

Entrepreneurship & innovation

Prepared by Dr. Amany Ramadan

PMG 611

Lecture 10



Artificial intelligence & Entrepreneurship

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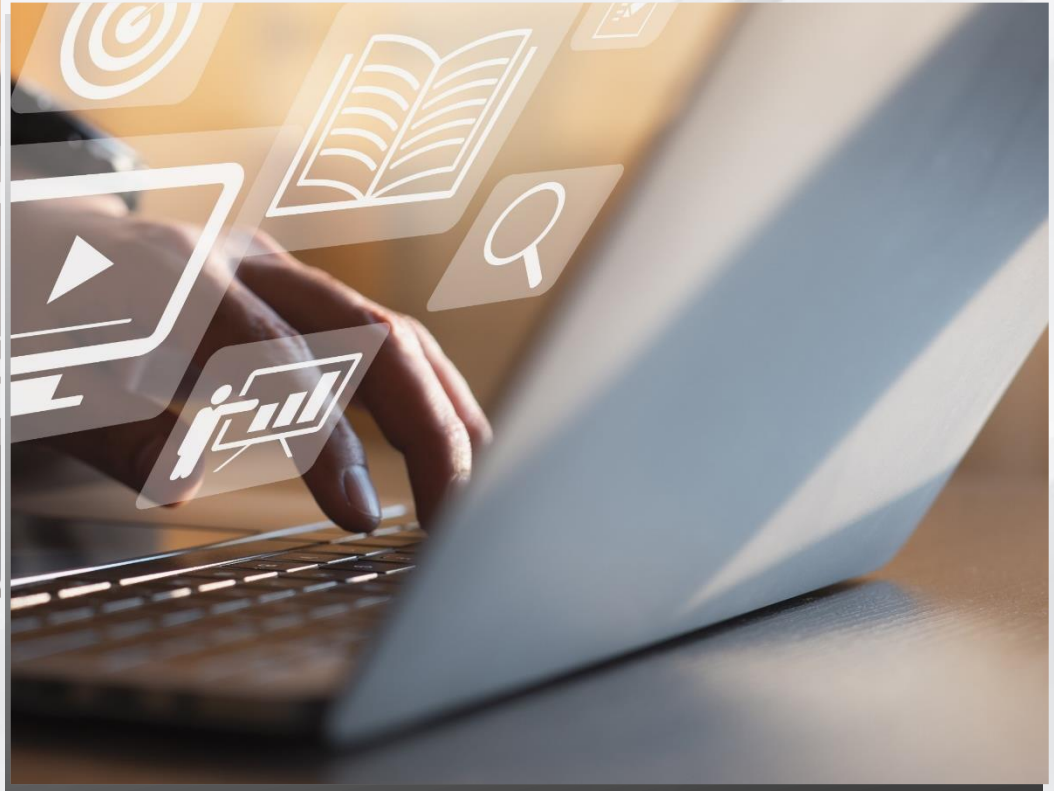
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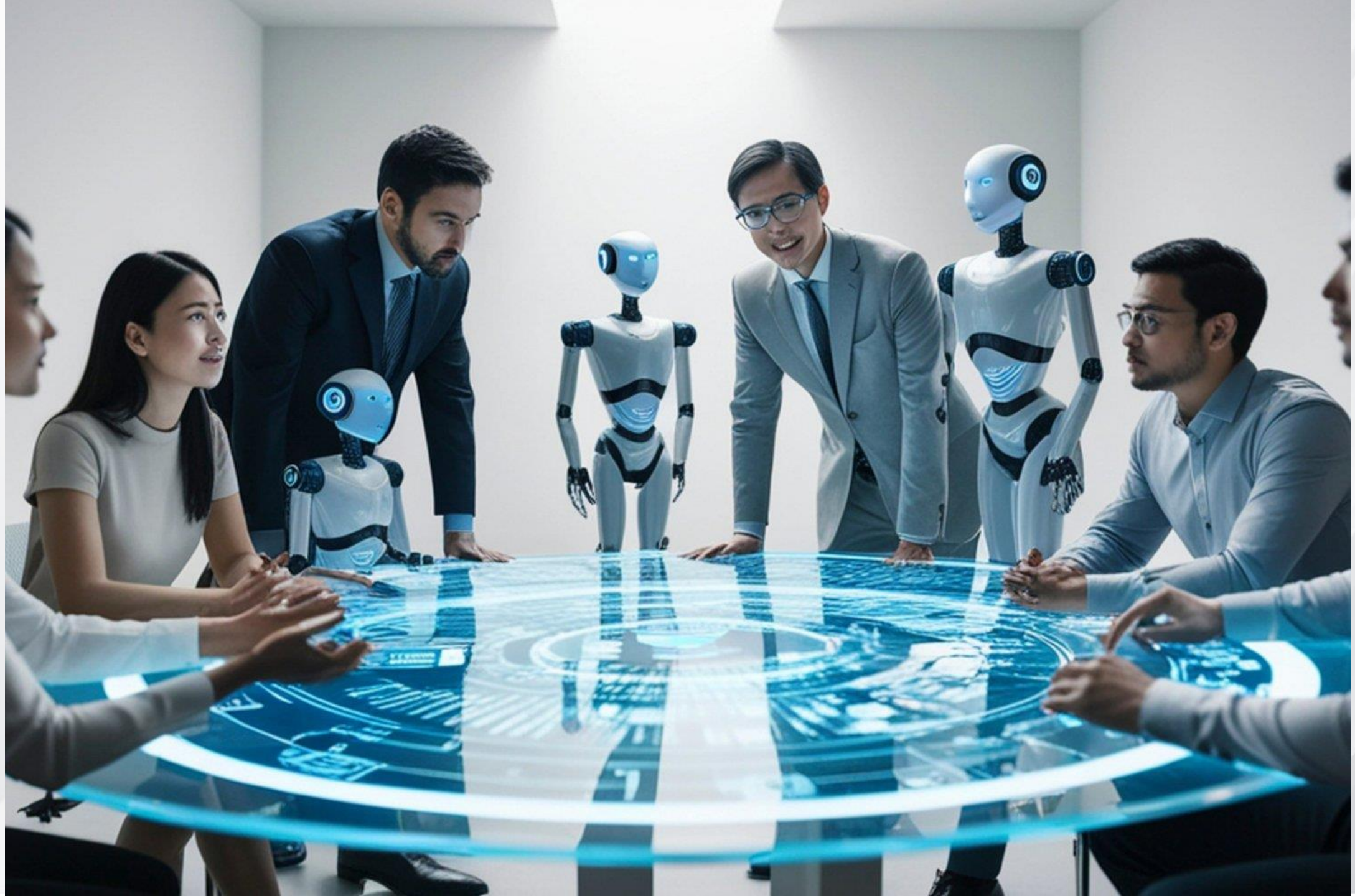
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Chapter

