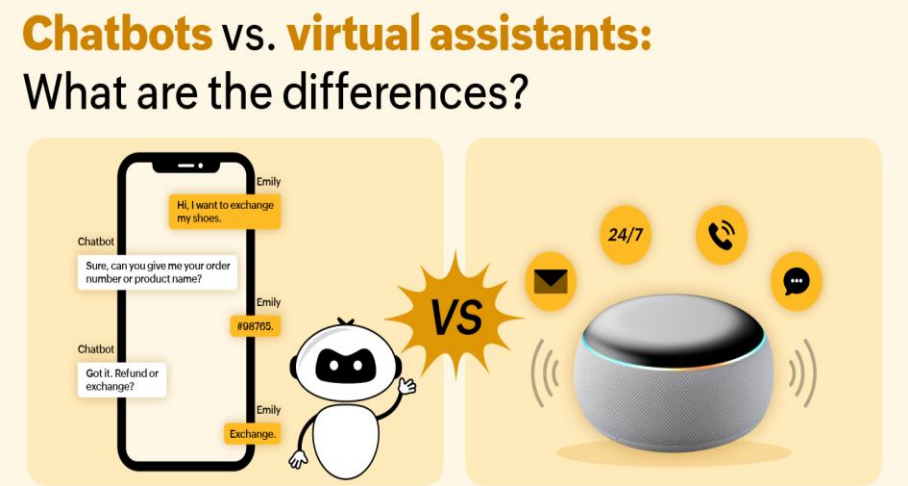
5. What is the timeline and history of OpenAI?

- **OpenAI was founded in 2015** with a focus on **developing AI and machine learning tools f**or various activities.
- Its **first offering was an open-source toolkit** for developing reinforcement learning algorithms (OpenAI Gym), which prompted it to focus on AI research for more general purposes.



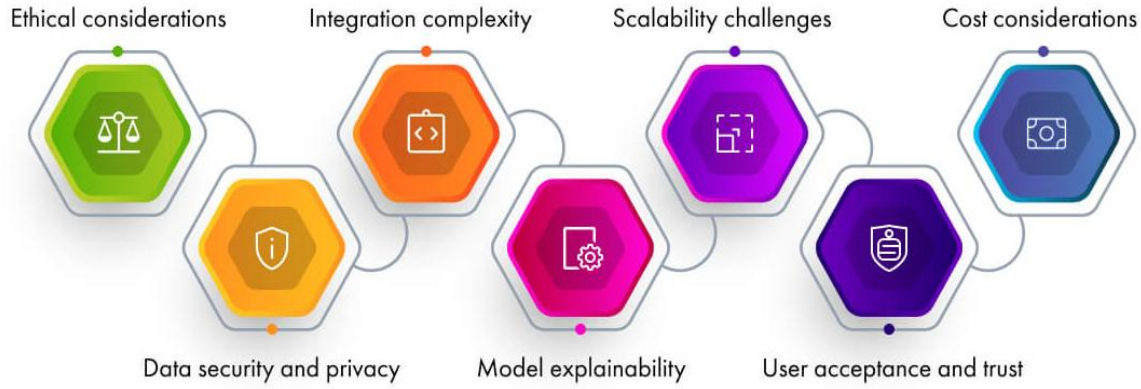
6. Mention about the applications of OpenAI?



Applications	Analysis
It can Be Integrated Into Applications	• **AI's primary purpose** is to **provide the ability** to **integrate tools** into your own apps, so with the help of **API, these tools can be integrated,** which is why **nullifying the requirement** to **build models from scratch.** • **Even coders can integrate the GPT-based model** into their applications using programming languages such as **JavaScript or Python.**
Virtual Assistants and Chatbots	• **ChatGPT-3 generates text** and **performs natural** language processing tasks by **powering virtual help** and **chatbots in applications.** • The best thing about the **chatbot is that it can integrate into various applications**, from e-commerce to healthcare. 
Content Generation	• **GPT models enable content creation** within the applications. • In simple terms, it can be used to **write apps to generate text per the user's requirement.**

	• Overall, the GPT model **allows a faster writing process** and enriches the overall quality of content.
Image Generation	• **Dall. E is a GPT-based model of OpenAI** that can be **integrated into applications** to **generate pictures and per-text promptings.** • If you have an **eCommerce platform**, this model is **suitable for building product images** and saves a lot of manpower.
Enables Problem-Solving and Scientific Research	• **OpenAI** makes the work easy by **helping scientists and researchers identify** patterns and **drive new innovations** via their discoveries. • On the other hand, **AI's smart algorithm allows businesses to optimize complex operation**s along with energy distribution or traffic flow. • Moreover, it is known for **predicting outcomes and recommending suggestions** in the field of finance or marketing, as **well as helping to make better decisions.**
Easy AI Accessibility and Affordability	• Offering a vast range of **APIs and tools, OpenAI** can assist in **building AI systems and apps.** • The free availability of these tools for people with an internet connection helps them to **create apps such as predictive models and chatbots.**

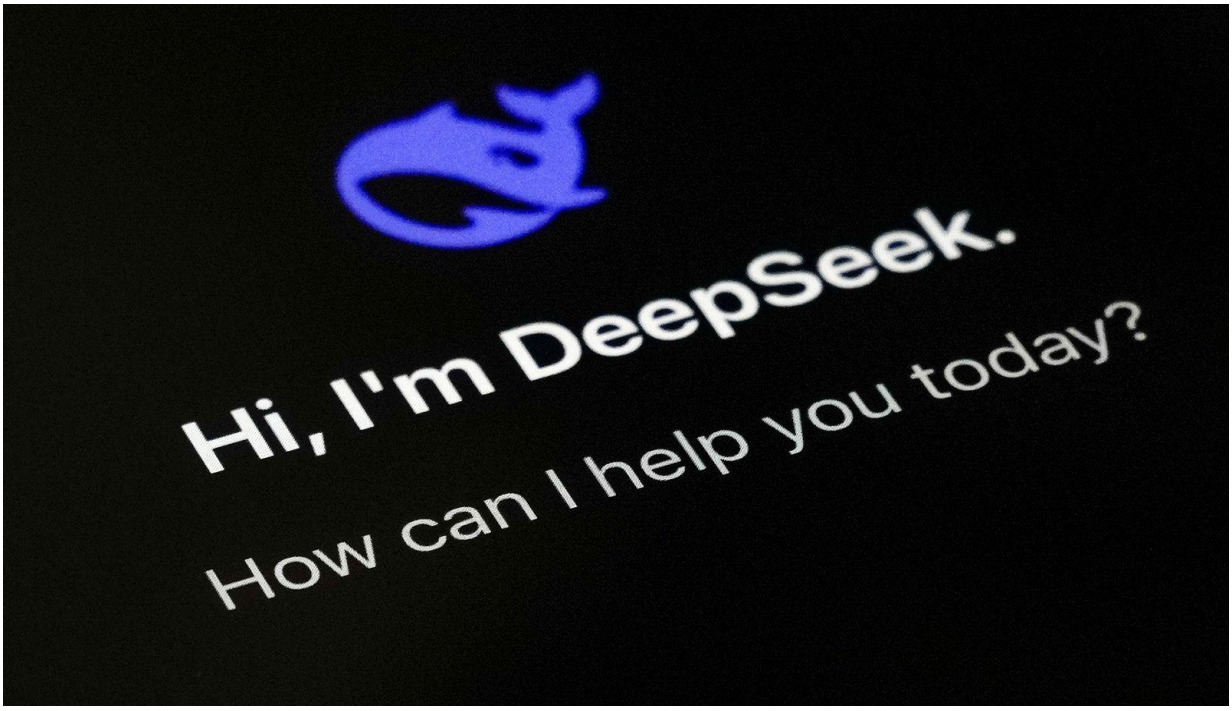
7. Mention about the challenges of OpenAI?



