Artificial Intelligence (AI)

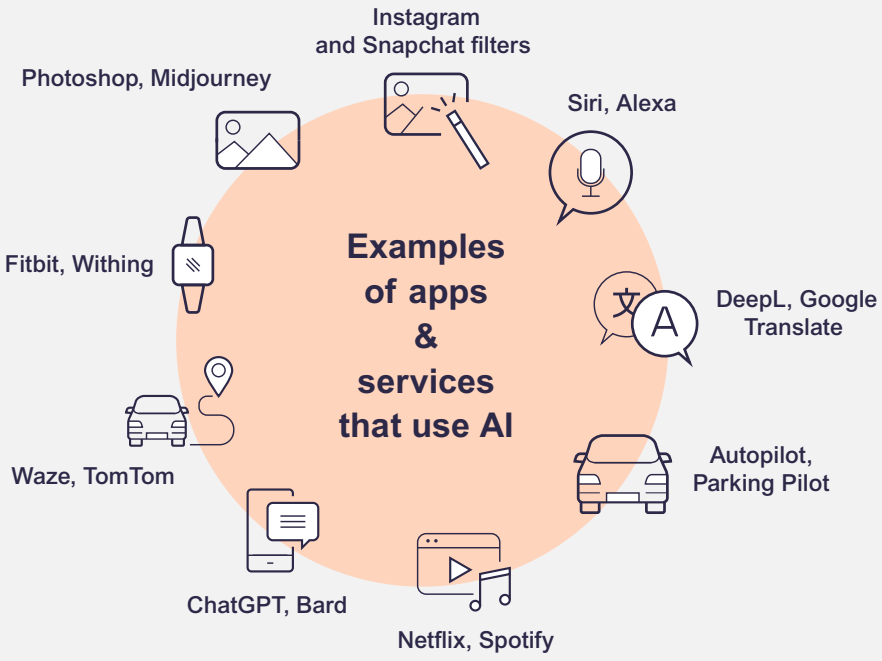
What is artificial intelligence?

To understand what artificial intelligence (AI) is fully, first we must define intelligence.

Intelligence can be defined in different ways: the capacity for abstraction, comprehension, logic, creativity, learning, reasoning, problem solving, critical thinking, awareness of emotions, self-awareness, etc. It can be described as the ability to perceive or deduce information and retain it as knowledge to be applied to adaptive behaviours in a given context.

Artificial intelligence is a field in computer science that focuses on designing software to perform tasks that would normally require human intellectual abilities.

It is very likely that you have already used apps or services that use artificial intelligence without even realising it.



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A brief history

While artificial intelligence has only recently become readily accessible, its development began years ago. As evidenced by a multitude of myths and fictions, from Pinocchio to R2-D2 and HAL 9000, human civilisation has always been fascinated by the idea of successfully creating an autonomous artificial entity capable of thinking and acting as a real person would.

1943

First mathematical modelling of neurons inspired by the functioning of biological neurons.

1957

Creation of the first computer model that can learn from data to adapt and perform classification tasks.

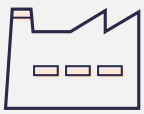
2012

Revolutionary year for deep learning: powerful algorithms designed for image classification, translation and other applications.

Today, advances in artificial intelligence are astonishing. Computers can beat the best chess players, understand natural language, have intelligible conversations with humans, recognise faces and objects, translate text, and even drive cars. They also have creative abilities and can produce content.

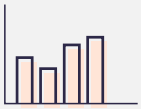
Artificial intelligence has become readily accessible and is now used in many fields:

Trade



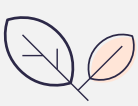
Industry

Health



Finance

Scientific research



Agriculture

Sécurity

Transport

Education

And many others

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The development of artificial intelligence

The rise of artificial intelligence cannot be separated from technology evolving and making it possible to process and manage data in increasing quantities (big data) and at ever greater speeds.

To be able to perform different tasks, the algorithms behind artificial intelligence process information which allows them to gain knowledge. Various methods are used to train these models to extract the information needed from a multitude of data:

- Machine learning involves autonomous learning and improving from data without being explicitly programmed.
- Deep learning is a branch of machine learning which uses artificial neural networks to process and model complex data.

Regulating artificial intelligence

The integration and use of artificial intelligence raise many questions for society and bring major challenges, particularly regarding the impact of these technologies on human relationships, data protection, and jobs. Several countries have started establishing laws and regulations to govern the use of artificial intelligence.