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Artificial Intelligence & Entrepreneurship

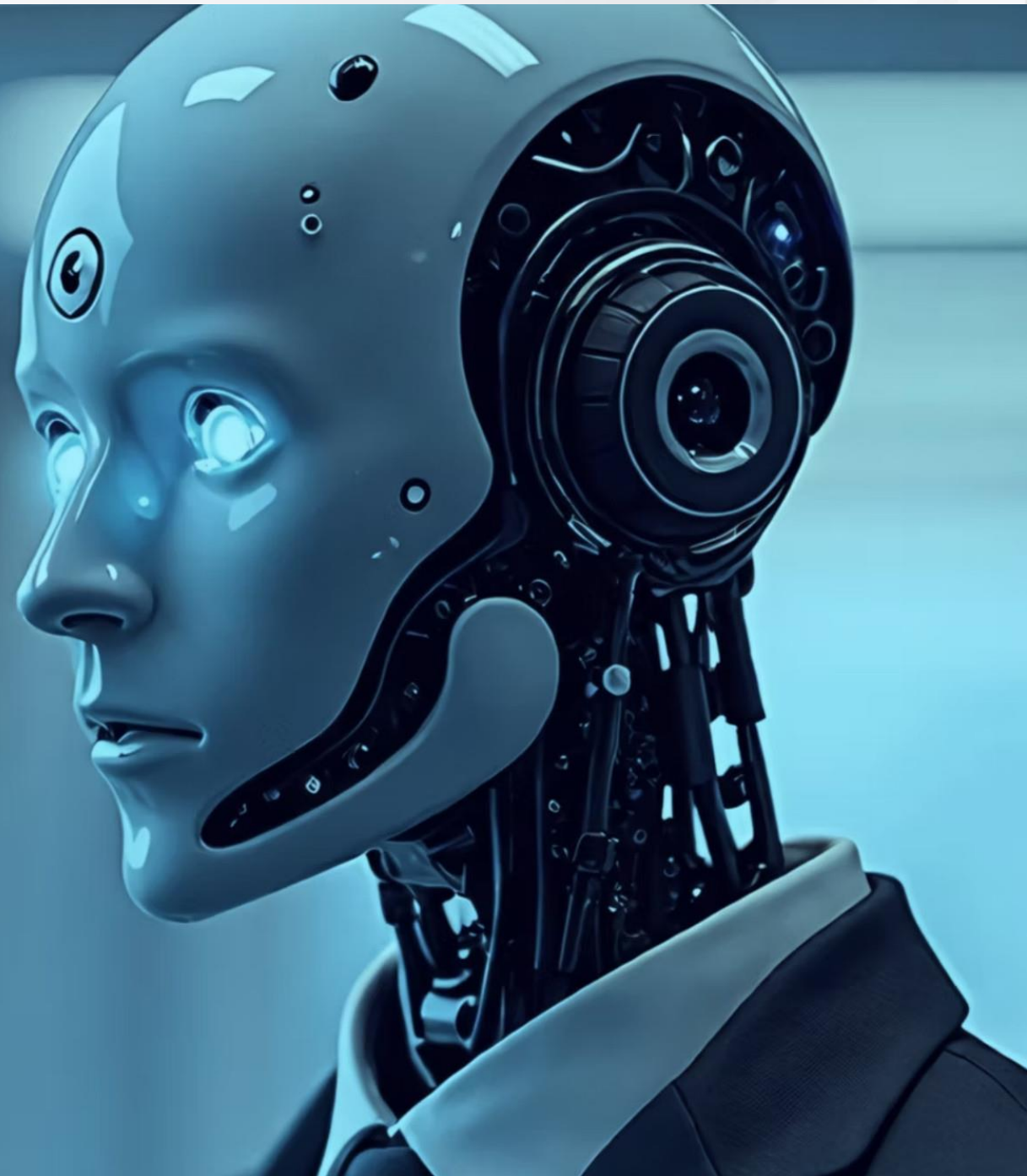




Artificial Entrepreneurship

The Influence of AI for the Creative Destruction of Schumpeter

What if an Artificial Intelligence could not only support the founders of Startups (e.g. in writing a business plan), but the AI could even become an Entrepreneur itself? What if the AI decided which business model a startup should implement, founded it and then only tasked the human with implementing it as a Manager? These questions are the focus of the new topic "Artificial Entrepreneurship".



Chapter

10

Artificial Intelligence (AI) Definition

Artificial Intelligence (AI) is the simulation of human intelligence by computers and machines, enabling them to learn, reason, solve problems, and make decisions.



Chapter

10

**Artificial Intelligence (AI)
Definition**

It encompasses technologies like machine learning and natural language processing to perform tasks autonomously, such as recognizing speech, identifying objects, and generating content.

Chapter
10**Key Aspects of AI****Key Aspects of AI:**

- **Definition:** Machines designed to mimic cognitive functions, including learning from data and improving performance without constant human oversight.
- **Usage Examples:**
 - **Generative Tools:** Creating text, images, and code (e.g., ChatGPT, Midjourney).

Chapter
10**Key Aspects of AI**

- Virtual Assistants: Chatbots and voice assistants like Siri, Alexa, and Google Assistant.
- Recommendation Engines: Algorithms used by Netflix, YouTube, and Amazon to suggest content or products.
- Autonomous Systems: Self-driving cars and drone technology.
- Predictive Analytics: Forecasting trends in finance and healthcare.

What is AI?

Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy.



Applications and devices equipped with AI can see and identify objects. They can understand and respond to human language. They can learn from new information and experience.



They can make detailed recommendations to users and experts. They can act independently, replacing the need for human intelligence or intervention (a classic example being a self-driving car).



Machine learning:

A simple way to think about AI is as a series of nested or derivative concepts that have emerged over more than 70 years:

1950's	 Artificial intelligence (AI) <i>Human intelligence exhibited by machines</i>	
	1980's	 Machine learning <i>AI systems that learn from historical data</i>
	2010's	 Deep learning <i>Machine learning models that mimic human brain function</i>
	2020's	 Generative AI (Gen AI) <i>Deep learning models (foundation models) that create original content</i>

Directly underneath AI,

we have machine learning, which involves creating models by training an algorithm to make predictions or decisions based on data.

It encompasses a broad range of techniques that enable computers to learn from and make inferences based on data without being explicitly programmed for specific tasks.

Deep learning

Deep learning is a subset of machine learning that uses multilayered neural networks, called deep neural networks, that more closely simulate the complex decision-making power of the human brain.