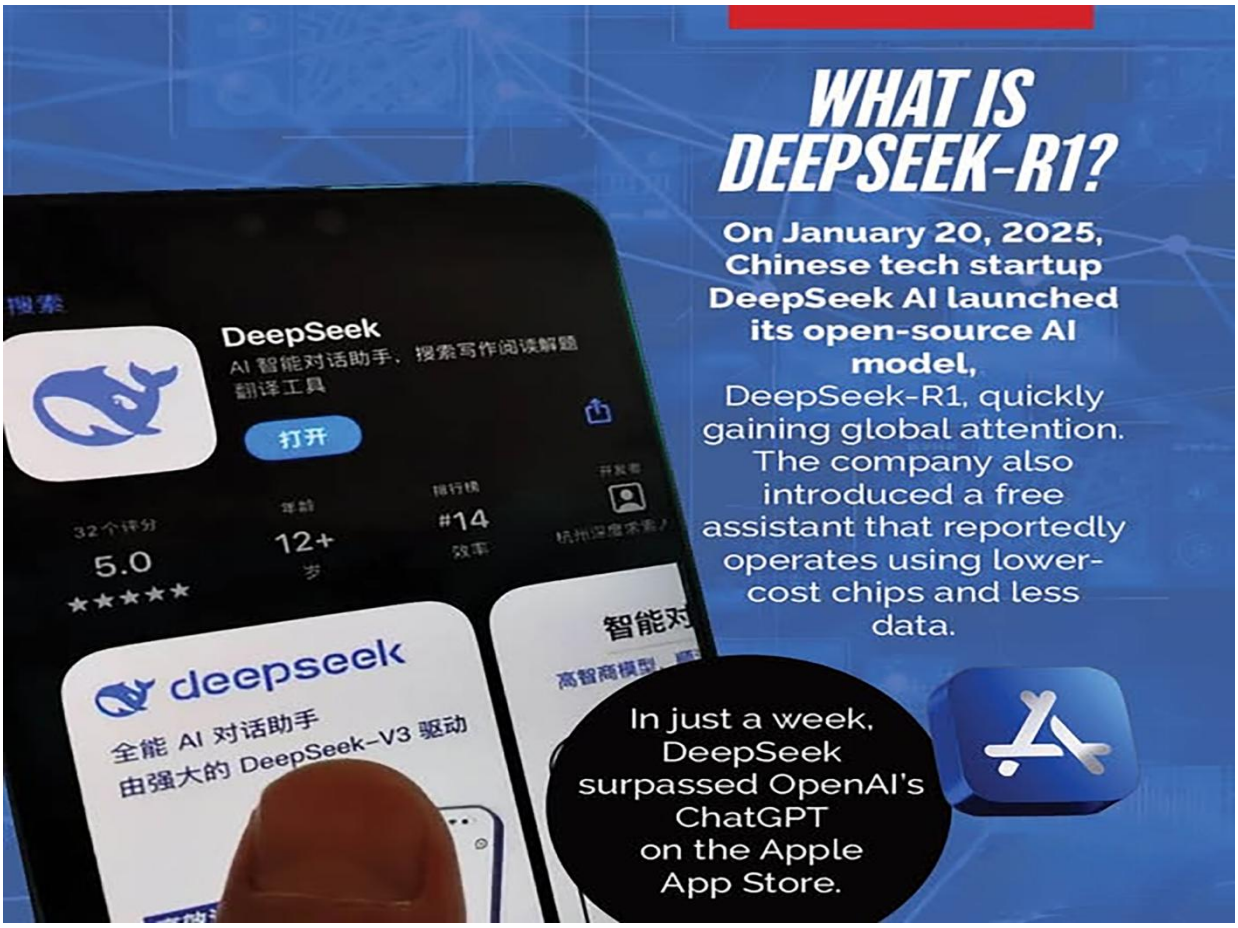
Challenges	Analysis
Limited Online Browsing Capabilities	• It is obvious that **developers and researchers carrying out their tasks using GPT-based models** have to **face limitations** regarding **OpenAI's online** browsing capabilities. The reason behind these models is that **we can not fully access information on the web in real-time.**

	• The **inability to browse external sources of information** that rely on existing data makes it difficult in **order to handle complex queries.** • However, **it provides inaccurate predictions that can be risky**.
Potential for Misuse	• As the **popularity of AI technology is increasing,** many individuals or companies may try to use them with **malicious intent.** • It is a **cause of concern in warfare or other probabilitie**s. • It **creates images** that **look real but fake images** can manipulate people or spread illicit information.
Data Privacy and AI Bias	• As **OpenAI is driven by training based** on data, it **brings some issues regarding** its **effectiveness.** This technology also brings up **concerns related to AI bias and data privacy.** • If a GPT-based model is fed data showing **societal or other types of biases**, they may hold those biases to offer further results. • On the other hand, AI is known to store large amounts of data and therefore there are **higher chances of data misuse or potential privacy violation.**
Little Transparency and Accountability	• Another drawback of OpenAI is its **opaqueness in making decisions and processing data**. • It creates a **hurdle for agencies to determine how** or why they came to a **specific output.** • Plus, **little transparency can also create issues.**

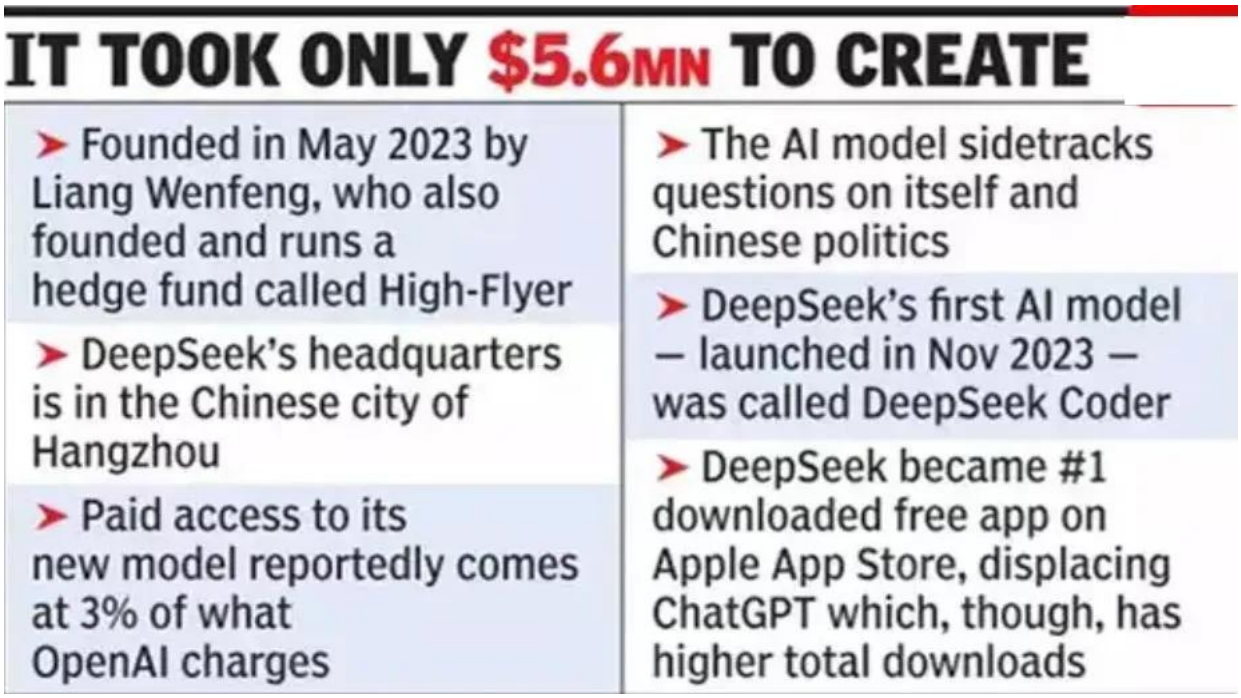
8. What is DeepSeek?



- **DeepSeek AI** is an **advanced Chinese artificial intelligence** model designed to perform tasks such as **text generation, language translation, and human-like conversation.**
- It is developed **to compete with leading AI technologies from the West, including models from OpenAI, Google, and Meta.**
- The **startup was founded in 2023 in Hangzhou, China,** by **Liang Wenfeng,** who previously co-founded one of **China's top hedge funds, High-Flyer.**
- The company wrote in a paper last month that the **training of DeepSeek-V3 required less than $6m (£5m) worth of computing power from Nvidia H800 chips.**
- The **overall cost-effectiveness of DeepSeek** is highlighted by its **pricing structure**, which is reportedly **20–40 times cheaper than equivalent models from OpenAI.**



9. What is the history of DeepSeek?



10. How does DeepSeek work?

- **DeepSeek operates** through a structured process:

Process	Analysis
Data Collection	• **Gather data from various sources**, including databases, sensors, and online platforms.
Preprocessing	• **Cleans, normalizes, and organizes data** for accurate analysis.

