

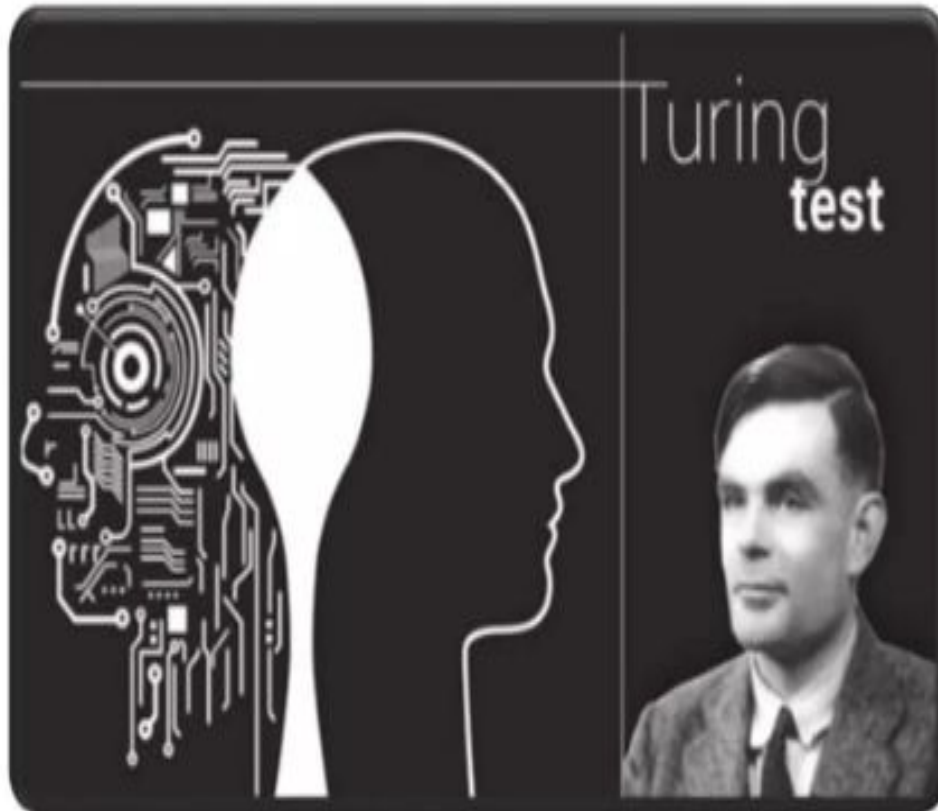
Role of AI

By T. Kar

What is AI

- It is the study of computer systems that attempts to model and apply the intelligence of human mind.
- It simulates the intelligent behavior in computers
- It is the capability of a machine to imitate intelligent human behaviour.
- <https://youtu.be/uMzUB89uSxU>

The Early History



- In 1950 English mathematician Alan Turing wrote a landmark paper titled "Computing Machinery and Intelligence" that asked the question: "Can machines think?"
- Further work came out of a 1956 workshop at Dartmouth sponsored by John McCarthy. In the proposal for that workshop, he coined the phrase a "study of Artificial Intelligence"

Types of Artificial Intelligence

Three Different Types of Artificial Intelligence

| Artificial Intelligence Type | Characteristics |
|--------------------------------|---|
| Weak artificial intelligence | Machines can learn and judge for clearly defined tasks. |
| Strong artificial intelligence | Machines think and solve problems independently. |
| Super artificial intelligence | Machines have intelligence far beyond the human. |

