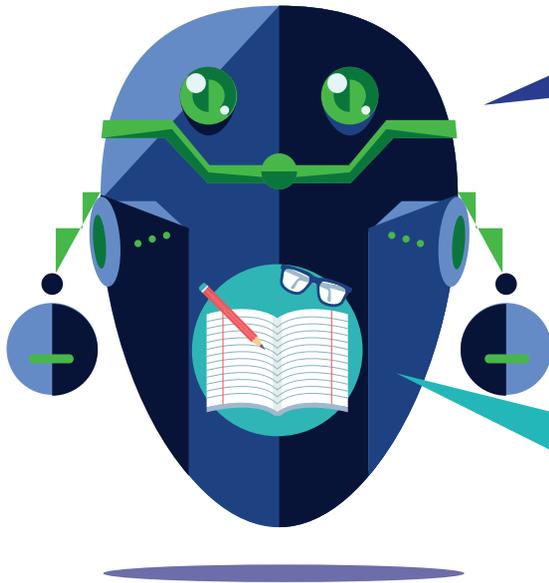


Artificial Intelligence (AI) and e-Learning

A starters' guide and overview of the current state, and the future of AI in eLearning.



Artificial Intelligence is an attempt to mimic human behaviour. It is, at its core, software that can solve problems independently. The purpose of research into AI is to automate intelligent reasoning, actions and analysis.

Machine Learning = continued development using data that has been collected

Machine Learning is a subcategory of AI that focuses on systems that draw conclusions independently, on the basis of data that has been collected.

In practice, the terms **AI** and **Machine Learning** are often used interchangeably, especially for the purpose of advertising products.

TYPES OF AI



Strong AI

Strong AI can solve general, undefined problems as well as a human can, or better.

At present, this type of AI only exists in science-fiction films.

Researchers agree that strong AI could be developed in **20–30 years**.



Weak AI

Weak AI refers to systems that can solve specifically defined problems by means of fixed methods.

They can become more skilled at solving problems **by gathering data and gaining experience**.

EXAMPLES OF WEAK AI



Image recognition

Social media platforms can automatically recognise the people in an image.



Smart assistant

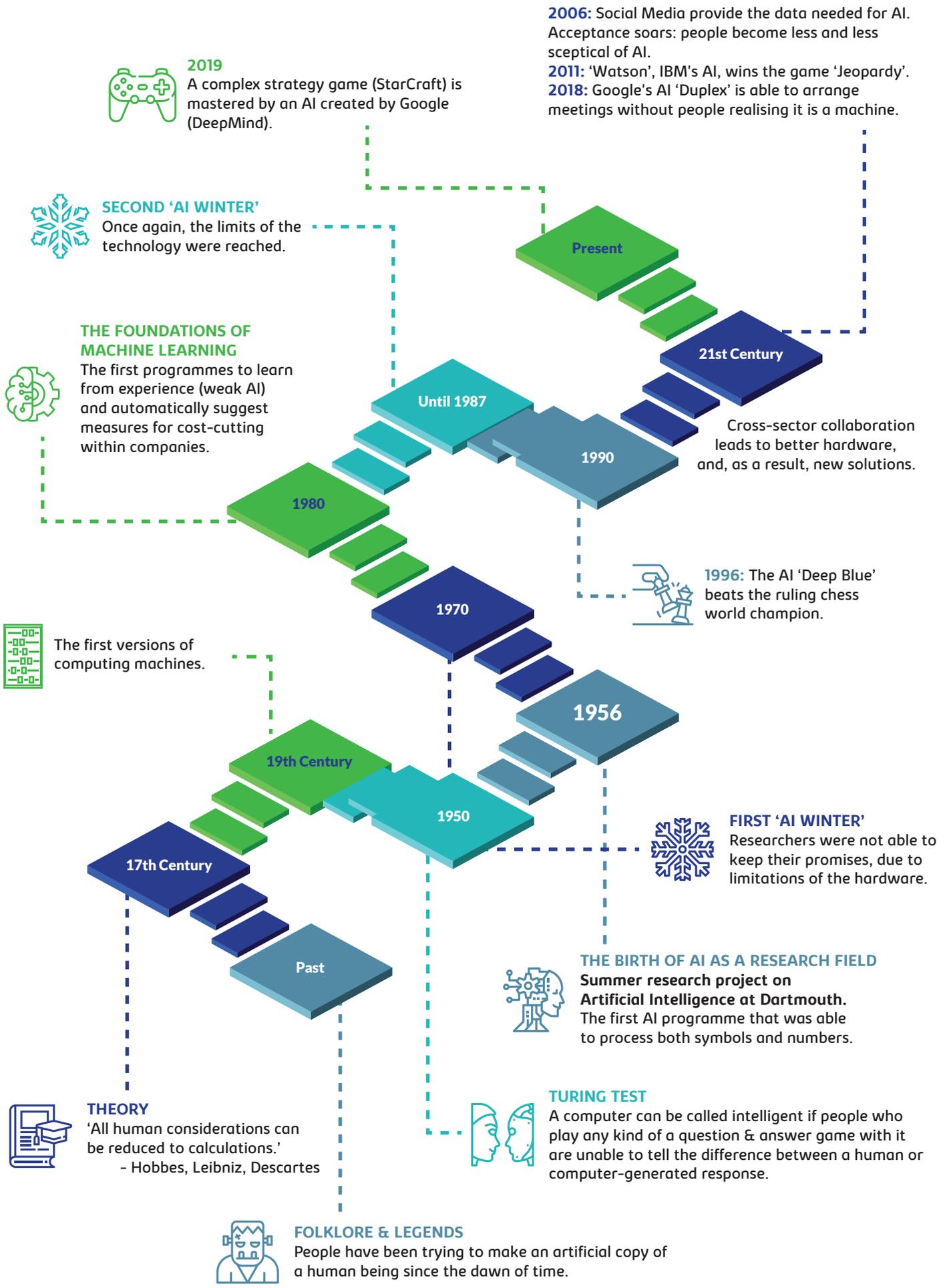
Algorithms can organise meetings on their own; via voice commands.