Deep learning also enables:

- Semi-supervised learning, which combines supervised and unsupervised learning by using both labeled and unlabeled data to train AI models for classification and regression tasks.
- Self-supervised learning, which generates implicit labels from unstructured data, rather than relying on labeled data sets for supervisory signals.

Deep learning also enables:

- Reinforcement learning, which learns by trial-and-error and reward functions rather than by extracting information from hidden patterns.
- Transfer learning, in which knowledge gained through one task or data set is used to improve model performance on another related task or different data set.

Generative AI:

Generative AI, sometimes called "gen AI", refers to deep learning long-form text, high-quality images, realistic video or audio and more in response to a user's prompt or request.

At a high level, generative models encode a simplified representation of their training data, and then draw from that representation to create new work that's similar, but not identical, to the original data.

How generative AI works

In general, generative AI operates in three phases:

1. Training, to create a foundation model.
2. Tuning, to adapt the model to a specific application.
3. Generation, evaluation and more tuning, to improve accuracy.



Benefits of AI :

AI offers numerous benefits across various industries and applications. Some of the most commonly cited benefits include:

- Automation of repetitive tasks.
- More and faster insight from data.
- Enhanced decision-making.
- Fewer human errors.
- 24x7 availability.
- Reduced physical risks.



Benefits of Artificial Intelligence



1-Automation of repetitive tasks:

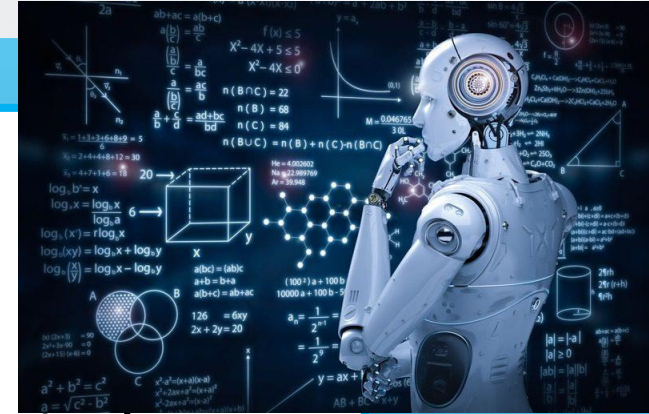
AI can automate routine, repetitive and often tedious tasks including digital tasks such as data collection, entering and preprocessing, and physical tasks such as warehouse stock-picking and manufacturing processes. This automation frees to work on higher value, more creative work.



2-Enhanced decision-making:

Whether used for decision support or for fully automated decision-making, AI enables faster, more accurate predictions and reliable, data-driven decisions.

Combined with automation, AI enables businesses to act on opportunities and respond to crises as they emerge, in real time and without human intervention.



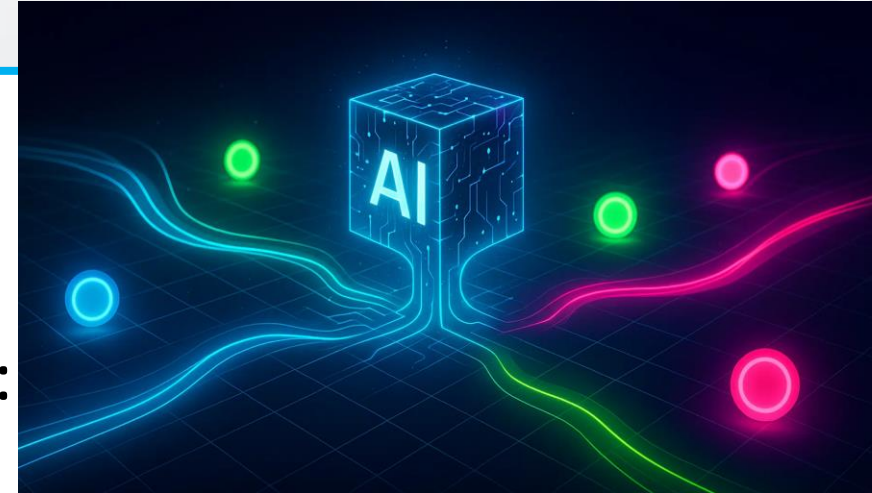
3-Fewer human errors:

AI can reduce human errors in various ways, from guiding people through the proper steps of a process, to flagging potential errors before they occur, and fully automating processes without human intervention.



