



1.ª Conferência Nacional de TIC e Inteligência Artificial no Ensino (CNTIC-IA)
8 e 9 de julho de 2026

Impacto da Inteligência Artificial no Ensino Superior

Artificial Intelligence for Sustainable Societies
Artificial intelligence and data science contributions to enterprise digital transformation

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UNIVERSIDADE
LUSÓFONA

Departamento de Engenharia Informática e Sistemas de Informação (**DEISI-CUP**)
Faculdade de Ciências Naturais, Engenharia e Tecnologias (**FCNET**)

Evolução da Inteligência Artificial e das Ciências da Computação

1950
Turing Test

First **electronic computers**,
emerging in the 1940s

1980
Expert Systems



IBM Personal
Computer (1981)

1990 - 2000
Machine Learning

Knowledge-Based Systems
Internet and WWW

Knowledge Management

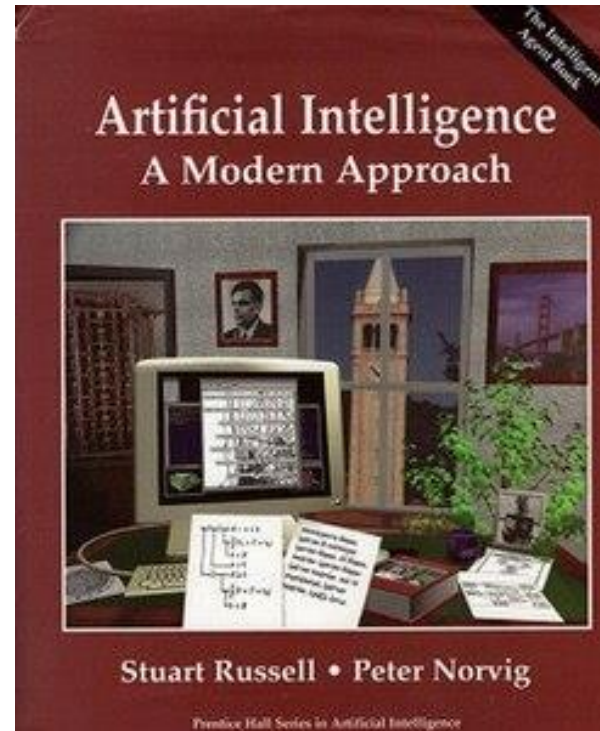
... 2010 ...
Deep Learning

Computer Vision

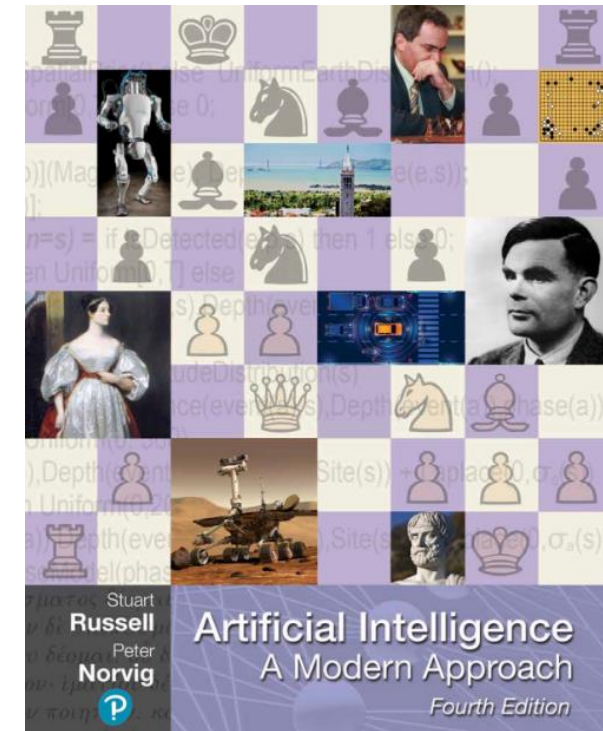
2023 (2017 – Presente)
Generative AI

1956 - Conferência de Dartmouth:
nascimento oficial da IA. John McCarthy,
Marvin Minsky, organizaram a
conferência onde o termo "**Inteligência
Artificial**" foi cunhado e adotado.

1959 - John McCarthy e Marvin Minsky
iniciaram o **laboratório de IA do MIT**.



1st edition: published in **1995**



4th edition: published in **2020**

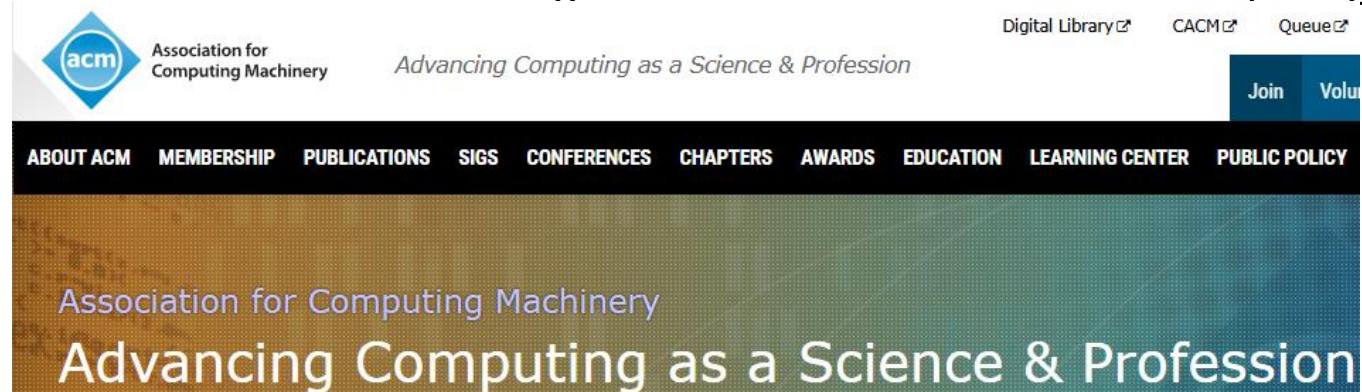
Evolução da Inteligência Artificial e das Ciências da Computação

Milestones in CS & AI Evolution

Foundational Computing (1940 - 1950)

Early computer science established binary code, algorithmic processing, and foundational hardware.

[Association for Computing Machinery \(ACM\)](#) is the world's oldest and largest educational and scientific computing society, founded on 1947.



Symbolic AI (1950 - 1970)

Early AI relied heavily on explicit logical rules and human-programmed domain expertise to replicate intelligence.

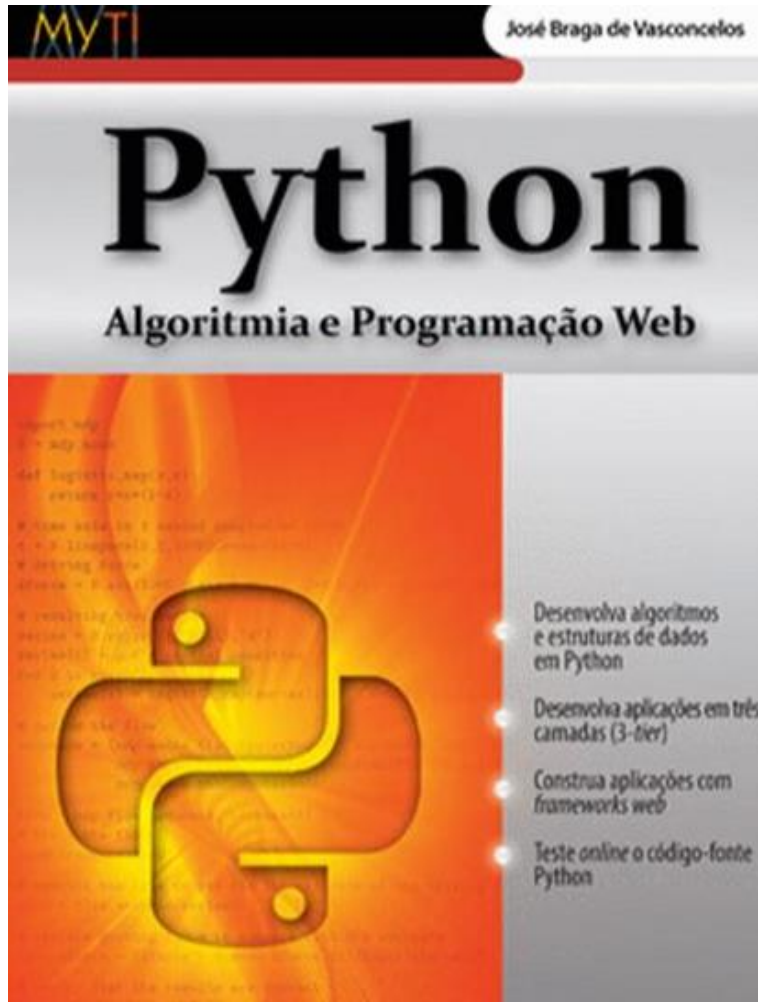
Machine Learning & Big Data (1990 - 2010)

The explosion of data allowed systems to learn from patterns rather than relying on explicit instructions.

Deep Learning & Generative AI (2020 - Present)

Neural networks and large language models (LLMs) enabled context awareness, reasoning, and generative capabilities.

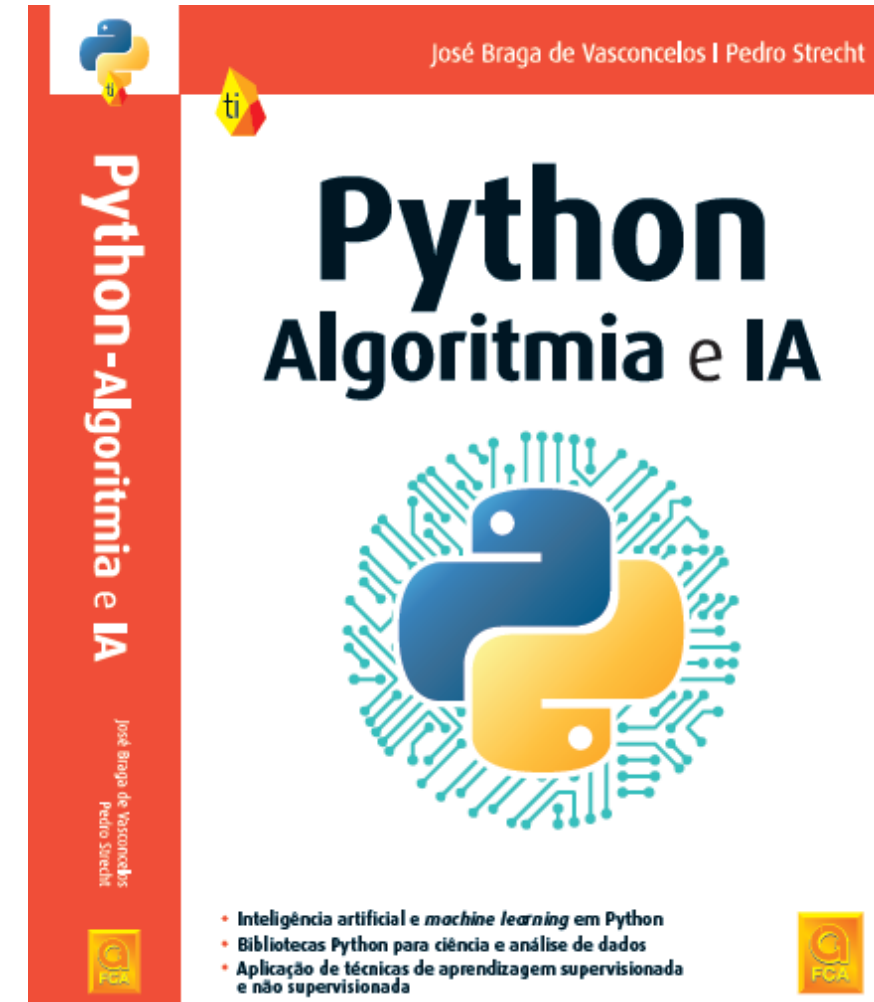
Evolução da Inteligência Artificial e da Ciência de Dados



2015



2017



2026

Inteligência artificial e aplicações

Conjunto de métodos e técnicas computacionais capazes de simular processos cognitivos humanos (**perspetiva tradicional da IA**);

Aprendizagem automática (*Machine Learning*);

Processamento de linguagem natural (NLP);

Análise preditiva e tomada de decisão baseada em dados (**Ciência de Dados**);

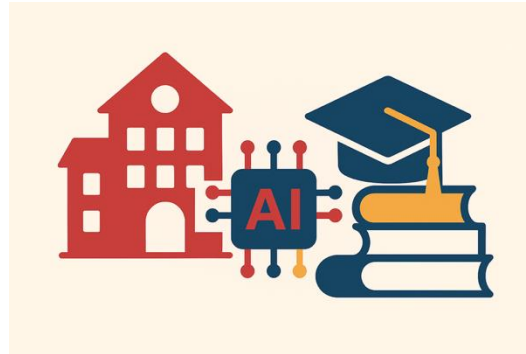
Visão por computador e IA;

IA Generativa;

Robótica e IA.