Model Training	• **Uses deep learning to train neural networks,** fine-tuning them for accuracy.
Inference	• **Analyzes new data to generate insights** or predictions.
Continuous Learning	• **Refines algorithms** by incorporating new data over time.

11. Mention about the applications of DeepSeek?

Application	Analysis
Text generation	• Writing different types of content like articles, emails, social media posts, and even creative writing.
Information summarization	• Condensing large amounts of text into concise summaries
Question answering	• Providing detailed answers to complex questions.
Reasoning and logic tasks	• Solving logical puzzles and mathematical problems.

12. Mention about the challenges of DeepSeek?

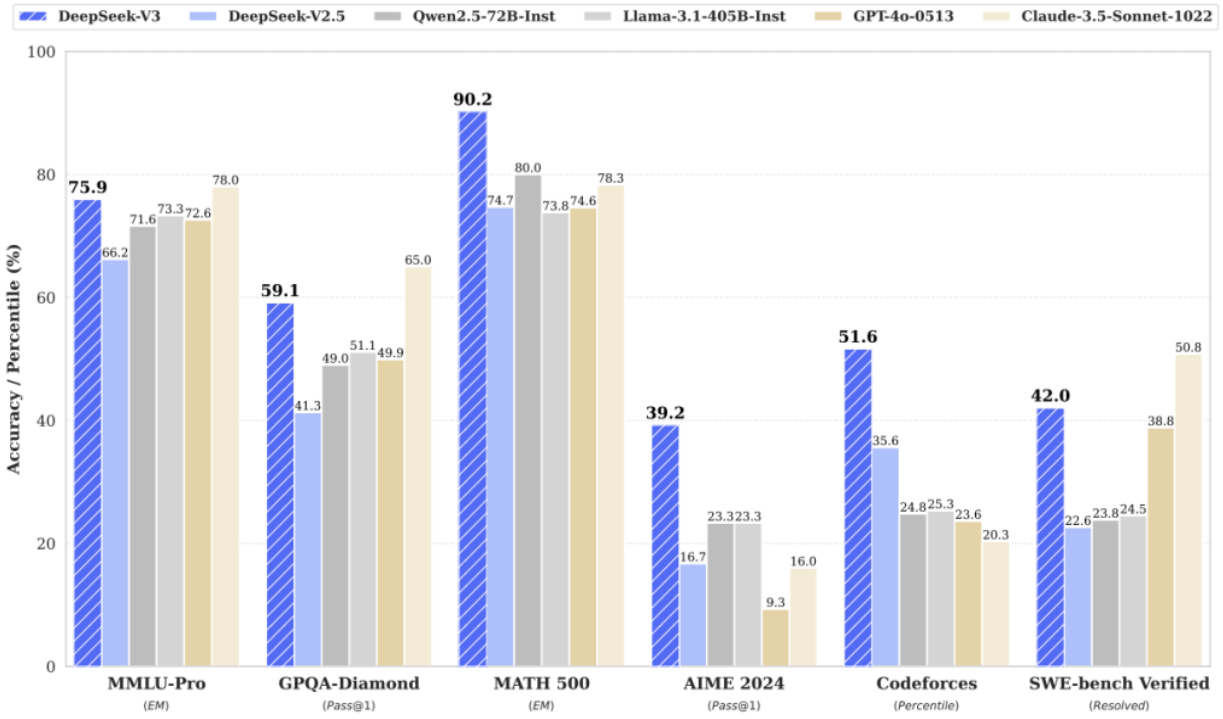
Challenges	Analysis
Data Privacy	• As a **Chinese company, DeepSeek stores user data** in **China**, raising **concerns about potential access** by the **Chinese government** and potential data leaks. • **China's extensive surveillance infrastructure** raises concerns about **AI being used for monitoring** rather than **unbiased decision-making.**
Bias in Training Data	• The model is likely trained on **data reflecting a Chinese perspective,** potentially leading t**o biased outputs** when dealing with topics sensitive to different cultural contexts.
Lack of Diversity in Development	• A **homogenous AI development team** may **overlook potential biases**, leading to unintentional

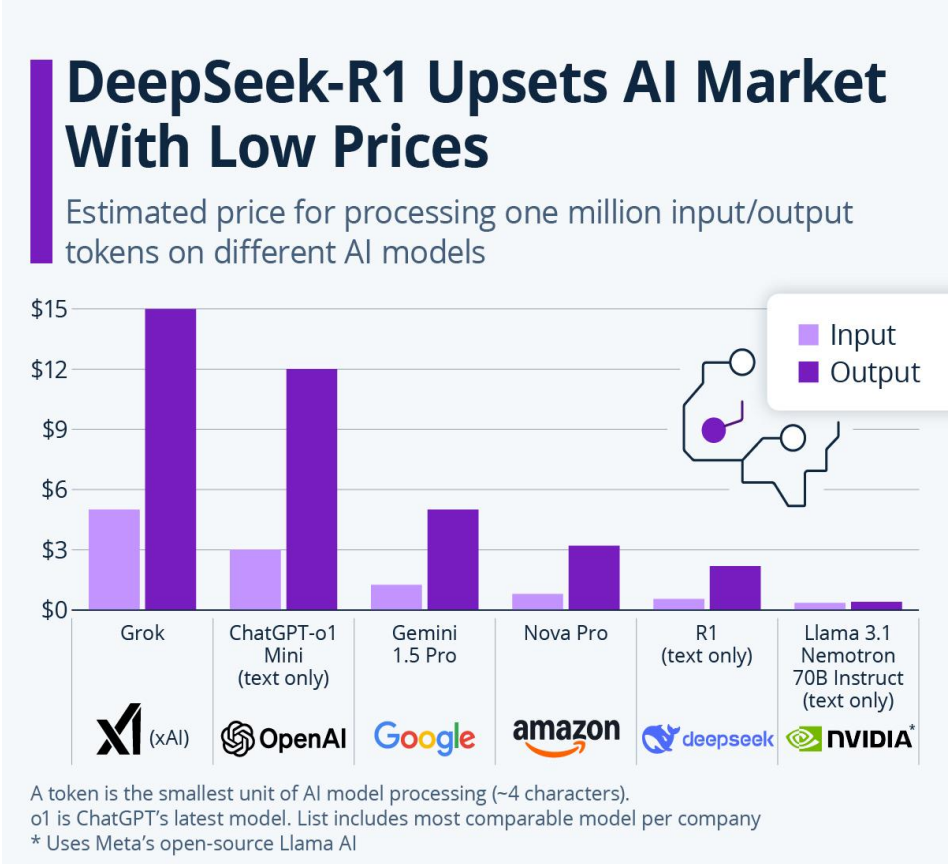
Teams	discrimination.
Context Mismatch	• An **AI model trained in one cultural or economic setting** may produce **inaccurate results when applied in another.**
Misuse Potential	• The **open-source nature of DeepSeek** could allow malicious actors to **easily access** and modify the model for **harmful purposes.**
Regulatory Restrictions	• Due to **privacy and security concerns**, several countries and organizations **have banned DeepSeek, including government agencies in Australia, Italy, and the United States.**
Lack of Transparency	• **Limited information about DeepSeek's development process** and data practices can further exacerbate concerns about its **reliability and ethical implications.**
Regulatory and Ethical Standards	• **China's AI governance** differs from **international standards, raising concerns about fairness,** transparency, and **ethical compliance.**