4-Round-the-clock availability and consistency:

AI is always on, available around the clock, and delivers consistent performance every time. Tools such as AI chatbots or virtual assistants can lighten staffing demands for customer service or support.



5-Reduced physical risk:

By automating dangerous work such as animal control, handling explosives, performing tasks in deep ocean water, high altitudes or in outer space, AI can eliminate the need to put human workers at risk of injury or worse.



AI use cases :

1-Customer experience, service and support:

Companies can implement AI-powered chatbots and virtual assistants to handle customer inquiries, support tickets and more. These tools use natural language processing (NLP) and generative AI capabilities to understand and respond to customer questions about order status, product details and return policies.

Chatbots and virtual assistants enable always-on support, provide faster answers to frequently asked questions (FAQs), free human agents to focus on higher-level tasks, and give customers faster, more consistent service.

2-Fraud detection:

Machine learning and deep learning algorithms can analyze transaction patterns and flag anomalies, such as unusual spending or login locations, that indicate fraudulent transactions.

This enables organizations to respond more quickly to potential fraud and limit its impact, giving themselves and customers greater peace of mind.

3-Personalized marketing:

Retailers, banks and other customer-facing companies can use AI to create personalized customer experiences and marketing campaigns that delight customers, improve sales and prevent churn.

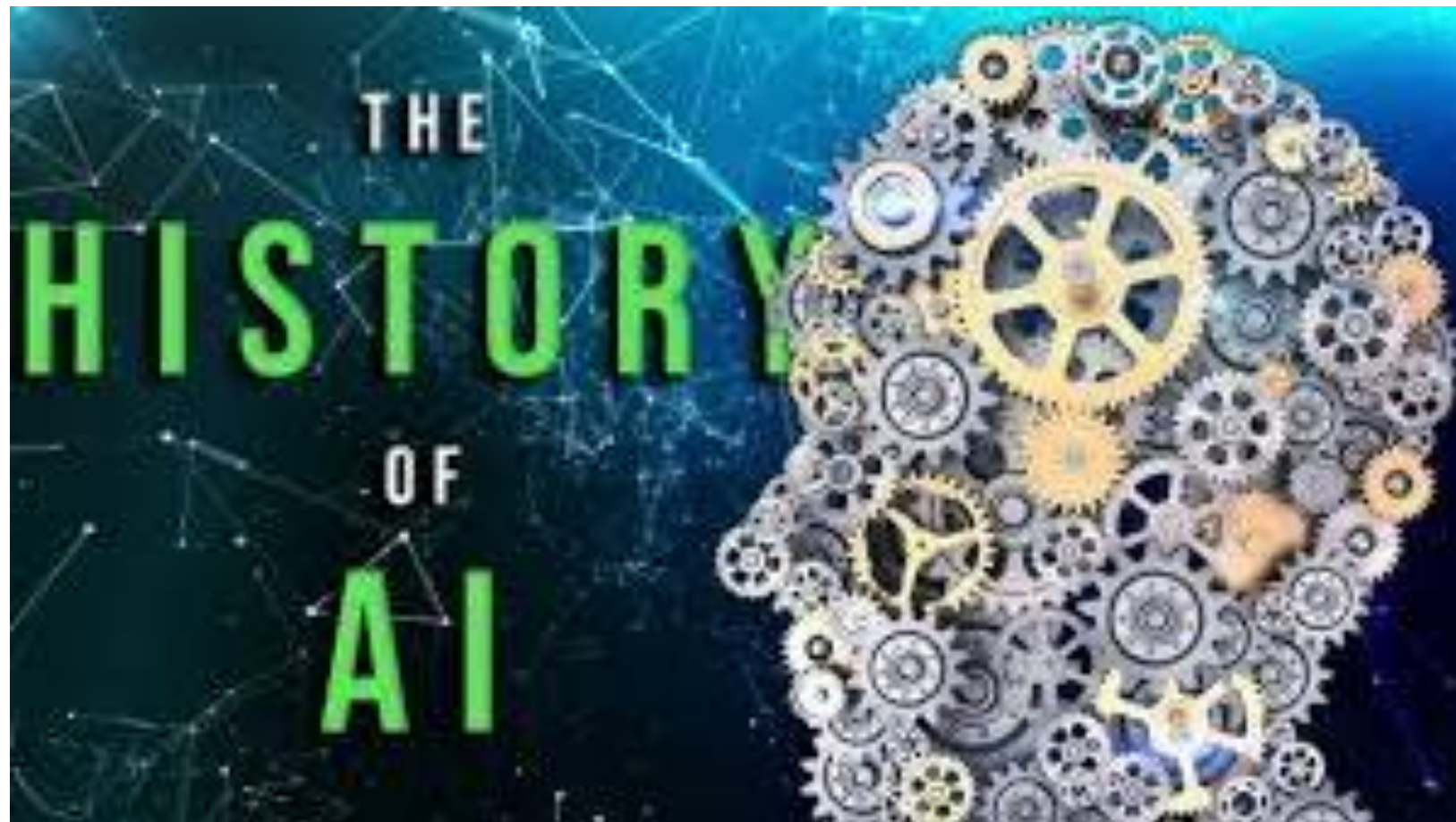
Based on data from customer purchase history and behaviors, deep learning algorithms can recommend products and services customers are likely to want, and even generate personalized copy and special offers for individual customers in real time.