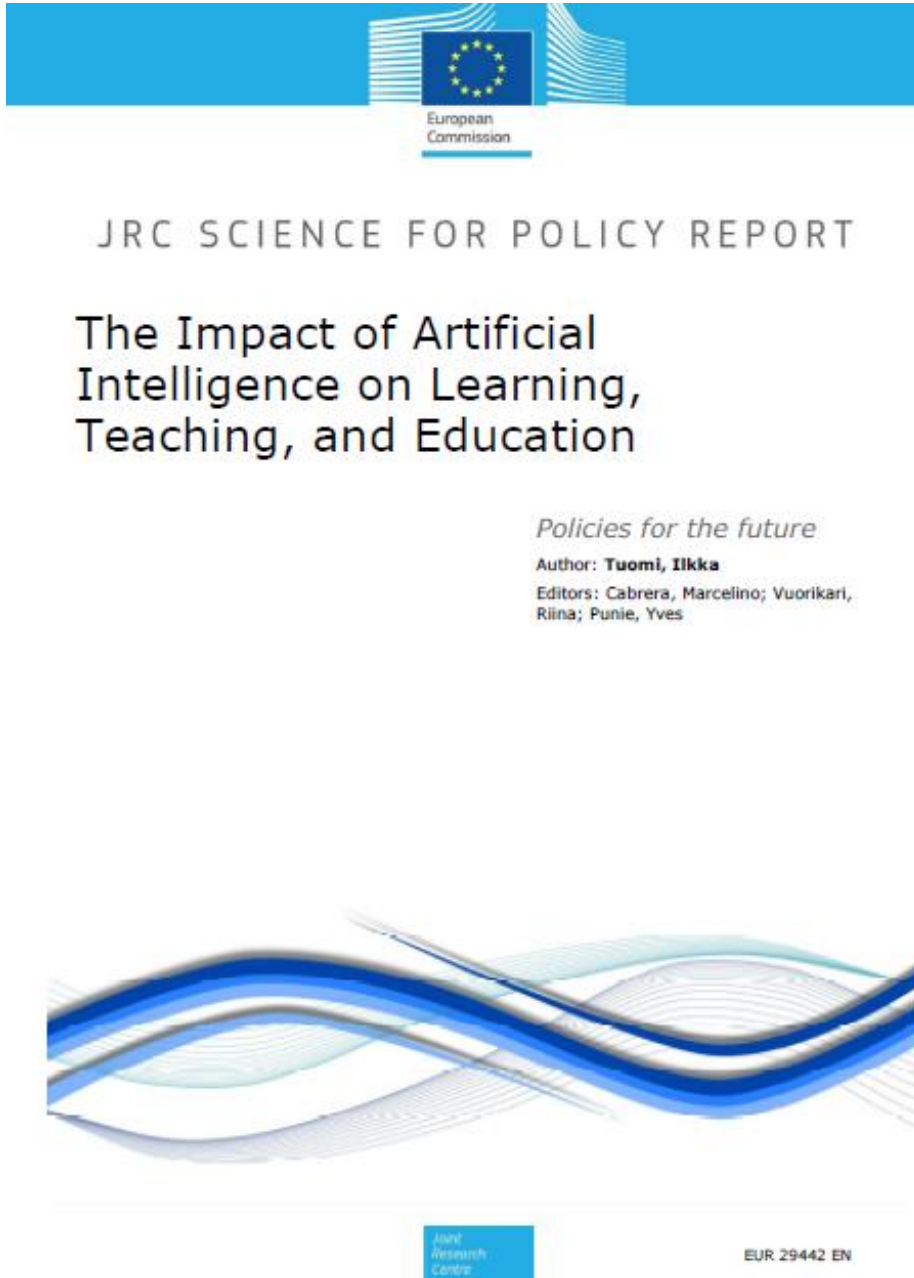
Inteligência artificial e a transformação digital

A ascensão da **IA generativa** abre uma nova fase (e paradigma): **capacidade de produzir linguagem, imagens, programas (software)** e raciocínios complexos, altera profundamente o panorama académico e social.



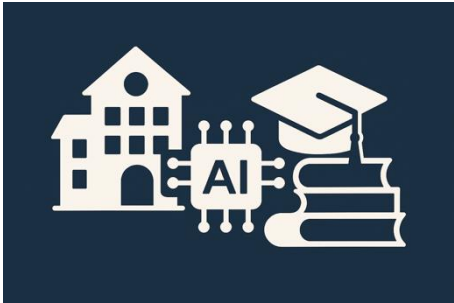
Esta evolução não é linear - é **exponencial** - exigindo atenção aos desafios **éticos, pedagógicos e científicos** que decorrem desta **transformação digital nas organizações**.

Impacto da Inteligência Artificial na Universidade



Tuomi, Ilkka. (2018). ***The Impact of Artificial Intelligence on Learning, Teaching, and Education: Policies for the Future.***
doi:10.2760/12297

Impacto da Inteligência Artificial na Universidade



JE O Jornal Económico

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JE TALKS

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30 Abril 2020 | ESPECIAL

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ESPECIAL

EDUCAÇÃO E TECNOLOGIA

VEM AÍ A ESCOLA DO FUTURO

As novas tecnologias têm um potencial enorme na educação e na formação profissional, desde o ensino à distância até às novas aplicações que utilizam Inteligência Artificial. Ouviemos especialistas, docentes e alunos para compreender o que está a mudar na forma como aprendemos e adquirimos novas competências. É assim que as novas tecnologias abrem a um caminho para a educação do futuro.

Inteligência Artificial está a mudar os modelos de aprendizagem

O desafio de transmitir valores éticos no ensino à distância

Covid-19 vai acentuar a desigualdade no acesso à educação?

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ESPECIAL

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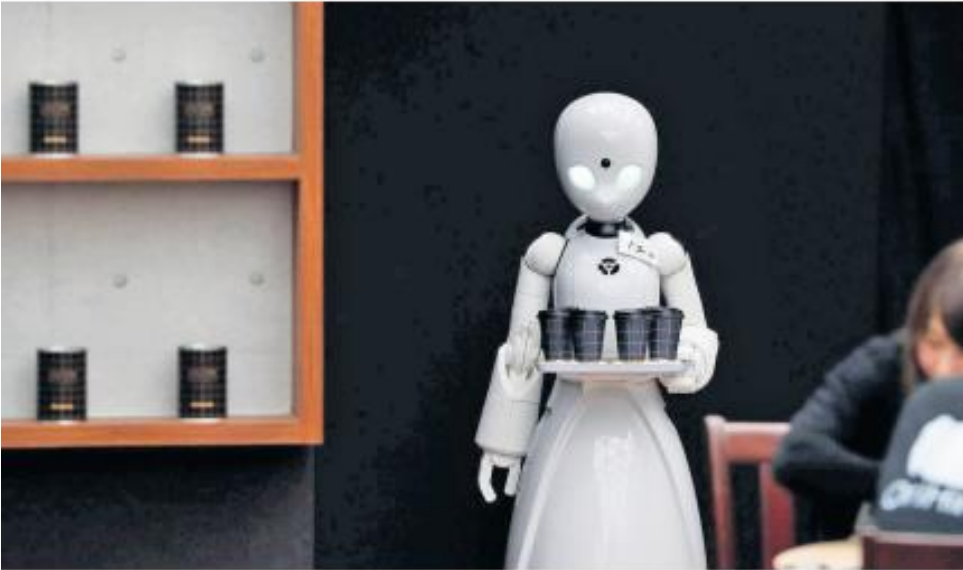
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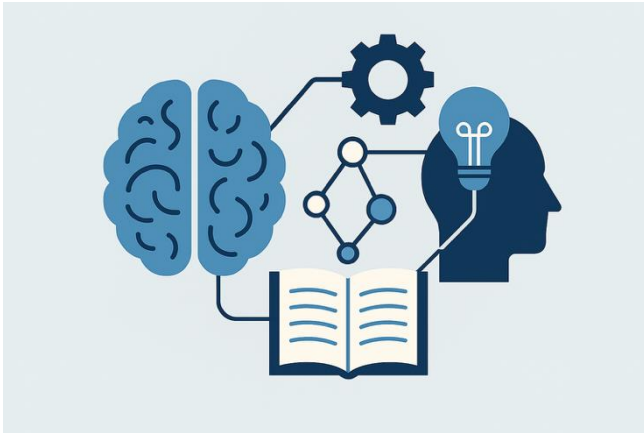


Inteligência Artificial está a mudar os modelos de aprendizagem

Para a presidente do Instituto Superior Técnico, não há dúvida de que a IA vai alterar a forma como se aprende, mas a mudança total do paradigma educacional ocorrerá num prazo de décadas. "Existe o potencial para cada aluno ter um tutor dedicado, que o acompanha em qualquer momento da aprendizagem, algo que é impossível hoje. De facto, é uma tecnologia que tem o potencial para alterar o paradigma do sistema educativo baseado no modelo de sala de aula que tem vigorado durante séculos, praticamente sem alteração", afirmou a professora Arlinda Oliveira ao Jornal Económico (JE).

É o que está a fazer realidade: mais como a IBM, que criou sistemas operacionais - no âmbito da plataforma Watson Education - para acompanhar o progresso dos alunos e atribuir-lhes tarefas consoante o local em que estão, identificar áreas que exigem maior atenção da sua parte e dar uma informação aos docentes. "Uma parte significativa do processo de aprendizagem em áreas como o software ou os sistemas de informação já é muito diferente do modelo tradicional, com os estudantes a apren-

Gestão de Conhecimento



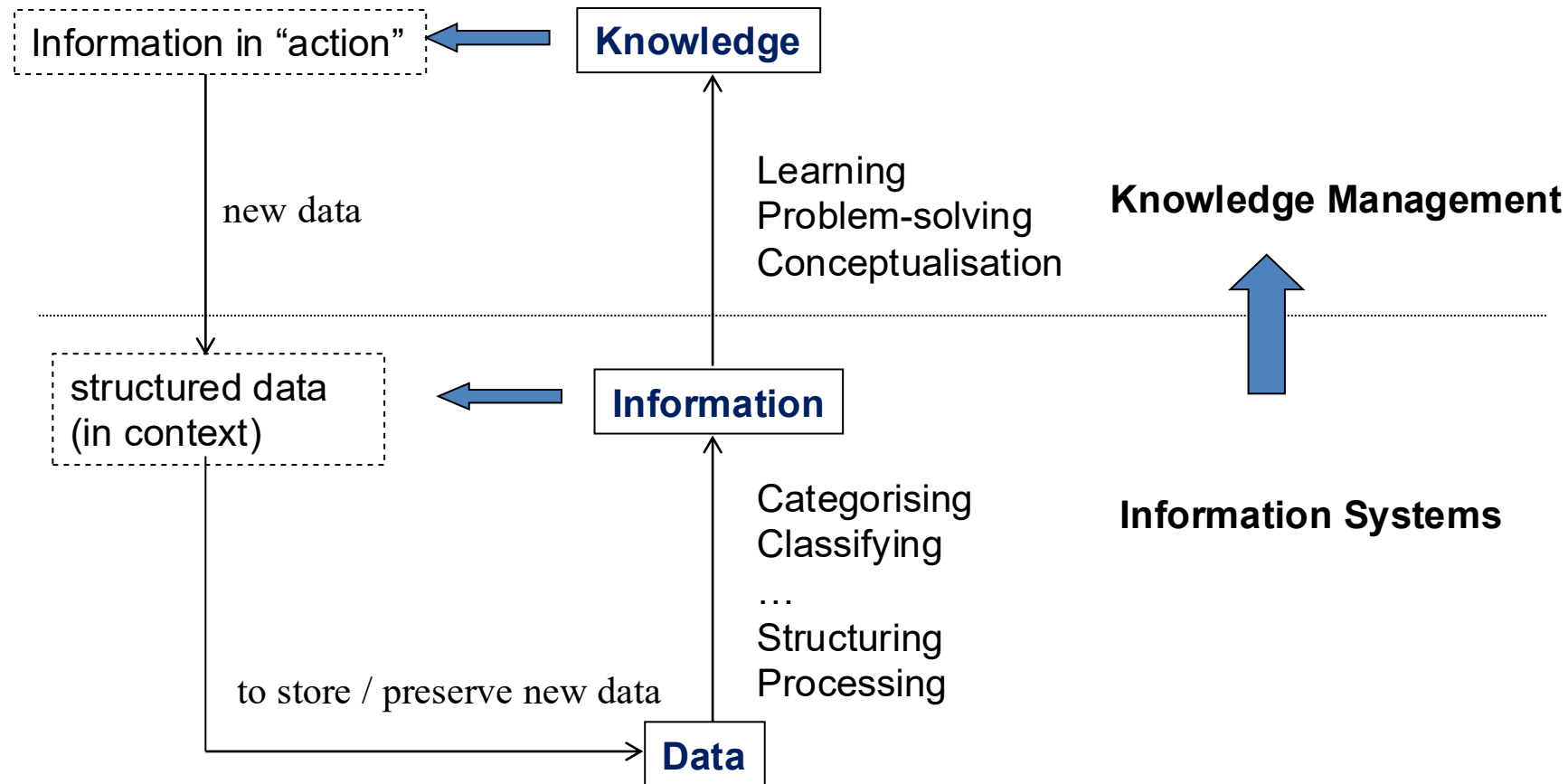
A Gestão de Conhecimento (Knowledge Management – KM) evoluiu ao longo de mais de 30 anos. Tornou-se popular no final da década de 1990, quando começaram a surgir várias conferências, revistas, publicações científicas, teses de doutoramento e mestrado, livros e programas de consultoria dedicados à gestão de conhecimento organizacional.