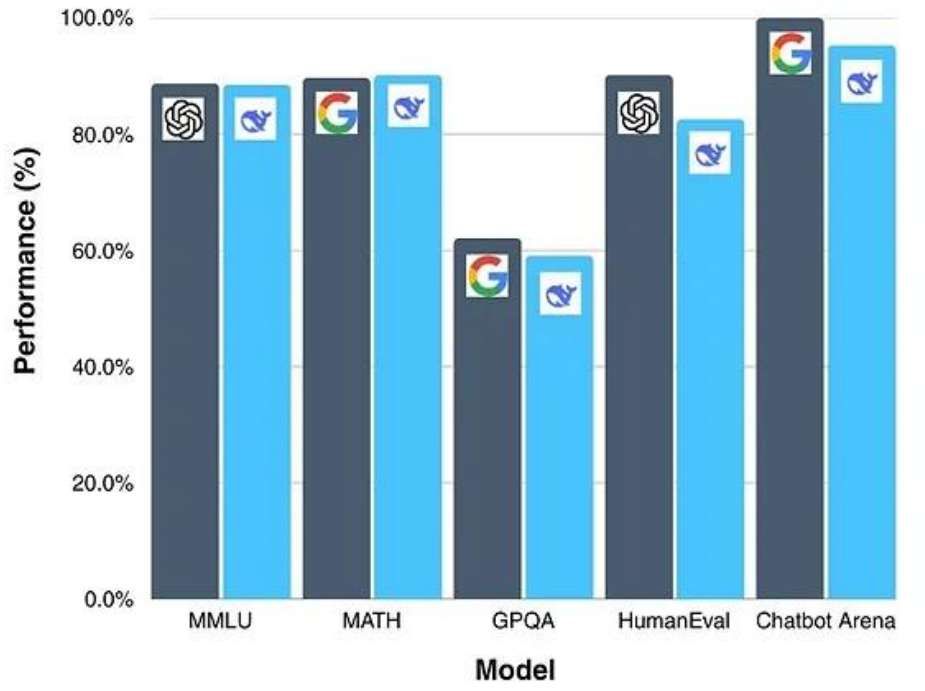
13. Enlist various differences between DeepSeek and OpenAI?

Factor	OpenAI	DeepSeek	Why It Wins
Budget	$100M+	$12M	95% cheaper.
Cost Per Token	$15	$0.55	20–40x cheaper.
Training Paradigm	RLHF (Human Feedback)	GRPO (Rule-Based Rewards)	No humans = huge savings.
Reward Model	Neural Rewards	Rule-Based Rewards	Lower computation cost.
Critic Network	Requires Critics	No Critics	Leaner and faster.
Model Architecture	Full Activation	Sparse Activation	Activates only what's needed.
Hardware	Expensive GPUs	Consumer GPUs	Low-cost and accessible.
Execution	Cloud-Only	Local-Friendly	Privacy + lower cost.
Transparency	Black Box	Clear Reasoning	Easy to debug.
Open Source	Closed Ecosystem	Open and Free	Free R&D from the community.

14. What makes DeepSeek AI models different from other global large language models?



Features	Analysis
Size	• Despite being developed **by a smaller team with drastically less funding than the top American tech giants,** DeepSeek is punching above its weight with a **large, powerful model** that runs just as well on fewer resources. • Despite being larger than other **AI models, DeepSeek-R1 uses only a fraction of its parameters** in each interaction.
Cost Efficiency	
Performance	• Despite its relatively modest means, **DeepSeek's scores on benchmarks keep pace with the latest cutting-edge models** from top AI developers in the United States.

	
Advanced AI Architecture	• **DeepSeek's Mixture-of-Experts (MoE)** architecture consists of multiple specialized sub-models, or **"experts,"** each trained to handle **specific types of tasks or data**. • When a query is processed, **the system** intelligently selects and activates **only the most relevant experts rathe**r than **engaging the entire model.**

15. Why is DeepSeek raising alarms in the U.S.?

- While there was much hype around the **DeepSeek-R1 release**, it has **raised alarm**s in the **U.S.**, triggering concerns and a **stock market sell-off in tech stocks**.
- On Monday, **Jan. 27, 2025, the Nasdaq Composit**e dropped by **3.4% at market opening**, with **Nvidia declining by 17%** and losing approximately **$600 billion in market capitalization.**