Intelligent recommendation

Streaming services predict which films their users might like to watch next.

What are the origins of Artificial Intelligence?



What are the origins of Artificial Intelligence?

2019
 A complex strategy game (StarCraft) is mastered by an AI created by Google (DeepMind).

2006: Social Media provide the data needed for AI. Acceptance soars: people become less and less sceptical of AI.
2011: 'Watson', IBM's AI, wins the game 'Jeopardy'.
2018: Google's AI 'Duplex' is able to arrange meetings without people realising it is a machine.

SECOND 'AI WINTER'
 Once again, the limits of the technology were reached.

THE FOUNDATIONS OF MACHINE LEARNING
 The first programmes to learn from experience (weak AI) and automatically suggest measures for cost-cutting within companies.

The first versions of computing machines.

Cross-sector collaboration leads to better hardware, and, as a result, new solutions.

1996: The AI 'Deep Blue' beats the ruling chess world champion.

The first versions of computing machines.

FIRST 'AI WINTER'
 Researchers were not able to keep their promises, due to limitations of the hardware.

THE BIRTH OF AI AS A RESEARCH FIELD
Summer research project on Artificial Intelligence at Dartmouth.
 The first AI programme that was able to process both symbols and numbers.

THEORY
 'All human considerations can be reduced to calculations.'
 - Hobbes, Leibniz, Descartes

TURING TEST
 A computer can be called intelligent if people who play any kind of a question & answer game with it are unable to tell the difference between a human or computer-generated response.

FOLKLORE & LEGENDS
 People have been trying to make an artificial copy of a human being since the dawn of time.

How is AI already being used in e-Learning? What is its potential in the following fields?



Personal Trainers

Virtual assistants answer specific learning questions, automatically suggesting relevant learning content on the basis of pre-defined learning objectives. This form of AI can currently be found in **learning chatbots**, which use the **data that has been collected** to achieve learning objectives. It also makes use of **automated text analysis**.

Prospects

In the future, AI chatbots could engage in complex consultations in their dialogue with users, and use it as a foundation upon which to recommend tangible training measures or even career steps.

