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TOOLBOX

Types of AI

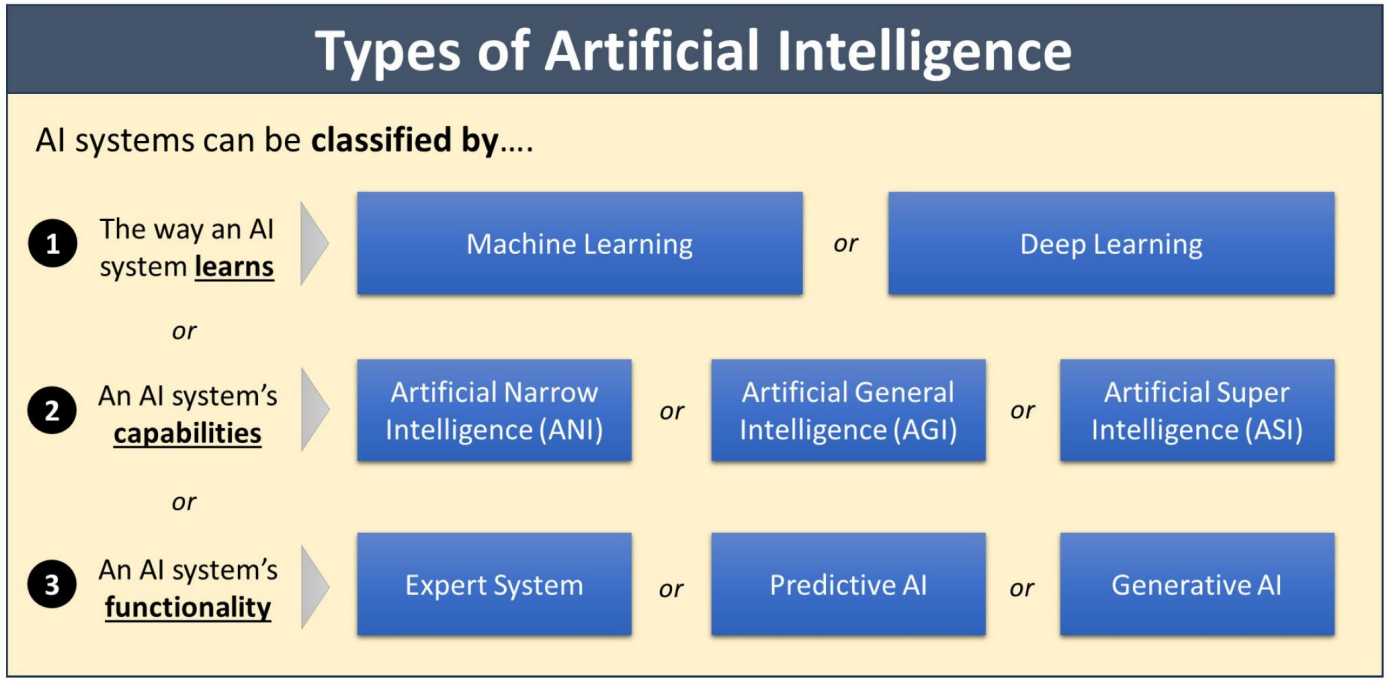
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Types Of AI

AI is a multi-use technology, with many different applications. There are therefore different ways that AI systems can be categorised, but they are normally segmented into one of three categories - either by the way they learn, by their capabilities or by their functionality.



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Types Of AI

Artificial Narrow Intelligence (ANI)

Also called **Narrow AI**, or **Weak AI**. These are AI systems that are designed to perform one specific task (or a narrowly defined set of tasks)

Example ANI systems include a (simple) AI powered email spam filter, or a (complex) self-driving car

ANI systems cannot apply their knowledge to multiple areas (e.g. an AI spam filter cannot also operate a self-driving car)

ANI systems are the most common type of AI in use today

or

Artificial General Intelligence (AGI)

Also called **General AI**, or **Strong AI**. These are AI systems that can perform a range of tasks with human like performance and can also apply their knowledge to several areas (including topics they may not have been specifically trained on)

AGI systems do not yet exist, but are a major goal of AI research and can involve the integration of AI with robotics, so a system can 'think' and perform physical tasks

Several AI and robotics companies have a stated goal to develop AGI solutions

or

Artificial Super Intelligence (ASI)

These are hypothetical AI systems that are more capable and intelligent than humans

They are often associated with a point in time known as the 'Singularity', which is a hypothetical point at which the growth of AI becomes uncontrollable and irreversible.