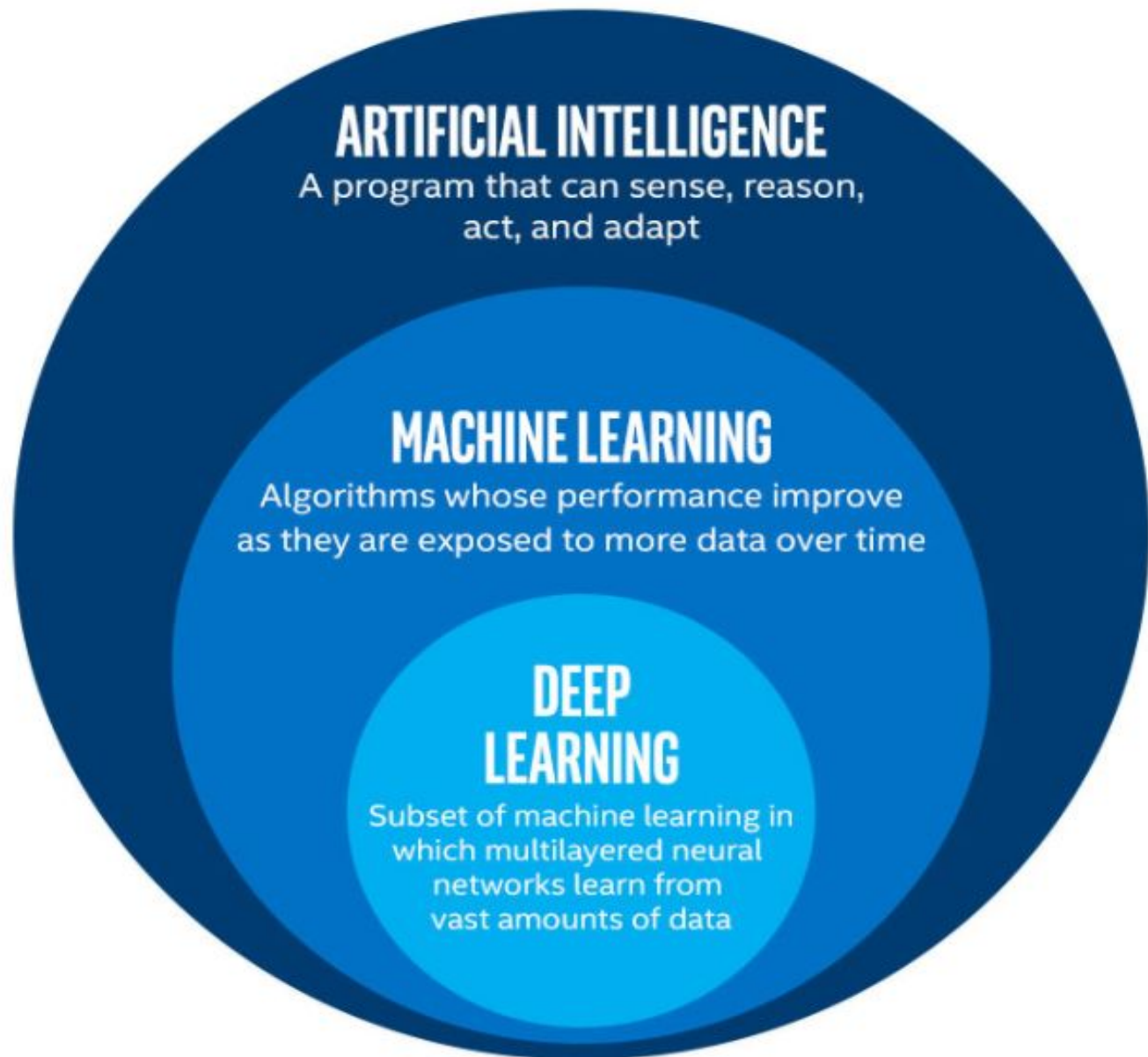
- **Weak AI** - Focuses on one task and cannot perform beyond its limitations (common in our daily lives)
- **Strong AI** - Can understand and learn any intellectual task that a human being can (researchers are striving to reach strong AI)
- **Super AI** - Surpasses human intelligence and can perform any task better than a human (still a concept)

Artificial Intelligence, Machine Learning, Deep Learning



What is the relationship between machine learning and deep learning and artificial intelligence?

AI, machine learning, and deep learning are interchangeable and easily confusing



Artificial Intelligence, Machine Learning, Deep Learning

- **Artificial Intelligence:** Artificial intelligence, also called machine intelligence, can be understood by an intelligence, unlike the natural intelligence shown by humans and animals, which is demonstrated by machines. It looks at ways of designing intelligent devices and systems that can address problems creatively that are often treated as a human prerogative. Thus, AI means that a machine somehow imitates human behavior.
- **Machine Learning:** Machine learning is an AI subset and consists of techniques that enable computers to recognize data and supply AI applications. Different algorithms (e.g., neural networks) contribute to problem resolution in ML.
- **Deep Learning:** Deep learning, often called deep neural learning or deep neural network, is a subset of machine learning that uses neural networks to evaluate various factors with a similar framework to a human neural system. It has networks that can learn from unstructured or unlabeled data without supervision.