The DeepSeek Impact

1-day price move 27 Jan 2025

Semiconductor

- NVIDIA -17%
- tsmc -13%
- arm -10%
- ASML -7%
- APPLIED MATERIALS -7%

IT Hardware

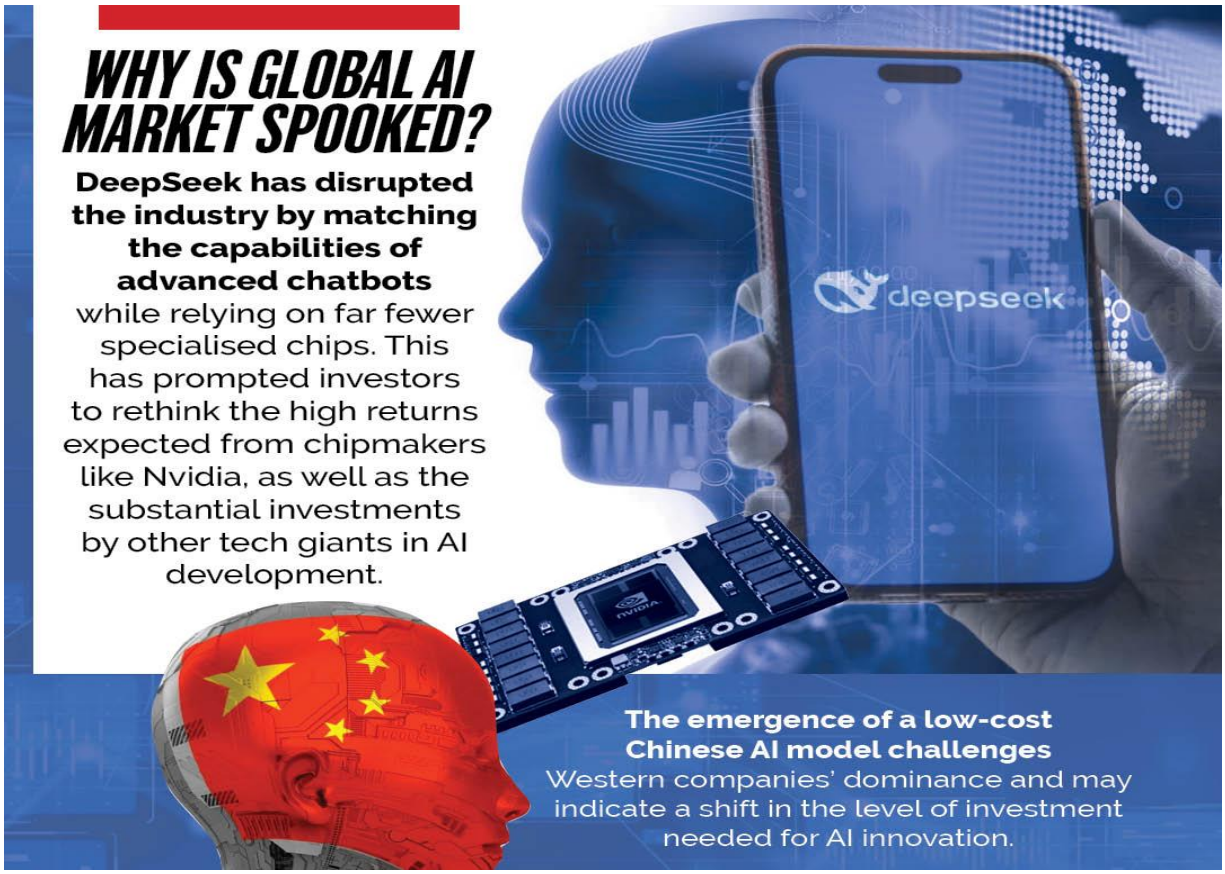
- ARISTA -22%
- DELL -9%

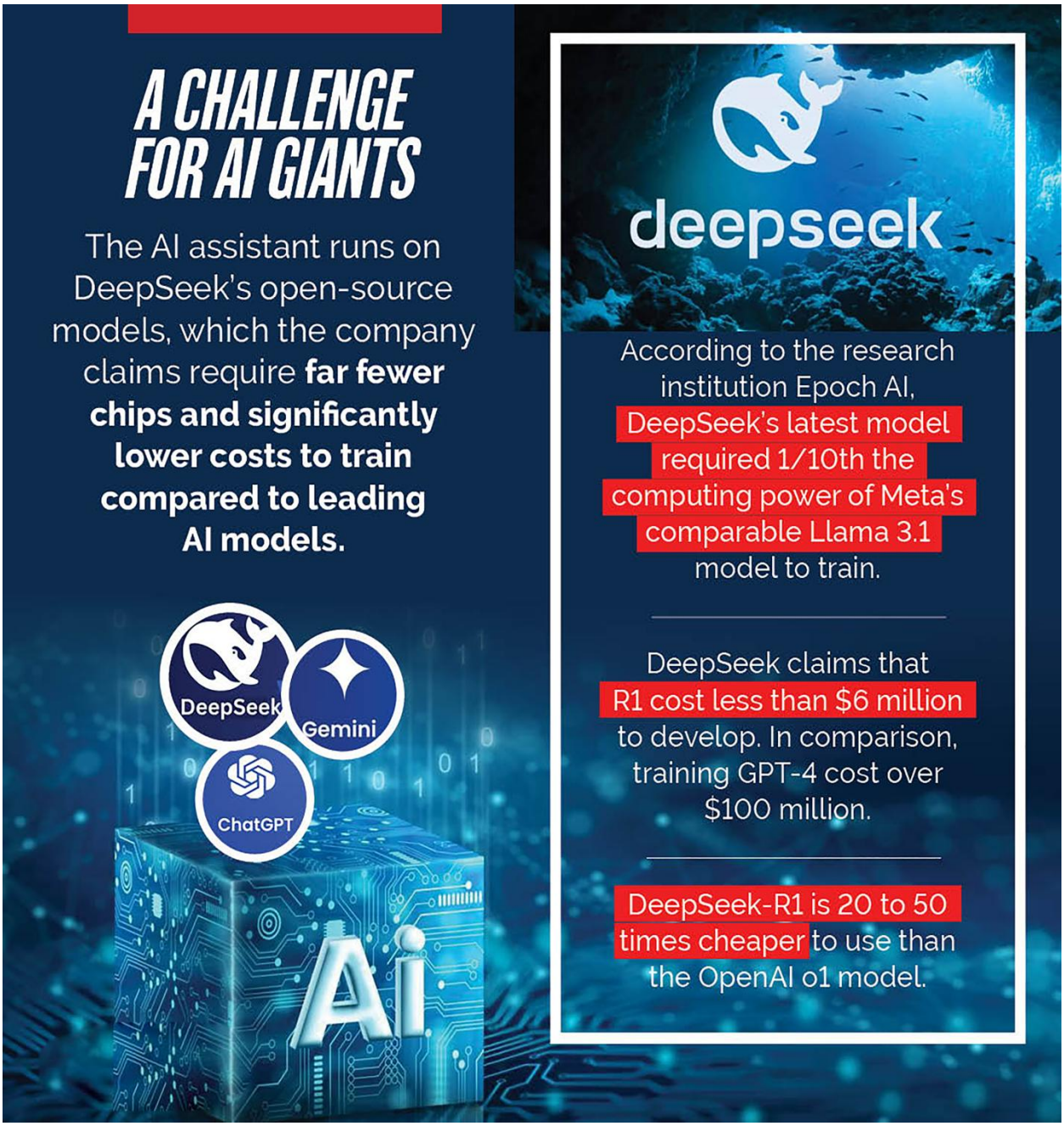
Data Centers

- DIGITAL REALTY -9%
- EQUINIX -4%

Electricity

- VISTRA -28%
- TALEN ENERGY -22%
- Constellation -21%





- **DeepSeek is raising alarms in the U.S.** for several reasons, including the following:

Concern	Analysis
Cost disruption	• **DeepSeek claims** to have developed its **R1 model for less than $6 million.**

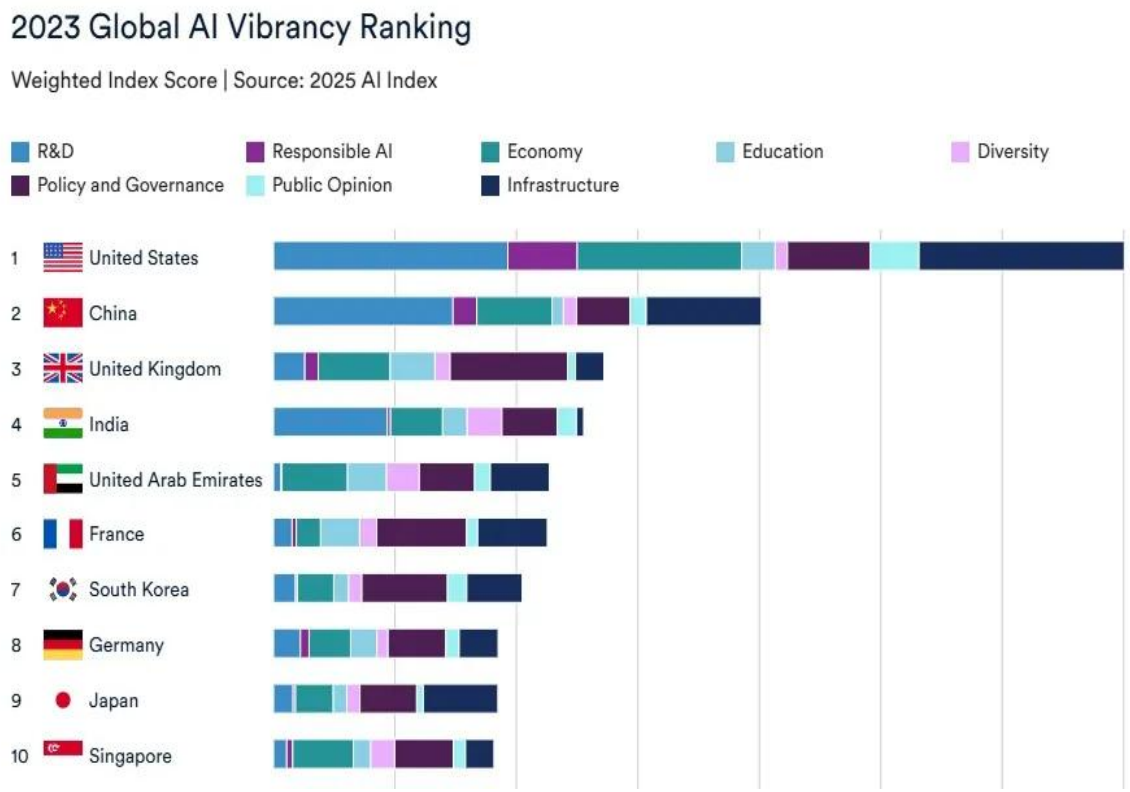
	• The low-cost development **threatens the business model of U.S. tech companie**s that have **invested billions in AI.** • **DeepSeek is also cheaper for users than OpenAI.**
Technical achievement despite restrictions	• The **export of the highest-performance AI accelerator** and **GPU chips from the U.S**. is **restricted to China**. • Yet, despite that, **DeepSeek has demonstrated that leading-edge AI** development is possible **without access to the most advanced U.S. technology.**
Business model threats	• In contrast with OpenAI, which is proprietary technology, **DeepSeek is open source and free, challenging the revenue model of U.S. companies** charging **monthly fees for AI services.**
Geopolitical concerns	• Being based in China, **DeepSeek challenges U.S. technological dominance in AI**. • Tech investor Marc Andreessen called it **AI's "Sputnik moment,"** comparing it to the **Soviet Union's space race breakthrough in the 1950s.**

16. Enlist countries that have banned the use of DeepSeek's AI?

Country	Analysis
Italy	• **Italy was one of the first countries to ban DeepSeek AI** over concerns about the **handling of user data and compliance with EU data protection laws**. • The **Italian Data Protection Authority (DPA) investigated DeepSeek's data** collection practices and removed the AI platform from app stores in the country.
Taiwan	• **Taiwan banned the use of DeepSeek AI** across **all public sector organisations, including public schools, state-owned** enterprises, and critical infrastructure. • **The Ministry of Digital Affairs cited concerns about cross-border data transmission** and information leaks as the reason for the ban.
Australia	• The **Australian government has banned its employees from using the DeepSeek AI** chatbot on government devices. • **Home Affairs Minister Tony Burke** stated that a national intelligence assessment found the **AI platform to pose an unacceptable security risk.**
United States	• The **American Navy has restricted** the **use of DeepSeek, and Texas** was the **first state to ban the Chinese AI app.** • Several federal agencies have instructed employees against accessing DeepSeek, and **"hundreds of companies"** have requested their **enterprise cybersecurity firms to block access to the app.**