A KM é um processo através do qual as organizações criam valor a partir dos seus ativos intelectuais e de conhecimento (*knowledge assets*).



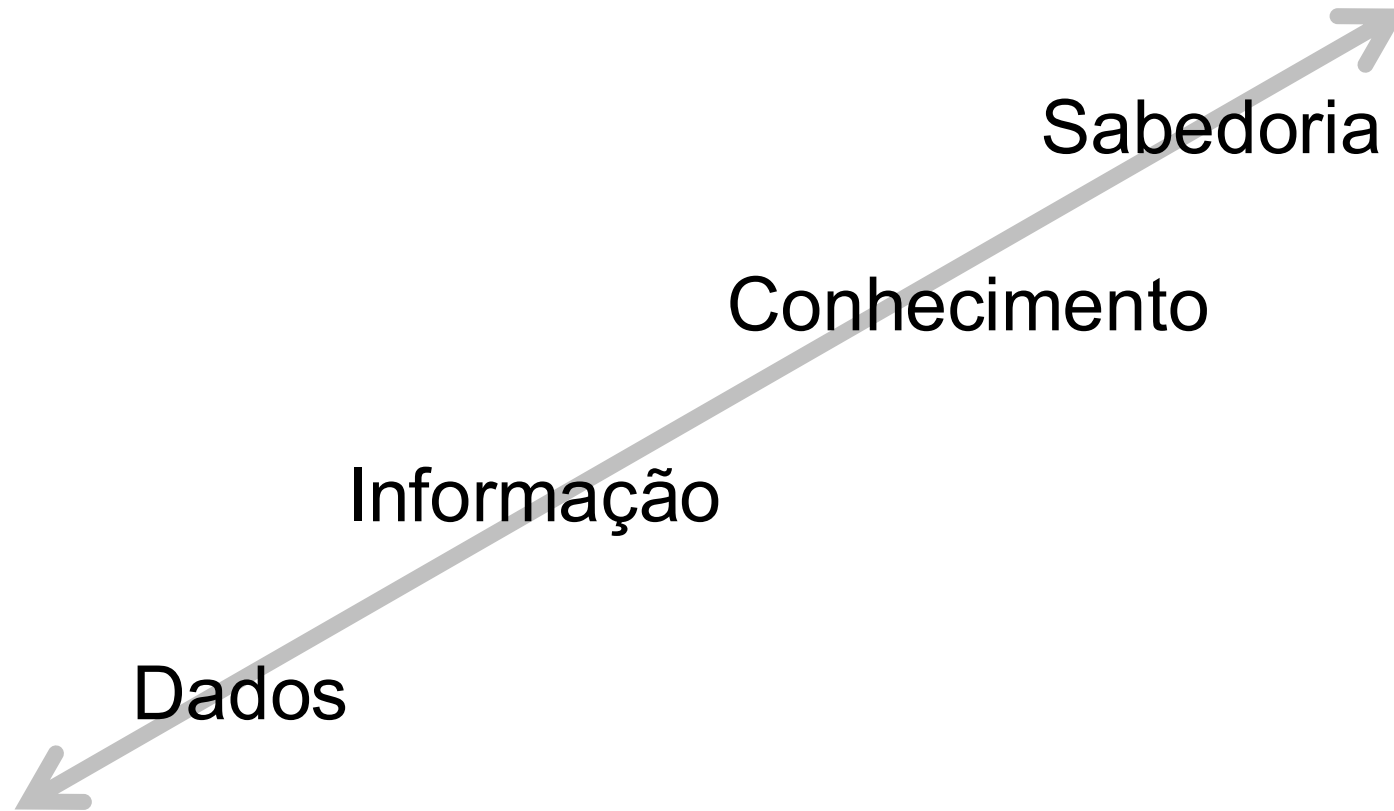
Gestão de Conhecimento

Dados, Informação e Conhecimento



Gestão de Conhecimento

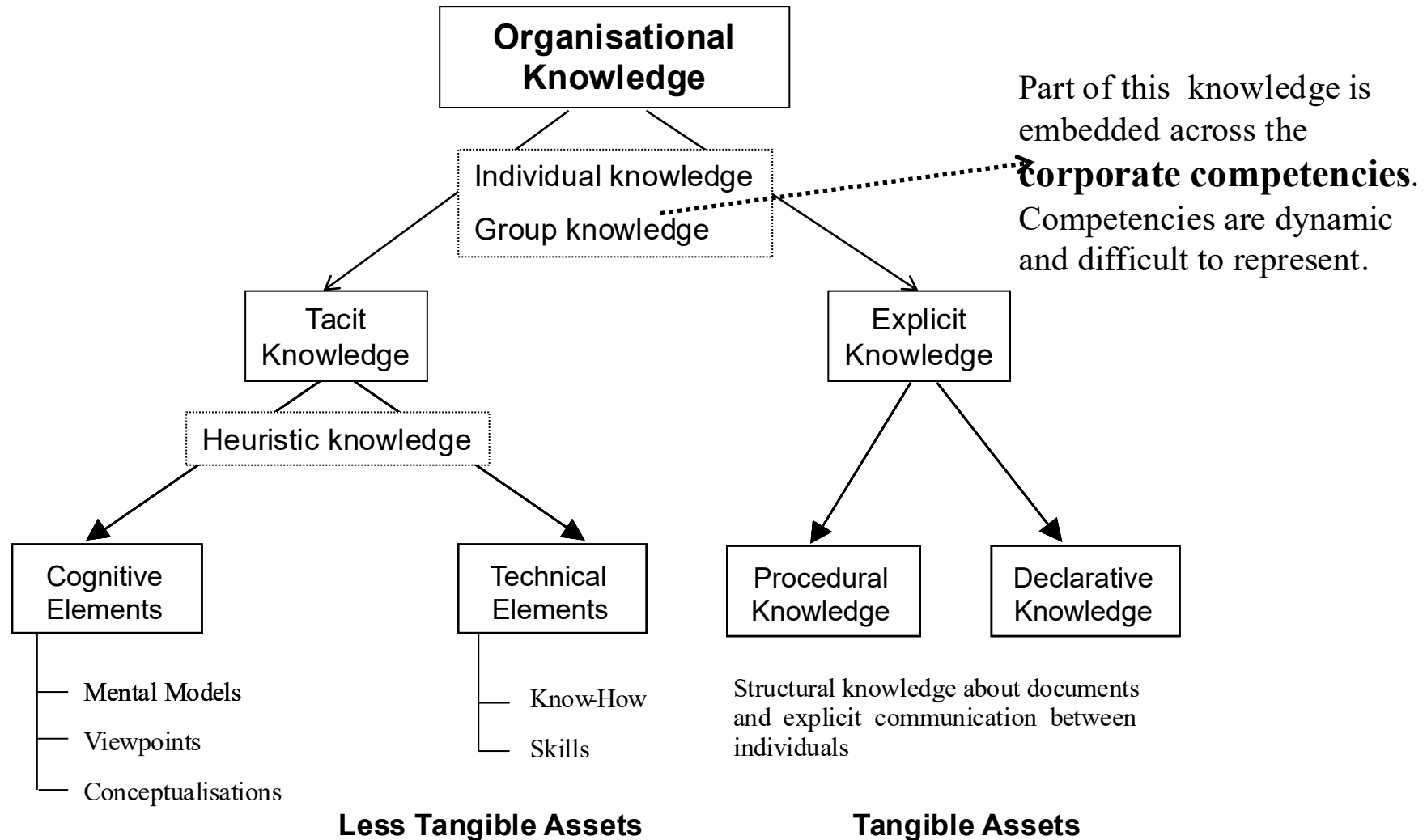
Dados, Informação, Conhecimento e Sabedoria



Classificação do Conhecimento Organizacional

Organisational Knowledge Classification

Organisation Taxonomy for Knowledge Assets



Knowledge Management and Engineering

KM roots and evolution

The roots of KM are deep. We can go back to Stanford University in the 1960. KM emerged with the vision that computing is much more than processing data. Later KM evolved integrating different research areas: computer science and artificial intelligence, information systems, management, and organisational sciences.

1970 to 1980	AI-based Expert Systems KR and Knowledge-based systems
1980 and 1990	Decision Support Systems Knowledge Sharing and Reuse Ontology design and development
1990 and 2000	Focus on Intellectual Capital and Knowledge Assets Organisational Memories Corporate Intranets and Knowledge Portals Ontology-based Knowledge Management Web 2.0 and Enterprise 2.0
2000 to 2010	Semantic web and web 3.0
2010 to 2020 ...	Generative Artificial Intelligence

Knowledge Management and Engineering

KM roots and evolution

AI-based Expert Systems

KR and Knowledge-Based Systems

Decision Support Systems (expert systems for business management)

Knowledge Sharing and Reuse (ontological approach)

Focus on Intellectual Capital (and knowledge assets)

1985 Marvin Minsky

1980s IBM et al.

1980s DEC et al.

1985 Arthur D. Little

1986 Böhme & Stehr

1987 Sveiby & Lloyd

1990 Peter Senge

1991 Thomas Stewart

1993 Prusak et al.

1993 Wiig

1993 Thomas Gruber

1995 Nonaka, I. & Takeuchi, H.

The Society of Mind

Personal Computer for business

Knowledge-Based System Applications

Applied AI

“The Knowledge Society”

Managing Knowhow”

“The Fifth Discipline”: Learning Organization

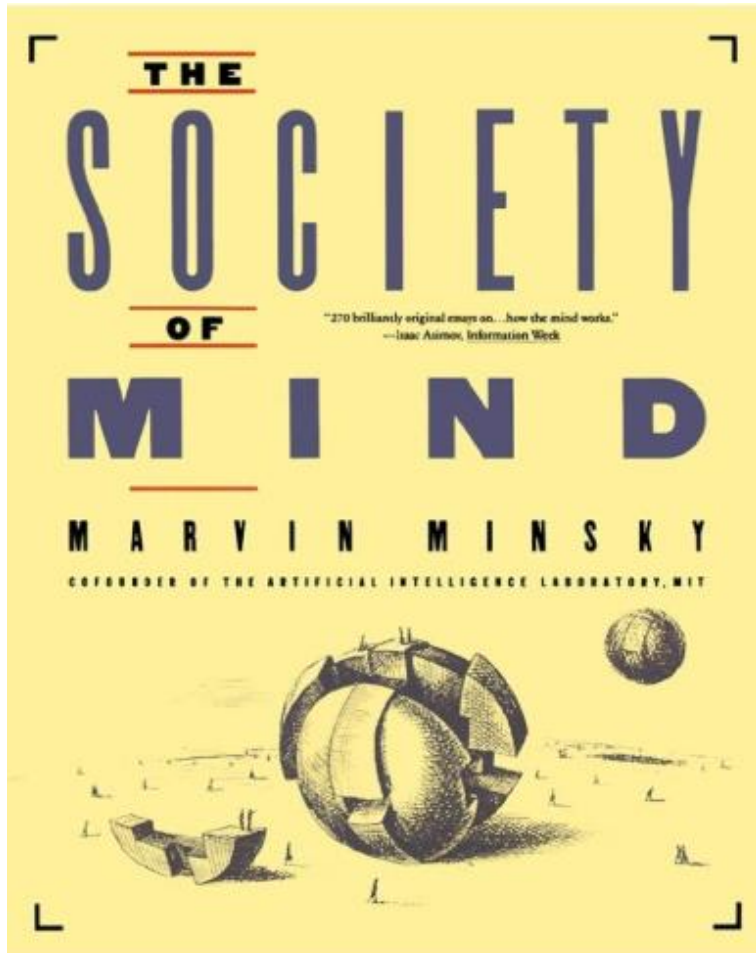
Brainpower (paper in Fortune)

Boston KM Conference

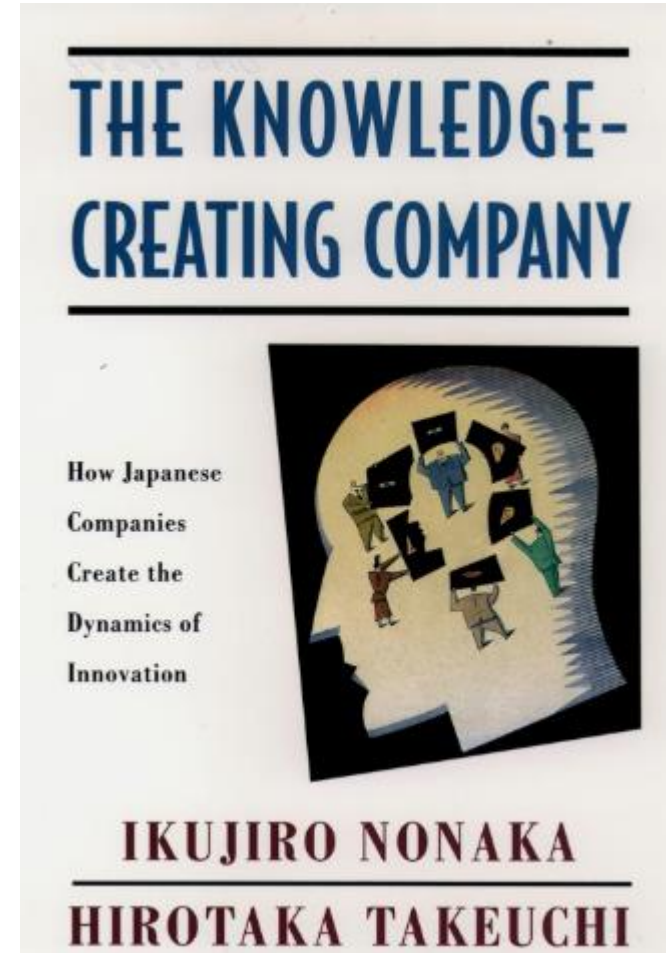
Knowledge Management Foundations

Portable Ontology Specifications

“The Knowledge Creating Company”



Marvin Minsky (1986) The Society of Mind. Publisher: Simon & Schuster - New York. ISBN:978-0-671-60740-1.