Some countries are already anticipating potential issues with artificial intelligence by developing AI regulations. The European Union has developed regulations for artificial intelligence, taking a risk-based approach. This approach identifies several levels of risk relating to the level of impact on society, the economy and security.

Acquiring new skills to master new tools

With companies rapidly adopting artificial intelligence, this transformation represents a challenge for employability and ascribing value to skills.

The rapid development of new tools and uses for artificial intelligence requires workers to strengthen their skills – both to the best use of these tools, and to contribute to their development and integration into business processes.

It will be essential for individuals to acquire transferable skills, such as communication, project management and leadership, so that they can adapt to the various professional roles that will become available in a rapidly changing world of work.

A culture of continuous learning is necessary. This change should be seen as an opportunity both for personal development and to ensure future employability.

Employability

Employers have a key role to play in anticipating which skills will be needed in the future and enabling teams to train up.

Find out more: **employabilite.ge.ch**

European Commission – Proposal for a Regulatory Framework for artificial intelligence

To date, Switzerland has no plans to regulate artificial intelligence and its uses, preferring a more liberal, self-regulatory approach.

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The development of artificial intelligence

In the coming years, we will witness the development of increasingly efficient and complex multimodal artificial intelligence. A multimodal approach to artificial intelligence is a system combining multiple data types, such as text, audio and video, with other forms of data to accomplish tasks.

Currently, the vast majority of artificial intelligence processing is carried out in data centres, with a minority occurring directly in IoT devices such as smartphones, computers, smart watches, and household appliances. Ultimately, then, the move is towards decentralised processing, carried out directly by the devices themselves. This development will lead to a transformation in device capabilities, equipping devices with advanced artificial intelligence features.

Soon, artificial intelligence is likely to be integrated with “traditional” tools in many fields. The goal is to leverage the capabilities of AI to improve the efficiency, accuracy and performance of existing processes and make tasks easier.

By way of example, the pharmaceutical industry is using artificial intelligence to accelerate the search for new molecules to produce medicines, reducing the time needed for this process and improving efficiency, which in turn allows for substantial cost savings. Artificial intelligence is also used to produce structures that are stronger, more efficient, less energy-consuming and more economical in terms of materials – particularly in aeronautics, but also in the road transport, construction and even semiconductor industry.

«Artificial intelligence goes far beyond a simple technology: it allows companies to boost their growth and increase their competitiveness.»

Michel Deriaz, professor at the Geneva Business School

Do not wait!

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Using artificial intelligence tools

Artificial intelligence tools are grouped into different categories:

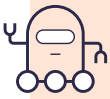
- **Supervised learning:** the algorithm learns how to recognise elements (images, sounds, etc.) from a large quantity of examples.
- **Reinforcement learning:** the algorithm learns by getting rewarded for a victory and punished for a defeat.
- **Generative algorithms:** the algorithm creates content (texts, images, translations, etc.) from the instructions provided.

Although efficient and easy to access, artificial intelligence does not have the capacity for human reasoning, sensitivity or consciousness. Tools that use artificial intelligence only execute the orders given to them, and require human supervision to guarantee the quality and conformity of results. To achieve optimal results through AI, it is essential that we learn to express our intentions in a precise way. Intentions are expressed by giving an order known as a “prompt”.

Interactions with these tools are mainly carried out in writing or orally. Sometimes, the tool can be provided with existing content (images, sounds, etc.) which can be analysed or used to produce new content.

Most of these tools offer a free version with a large number of features and options.

Internet user: Define what a prompt is in 2 lines and explain clearly and briefly how to write a prompt. Put yourself in the shoes of an artificial intelligence expert.



ChatGPT: A prompt is an instruction or request made to an artificial intelligence model to generate a specific response. To write an effective prompt, you need to define your request clearly with enough context.

Advantages of artificial intelligence

- Wide scope for application
- Increased productivity
- Less need for “the middleman”
- Time saved and efficiency increased
- Ability to make decisions based on a large number of different parameters
- Cost savings
- Automation of tasks, processes and supervision
- Help with decision making
- Available at all times
- Continuous learning which improves performance over time
- Resource optimisation
- New jobs created

Disadvantages of artificial intelligence

- No moral judgement
- Loss of personal reflection and basic knowledge
- Decline in skill level
- Need access to computer equipment to interact
- Technological dependence
- Job cuts
- Internet connection required most of the time
- Algorithm biases and over-confidence in tools
- Dependence on the quality of the training data used as input for the tool
- Energy consumption

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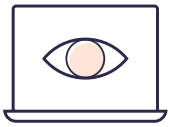
Areas where artificial intelligence is used

Natural Language Processing (NLP)

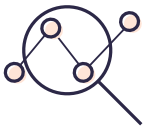
NLP is a blanket term that covers all the processes used to translate oral or written human language so that a computer programme can understand it. For the most part, chatbots and voice assistants rely on NLP, as does ChatGPT, which has revolutionised access to this type of technology.