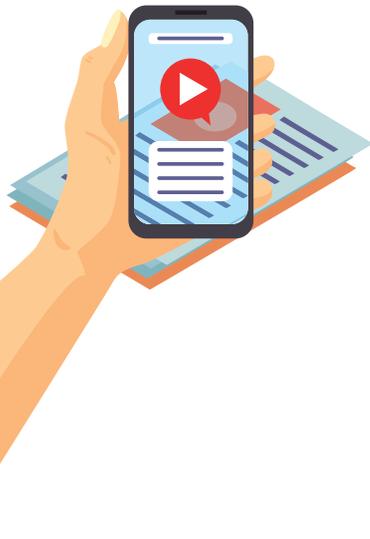
Advantages

personal learning support, increased motivation, time-saving

OUR ASSESSMENT:

Current use: ★ ★ ★ ☆ ☆

Future potential: ★ ★ ★ ☆ ☆



Augmented Learning Content (Augmented content through human-machine interaction)

Artificial intelligence is used to generate content. For example, AI can look for relevant information and learning content and summarise it. This preparatory work can involve generating summaries of entire subject fields, the formulation of questions for quizzes using pools of material, or the analysis of learning data and the subsequent allocation of new tasks for the learners.

Prospects

This vision of the future revolves around people who interact with the AI and work with it in-depth. AI is intended to automate the compilation of relevant information, thereby improving, expanding and complementing the skills of human beings.

Advantages

time-saving, targeted recommendations for action, individual training pathways

OUR ASSESSMENT:

Current use: ★ ★ ☆ ☆ ☆

Future potential: ★ ★ ★ ★ ★



Personal Learning Content

Adaptive learning systems and Learning Experience Platforms use AI to personalise user content, just like well-known streaming services do. **Learning analytics** optimise learning processes and learning environments by means of AI. Dynamically generated data from learners and trainers provides the basis for this system, which analyses personal, performance and thematic variables from the learners.

For example, adaptive learning systems that offer a range of videos can arrange them so that those shown first are those that best suit the users' learning history and profile. The data that has been collected enables videos to be automatically categorised. This creates an **individual learning pathway** for every learner.

Prospects

With new technological advancements, it can be assumed that learning content can be adjusted to suit learning needs in real time, whether it is in the form of written texts, videos or interactive games. The platform shows learning patterns that would best benefit learners at any particular point in time. In the future, it will be possible to optimise this learning profile on an ongoing basis, by means of data collected over the course of several years. For this, however, the AI needs time to get to know and understand learners and their behaviour better.

Advantages

time-saving, increased motivation, individual learning pathways, transparency, enhanced learning success

OUR ASSESSMENT:

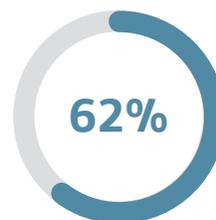
Current use: ★ ★ ★ ☆ ☆

Future potential: ★ ★ ★ ★ ☆

Current figures for usage of AI in companies in Germany, Austria & Switzerland



of companies have not yet come to grips with the topic of AI.



of companies would use AI for more effective training.



of companies think the major value added by AI lies in individualised learning recommendations and performance support.



For 55,3%, 'too little internal knowledge' is the strongest argument against using AI tools.

Potential of AI for each target group:



FOR TRAINERS

Trainers define target skills.

AI suggests various versions of learning pathways: learning content is automatically allocated so that the required skills can be attained.



FOR AUTHORS

Production of content in the most effective way: defining learning targets, which AI then uses to automatically generate and prepare content clusters.

In order to do so, authors work closely with AI.



FOR LEARNERS

They only learn the content that is really required in the situation at hand – in an exciting way that is adapted to suit the current situation.

Automatic recommendations for the next set of content to be learned, so that it suits the learner's personal profile.



Further reading

Study: eLearning Benchmark Studie (Teilstudie) – Künstliche Intelligenz ('eLearning Benchmark Study (sub-study) – Artificial Intelligence'), 2019

BOOK: Künstliche Intelligenz Technologie | Anwendung | Gesellschaft ('Artificial Intelligence Technology | Usage | Society'), 2018, Volker Wittpahl (Springer Verlag)

Blog: <https://www.welove.ai/de/blog/post/geschichte-kuenstlicher-intelligenz.htm>

Blog: <https://elearningindustry.com/artificial-intelligence-will-shape-elearning>

Learn Tomorrow uses Artificial Intelligence to provide a state-of-the-art analysis of KPIs (Key Performance Indicators), providing learners with content recommendations and suggestions for immediate action in their working context. Learn Tomorrow's AI-based approach in e-learning makes the impact of learning visible in both operational activities and production tasks.



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