India	• The **Ministry of Finance has banned the use of DeepSeek by its employees.** • The **central government has prohibited** its employees from **using AI tools** and applications such as **DeepSeek and ChatGPT** on **office computers and devices.**

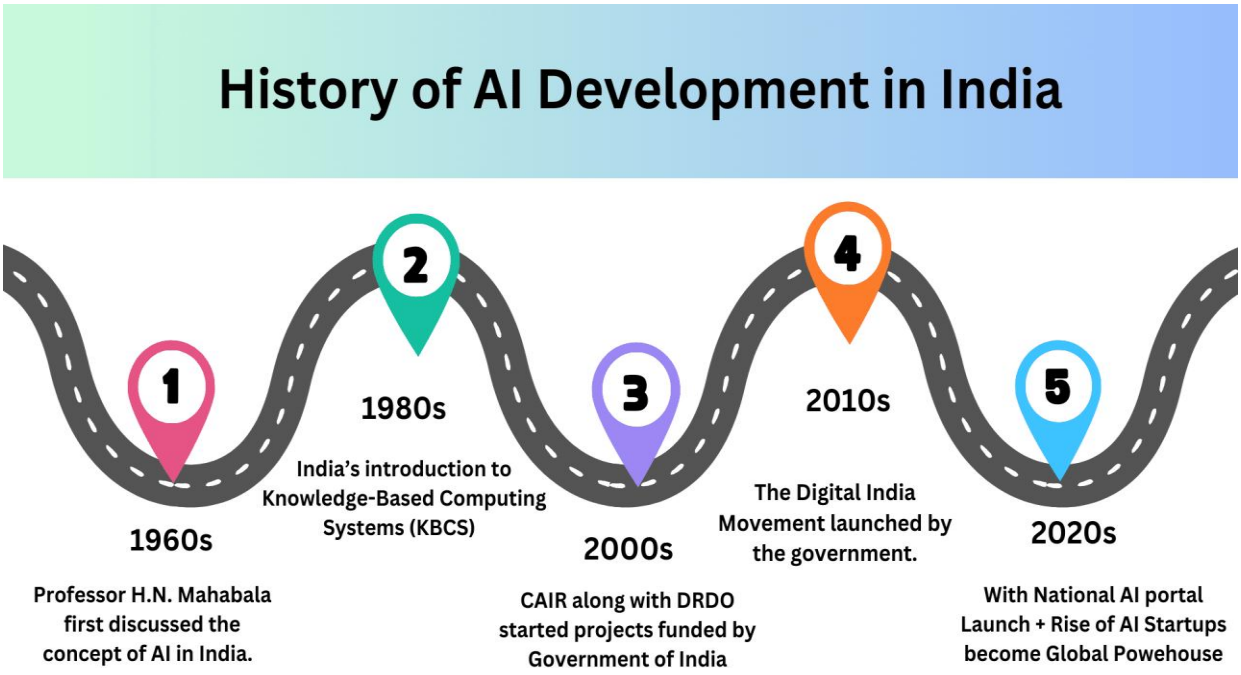
17. Where does India stand in the global AI race?



- **India** is emerging as one of the **global leaders in the field of Artificial Intelligence (AI),** with the country securing **fourth rank in AI development** in an assessment by the **US-based Stanford Institute for Human-Centered AI (HAI)**
- The **Stanford HAI** has released its findings about the **AI-led technology ecosystem at a global level**, using the **Global Vibrancy Tool 2024** developed by the institute.

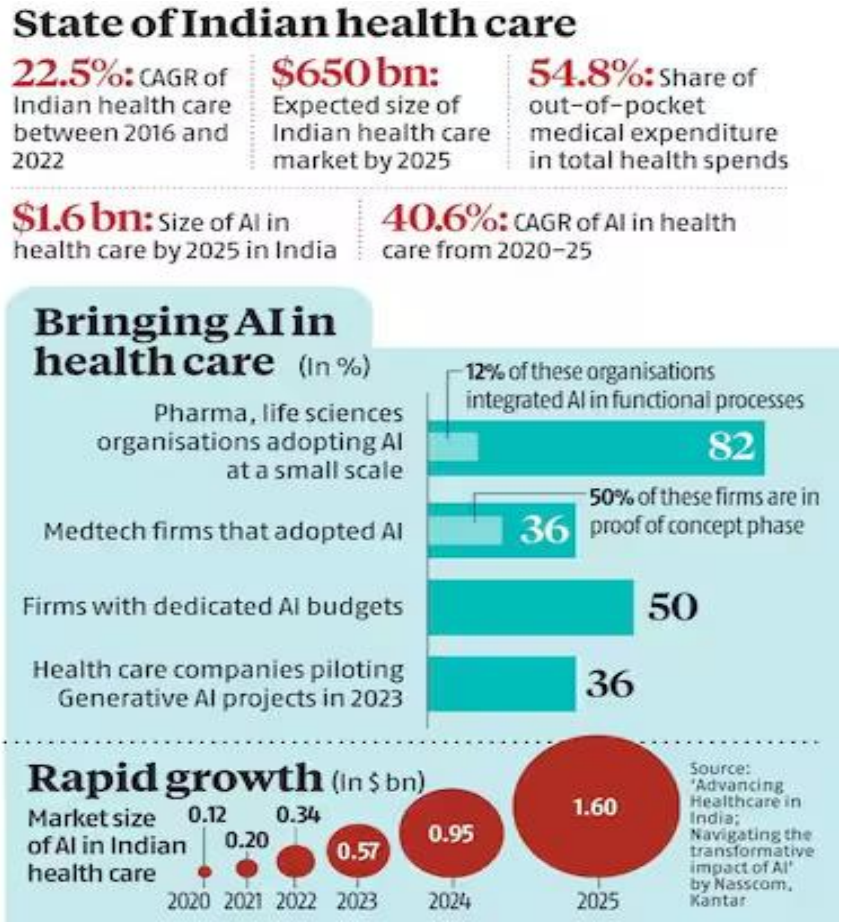
- According to the index, **India scores highly in AI research** and development, indicated by a **good performance** in parameters such as **AI Journal Publications**, **AI Conference Publications, AI Journal Citations and AI Conference Citations**, alongside having notable AI GitHub projects and scoring well in relative **AI skill penetration,** AI hiring and AI talent concentration.
- However, **India lags behind the top three countries** in areas such as **policy and governance and infrastructure, bringing down its overall weighted score**.