The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation

The knowledge-creating company: How Japanese companies create the dynamics of innovation: by Nonaka, Ikujiro & Takeuchi, Hirotaka, New York, Oxford University Press, 1995, 284 pp., 19.39 (Hardcover) & 7.40 (paperback), ISBN: 0199879923, 9780199879922.

Gestão de Conhecimento Organizacional

Organisational Knowledge Classification

Explicit Knowledge .vs. Tacit Knowledge (Nonaka's SECI Model)

Nonaka's SECI: a research work (1994) on knowledge transfer in the consumer goods manufacturing industry in Japan. A model for knowledge transfer in all sectors

	Tacit	Explicit
Tacit	S Socialisation	E Externalisation
Explicit	I Internalisation	C Combination

A Segurança do Saber e da Ciência

A **inteligência artificial** está a transformar profundamente o modo como o conhecimento é criado, disseminado e validado.

No contexto universitário, esta transformação levanta questões fundamentais sobre a **segurança do saber e da ciência**:



- Como garantir que o saber mantém **rigor e autenticidade** num ambiente onde a produção automática (e semiautomática) de **informação cresce exponencialmente**?
- A universidade, enquanto **guardião do conhecimento científico**, enfrenta a necessidade de redefinir os seus mecanismos de confiança e validação.



A Segurança do Saber e da Ciência

A **inteligência artificial** abre oportunidades sem precedentes para ampliar a **capacidade humana de investigar e aprender**.

Esta expansão tecnológica (e novo paradigma) exige um **reposicionamento estratégico das instituições académicas**, reforçando o papel crítico da **supervisão ética e da literacia digital**.

O desafio central é equilibrar **inovação com responsabilidade**, garantindo que a **ciência** continua a ser construída sobre **bases sólidas, transparentes e fiáveis**.

Transformação Digital da Universidade

As universidades enfrentam uma transformação digital profunda

Alteração dos modelos de ensino, aprendizagem e investigação;

Impacto na investigação, ensino e gestão académica.



A **transformação digital acelerada** redefine o ecossistema académico, modificando práticas pedagógicas, administrativas e científicas.

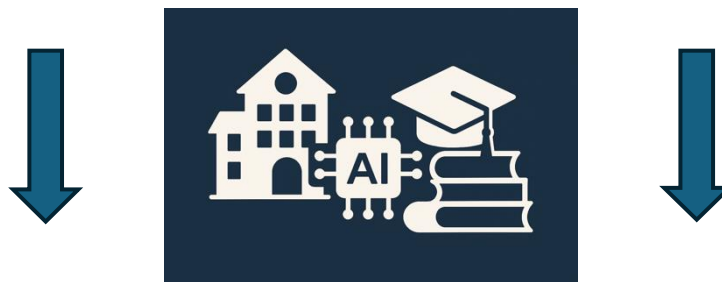
A IA surge como tecnologia estruturante, impulsionando automação, **personalização da aprendizagem** e novas formas de **análise e avaliação educativa**.



Transformação Digital da Universidade

As universidades enfrentam o desafio de atualizar infraestruturas, formar docentes e adaptar políticas institucionais.

A **transformação digital** não é apenas técnica: é cultural e requer **novas competências**, novos processos e uma abordagem estratégica que integre inovação sem comprometer a qualidade e os **princípios fundamentais do ensino superior**.



Gestão e Engenharia de Conhecimento no Ensino Superior

A universidade assume um papel ainda mais central: orientar, enquadrar e garantir que o uso da IA reforça - e não enfraquece - a integridade e a gestão do conhecimento.



O futuro da educação assenta num modelo colaborativo entre humanos e sistemas de IA. Os estudantes podem beneficiar de tutores inteligentes, sistemas de personalização e plataformas de análise de aprendizagem.

Os professores passam a desempenhar um papel mais estratégico - orientar, interpretar e contextualizar o conhecimento. Esta arquitetura não substitui **a relação pedagógica**; pelo contrário, **amplia-a**.

Os professores deverão manter a mediação crítica necessária para **transformar informação em conhecimento**. A colaboração humano-IA redefine como se aprende e também como se ensina (**processo de ensino-aprendizagem**).



Generative AI

The screenshot shows a web application interface. On the left is a sidebar with a navigation menu containing icons and labels for 'New', 'Computer', 'Spaces', 'Artefacts', 'Customise', 'Connectors', 'Skills', 'Workflows', 'Memory', and 'History'. Below the menu is a search bar with the text 'how to integrate two Euro ...'. The main content area has a top bar with icons and labels for 'Answer', 'Links', 'Images', and 'Videos'. Below this is a paragraph of text: 'only account type that can be merged is an account created with your eID, and it can be linked with another external account you created yourself. For most cases, the practical solution is to keep one account and use the EU Login app to add both accounts on the same phone.' This is followed by a code snippet 'trusted-digital-identity. +2'. Below the code is a section titled 'What you can do' with a bulleted list: '• If one of your accounts is an **eID account**, you can link it to your other account either from the eID account via **Link my eID** or from the other account via **Manage my eIDs**.', '• If you just need to use both accounts on one device, the app supports **multiple accounts on a single device**.', and '• If you accidentally created a new account with a different email address, you generally should **update the existing account**, as the same email address cannot be linked to two EU Login accounts.' This is followed by another code snippet 'trusted-digital-identity.'. Below the list is a section titled 'How to link accounts in the app' with a numbered list: '1. Open the EU Login mobile app.' and '2. Tap the management icon in the top-left corner.' At the bottom of the main content area is a text input field with the placeholder 'Ask a follow-up'. On the right side of the main content area, there are two buttons labeled 'Artefact' and 'Source'. A dropdown menu is open over the main content area, showing a list of models: 'Best' (selected with a checkmark and a description 'Selects the best available model'), 'Sonar 2', 'GPT-5.4', 'GPT-5.5 Max' (with a lock icon), 'Gemini 3.1 Pro', 'Claude Sonnet 4.6', 'Claude Opus 4.8 Max' (with a lock icon), and 'Kimi K2.6'.

Answer Links Images Videos

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trusted-digital-identity. +2

What you can do

- If one of your accounts is an **eID account**, you can link it to your other account either from the eID account via **Link my eID** or from the other account via **Manage my eIDs**.
- If you just need to use both accounts on one device, the app supports **multiple accounts on a single device**.
- If you accidentally created a new account with a different email address, you generally should **update the existing account**, as the same email address cannot be linked to two EU Login accounts.

trusted-digital-identity.

How to link accounts in the app

1. Open the EU Login mobile app.
2. Tap the management icon in the top-left corner.

Ask a follow-up

Artefact

Source

Best ✓
Selects the best available model

Sonar 2

GPT-5.4

GPT-5.5 Max

Gemini 3.1 Pro

Claude Sonnet 4.6

Claude Opus 4.8 Max

Kimi K2.6

- Inteligência Artificial Generativa na investigação e desenvolvimento (I&D)
- Apoio à revisão da literatura
- Programação e desenvolvimento de software
- Engenharia de Software e IA Generativa
- Apoio à escrita científica
- Ética e utilização responsável
- Governança, sustentabilidade e **colaboração humano-IA**
- Definir regras (institucionais) claras para a utilização da GenAI.



Erasmus Mundus Joint Master Programme

Artificial Intelligence for Sustainable Societies



Sustainable Information Technologies for Societies Joint Masters (SITEs–JM) - ERASMUS 2027 Programme. SITEs–JM implements the **Artificial Intelligence for Sustainable Societies (AISS)** Erasmus Mundus programme and Joint Master Degree, co-created and delivered by partners from Tallinn University (Estonia), University Lusófona (Portugal) and Tampere University (Finland).

<https://aissprogram.eu/>



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Articles & News

EU Alumni

Artificial Intelligence For Sustainable Societies

Erasmus Mundus Joint Master's program in the fields of sustainable societies, artificial Intelligence solutions and participatory design

Artificial Intelligence For Sustainable Societies

Erasmus Mundus Joint Master's program in the fields of sustainable societies, artificial Intelligence solutions and participatory design. The next application period begins on December 2, 2025.

Erasmus Mundus Master's Degree

Study across 3 European countries: Tallinn University (Estonia), Lusófona University (Portugal) and Tampere

Our mission

We aim to empower students to use AI for societal good, fostering innovators committed to equity, inclusion, ethics, and sustainability.

Future Students

If you believe you can think critically and build bridges between different disciplines and sectors, join us!

Programme Details

Language of instruction: English
Duration: 2 years (4 semesters)
ECTS Credits: 120 ECTS

Erasmus Mundus Masters Artificial Intelligence for Sustainable Societies

ENGINEERING AND NATURAL SCIENCES

PORTO

The Erasmus Mundus Joint Master's Programme (EMJM) in Artificial Intelligence for Sustainable Societies (AISS) focuses on sustainability, artificial intelligence and data-driven decisions, and participatory design methods engaging citizens. After completin [Read more](#)



Degree

**Erasmus Mundus
Masters**

Semesters

4

Credits

120



PDF FLYER



Research and Lusófona

Lusófona University is the largest non-state funded university in Portugal. Lusófona University is located in the city centers of Lisbon and Porto. Since 1998, its objectives comprise "teaching and research in the various fields of science, culture and technologies, from an interdisciplinary perspective with a view to the development of the Portuguese-speaking countries and peoples".

This portal contains information about our research activities and outcomes including publications, projects and scientific activities.

UN Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint of global goals towards peace and prosperity for people and the planet, now and into the future. Click on a goal to the right to explore how ULisboa researchers and their work are contributing to sustainability.