ASI raises many ethical and philosophical questions for the future of humanity

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Machine Learning vs. Deep Learning

Machine Learning (ML): A subset of AI focused on enabling systems to learn from data and improve performance over time. ML relies on structured data and often requires human intervention for feature extraction and selection. Examples include regression, decision trees, and support vector machines.

Deep Learning (DL): A subset of ML that uses neural networks modeled after the human brain. DL processes vast amounts of unstructured data (e.g., images, text, audio) and automatically extracts features. It excels in complex tasks like image recognition, natural language processing, and autonomous driving.

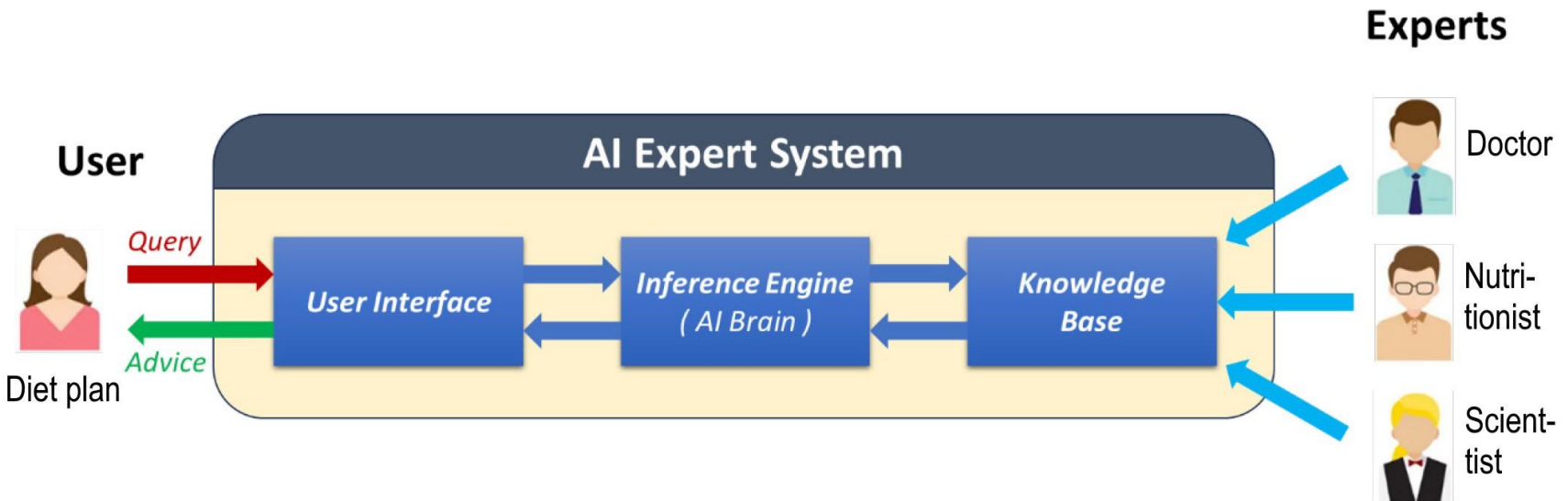
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Expert Systems

An AI Expert System is a smart computer program that uses AI to simulate the expertise of humans in a specific area, such as for medical diagnosis, health monitoring or financial advice.

- Expert systems contain a knowledge base of rules and facts about a specific domain, which are combined with AI (in a system called an 'inference engine') to reason through problems and provide advice, or recommendations.



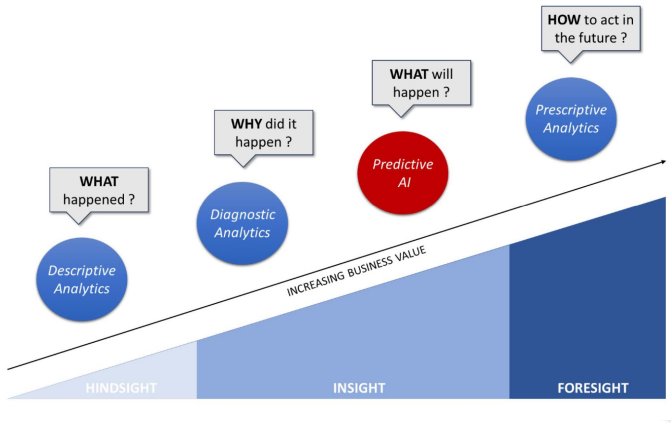
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Predictive AI

Predictive AI is another way to classify an AI system's functionality and refers to AI that uses current and historical data to make predictions about future events, outcomes, or behaviours.