Relationship between machine learning and Deep learning and Artificial intelligence

- Machine learning and deep learning can be seen as sub-concepts of artificial intelligence. More precisely, the sub-concept of artificial intelligence is machine learning, and the sub-concept .
- Machine learning is a sub-concept of artificial intelligence and one of the concrete approaches for realizing artificial intelligence of machine learning is deep learning.
- The major aim of ML is to allow the systems to learn by themselves through experience without any kind of human intervention or assistance.

Relationship between machine learning and Deep learning and Artificial intelligence

- Deep learning is a sub-concept of machine learning and can be said to be a system that learns through numerous simulations and trial and error.
- Deep Learning is basically a sub-part of the broader family of Machine Learning which makes use of **Neural Networks**(similar to the neurons working in our brain) to mimic human brain-like behavior.
- DL algorithms focus on **information processing patterns** mechanism to possibly identify the patterns just like our human brain does and classifies the information accordingly.
- DL works on larger sets of data when compared to ML and the **prediction mechanism is self-administered by machines.**

Comparison among AI, ML and DL

| Artificial Intelligence | Machine Learning | Deep Learning |
|---|--|--|
| AI stands for Artificial Intelligence, and is basically the study/process which enables machines to mimic human behaviour through particular algorithm. | ML stands for Machine Learning, and is the study that uses statistical methods enabling machines to improve with experience. | DL stands for Deep Learning, and is the study that makes use of Neural Networks(similar to neurons present in human brain) to imitate functionality just like a human brain. |
| AI is the broader family consisting of ML and DL as it's components. | ML is the subset of AI. | DL is the subset of ML. |
| AI is a computer algorithm which exhibits intelligence through decision making. | ML is an AI algorithm which allows system to learn from data. | DL is a ML algorithm that uses deep(more than one layer) neural networks to analyze data and provide output accordingly. |

Source:

<https://www.geeksforgeeks.org/difference-between-artificial-intelligence-vs-machine-learning-vs-deep-learning/>

Comparison among AI, ML and DL Cont...

| Artificial Intelligence | Machine Learning | Deep Learning |
|---|--|--|
| Search Trees and much complex math is involved in AI. | If you have a clear idea about the logic(math) involved in behind and you can visualize the complex functionalities like K-Mean, Support Vector Machines, etc., then it defines the ML aspect. | If you are clear about the math involved in it but don't have idea about the features, so you break the complex functionalities into linear/lower dimension features by adding more layers, then it defines the DL aspect. |
| The aim is to basically increase chances of success and not accuracy. | The aim is to increase accuracy not caring much about the success ratio. | It attains the highest rank in terms of accuracy when it is trained with large amount of data. |
| Three broad categories/types Of AI are: Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI) | Three broad categories/types Of ML are: Supervised Learning, Unsupervised Learning and Reinforcement Learning | DL can be considered as neural networks with a large number of parameters layers lying in one of the four fundamental network architectures: Unsupervised Pre-trained Networks, Convolutional Neural Networks, Recurrent Neural Networks and Recursive Neural Networks |

Source:

<https://www.geeksforgeeks.org/difference-between-artificial-intelligence-vs-machine-learning-vs-deep-learning/>

Comparison among AI, ML and DL Cont...

| Artificial Intelligence | Machine Learning | Deep Learning |
|---|--|---|
| The efficiency Of AI is basically the efficiency provided by ML and DL respectively. | Less efficient than DL as it can't work for longer dimensions or higher amount of data. | More powerful than ML as it can easily work for larger sets of data. |
| Examples of AI applications include: Google's AI-Powered Predictions, Ridesharing Apps Like Uber and Lyft, Commercial Flights Use an AI Autopilot, etc. | Examples of ML applications include: Virtual Personal Assistants: Siri, Alexa, Google, etc., Email Spam and Malware Filtering. | Examples of DL applications include: Sentiment based news aggregation, Image analysis and caption generation, etc. |
| AI refers to the broad field of computer science that focuses on creating intelligent machines that can perform tasks that would normally require human intelligence, such as reasoning, perception, and decision-making. | ML is a subset of AI that focuses on developing algorithms that can learn from data and improve their performance over time without being explicitly programmed. | DL is a subset of ML that focuses on developing deep neural networks that can automatically learn and extract features from data. |