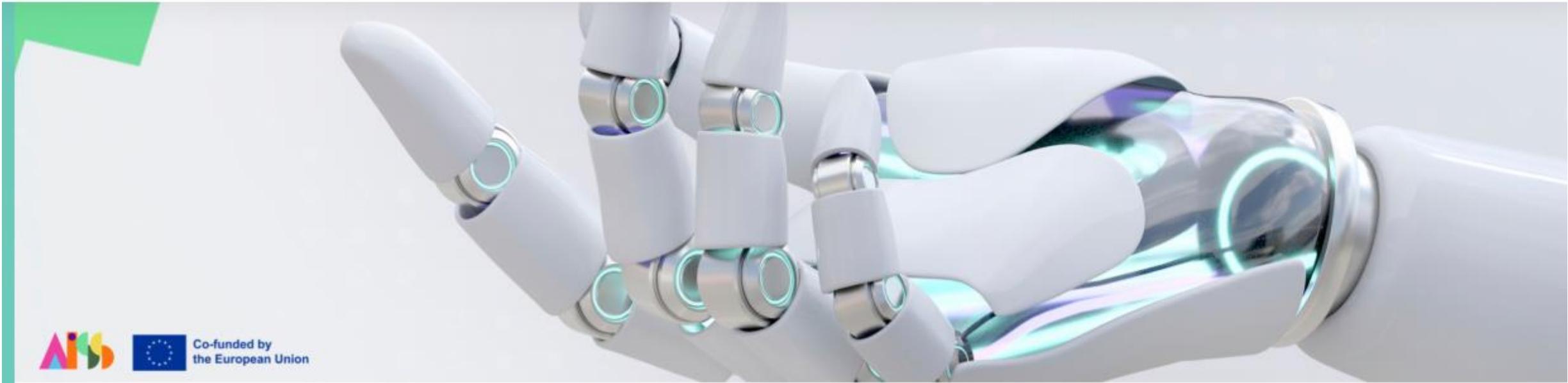




Collaborations and top research areas from the last five years

Click dots and donuts to bring up details or [Select a country/territory from the list](#)





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STUDY LEVEL
Master's Studies



DURATION OF STUDY
2 years

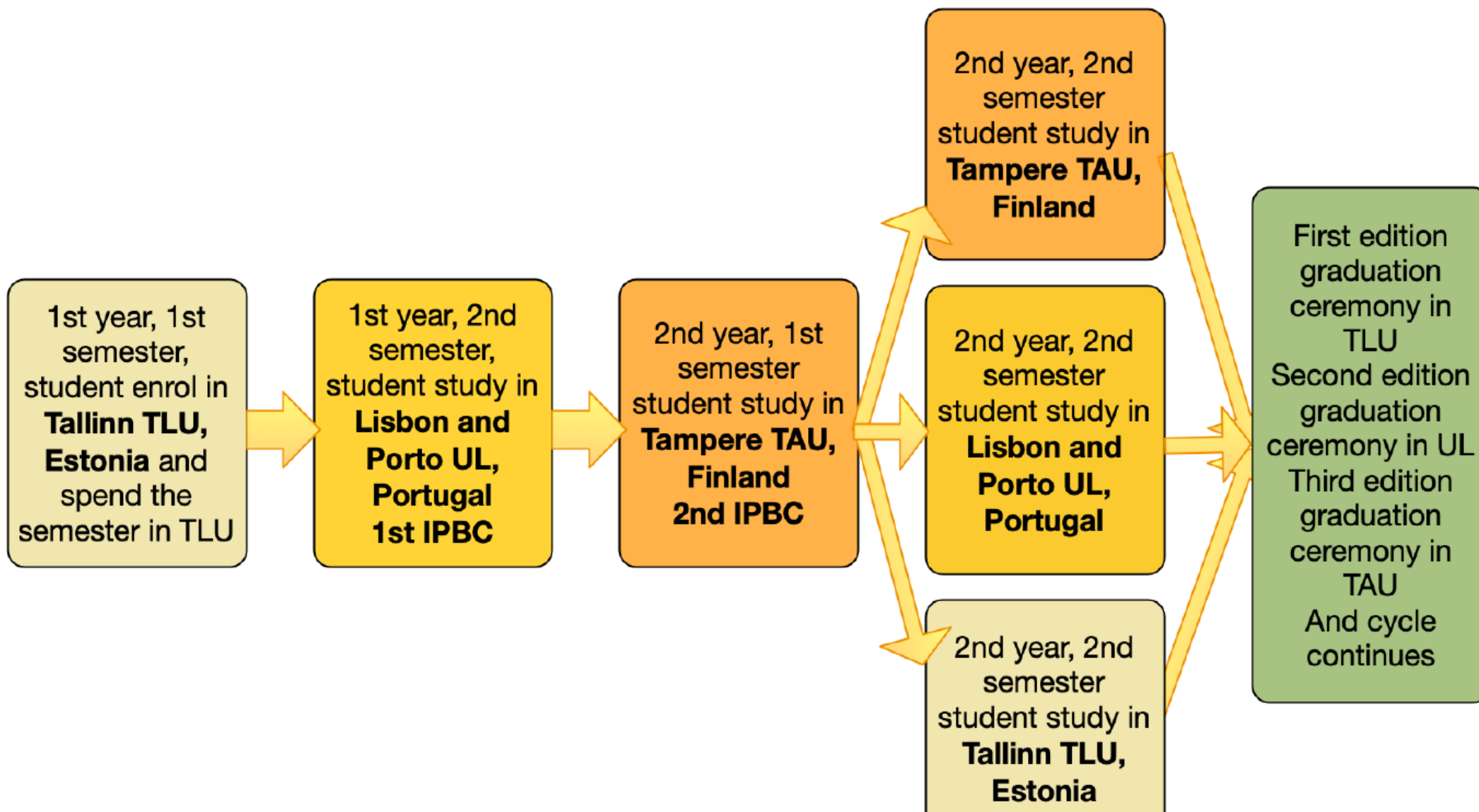
Artificial Intelligence for Sustainable Societies

The Erasmus Mundus Joint Master's Programme (EMJM) in

Apply Now 

Watch the Info
Session 

Places and time schedules of mobility and the locations of interdisciplinary project-based courses



Erasmus Mundus Joint Master Programme

Artificial Intelligence for Sustainable Societies



Compulsory studies to the students		
Sustainable Digital Society (TAU) Principles of Service Design 6 ECTS Sustainable Design 6 ECTS Fundamentals of Accessibility 6 ECTS TOTAL 18	Data-driven active citizenship (TLU) SDG & ESGS 4 ECTS Collective Intelligence in Socio-Technical Systems 6 ECTS Civic Engagement 6 ECTS TOTAL 16	AI and Data Science (UL) Fundamentals of Artificial Intelligence Introduction to Data Science 6 ECTS Geographic information systems 6 ECTS Fundamentals of Statistics for Data Science 6 ECTS Interdisciplinary project-Based Courses 2 ECTS TOTAL 22 ECTS
Master's Thesis Seminar 6 ECTS (TLU) + Research Methods 6 ECTS (TLU) & Master's Thesis 24 ECTS (TLU leads), Total compulsory 68 ECTS + Master's Thesis 24 ECTS		
Pillar studies in interdisciplinary and electives		
Sustainable Digital society Users and Digital Literacy 6 ECTS Information Analytics and Visualisation 6 ECTS Interdisciplinary project-Based Courses 6 ECTS TOTAL 18 ECTS	Data-driven active citizenship Data Driven Decision Making 6 ECTS Legal Aspects of E-governance 6 ECTS Civil Society and Social Innovations 6 ECTS TOTAL 18 ECTS	AI and Data Science Topics on Machine Learning and its Applications 6 ECTS Applied Programming for Data Science 6 ECTS TOTAL 12 ECTS

Erasmus Mundus Joint Master Programme

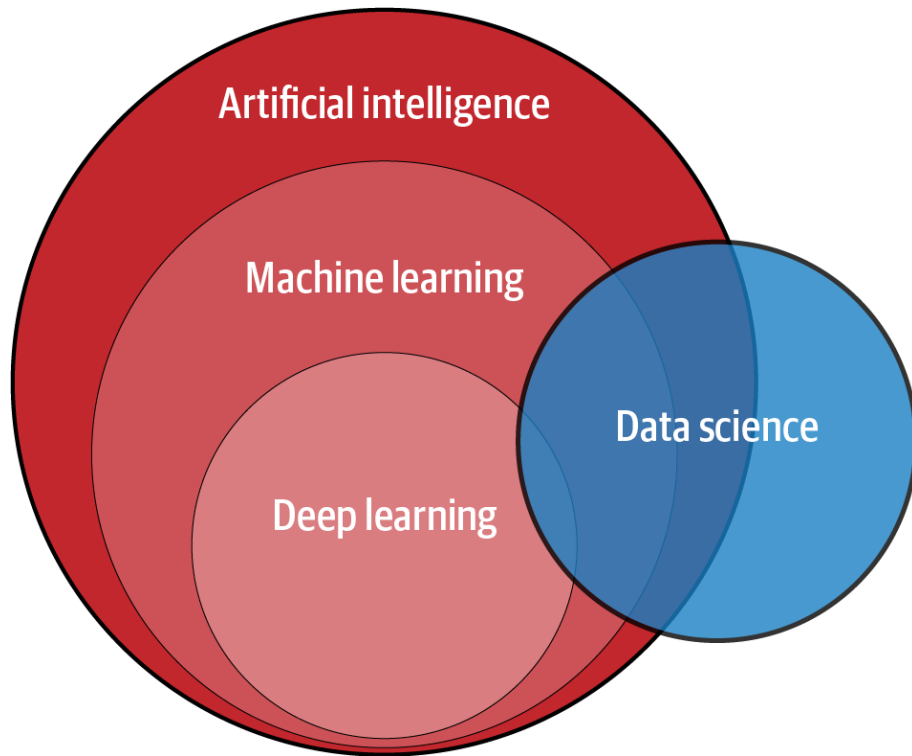
Artificial Intelligence for Sustainable Societies



Elective Courses				
Electives min. 12 ECTS		ECTS	Autumn 2025	Spring 2026
AISS.400	<u>Users and Digital Literacy</u>	6		6
AISS.800	<u>Content Creation for Immersive Digital Services</u>	6		6
IFI7359.DT	<u>Information Visualization and Representation</u>	6		6
IFI7403.DT	<u>Data Driven Decision Making and Change Management in Organisations</u>	6	6	
ULP6613-24297	<u>Topics on Machine Learning and its Applications</u>	6		6
ULP6613-25230	<u>Applied Programming for Data Science</u>	6		6



Artificial Intelligence, Machine Learning, Deep Learning, and Data Science

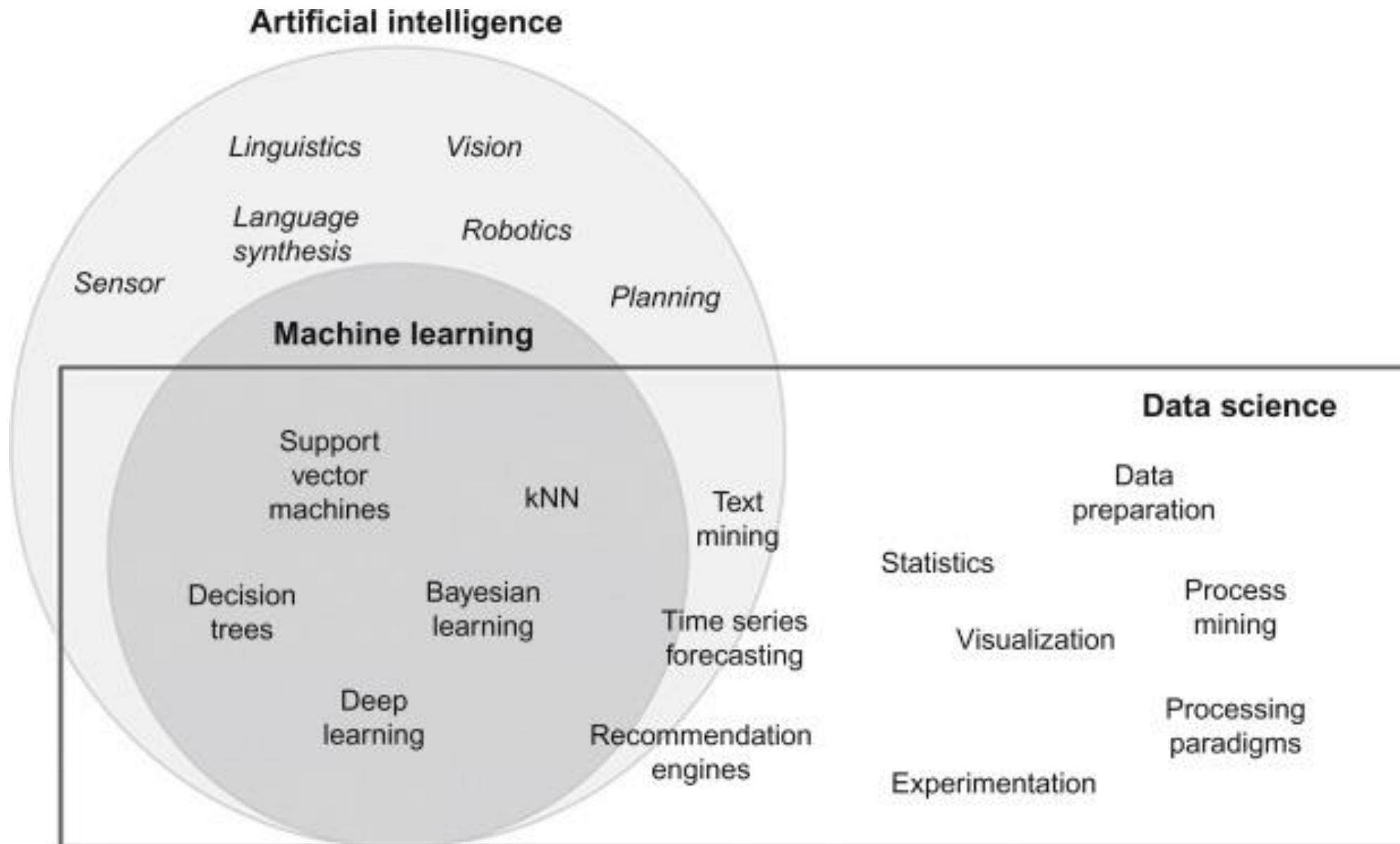


Machine learning is a subset of **Artificial Intelligence** (AI) to identify patterns in data and to develop AI applications.

Deep learning is a subset of machine learning that enables computers to solve more complex problems and applying deeper computing resources.

Data science uses machine learning, deep learning, and AI to analyse data to solve problems and reach conclusions.