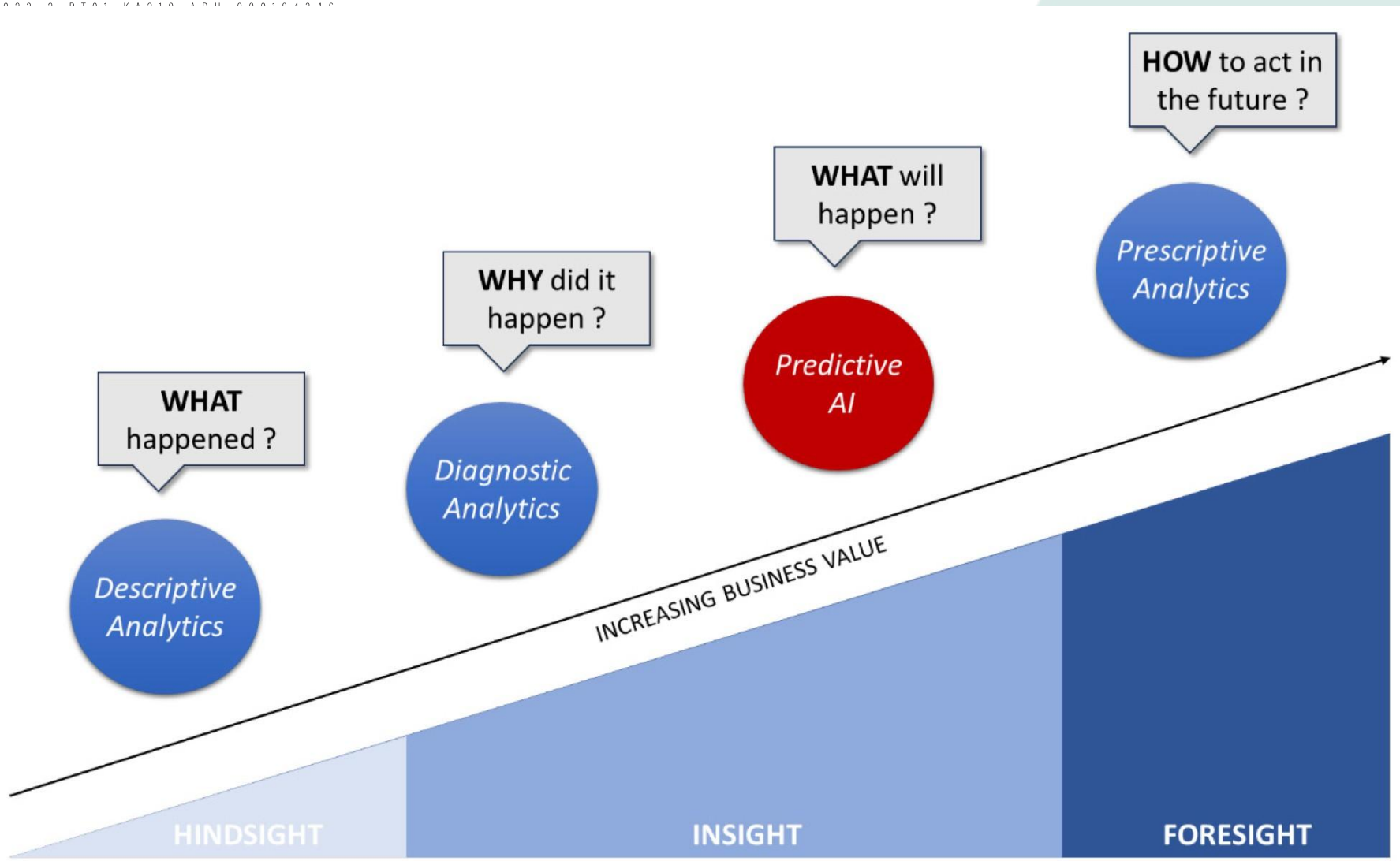
- They do this by analysing large amounts of data to identify patterns, trends and relationships that can help to anticipate the future.
- Predictive AI can also be combined with other forms of data analytics to create more comprehensive and powerful approaches to solving complex problems and gaining valuable business insights.