Source:

<https://www.geeksforgeeks.org/difference-between-artificial-intelligence-vs-machine-learning-vs-deep-learning/>

Comparison among AI, ML and DL Cont...

| Artificial Intelligence | Machine Learning | Deep Learning |
|--|--|---|
| AI can be further broken down into various subfields such as robotics, natural language processing, computer vision, expert systems, and more. | ML algorithms can be categorized as supervised, unsupervised, or reinforcement learning. In supervised learning, the algorithm is trained on labeled data, where the desired output is known. In unsupervised learning, the algorithm is trained on unlabeled data, where the desired output is unknown. | DL algorithms are inspired by the structure and function of the human brain, and they are particularly well-suited to tasks such as image and speech recognition. |
| AI systems can be rule-based, knowledge-based, or data-driven. | In reinforcement learning, the algorithm learns by trial and error, receiving feedback in the form of rewards or punishments. | DL networks consist of multiple layers of interconnected neurons that process data in a hierarchical manner, allowing them to learn increasingly complex representations of the data. |

[Source:](https://www.geeksforgeeks.org/difference-between-artificial-intelligence-vs-machine-learning-vs-deep-learning/)
<https://www.geeksforgeeks.org/difference-between-artificial-intelligence-vs-machine-learning-vs-deep-learning/>

Application of AI



Source:

<https://www.slideteam.net/introduction-to-artificial-intelligence-powerpoint-presentatio>

AI in Healthcare

AI Usecase in HealthCare



Source:

<https://www.slideteam.net/introduction-to-artificial-intelligence-powerpoint-presentation-slides.html>

