AI in a nutshell

Quick reference guide

Natural Language Processing (NLP)

enables computers to understand and talk to us in plain human language.

Chatbots & Virtual Assistants
e.g., Siri, Alexa, Google Assistant

Text Generation and Summarization
e.g., GPT-based applications

Text Analysis
e.g., for content moderation, spam detection, document summarization

Language Translation
e.g., Google Translate, Microsoft Translator, DeepL Translator

Sentiment Analysis
e.g., tools for social media monitoring like Lexalytics, Qualtrics, TalkWalker, Brand24

Speech Recognition
e.g., Siri, Alexa, Google Assistant, Duolingo

Computer Vision

empowers machines to identify and recognise objects and visual information from the world.

Image & Video Recognition
e.g., for photo tagging on social media, security surveillance, and medical imaging

Facial Recognition
e.g., to identify individuals, for security systems, smartphone unlocking

Video Analysis
e.g., to detect events, activities, and changes over time, in security monitoring, traffic

Object Detection
e.g., for autonomous vehicles, self-driving cars

Augmented Reality (AR)
e.g., to enhance user experiences in gaming, retail, and navigation

Optical Character Recognition (OCR)
e.g., for converting documents into editable and searchable data

Machine Learning & Predictive Analytics

teach computers to learn from data and make smart, informed guesses and forecasts.

Recommendation Systems
e.g., Netfix, Amazon recommendations

Fraud Detection
e.g., in banking, insurance, online payment systems

Diagnostics
e.g., in healthcare

Forecasting
e.g., in supply chain management, sales, energy consumption, customer churn prediction

Risk Assessment
e.g., credit scoring systems

Robotics & Automation

facilitate execution of tasks automatically, enhancing operational efficiency.

Industrial Automation
e.g., robotic arms in manufacturing, surgical robots, warehouses

Robotic Process Automation (RPA)
e.g., automating repetitive and rule based tasks, data entry, invoice processing, & customer service operations

Autonomous Vehicles
e.g., self-driving cars, trucks, automated guided vehicles (AGV)

Drones
e.g., for delivery and surveillance

Collaborative Robots (Cobots)
e.g., working alongside humans, ensuring safety and fexibility in operations

Humanoid Robots
e.g., resembling and mimicking human actions, in research, entertainment, customer service

Data Analytics & Business Intelligence

extract valuable insights from data to drive informed business decisions

Business Intelligence Tools
e.g., Tableau, PowerBI

Pattern Recognition
e.g., identifying patterns in data, in banking, customer segmentation, maintenance

Analysis
e.g., sentiment analysis in social media monitoring, fnancial performance analysis, business operations

Anomaly Detection
e.g., identifying unusual patterns or deviations in data

Optimisation
e.g., supply chain, energy management, dynamic pricing, logistics planning

AI in a nutshell

Key Concepts

General AI Concepts

AI - Artificial Intelligence

The simulation of human intelligence in machines that are designed to think and act like humans

AGI - Artifcial General Intelligence

AI that can perform any intellectual task that a human can do. AGI is a theoretical goal of AI research

Narrow AI - Narrow Artifcial Intelligence

AI that is specialised for a specifc task or a narrow range of tasks (e.g., speech recognition, image classifcation

ML - Machine Learning

A subset of AI that involves training algorithms to recognise patterns in data and make decisions without being explicitly programmed

Supervised learning

A type of machine learning where the model is trained on labelled data, learning to map inputs to outputs based on example inputoutput pairs.

Unsupervised learning

A type of machine learning that involves fnding hidden patterns or intrinsic structures in input data without the use of labelled responses.

Reinforcement learning

A type of machine learning where an agent learns to make decisions by taking actions in an environment to maximise cumulative rewards through trial and error.

DL - Deep Learning

A type of machine learning that uses neural networks with many layers (hence "deep") to analyze and learn from large amounts of data

Neural Networks

A neural network is a computational model inspired by the human brain's interconnected neurons, designed to recognise patterns and solve complex problems through layers of interconnected nodes

CNN - Convolutional Neural Network

A type of deep learning model typically used for analyzing visual data, such as images.

RNN - Recurrent Neural Network

A type of neural network that is well-suited for processing sequential data, like time series or natural language.

GAN - Generative Adversarial Network

A type of neural network where two models, a generator and a discriminator, are trained together to generate realistic data (e.g., images)

NLP - Natural Language Processing

The branch of AI that focuses on the interaction between computers and human (natural) languages, enabling machines to understand, interpret, and respond to human language.

Data & Computing

IoT - Internet of Things

A network of interconnected devices that collect and exchange data, often integrated with AI to automate processes and analyze data.

Big Data

Large volumes of data that can be analyzed computationally to reveal patterns, trends, and associations, especially in relation to human behavior and interactions.

API - Application Programming Interface

A set of tools and protocols for building and interacting with software applications, often used to integrate AI capabilities into other systems.

GPU - Graphics Processing Unit

A specialised processor that can perform many calculations simultaneously, widely used in deep learning for training models faster.

Ethics & Governance

AI Ethics

The field of study that addresses the moral implications and societal impact of AI technologies, focusing on ensuring that AI systems are fair, transparent, and accountable.

XAI - Explainable AI

Techniques in AI that make the decision-making process of models transparent and understandable to humans.

AI Governance

The framework of policies, regulations, and guidelines that govern the development and use of AI technologies.

IEEE - Institute of Electrical and Electronics Engineers

A professional association that develops standards and ethics guidelines for AI and related technologies.

Facts & Figures

$15.7 trillion global economic growth that AI will provide by 2030 according to PwC research

Who will get the biggest share of this price? **Those who take the lead now.**

Generative AI could boost Belgian economy by up to **€ 50 billion** over the next 10 years according to report from Implement Consulting Group, commissioned by internet giant Google

80% of Belgian CEOs are convinced that GenAI will change the way their company creates, delivers & captures value in the next 3 years. according to the PwCs 27th Annual Global CEO Survey Jan 2024

Up to **70% reduction in cycle time for physical product design** through (Gen)AI technology Industry 4.0 in higher gear through (Gen)AI technology May 2024 - Bart Verlinden - Sirris