Artificial Intelligence, Machine Learning, Deep Learning, and Data Science

Artificial Intelligence

Artificial intelligence is usually defined as the science of making computers do things and perform tasks that usually require **human intelligence**. These tasks include decision making, speech recognition, visual perception, translation between languages, among other tasks.

Machine Learning

Machine learning is a **software application of artificial intelligence** (AI) that provides the AI system with the ability to learn from the software environment and apply the lessons learned to make enhanced decisions and develop **predictive analysis**. There are several algorithms that machine learning uses to systematically learn, describe and improve data, identify hidden patterns, and then perform actions on these patterns.



Artificial Intelligence, Machine Learning, Deep Learning, and Data Science

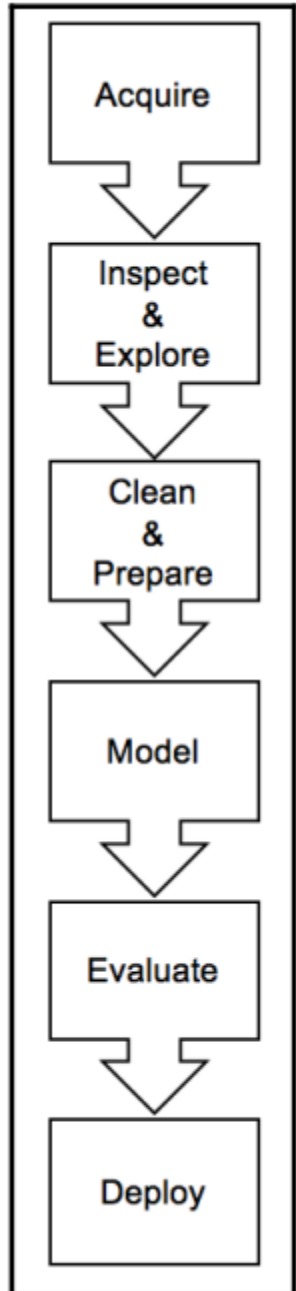
Deep learning

The deep learning models are inspired by the **biological neural network of the human brain** and aims to analyse data with a logical structure like how a human person think and draw conclusions. **Deep learning is a subset of machine learning** for the study of **algorithms** related to **artificial neural networks** that contain many layers stacked on each other. Deep learning algorithms require large amounts of computing resources.

Data science

Data science is an interdisciplinary field like data mining that uses scientific (e.g. statistics) methods and systems to **extract knowledge from data**. Data science aims to gain insights from data by using different scientific tools and techniques, including machine learning (ML) techniques. Data science combines ML, deep learning and AI with other disciplines such as **big data analytics**, **business intelligence**, **knowledge management and engineering**, and **cloud computing**.





Data sets sources

Acquisition, inspection and exploration, cleaning and preparation, modeling, evaluation, and deployment.

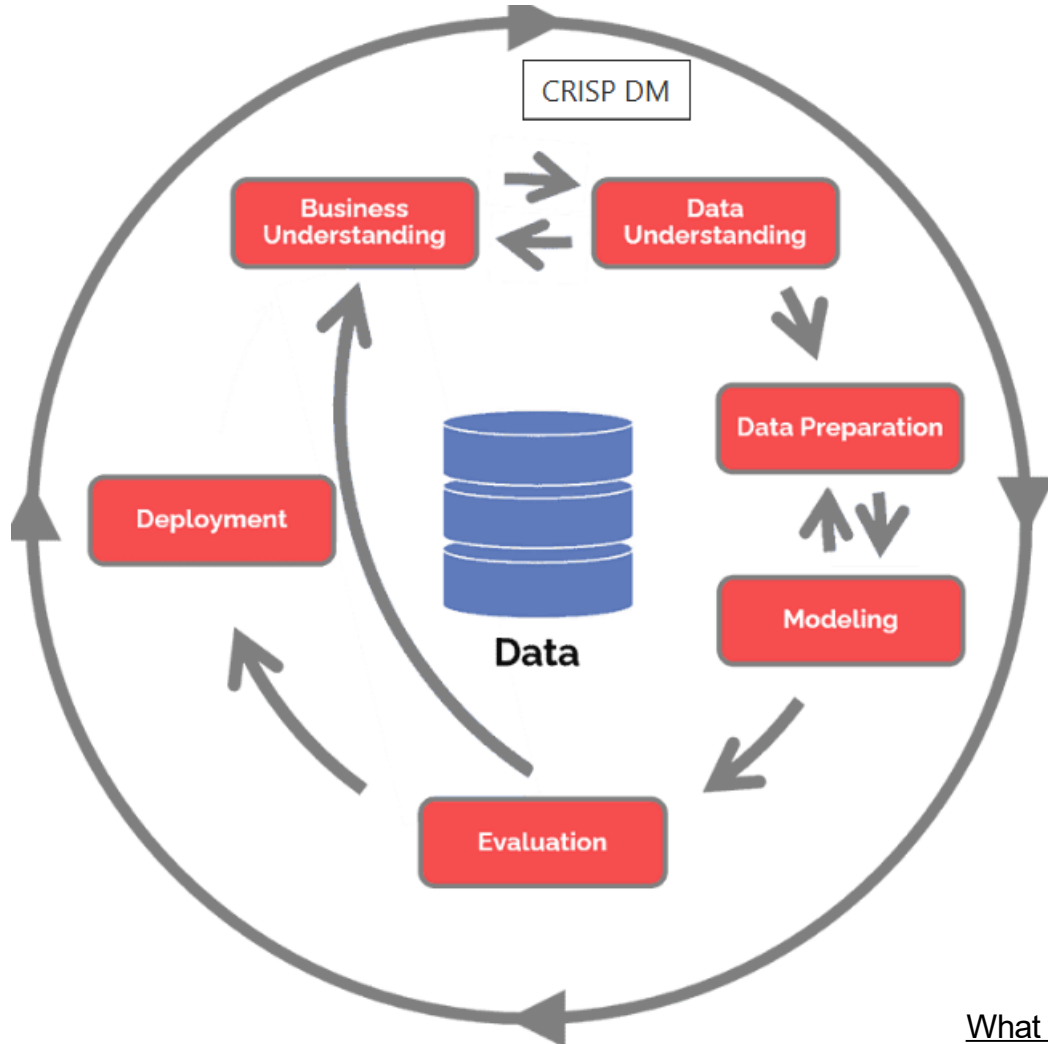
Data quality check

Filtering, aggregating, imputing data, and transforming.
([natural-language-based text](#) transformations vs. [time series data](#) transformations)

Algorithm to model and train the data
(model to make predictions) – **predictive analysis**

Evaluate the quality (and performance) of the model

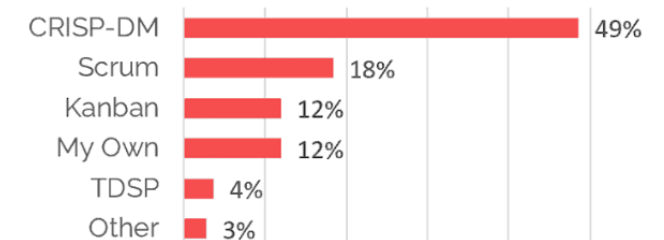
Software deployment
Include as a feature/functionality within a target **software application**



- The CRoss Industry Standard Process for Data Mining (**CRISP-DM**) is a process model that serves as the base for a [data science process](#).
- Going through the entire process without having solved the problem is NOT a failure.

datascience-pm.com Poll Results

Which process do you most commonly use for data science projects?



What is the Data Science Process? - Data Science Process Alliance (datascience-pm.com)

1. Define the problem (and problem-solving tasks)

A **well-defined problem** facilitates the right approach to create the solution.

Machine learning depends on data, usually **big sets of data**.

2. Data collection and preprocessing

Retrieve, clean, and prepare the data from the source.

2.1. Retrieving the data

- Data flows across business processes and tasks daily stored in databases or embedded in software applications.
- Use **public data repositories** and pull selected data into one single repository/dataset



2.2. Clean the data (Data Wrangling)

- clean duplicates, correct errors, input missing data, structure, delete garbage data and annoying noise, and remove misinformation.

2.3. Prepare the data

- After data cleansing, it is necessary to format the data into a model-ready format. Split the data into train, validation, and test data sets. Combine and label attributes. Build the datasets needed for training:
 - **Training set:** Dataset that enables the model to process information by defining parameters.
 - **Validation set:** Verify the model's accuracy and fine-tune the parameters for better results.
 - **Test set:** Used to find any bugs or mis-trainings and to test the performance of the model.



3. Training

Train, validate, and test the model

Machine Learning algorithms and different types of machine learning techniques:

Supervised Learning

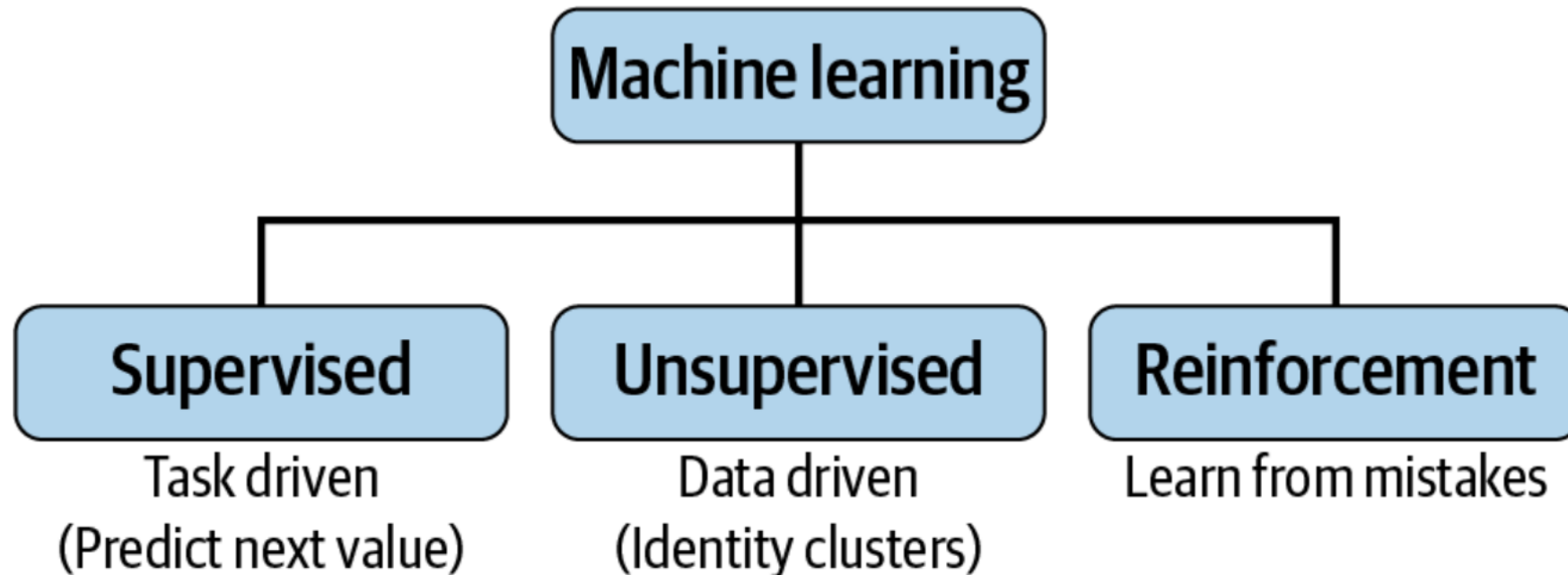
Unsupervised Learning

Reinforced Learning



Data Science / Machine Learning Workflow

There are three types of machine learning: **supervised learning**, **unsupervised learning**, and **reinforcement learning**.