AI in HR

AI Use Cases in Human Resource



LEARNING

- Curated Training
- Skill Development



RECRUITING

- Dynamic Career Sites
- Smart Sourcing



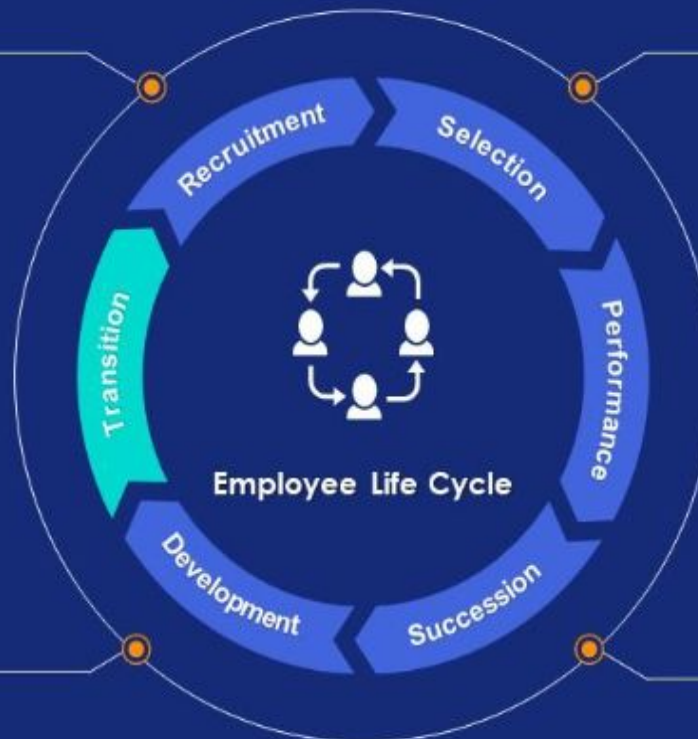
ENGAGEMENT

- HR Chatbot
- Engagement Surveys



ONBOARDING

- Automated Messages
- Curated Videos

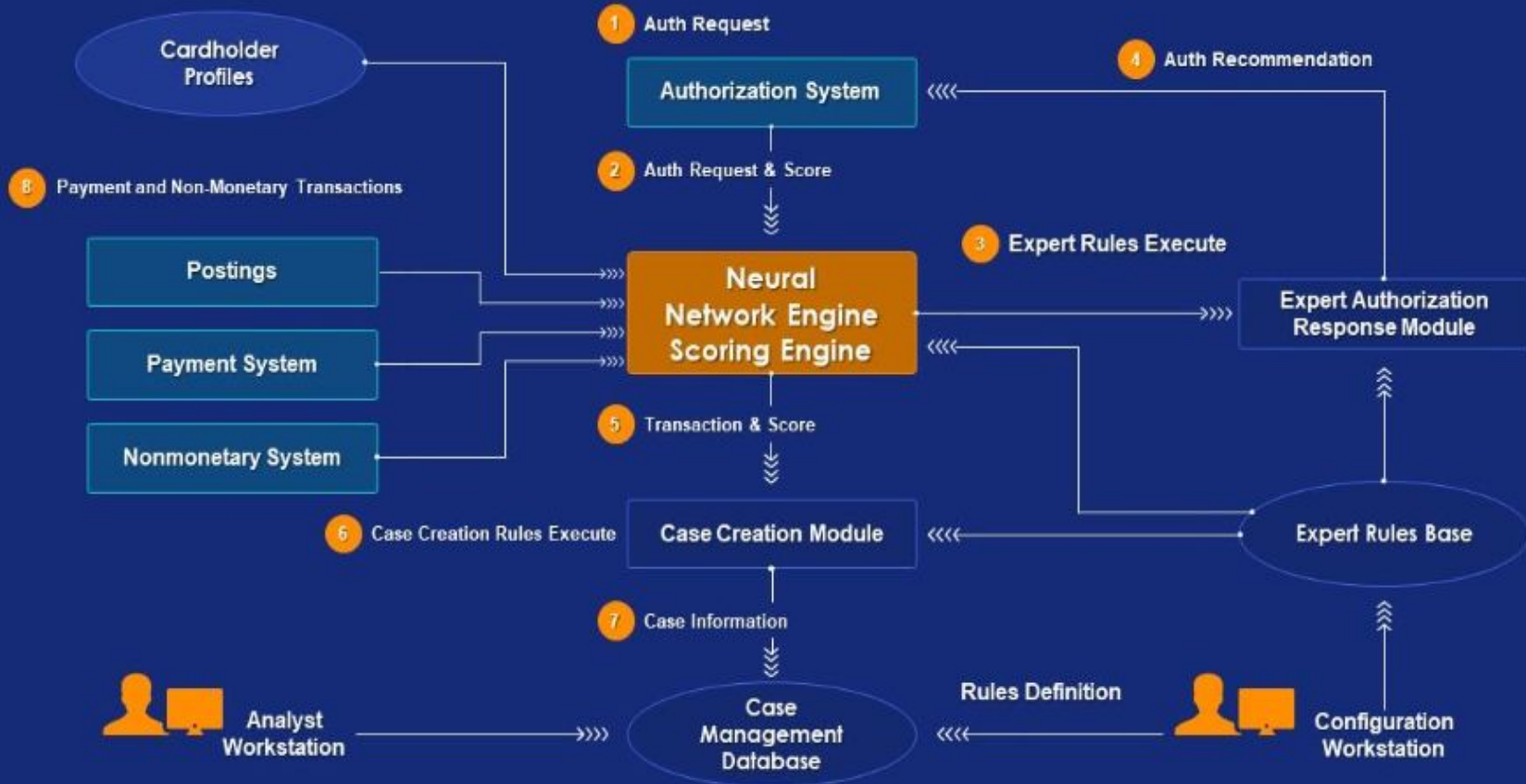


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AI in Banking

AI in Banking for Fraud Detection



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AI in Supply Chain

AI in Supply Chain



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AI in Supply Chain

- Supply chain management is all activities that go into sourcing, producing, and delivering goods. The exact details will depend on the industry. For example, manufacturing supply chains focus on the process of sourcing raw materials to delivering the finished products.
- Logistics are the activities within supply chain management focused on delivery and transport. How does raw material A reach point B and how does the finished product reach the customer from there? Answering that question in the most efficient and cost-effective way – that's logistics.
- Supply chains and logistics are the very lifeblood of business. Grocery stores would be empty and factories would stand idle without it.
- **But what does this all have to do with AI?**
- Here are some of the ways that technology is being used in supply chain management and logistics today:
 - **Demand Forecasting**
 - **Optimizing Routing and Delivery**
 - **Improving the Loading Process**
 - **Generative AI in Supply Chains**

AI in Supply chain

5 Ways AI can be Used in Supply Chain Management

-  **Inventory Management**
-  **Demand Forecasting**
-  **Transportation Optimization**
-  **Warehouse Automation**
-  **Customer Service**

Pros and Cons..