4-Human resources and recruitment:

AI-driven recruitment platforms can streamline hiring by screening resumes, matching candidates with job descriptions, and even conducting preliminary interviews using video analysis.

5-Predictive maintenance:

Machine learning models can analyze data from sensors, Internet of Things (IoT) devices and operational technology (OT) to forecast when maintenance will be required and predict equipment failures before they occur.



History of AI

The idea of "a machine that thinks" dates back to ancient Greece.

1950

Alan Turing publishes Computing Machinery and Intelligence. In this paper, Turing famous for breaking the German ENIGMA code during WWII and often referred to as the "father of computer science" asks the following question: "Can machines think?"

1956

John McCarthy coins the term "artificial intelligence" at the first-ever AI conference at Dartmouth College. (McCarthy went on to invent the Lisp language.) Later that year, Allen Newell, J.C. Shaw and Herbert Simon create the Logic Theorist, the first-ever running AI computer program.

1967

Frank Rosenblatt builds the Mark 1 Perceptron, the first computer based on a neural network that "learned" through trial and error. Just a year later, Marvin Minsky and Seymour Papert publish a book titled Perceptrons, which becomes both the landmark work on neural networks and, at least for a while, an argument against future neural network research initiatives.

1980

Neural networks, which use a backpropagation algorithm to train itself, became widely used in AI applications.

1995

Stuart Russell and Peter Norvig publish Artificial Intelligence: A Modern Approach, which becomes one of the leading textbooks in the study of AI. In it, they delve into four potential goals or definitions of AI, which differentiates computer systems based on rationality and thinking versus acting.

1997

IBM's Deep Blue beats then world chess champion Garry Kasparov, in a chess match (and rematch).

2004

John McCarthy writes a paper, What Is Artificial Intelligence?, and proposes an often-cited definition of AI. By this time, the era of big data and cloud computing is underway, enabling organizations to manage ever-larger data estates, which will one day be used to train AI models.

2011

IBM Watson® beats champions Ken Jennings and Brad Rutter at Jeopardy! Also, around this time, data science begins to emerge as a popular discipline.

2015

Baidu's Minwa supercomputer uses a special deep neural network called a convolutional neural network to identify and categorize images with a higher rate of accuracy than the average human.

2016

DeepMind's AlphaGo program, powered by a deep neural network, beats Lee Sodol, the world champion Go player, in a five-game match. The victory is significant given the huge number of possible moves as the game progresses (over 14.5 trillion after just four moves).

2022

A rise in large language models or LLMs, such as OpenAI's ChatGPT, creates an enormous change in performance of AI and its potential to drive enterprise value. With these new generative AI practices, deep-learning models can be pretrained on large amounts of data.

2024

The latest AI trends point to a continuing AI renaissance. Multimodal models that can take multiple types of data as input are providing richer, more robust experiences. These models bring together computer vision image recognition and NLP speech recognition capabilities. Smaller models are also making strides in an age of diminishing returns with massive models with large parameter counts.

9 SIGNS YOUR BUSINESS IS **READY FOR AI**

Clear AI Problem Defined

Strong Leadership Support

Team Ready For Change

Solid AI Governance Plan



Reliable And Usable Data

Stable Internal Processes

Budget And Resources Set

Access To AI Talent

Vision To Scale AI

Examples of **artificial intelligence** use in business



Business management

- Emails: Spam filters, email categorisation and auto-responders
- Voice-to-text
- Personal assistants
- Process automation
- Sales forecasting
- Security
- Data-driven insights



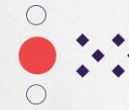
E-commerce

- Smart searches and predictions based on history
- Service personalisation
- Product recommendations
- Fraud prevention
- Dynamic price modelling