Computer Vision (CV)



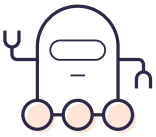
CV allows digital images and videos to be interpreted, going beyond simple image categorisation by combining different data streams that can be obtained in real time using sensors such as cameras and radars. Learning algorithms are applied to these data so that the machine can automate certain decisions. Driverless vehicles are the best-known example of this technology.

Data analysis



Artificial intelligence is widely used in data analysis to perform predictive and prescriptive analysis, as well as to detect anomalies. The algorithms used make it possible to process a very large amount of data, all of different types and quality. Examples of such uses are found in customer behaviour analysis solutions, disease prevention and detection, automation of accounting, fraud detection and finance, as well as simulating complex phenomena such as weather forecast models.

Robotics



After being used for many years, particularly in production, robots are now being “augmented” by artificial intelligence processes (generally through IoT sensors being added). These additions allow the robots to automate a greater number of tasks without the need for human intervention. Robotics can be involved in everything from preparing orders to logistics flows and agricultural robots.

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Which type of artificial intelligence is right for your business?

Every business sector is likely to be affected by artificial intelligence. By leveraging the technology, you can improve productivity and optimise your services. The following is a non-exhaustive list of the ways in which artificial intelligence is being used across different sectors:

Transport

- Driverless vehicles.
- Driving assistance by detecting potential dangers and taking preventive measures such as automatic emergency braking.
- Predictive vehicle maintenance.
- Optimising vehicle fleet management by distributing vehicles efficiently.
- Environmental data analysis using sensors and/or satellites (such as traffic data and route optimisation based on environmental criteria).
- Monitoring and governance of transport policies through data processing.
- Providing a choice of routes based on traffic and weather conditions.

Marketing and communication

- Help with customer acquisition through data processing, audience analyses, and automating segmentation and targeting.
- Personalising the customer experience and helping create tailored content and automated recommendations.
- Helping build loyalty through behavioural analysis and optimising sites and customer support.
- Optimising the effectiveness of advertising campaigns by delivering personalised, targeted advertisements.
- Predicting emerging trends and anticipating customer needs.
- Developing chatbots that can interact with website users in an automated manner, answering questions, providing information on products or services and carrying out transactions.

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Which type of artificial intelligence is right for your business?

Banking and insurance

- Streamlining customer relations using chatbots and offering personalised fiduciary advice.
- Personalising insurance policies and financial products offered to customers based on their needs and characteristics, thus making offers more relevant.
- Automating banking and insurance processes, such as opening accounts, purchasing insurance policies and processing claims.
- Preventing and detecting fraud in financial transactions.
- Strengthening security and ensuring that transactions are compliant, such as biometric mechanisms.

Health

- Accelerating medical research and diagnosis by analysing large research databases.
- Assisting the elderly through assistance robots that help with daily activities and taking medication.
- Preventing epidemics.
- Personalised treatment recommendations adapted to the needs of patients, as well as personalised follow-up.
- Surgery assisted by surgical robots and computers.
- Developing tailored pharmaceutical treatments

Production

- Automated order preparation.
- Optimising supply chain management, including route planning, stock management, supply chain coordination and resource allocation.
- Data analysis to predict demands and avoid items going out of stock or overstock.
- Intelligent inventory management and automatically launching production phases.
- Monitoring production equipment data in real time to perform predictive maintenance interventions and avoid breakdowns.
- Automating quality checks using algorithms that analyse sensor and camera data to detect defects and anomalies.

Retail trade

- Targeting advertisements and personalising messages to improve the return on investment of advertising campaigns.
- Managing direct interactions with customers.
- Real-time price adjustments to optimise profitability and maximise sales.
- Demand forecasting by analysing past sales data, seasonal events, market trends, weather conditions, etc.
- Improved in-store experience, for example through virtual assistants who help customers find the products they want.