Public data repositories

Data Sets

Open Data Portals

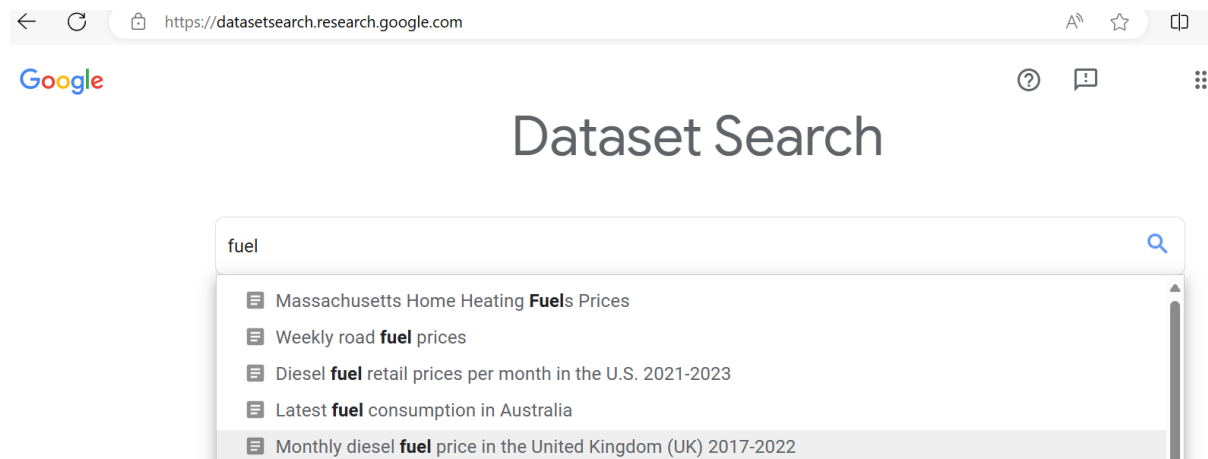
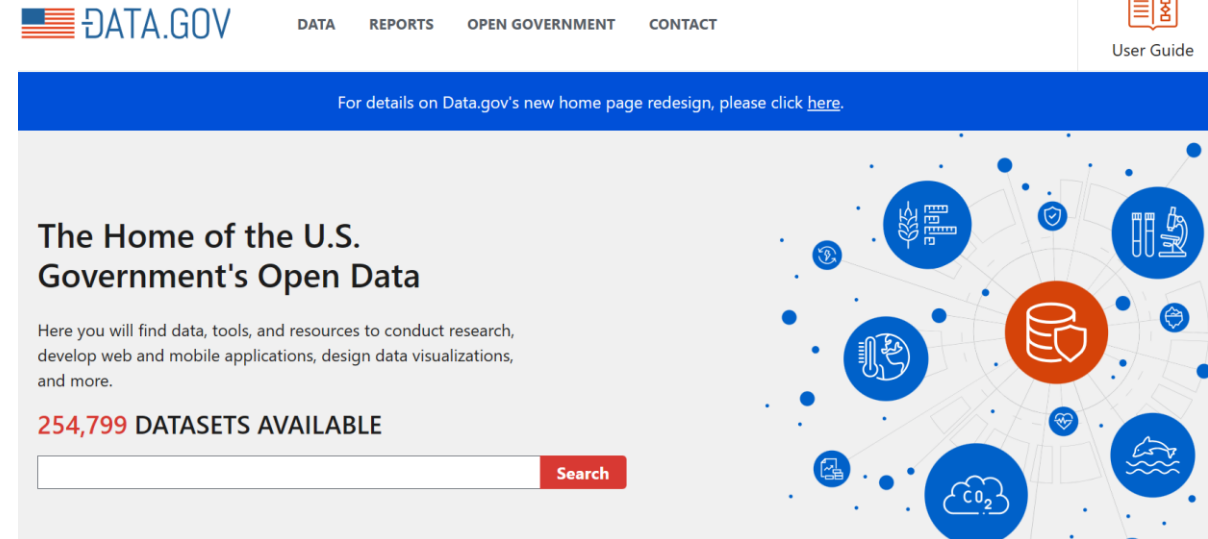
Many governments and organizations provide open datasets for public use. Examples include data.gov, Eurostat, and World Bank Data.

Websites: data.gov, [Eurostat](https://ec.europa.eu/eurostat), [World Bank Data](https://data.worldbank.org)

Google Dataset Search

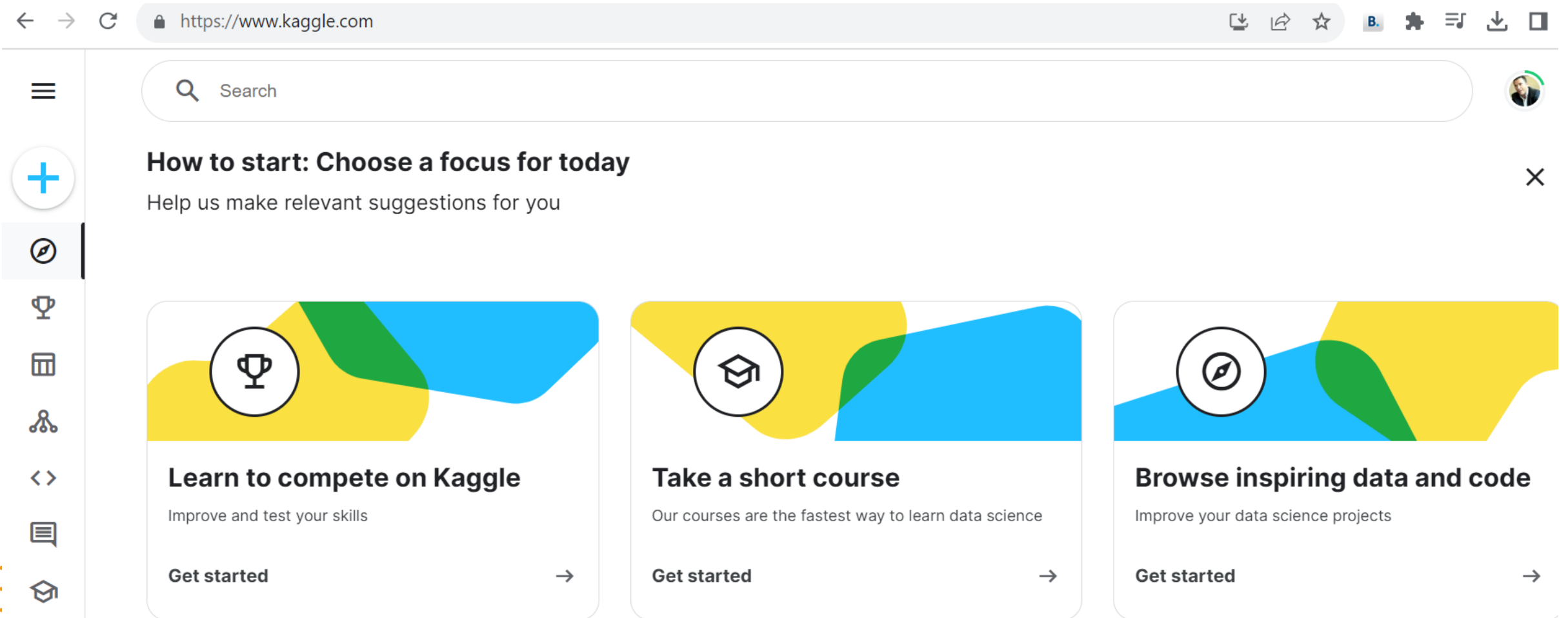
Google's Dataset Search is a search engine specifically designed to help you discover datasets from various sources on the web.

Website: [Google Dataset Search](https://datasetsearch.research.google.com)



[Kaggle Datasets](#)

Kaggle hosts a vast collection of datasets along with competitions and notebooks for data analysis and ML model development.



The screenshot shows the Kaggle homepage in a web browser. The browser's address bar displays 'https://www.kaggle.com'. The page features a navigation sidebar on the left with icons for home, datasets, competitions, notebooks, and a search icon. The main content area has a search bar at the top. Below the search bar, there is a section titled 'How to start: Choose a focus for today' with the subtitle 'Help us make relevant suggestions for you'. This section contains three cards: 'Learn to compete on Kaggle' (with a trophy icon), 'Take a short course' (with a graduation cap icon), and 'Browse inspiring data and code' (with a compass icon). Each card includes a brief description and a 'Get started' button with a right arrow.

← → ↻ <https://www.kaggle.com> [Download] [Share] [Star] [B.] [Puzzle] [Menu] [Download] [Print]

☰ Search [User Profile]

How to start: Choose a focus for today ✕
Help us make relevant suggestions for you



Learn to compete on Kaggle

Improve and test your skills

Get started →



Take a short course

Our courses are the fastest way to learn data science

Get started →



Browse inspiring data and code

Improve your data science projects

Get started →

Open Data Portal by European Data Portal - European Data Portal

The European Data Portal provides access to a variety of datasets from European countries. It covers diverse topics such as environment, economy, and society.

GitHub Repository - Awesome Public Datasets

This GitHub repository is a curated list of public datasets across various domains. It includes links to datasets and information about their sources.

Microsoft Research Open Data

Microsoft Research Open Data offers a collection of datasets contributed by Microsoft researchers. It covers a range of domains, including computer vision, natural language processing, and healthcare.

NASA Open Data Portal

NASA provides access to a variety of datasets related to space exploration, Earth science, and aeronautics.



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https://portal.gdc.cancer.gov

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🖼️

⋮

NIH

NATIONAL CANCER INSTITUTE

GDC Data Portal

Home

Projects

Exploration

Analysis

Repository

🔍

Manage Sets

➡️

🛒

0

☰

Harmonized Cancer Datasets

Genomic Data Commons Data Portal

Get Started by Exploring:

📁 Projects

🔍 Exploration

🔬 Analysis

📦 Repository

🔍

e.g. BRAF, Breast, TCGA-BLCA, TCGA-A5-A0G2

Data Portal Summary

Data Release 39.0 - December 04, 2023

PROJECTS

79

PRIMARY SITES

69

CASES

44 451

FILES

986 114

GENES

22 534

MUTATIONS

2 930 136

Adrenal Gland

1

Bile Duct

1

Bladder

1

Bone

1

Bone Marrow

7

Brain

1

Breast

4

Cervix

1

Colorectal

3

Esophagus

1

Eye

1

Head and Neck

1

Kidney

2

Liver

1

Lung

5

Lymph Nodes

1

Nervous System

1

Ovary

1

Pancreas

1

Pleura

1

Prostate

1

Skin

1

Soft Tissue

1

Stomach

1

Testis

1

Thymus

1

Thyroid

1

Uterus

1



BioPortal

Ontologies

Search

Annotator

Recommender

Mappings

Login

Welcome to BioPortal, the world's most comprehensive repository of biomedical ontologies

Search for a class

Enter a class, e.g. Melanoma



[Advanced search](#)

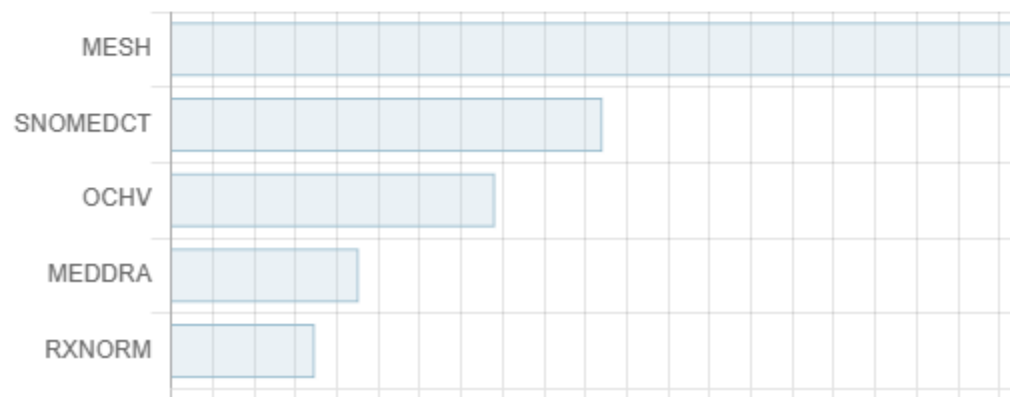
Find an ontology

Start typing ontology name, then choose from list



[Browse ontologies ▾](#)

Ontology visits (January 2026)



Statistics

Ontologies

1,266

Classes

17,603,516

Properties

36,286

Mappings

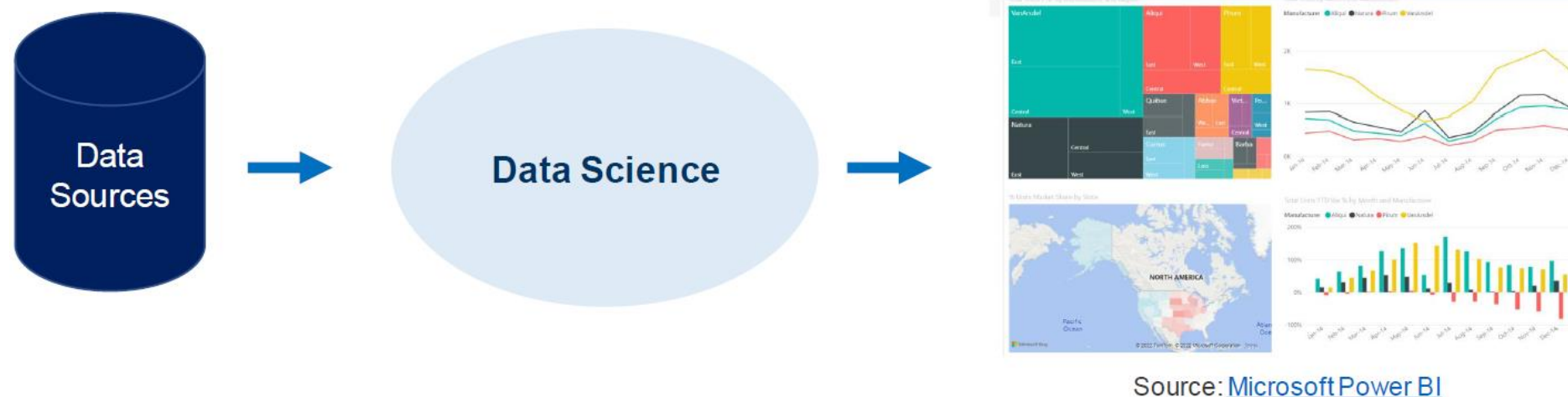
93 606 119

Data, the new oil



2.5 Zetabytes of data are produced every day

About 500 books a day for every person on the planet



Data science is an integrated and multi-disciplinary practice for extracting meaning and actionable insights from data.