18. What is the history of AI development in India?



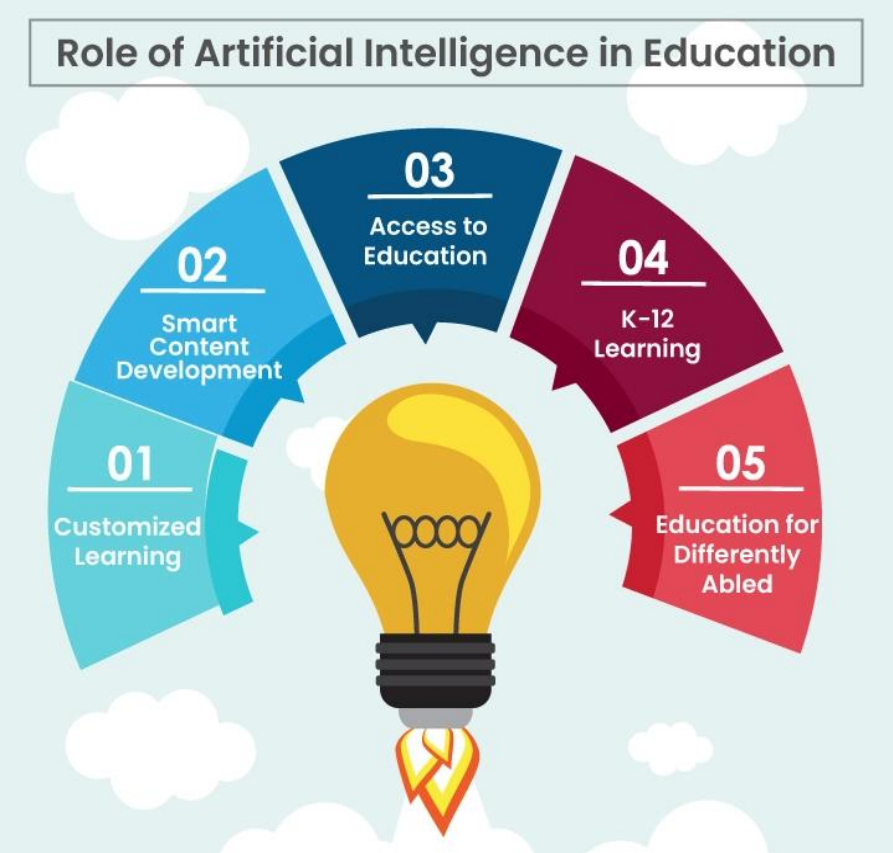
19. What is the impact of Artificial Intelligence on various sectors in India?

Sectors	Impact
Healthcare	• AI is revolutionizing the **healthcare industry by enabling more accurate diagnoses,** personalized treatments, and improved patient outcomes.

	• **Machine learning algorithms** can analyze medical images, such as **X-rays and MRIs, to detect anomalies** and assist radiologists in their diagnoses.  • **AI-powered chatbots** and **virtual assistants** are enhancing **patient interactions** and **providing 24/7 support.** • Additionally, **AI-driven predictive analytic**s can help healthcare providers **identify high-risk patients** and intervene early to prevent diseases.
Finance	• AI is transforming the **finance industry by automating repetitive tasks,** improving **fraud detection**, and enhancing customer experiences.

	• **AI algorithms** can analyze vast **amounts of financial data, identify patterns, and make real-time predictions** for investment decisions. • **Robo-advisors are using AI to provide personalized financial advice** to investors. • **AI-powered chatbots** and **virtual assistants** are streamlining customer service, **addressing inquiries, and simplifying banking processes.** • Moreover, AI-based algorithms can detect fraudulent transactions and prevent financial crimes more effectively.
Manufacturing	• AI is driving the concept of **smart manufacturing by optimizing production** processes, reducing downtime, and improving product quality. **Potential Benefits of AI in Manufacturing** 

	• **AI-powered robots** and automation systems are taking over **repetitive tasks, leading to increased efficiency** and productivity. • **Machine learning algorithms** are used to predict maintenance needs and schedule proactive repairs, minimizing unplanned downtime. • **AI-enabled quality control systems** can **detect defects in real-time,** ensuring products meet the highest standards.
Retail	• **AI is revolutionizing** the **retail industry** by enhancing **customer experiences, improving inventory management**, and enabling personalized marketing. • **Recommendation systems** powered by AI algorithms **provide personalized product suggestions** based on customer preferences and browsing history.
Education	• **AI is transforming** the **education industry** by personalizing learning experiences, automating administrative tasks, and **facilitating adaptive assessments.**

	 • **AI-powered learning platforms** can adapt **content based on individual student needs,** providing personalized education pathways.
Agriculture	• AI is revolutionizing the **agricultural sector by optimizing crop yields**, **reducing resource consumption,** and improving farming practices. • AI algorithms analyze **environmental data, soil conditions, and weather patterns** to provide farmers with **insights on optimal planting times, irrigation schedules, and pest control measures.** • **AI-powered drones and robots can monitor crops,** identify disease outbreaks, and automate labor-intensive tasks.

20. What are the challenges in India's AI development?

- Despite the well-acknowledged potential of AI to drive national growth and prosperity, there are **significant hiccups along the way that are hampering a wide scale adoption of AI solutions in India.**
- The **Data Security Council of India (DSCI)** has highlighted some of these key challenges in a recently released whitepaper.

Challenges	Analysis
Data security and privacy issues	• **AI solutions built on ML and DL** are based on a **huge volume of confidential data,** which are often sensitive and personal in nature. • Along with automation, **AI also brings a range of security and privacy vulnerabilities**, which can **subsequently exacerbate** any **organisation's exposure to cyber risk** and geopolitical risk. • However, **India is moving in the right direction with the Personal Data Protection Bill, 2019, and the National Cyber Security Strategy, 2020.**

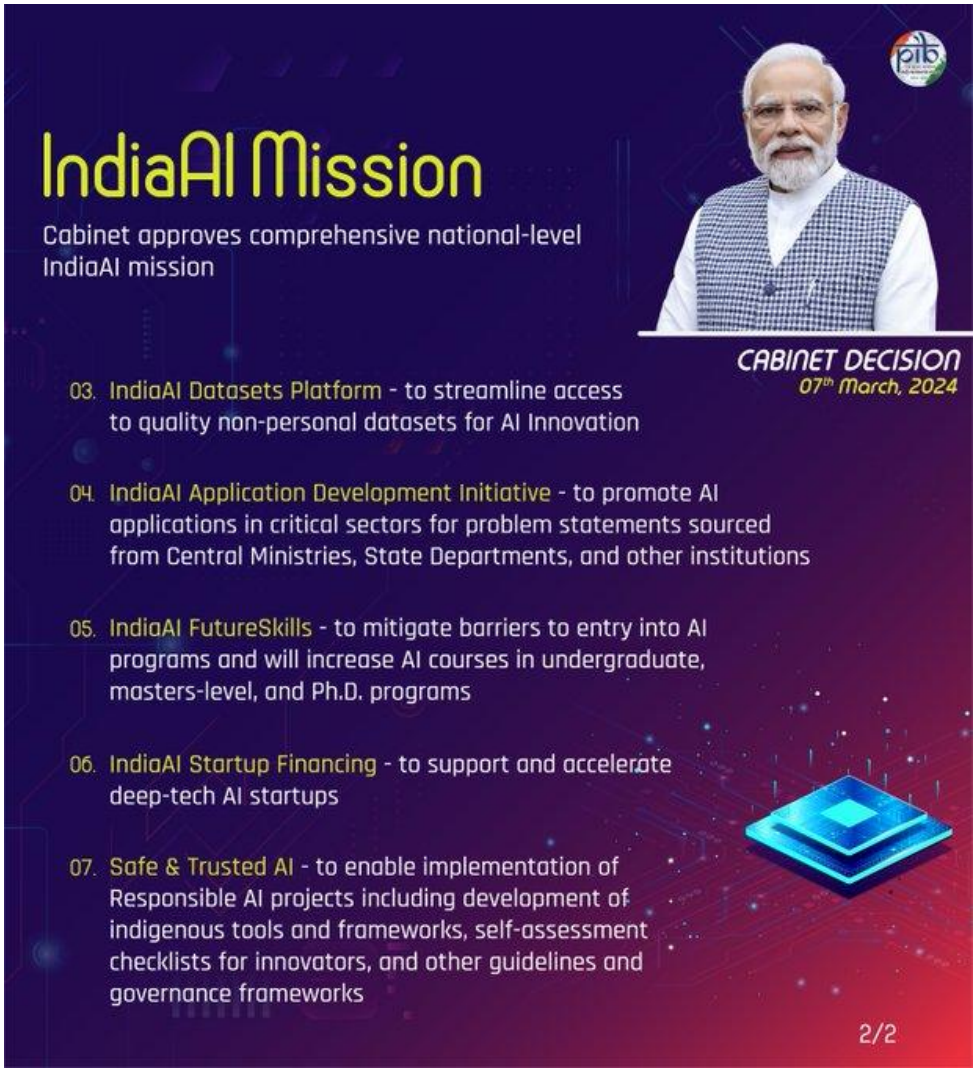
Limited AI expertise and lack of investment to implement AI solutions	• **AI** requires **highly trained and skilled professionals,** but being an emerging technology, the **talent pool is limited.** • As per **McKinsey, "Talent is one of the biggest challenges to AI**, no matter how advanced a company's digital program, it's perhaps not surprising that companies are leaving no stone unturned when sourcing people and skills." • There are **concerted efforts to be seen, in the form of NASSCOM's FutureSkills Prime initiative**, for instance, which **aims to bridge the skilling gaps**. • Furthermore, **high implementation cost resists numerous organizations to implement AI solutions.** • For instance, **transforming a manufacturing plant** from manual operation to automated operation would **require high capital investment to integrate IIoT** and other components of industry 4.0.
Lack of AI and cloud computing infrastructure	• **AI and cloud** are **inseparable** because **AI is data hungry and cloud** is the **only viable solution.** • There are **endless possibilities to scale up AI** with its **convergence with cloud computing.** • However, **despite the potential**, **India lacks** access to **specialised compute and storage** facilities which **forms the backbone of AI**. • A beginning has been made with **India's own AI-first compute infrastructure, AIRAWAT**, which is a **cloud platform for Big Data analytics** with advanced AI processing capabilities.