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Getting started with artificial intelligence

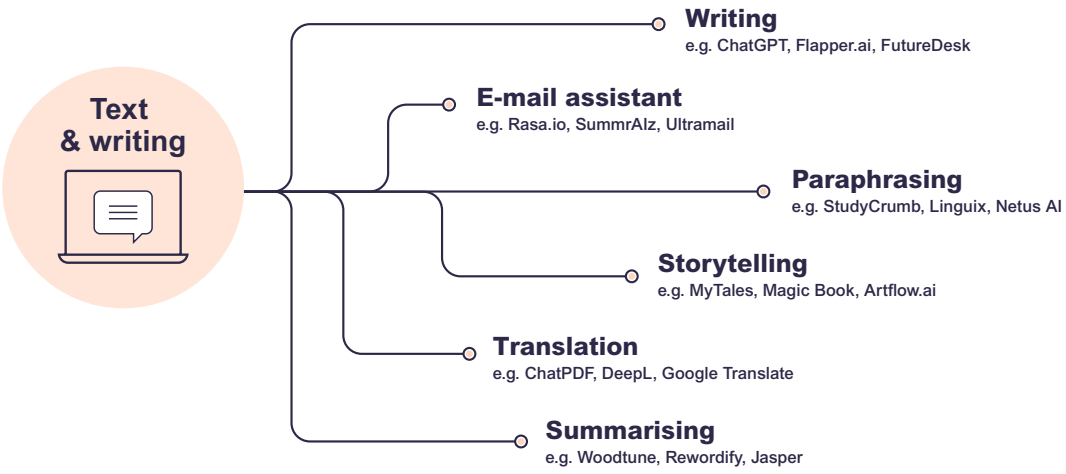
1 Explore the different tools and choose the one that is most suitable for you

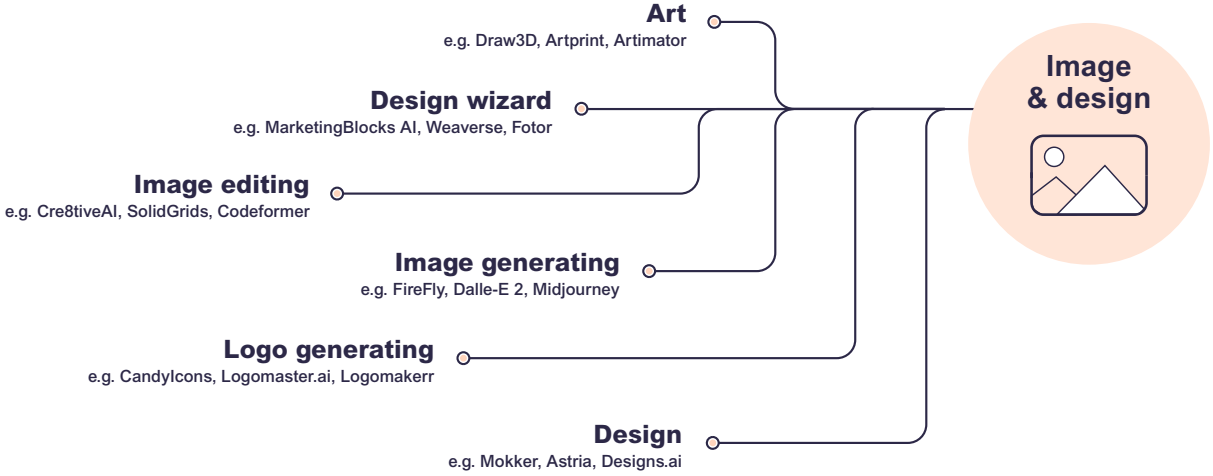
There are many online artificial intelligence solutions for businesses and individuals which allow for greater autonomy and productivity. These tools cover many areas of activity and complement or replace the usual productivity tools.

The following is a non-exhaustive list:

Get up to speed

with the development of new tools, and stay informed about advances in artificial intelligence to stay competitive and develop your skills.