Pros and Cons of AI in Supply Chain Management

PROS

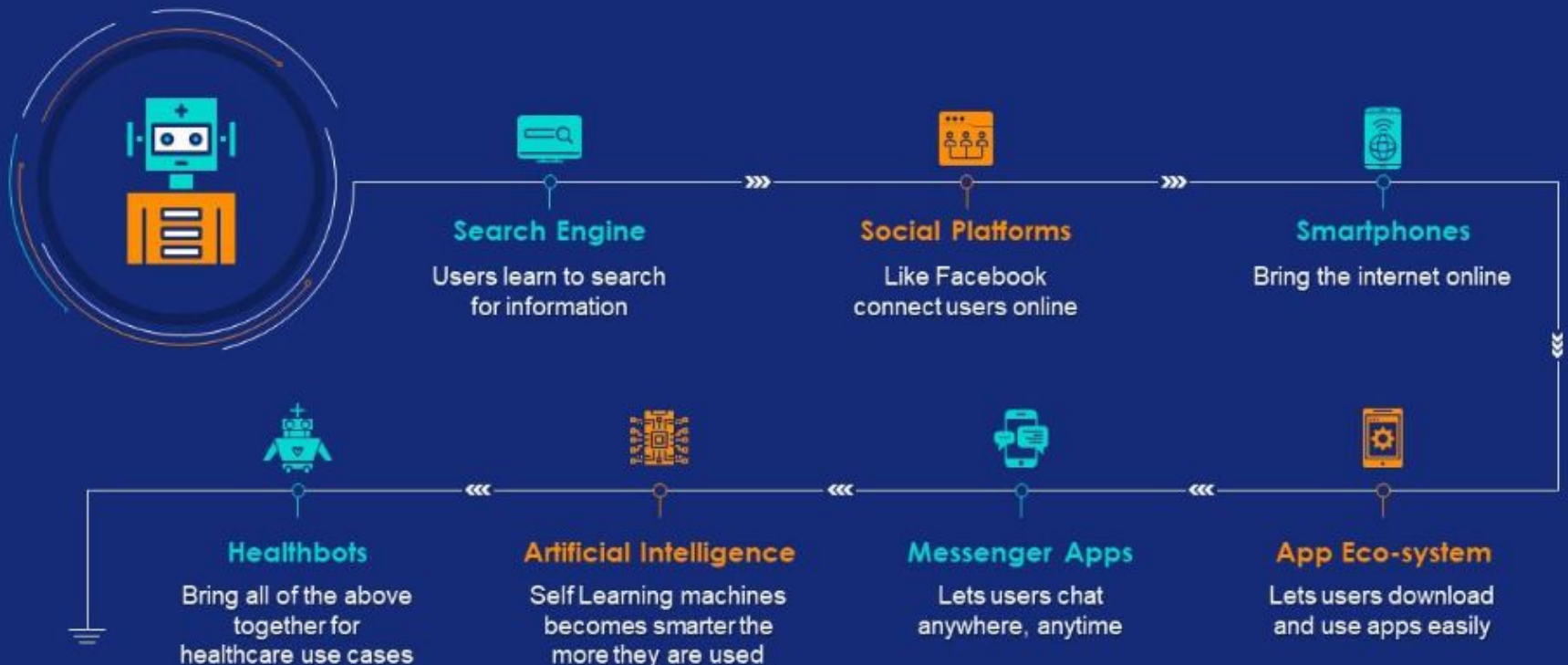
- 1 Increased Efficiency and Cost Savings
- 2 Increased Transparency and Visibility
- 3 Transportation Optimization
- 4 Improved Customer Satisfaction

CONS

- 1 Data Privacy and Security
- 2 Job Losses
- 3 High Implementation Costs

AI Chatbots in Healthcare

Ai Chatbots in Healthcare



Source:

<https://www.slideteam.net/introduction-to-artificial-intelligence-powerpoint-presentatio>

Why is AI Booming

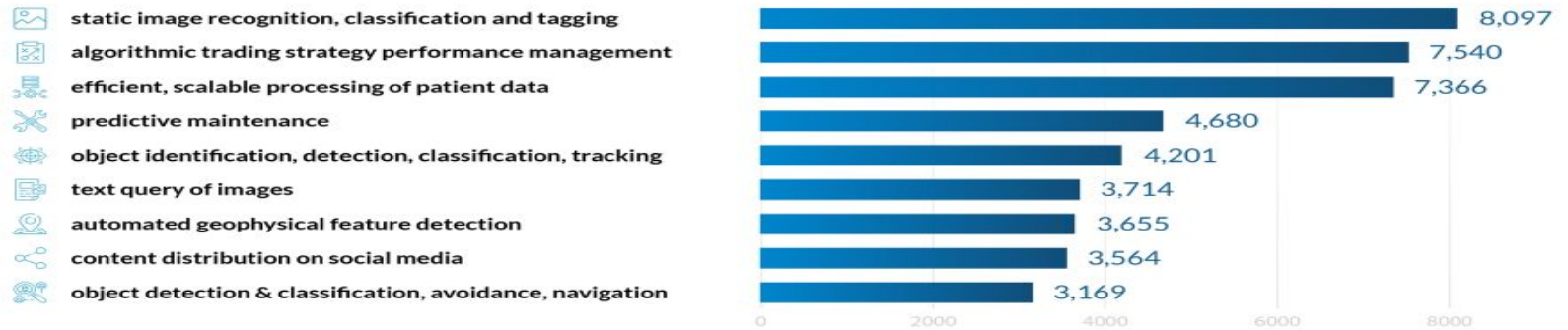
- Increased computing power, big data availability, improved algorithms, industry adoption, and technological convergence has created a favorable environment for the boom of AI in recent years.

Key AI Trends

3 Key AI Trends You Should Know

1 Global AI revenue forecast by 2025, ranked by use case in millions US dollar

Source: Statista



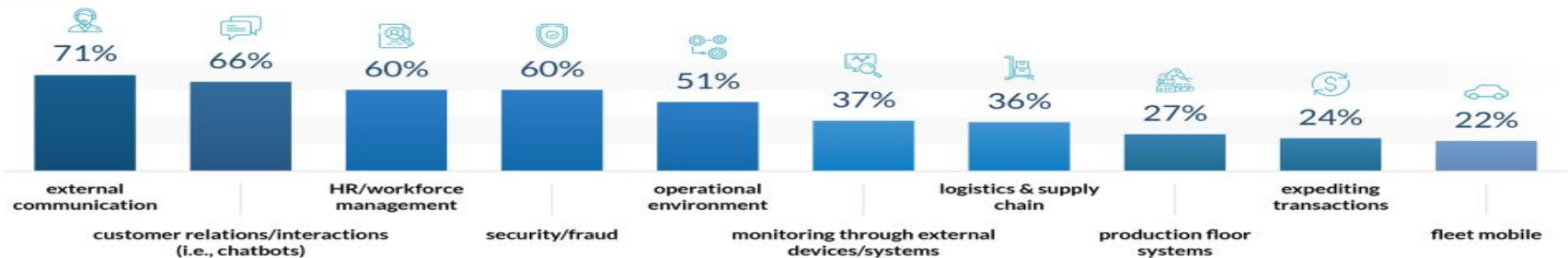
2 Penetration of artificial intelligence skills, by country

Source: Dun & Bradstreet



3 Organizations deploying AI, by functional areas

Source: Medium



Source: <https://financesonline.com/ai-trends/>

10 AI Trend in 2020

10 AI Trend in 2020



Source:

<https://www.slideteam.net/introduction-to-artificial-intelligence-powerpoint-presentatio>