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Predictive AI

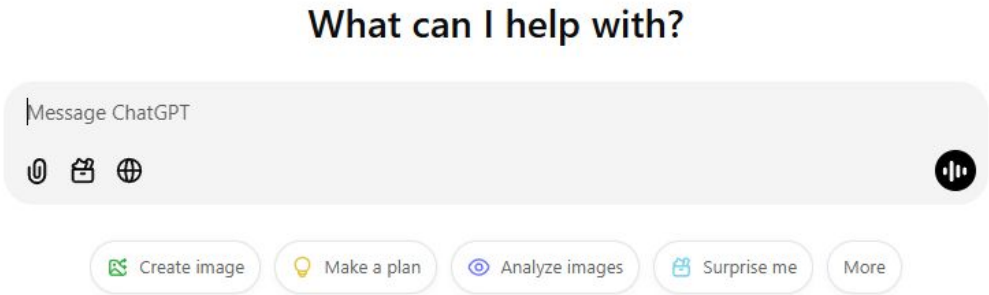


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Generative AI

Generative AI is a relatively new form of AI that burst onto the global scene in late 2022 with the release of a sophisticated AI chatbot called **ChatGPT**.



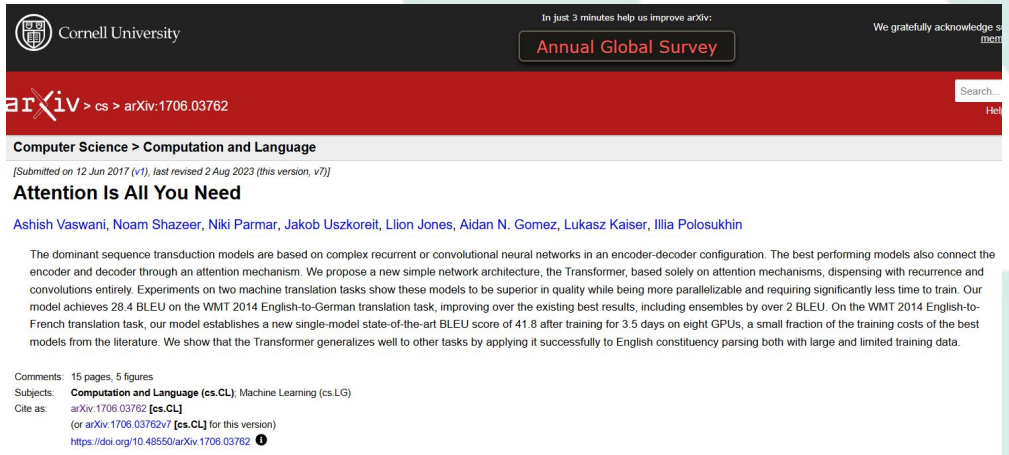
- AI chatbots are powered by generative AI, which is a type of AI technology that can produce new and creative content from a user 'prompt'.
- It creates this new content based on the prompt and what it has learned from very large quantities of training data (sometimes many millions of internet pages) to produce a generative AI model.

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Generative AI

- An example of this is foundation models which can be defined as “AI models trained on a broad data set that can applied to a wide range of downstream tasks.
- Generative AI has its origins in a 2017 Google research paper entitled “Attention Is All You Need”, which introduced a new type of AI architecture for language understanding called ‘Transformers’.


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[Submitted on 12 Jun 2017 (v1), last revised 2 Aug 2023 (this version, v7)]
Attention Is All You Need
Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N. Gomez, Lukasz Kaiser, Illia Polosukhin
The dominant sequence transduction models are based on complex recurrent or convolutional neural networks in an encoder-decoder configuration. The best performing models also connect the encoder and decoder through an attention mechanism. We propose a new simple network architecture, the Transformer, based solely on attention mechanisms, dispensing with recurrence and convolutions entirely. Experiments on two machine translation tasks show these models to be superior in quality while being more parallelizable and requiring significantly less time to train. Our model achieves 28.4 BLEU on the WMT 2014 English-to-German translation task, improving over the existing best results, including ensembles by over 2 BLEU. On the WMT 2014 English-to-French translation task, our model establishes a new single-model state-of-the-art BLEU score of 41.8 after training for 3.5 days on eight GPUs, a small fraction of the training costs of the best models from the literature. We show that the Transformer generalizes well to other tasks by applying it successfully to English constituency parsing both with large and limited training data.
Comments: 15 pages, 5 figures
Subjects: Computation and Language (cs.CL); Machine Learning (cs.LG)
Cite as: arXiv:1706.03762 [cs.CL]
(or arXiv:1706.03762v7 [cs.CL] for this version)
https://doi.org/10.48550/arXiv.1706.03762

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Advancing Your AI Knowledge

Next Steps

After this presentation, we encourage you to explore "Prompt Engineering" to refine your skills in interacting with AI systems.

Why It’s Important

Mastering prompt engineering enables you to leverage AI tools more effectively, unlocking their full potential for problem-solving and creativity.

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