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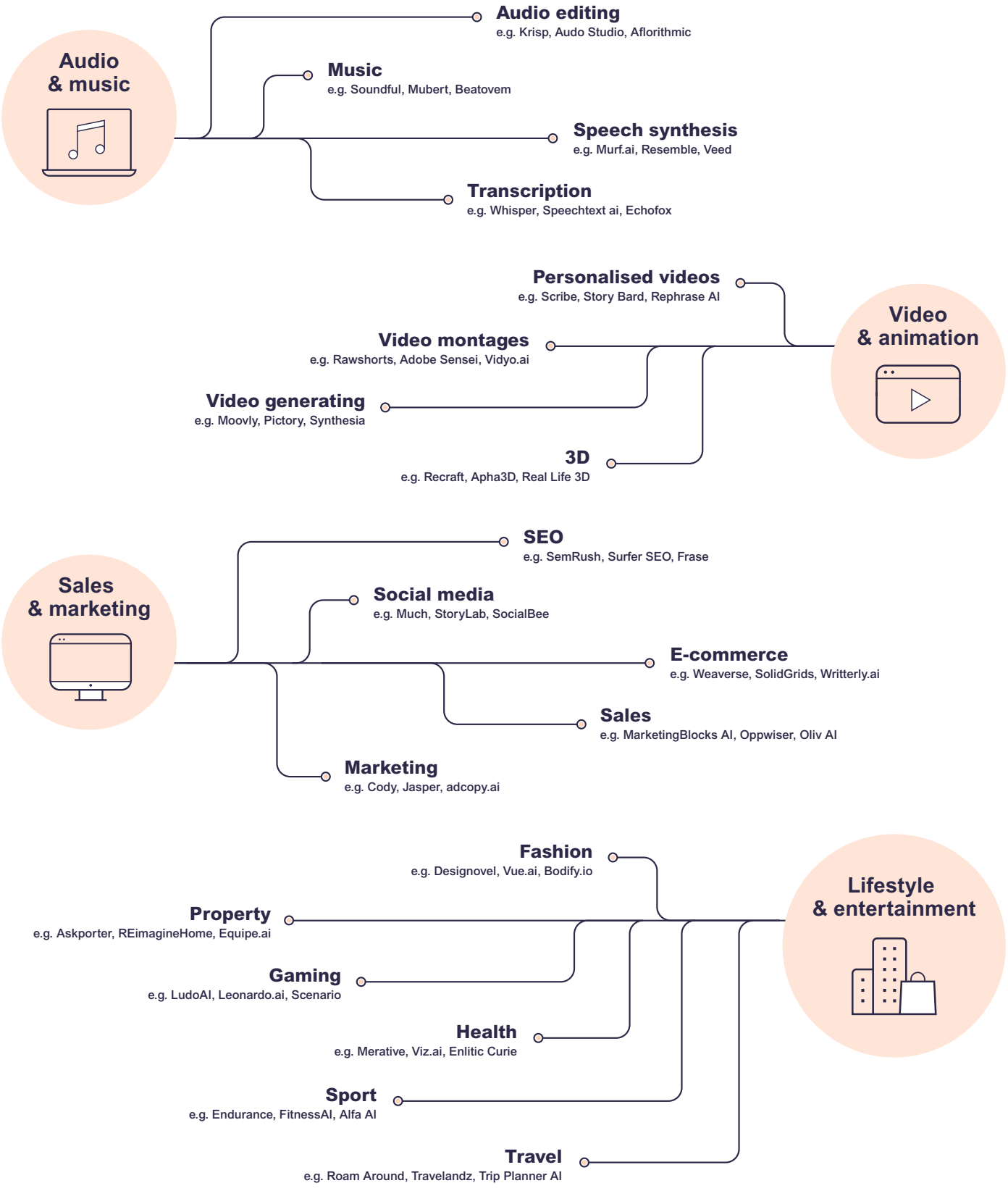
Getting started with artificial intelligence