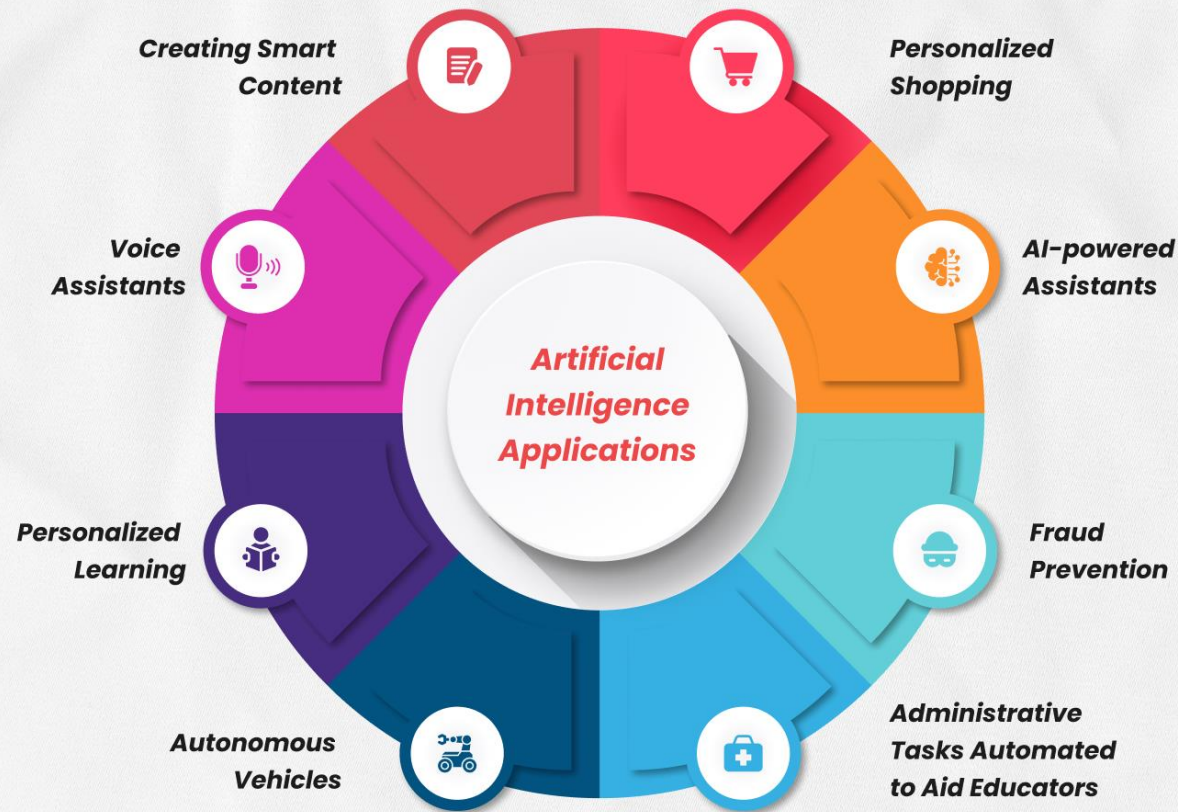


Marketing

- Content curation
- News feed personalisation
- Image and language recognition
- Customer segmentation
- Targeted ads
- Web design



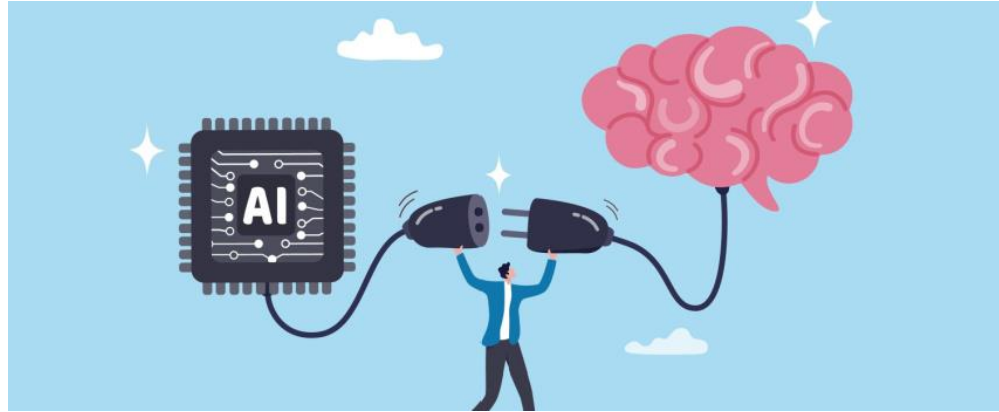
Examples of **Artificial Intelligence** Applications



AI challenges and risks

1-Data risks

AI systems rely on data sets that might be vulnerable to data poisoning, data tampering, data bias or cyber attacks at can lead to data breaches. Organizations can mitigate these risks by protecting data integrity and



2-Model risks

Threat actors can target AI models for theft, reverse engineering or unauthorized manipulation.