AI and Industry 4.0

- Intelligent software solutions can use the high volumes of data generated by a factory to identify trends and patterns that can then be used to make manufacturing processes more efficient and reduce their energy consumption. This is how plants are constantly adapting to new circumstances and undergoing optimization with no need for operator input.
- And as the level of networking increases, the AI software can learn to “read between the lines,” which can lead to the discovery of many complex connections in systems that aren’t yet or are no longer evident to the human eye.
- Intelligent software with sufficiently intelligent analytical technology is already available. But whether data processing is performed using a cloud solution or at the local level (for example, using Edge computing) will depend on the user’s requirements. Data on an Edge platform is available more quickly and at a higher resolution, whereas a considerable amount of computing power is available in the cloud. In many cases combining edge and cloud computing is required to benefit from both worlds.
- [Insights Hub](#) can be used to link products, plants, systems, and machines. It is one of the most important foundations enabling the use of AI in industry. The tool performs extensive analyses to make the vast amounts of data generated by the Internet of Things (IoT) useful for optimization, simulation, and decision-making.
- Insights Hub (formerly MindSphere) is the industrial IoT application suite that empowers you to generate actionable insights from assets and operational data, driving manufacturing excellence by improving operational efficiency and quality.
- The digital twin enables virtual testing of a variety of scenarios and promotes smart decisions in areas such as optimizing production.
- In the future, using a digital representation of a machine tool and the associated manufacturing process, AI will be able to recognize whether the workpiece currently being manufactured meets quality requirements.
- Moreover, it determines the production parameters that need to be adapted to ensure that this remains the case during the ongoing production process. As a result, production is made even more reliable and more efficient and companies even more competitive.

Digital twins

- **A digital twin is a digital representation of a physical object, process, service or environment that behaves and looks like its counterpart in the real-world.**
- A digital twin can be a digital replica of an object in the physical world, such as a jet engine or wind farms, or even larger items such as buildings or even whole cities, alternatively digital twin technology can be used to replicate processes in order to collect data to predict how they will perform.
- A digital twin is, in essence, a computer program that uses real world data to create simulations that can predict how a product or process will perform. These programs can integrate the [internet of things](#) ([Industry 4.0](#)), artificial intelligence and software analytics to enhance the output.
-

Advantages of AI

- 1. Reduction in Human Error
- 2. Zero Risks
- 3. 24x7 Availability
- 4. Digital Assistance
- 5. New Inventions
- 6. Unbiased Decisions
- 7. Perform Repetitive Jobs
- 8. Daily Applications
- 9. AI in Risky Situations
- 10. Faster Decision-making
- 11. Pattern Identification
- 12. Medical Applications

Source:

<https://www.simplilearn.com/advantages-and-disadvantages-of-artificial-intelligence-article>

Disadvantages of AI

- 1.Substantial dependency on data
- 2.High Costs
- 3. No Creativity
- 4. Unemployment
- 5. Make Humans Lazy
- 6. No Ethics
- 7. Emotionless
- 8. No Improvement
- 9.Since artificial intelligence learns and makes judgments by itself, a completely different artificial intelligence may be born that deviates from human development intentions at first.
- 10.Bias can be planted in AI

•Source:

<https://www.simplilearn.com/advantages-and-disadvantages-of-artificial-intelligence-article>

How Will Artificial Intelligence Affect Jobs 2023-2030

- The World Economic Forum has estimated that AI will replace some 85 million jobs by 2025. 65% of retail jobs could be automated by that year, which is largely due to technological advancements, rising costs and wages, tight labor markets, and reduced consumer spending.
- Perhaps machines are likely to replace humans in existing simple repetitive tasks due to automation and sensor technology.
- If so, there is a high possibility that humans will do more creative and high-thinking tasks that are difficult for artificial intelligence to do, that is, with little existing data.

Source:

<https://www.nexford.org/insights/how-will-ai-affect-jobs#:~:text=The%20World%20Economic%20Forum%20has,85%20million%20jobs%20by%202025.>

Few useful links

- <https://www.analyticsvidhya.com/blog/2018/05/10-videos-machine-intelligence/>
- Instructors are encouraged to show few videos available in above link **illustrating Amazing Applications of Artificial Intelligence (AI)**
- <https://www.infosysbpm.com/blogs/bpm-analytics/fraud-detection-with-ai-in-banking-sector.html#:~:text=AI%20can%20detect%20and%20flag,block%20maleficence%20and%20prevent%20fraud.>
- <https://www.siemens.com/global/en/company/stories/industry/ai-in-industries.html>

**Thank
You**