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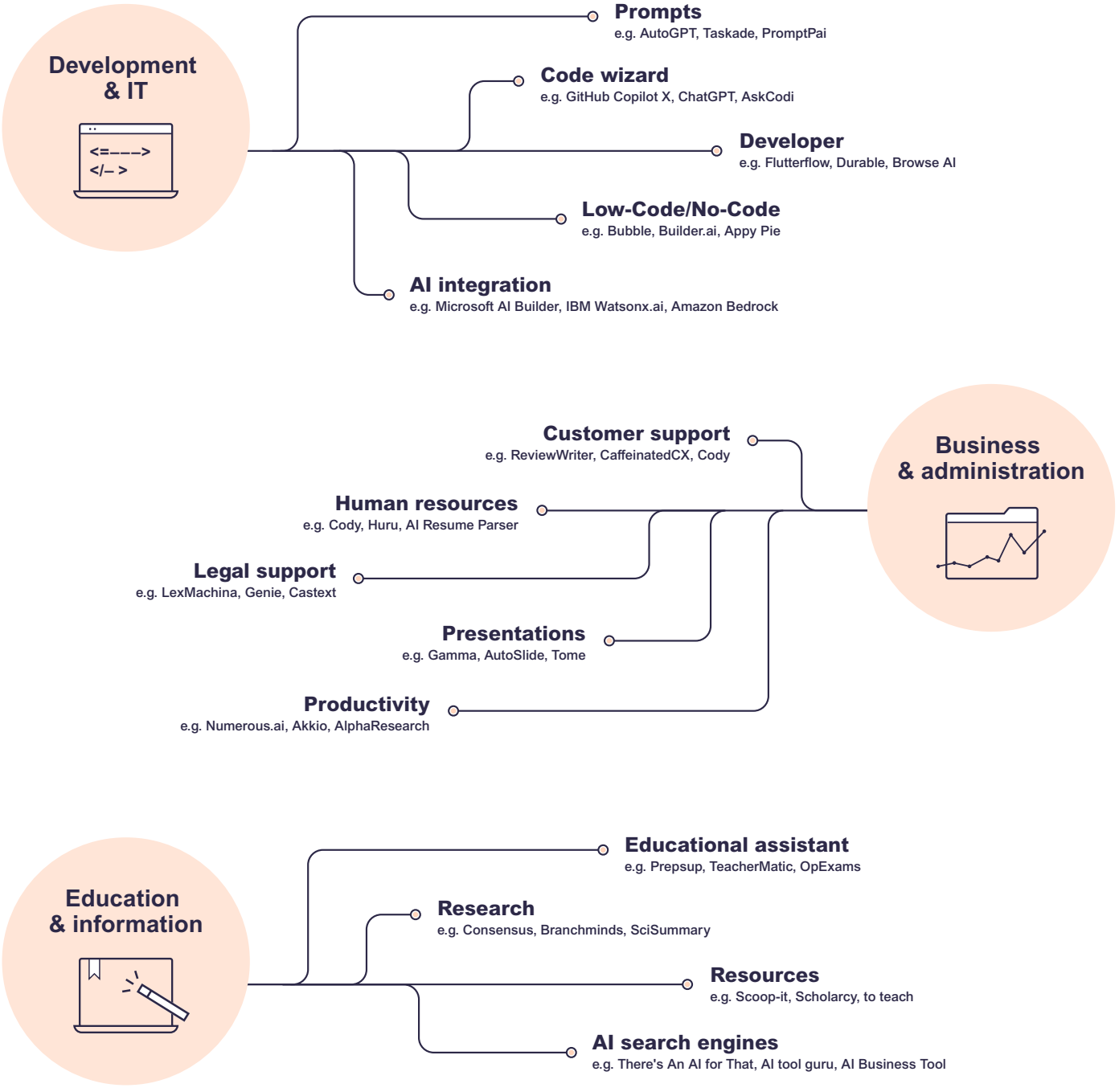
Getting started with artificial intelligence



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Getting started with artificial intelligence

2 Integrate the tool into your company

Once you have chosen the right tool for your needs, start using it in your company to generate content or accomplish specific tasks. To obtain the desired result, you must accurately express your intentions to the tool in the form of a prompt (see page 5). If the result does not meet your expectations, reformulate your prompt, and always check the quality of the result. Call on a specialist to assist you if necessary.

3 Train your teams to use the tools

It is essential that your teams are trained in these technologies so that your company can fully benefit from their potential and identify areas for improvement.

Employees know the company's business processes, as well as the gaps that can be filled by AI tools. They can also help identify new opportunities that make use of these new technologies.

Teams should be involved in integrating these new tools from the start of the project. This approach encourages buy-in, as well as understanding and identifying business needs.

4 Develop a bespoke artificial intelligence solution for your business

Existing artificial intelligence tools can also be used to design new tools and services that offer customers original, innovative services. It can be simple and inexpensive to integrate these tools into an existing service.

To go further and take an innovative approach, you can develop a bespoke tool using artificial intelligence that you train using your own data. The tool will then respond as closely as possible to your company's needs, and you can retain control as well as intellectual property rights. Call on a specialist to assist you if necessary.

5 Sell your artificial intelligence services

You can create new sources of income by selling on tools and services developed by or for the company. These new services will enrich your company's business model.

For example, it is possible to sell or resell training models, online services and even software.

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