Lack of data and poor data quality	• **Data is the backbone of AI,** hence easy availability of **open-source data is crucial for any country** to accelerate AI innovation and adoption. • Apart from regulatory restrictions on data, **data annotation and labelling are tedious** but essential processes to provide useful datasets. • The **government** has very **recently opened access to geospatial data and services,** a step that is sure **to encourage innovation in this area.**
Lack of integrity and ethics with AI and ML solutions	• With the **advent of AI products** and **algorithms and their increasing role in decision making, ethics and morality** have emerged as a **major challenge** for the **AI solution providers.** • An AI algorithms work based on training given to it, meaning the **AI solution predicts instances based on the data being fed** into it and based on the **self-learning capability**. However, in a few instances, the **AI algorithm overlooks the correctness of the data and gives an ambiguous result**. • It is also possible for the **results to be skewed due to tampering of the dataset itself.**


Challenges in
Artificial Intelligence
1
Building Trust
The working of AI lies on the technological side, a lot of which people do not trust and understand
2
AI Human Interface
With advancement of AI rising, businesses lack skilled professionals who can work with this technology
3
Investment
AI is an expensive technology that not every business owner or manager can invest money into
4
Software Malfunction
With machines & algorithms controlling AI, it is difficult to identify the cause of mistakes and malfunctions
5
Can Replace only Certain Tasks
Like any other technology, AI also has its own limitations; it simply cannot replace all tasks
6
High Expectations
Not everyone understands the functioning of AI and might also have very high expectations of functioning

21. Mention initiatives taken by India for AI development?

Initiatives	Analyses
IndiaAI Mission	• The mission aims to establish a **robust AI computing infrastructure in India** to support the development and **testing of AI systems.** • The Mission aims to **enhance data quality,** and develop indigenous AI technologies. • The Union Cabinet approved the Rs 10,372 crore for **IndiaAI Mission.**

	
National Strategy for Artificial Intelligence	• The **National Strategy for Artificial Intelligence** was launched by **NITI Aayog**, to position **India as a leader in AI for economic growth,** social development, and inclusive growth.

	 • It emphasizes **leveraging AI for societal needs, such as healthcare, education, agriculture, and smart cities.**
AI for All	• The **strategy focuses on ensuring the benefits of AI** are accessible to the **entire Indian population**. • It includes developing AI technologies that **address language diversity, enhance skill development, and promote ethical AI use.**
Budget 2025-26	• In the latest Budget session, the **government allocated ₹500 crore for setting up a Centre of Excellence in AI for education** to improve India's education system by using AI.

- This initiative builds on the **three AI centres set up in 2023 for agriculture, healthcare, and sustainable cities.**

22. What is the Paris AI summit 2025?

- The **Paris AI Summit 2025**, held on **February 10-11 at the Grand Palais,** convenes global leaders, tech giants, and experts **to discuss AI's future. Co-hosted by France and India**, the summit focuses **on equitable AI access, environmental sustainability, and establishing international governance frameworks.**
- This is the **third edition of the AI Action Summit,** following two previous **editions held in the UK in 2023** and a smaller gathering in Seoul, South Korea, last year.
- The **Paris AI Summit 2025 focuses on several key themes** related to the opportunities, benefits, and governance of AI.
- **These themes include:**
  - ***AI for Public Good:*** Exploring how AI can be applied in sectors like healthcare, education, and governance to benefit society.
  - ***Future of Work:*** Examining AI's impact on job automation and the creation of new employment opportunities.

- ***Innovation and Culture:*** Discussing AI's transformative role in creativity, content generation, and cultural industries.
- ***Global AI Governance:*** Seeking common ground on ethical AI use, regulations, and global policies.
- ***Trust and Transparency:*** Addressing concerns related to AI's decision-making processes, biases, and the spread of misinformation.
- ***Environmentally Sustainable AI Solutions***: Promoting AI development that is environmentally friendly.

23. What is the relevance of the topic for UPSC CSE?

- **For Prelims:** Key Recent Breakthroughs in Artificial Intelligence, Applications of AI in Different Sector, Precision farming, Digital banking, Acing Development of Innovative Technologies with iDEX (ADITI) scheme, India Skills Report, Quick commerce, Personal Data Protection Act 2023, FutureSkills Prime initiative.
- **For Mains:** Key Opportunities AI Revolution Brings for India's Economic Growth, Key Challenges AI Poses to India's Traditional Economy

Some previous years prelims questions.

Q1. Which one of the following words/phrases is most appropriately used to denote "an interoperable network of 3D virtual worlds that can be accessed simultaneously by millions of users, who can exert property rights over virtual items"?**(2024)**

(a) Big data analytics
(b) Cryptography
(c) Metaverse
(d) Virtual matrix

Ans: (c)

Q2. With the present state of development, Artificial Intelligence can effectively do which of the following? **(2020)**

1. Bring down electricity consumption in industrial units
2. Create meaningful short stories and songs
3. Disease diagnosis
4. Text-to-Speech Conversion
5. Wireless transmission of electrical energy

Select the correct answer using the code given below:

(a) 1, 2, 3 and 5 only
(b) 1, 3 and 4 only
(c) 2, 4 and 5 only
(d) 1, 2, 3, 4 and 5

Ans: (b)

Some previous years mains questions.

Q1. The application of Artificial Intelligence as a dependable source of input for administrative rational decision-making is a debatable issue. (10 Marks, 2024)

Q2. Introduce the concept of Artificial Intelligence (AI). How does AI help clinical diagnosis? Do you perceive any threat to privacy of the individual in the use of AI in healthcare? (10 Marks, 2023)

Some questions from this year and previous years interview transcripts.

Board Sheel Vardhan sir:

- What is the Difference between Artificial Intelligence (AI) and Machine Learning?
- What is artificial about AI?

- What is singularity in AI?
- I am anxious about AI as a technology.
- Are you anxious about AI?

Board Sanjay Verma sir:

- What do you mean by intelligence
- Now what is artificial intelligence?
- Who is intelligent - human intellectual or artificial intelligence?
- Where is maths used in AI?

Board B.B. Swain Sir:

- Have you heard about Artificial intelligence?

Board BB Swain Sir:

- You have worked on Al.
- We have seen the proliferation of Al like ChatGPT.
- What is GPT in ChatGPT?
- Give me examples of Al tools other than ChatGPT.

Board Dinesh Dasa sir:

- Tell me will there be job loss by AI ?

Some questions for QUIZ.

Q1. With reference to the Global Partnership on Artificial Intelligence (GPAI) consider the following statements.

1. GPAI is an international initiative to support responsible and human-centric development and use of Artificial Intelligence (AI).
2. India is one of its founding members.

3. GPAI was launched in the year 2023 during the G20 summit.
4. UNESCO has an observer status to GPAI.
5. GPAI is supported by a Secretariat hosted by the OECD.

How many of the above statements are correct?

(a) Only two
(b) Only three
(c) Only four
(d) All five

Ans: (c)

Some questions for POLL.

Q1. Do you think DeepSeek is better than OpenAI?

(a) YES
(b) NO
(c) Can't say.

Q2. Can India become world leader in AI?

(a) YES
(b) NO
(c) Can't say.

■■■■