Knowledge Management

From Data to Decision Knowledge

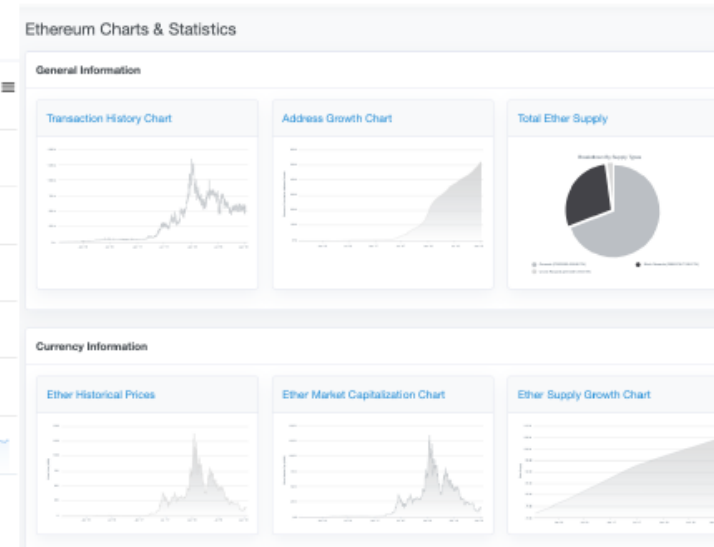
Data

Information

Knowledge

Decision

A1				
	A	B	C	D
1	Date(UTC)	UnixTimeSta	Value	
2	7/30/15	1438214400	0	
3	7/31/15	1438300800	0	
4	8/1/15	1438387200	0	
5	8/2/15	1438473600	0	
6	8/3/15	1438560000	0	
7	8/4/15	1438646400	0	
8	8/5/15	1438732800	0	
9	8/6/15	1438819200	0	
10	8/7/15	1438905600	2.77	
11	8/8/15	1438992000	0.81	
12	8/9/15	1439078400	0.74	
13	8/10/15	1439164800	0.68	
14	8/11/15	1439251200	1.06	
15	8/12/15	1439337600	1.25	
16	8/13/15	1439424000	1.78	
17	8/14/15	1439510400	1.79	
18	8/15/15	1439596800	1.79	
19	8/16/15	1439683200	1.37	
20	8/17/15	1439769600	1.19	
21	8/18/15	1439856000	1.27	
22	8/19/15	1439942400	1.26	
23	8/20/15	1440028800	1.48	
24	8/21/15	1440115200	1.44	
25	8/22/15	1440201600	1.39	
26	8/23/15	1440288000	1.35	
27	8/24/15	1440374400	1.24	
28	8/25/15	1440460800	1.17	
29	8/26/15	1440547200	1.16	
30	8/27/15	1440633600	1.13	
31	8/28/15	1440720000	1.3	



Buy?

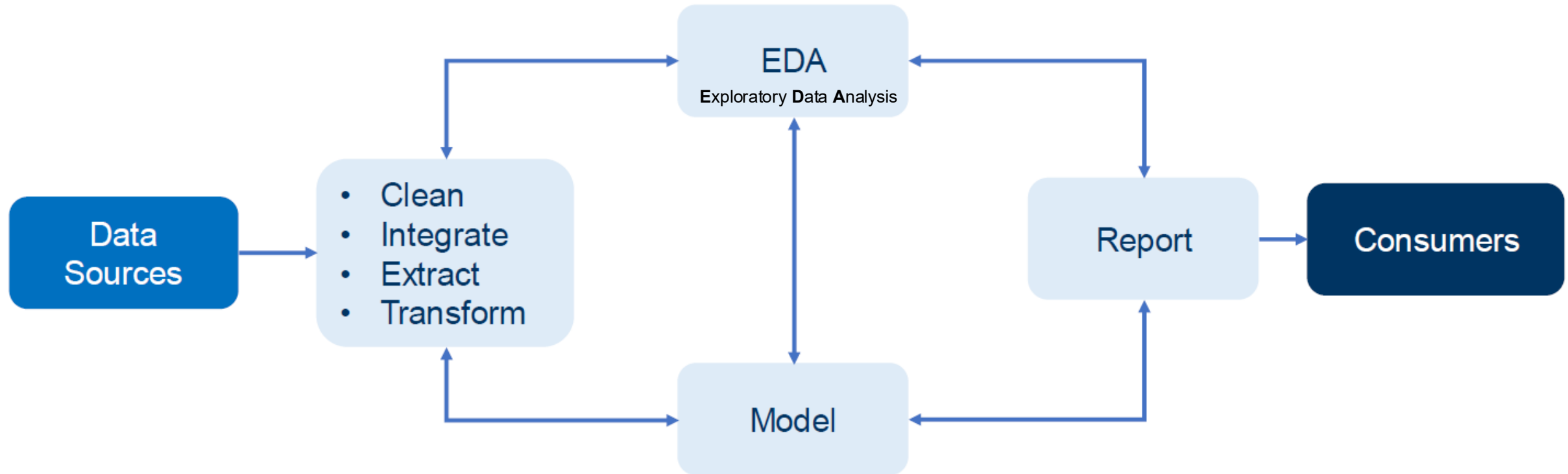
Raw data

Meaning

Context

Decision





Data science combines **statistics**, **data analysis**, data visualization, **artificial intelligence**, **machine learning**, and related methods to understand phenomena with data





- Digital transformation has become a strategic imperative for enterprises.
- Artificial Intelligence and Data Science are central enablers of this transformation.
- Organisations increasingly rely on data-driven and intelligent systems to remain competitive.
- Organisations that leverage AI effectively are more likely to achieve their digital transformation goals.



Python programming language



Open Source

Readability

Extensive libraries

Large community

Data science

Pandas, NumPy and SciPy



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https://www.python.org

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The Python Software Foundation



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```
# For loop on a list
>>> numbers = [2, 4, 6, 8]
>>> product = 1
>>> for number in numbers:
...     product = product * number
...
>>> print('The product is:', product)
The product is: 384
```

>_

All the Flow You'd Expect

Python knows the usual control flow statements that other languages speak — `if`, `for`, `while` and `range` — with some of its own twists, of course. [More control flow tools in Python 3](#)

1 2 3 4 5

Python is a programming language that lets you work quickly

tps://www.python.org/psf/

Python community



And many,
many more...



NumPy - Numerical Python, is one of the most important foundational packages for numerical computing in Python.

https://numpy.org



B.



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NumPy



The fundamental package for scientific computing with Python

LATEST RELEASE: NUMPY 1.26. VIEW ALL RELEASES

NumPy 2.0 release date: June 16 2024-05-23

Powerful N-dimensional arrays

Fast and versatile, the NumPy vectorization, indexing, and broadcasting concepts are the de-facto standards of array computing today.

Numerical computing tools

NumPy offers comprehensive mathematical functions, random number generators, linear algebra routines, Fourier transforms, and more.

Open source

Distributed under a liberal [BSD license](#), NumPy is developed and maintained [publicly on GitHub](#) by a vibrant, responsive and diverse [community](#).

Interoperable

NumPy supports a wide range of hardware

Performant

The core of NumPy is well-optimized C

Easy to use

NumPy's high level syntax makes it



Pandas Data Structures

Essential Functionality

Summarizing and Computing Descriptive Statistics

Reading/writing data in text format



Data Science libraries

```
*IDLE Shell 3.14.2*
File Edit Shell Debug Options Window Help
Python 3.14.2 (tags/v3.14.2:df79316, Dec 5 2025, 17:18:21) [
Enter "help" below or click "Help" above for more information
>>> import matplotlib
>>> import pandas
>>> import numpy
>>> import yfinance
>>>
```

File Edit Format Run Options Window Help

```
# Closing Stock Prices (2025)
# Libraries: pandas, matplotlib, yfinance

import pandas as pd
import matplotlib.pyplot as plt
import yfinance as yf

# Stock tickers and company names
tickers = {"MSFT": "Microsoft", "AMZN": "Amazon", "AAPL": "Apple", "GOOGL": "Google"}

# Time period: year 2025
start_date = "2025-01-01"
end_date = "2025-12-31"

# Download real closing prices
data = yf.download(list(tickers.keys()), start=start_date, end=end_date) ["Close"]

# Rename columns to company names only
data.rename(columns=tickers, inplace=True)

# Remove missing values
data.dropna(inplace=True)

# Plot real closing prices
plt.figure(figsize=(12, 6))

for company in data.columns:
    plt.plot(data.index, data[company], label=company)

plt.title("Closing Stock Prices of Major Tech Companies (2025)")
plt.xlabel("Date")
plt.ylabel("Closing Price (USD)")
plt.legend()
plt.grid(True)

plt.tight_layout()
plt.show()
```

Closing Stock Prices of Major Tech Companies (2025)



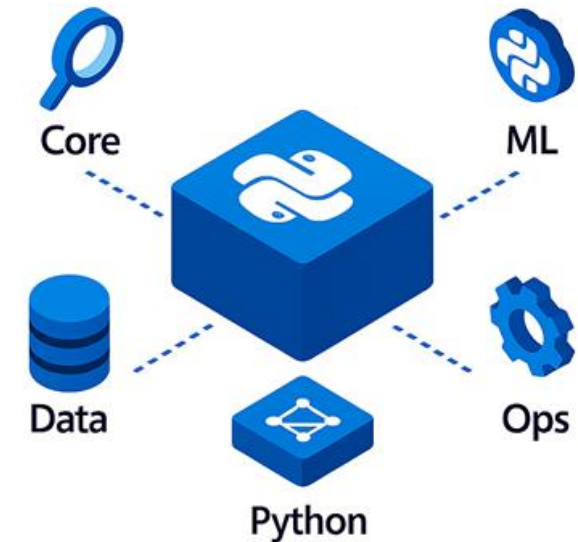
Python for Artificial Intelligence

Python is the dominant language **for machine learning**

Rich ecosystem (Python ML libraries), such as TensorFlow, PyTorch, Scikit-learn

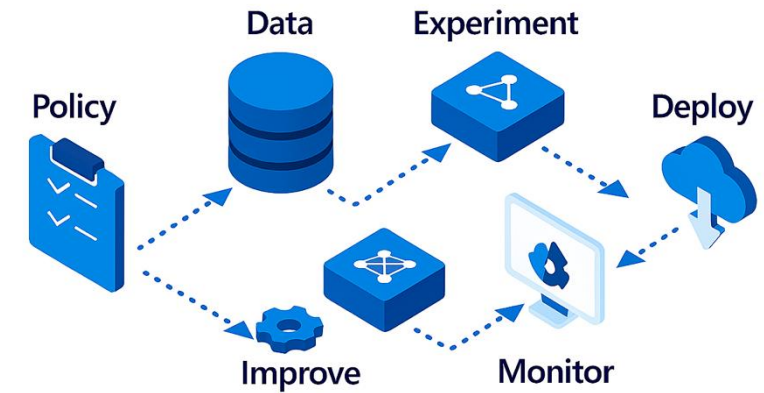
Rapid prototyping and experimentation

Software Engineering for Data Science

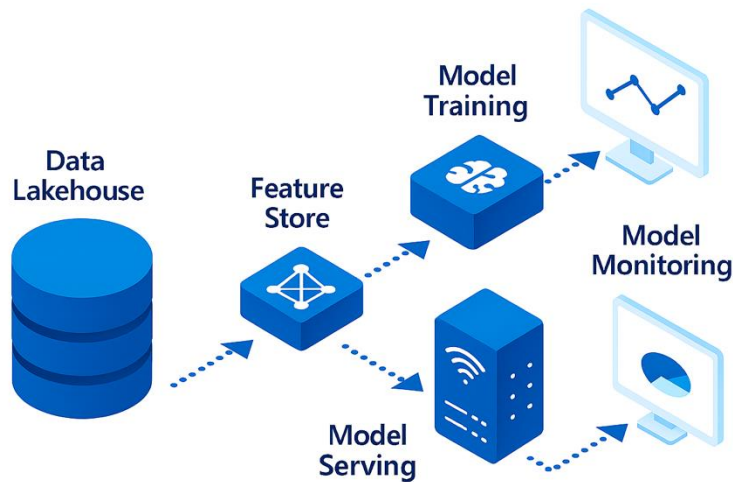


Python contributions to digital transformation

- Enables automation and intelligent analytics
- Supports integration of AI into enterprise workflows
- Accelerates innovation through an open-source ecosystem and growing software community.



organisations



The vision for **AI-augmented organisations** focus on **Artificial Intelligence as a strategic partner** that enhances human capabilities, drives innovation, and improves decision-making.

The approach focuses on **creating human-in-the-loop systems** where AI handles **routine, data-intensive tasks**, freeing human talent to focus on **creativity, strategy, and complex problem-solving**.