



MACHINE LEARNING VERSUS DEEP LEARNING

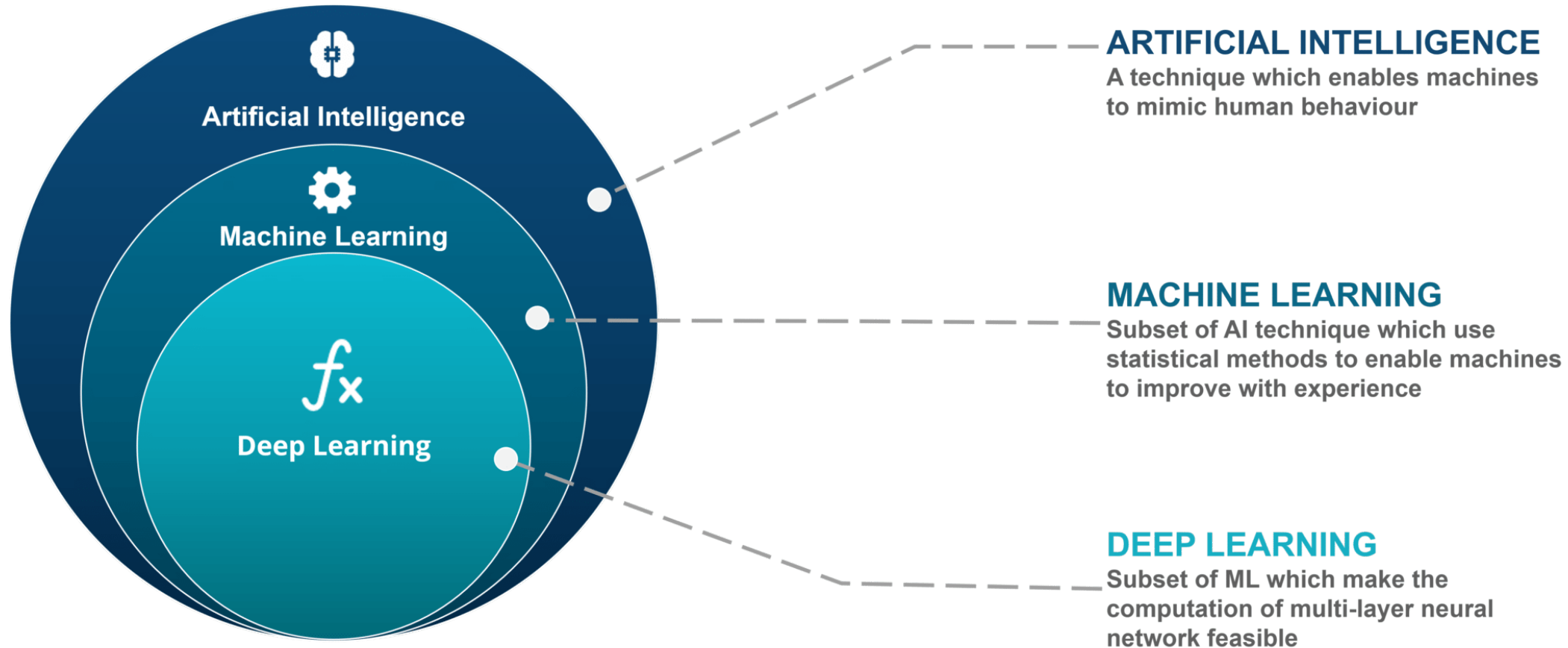
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SUBFIELDS OF ARTIFICIAL INTELLIGENCE

- Machine Learning (ML): development of algorithms that can learn from data.
- Deep Learning (DL): subfield of Machine Learning, uses artificial neural networks for learn from data.
- Natural Language Processing (NLP): field of study with focus on interaction between computers and human (natural) languages.
- Computer Vision (VP): ability of computers to interpret and understand visual information.
- Robotics: the design, construction, operation, and application of robots.



AI SUBFIELDS



MACHINE LEARNING — DEEP LEARNING

Machine Learning

- Subfield of AI
- Development of algorithms that can learn from data without being explicitly programmed to do so.
- Learn from data to make predictions or decisions
- Algorithms can be used to solve a wide range of problems
- Often statistical methods or mathematical optimisation techniques, such as regression and clustering
- Can be used for both structured and unstructured data

Deep Learning

- Subfield of Machine Learning
- Uses Artificial Neural Networks (ANN's) to learn from data
- Inspired by the structure and function of the human brain
- Algorithms composed of layers of interconnected neurons
- Learn from data by adjusting the weights/bias of the connections between neurons
- Well-suited for tasks involving complex patterns or relationships, such as image recognition and natural language processing



KEY DIFFERENCES

○ **Structure:**

- ML based upon a variety of structures
- DL specifically based on ANN's

○ **Learning:**

- ML learns from data using a variety of techniques
- DL learns from data using ANN's

○ **Data Requirements:**

- ML can be used with structured and unstructured data
- DL typically require large amounts of structured data

○ **Applications:**

- ML can be used to solve wide ranging mathematical problems
- DL particularly suited for tasks involving complex patterns or relationships



TABLE SUMMARISING KEY DIFFERENCES

Feature	Machine Learning (ML)	Deep Learning (DL)
Definition	A field of study that focuses on the development of algorithms that can learn from data without being explicitly programmed.	A subfield of machine learning that uses artificial neural networks (ANNs) to learn from data.
Key characteristics	Algorithms learn from data to make predictions or decisions.	Algorithms are inspired by the structure and function of the human brain.
Applications	Wide range of problems, including classification, regression, and clustering.	Tasks that involve complex patterns or relationships, such as image recognition and natural language processing.
Structure	Variety of structures	Specifically based on ANNs
Learning	Variety of techniques	ANNs
Data requirements	Structured and unstructured data	Large amounts of structured data