Attackers might compromise a model's integrity by tampering with its architecture, weights or parameters; the core components that determine a model's behavior, accuracy and performance.

3-Operational risks:

Like all technologies, models are susceptible to operational risks such as model drift, bias and breakdowns in the governance structure. Left unaddressed, these risks can lead to system failures and cybersecurity vulnerabilities that threat actors can use.

4-Ethics and legal risks:

If organizations don't prioritize safety and ethics when developing and deploying AI systems, they risk committing privacy violations and producing biased outcomes. For example, biased training data used for hiring decisions might reinforce gender or racial stereotypes and create AI models that favor certain demographic groups over others.

AI ethics and governance

AI ethics is a multidisciplinary field that studies how to optimize AI's beneficial impact while reducing risks and adverse outcomes.

Principles of AI ethics are applied through a system of AI governance consisted of guardrails that help ensure that AI tools and systems remain safe and ethical.



AI ethics and governance

AI governance encompasses oversight mechanisms that address risks. An ethical approach to AI governance requires the involvement of a wide range of stakeholders, including developers, users, policymakers and ethicists, helping to ensure that AI-related systems are developed and used to align with society's values.



Here are common values associated with AI ethics and responsible AI:

1-Explainability and interpretability:

As AI becomes more advanced, humans are challenged to comprehend and retrace how the algorithm came to a result. Explainable AI is a set of processes and methods that enables human users to interpret, comprehend and trust the results and output created by algorithms.

2-Fairness and inclusion:

Although machine learning, by its very nature, is a form of statistical discrimination, the discrimination becomes objectionable when it places privileged groups at systematic advantage and certain unprivileged groups at systematic disadvantage, potentially causing varied harms. To encourage fairness, practitioners can try to minimize algorithmic bias across data collection and model design, and to build more diverse and inclusive teams.

3-Robustness and security:

Robust AI effectively handles exceptional conditions, such as abnormalities in input or malicious attacks, without causing unintentional harm. It is also built to withstand intentional and unintentional interference by protecting against exposed vulnerabilities.

4-Accountability and transparency:

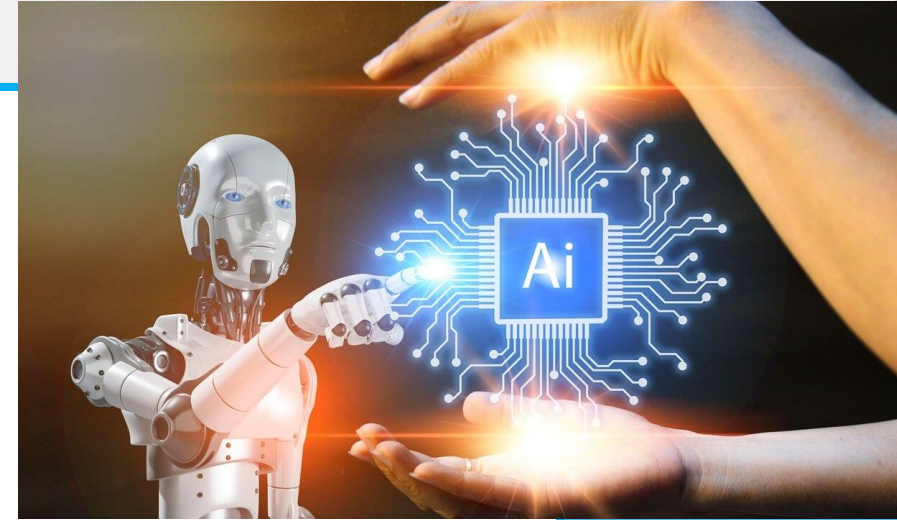
Organizations should implement clear responsibilities and governance structures for the development, deployment and outcomes of AI systems. In addition, users should be able to see how an AI service works, evaluate its functionality, and comprehend its strengths and limitations. Increased transparency provides information for AI consumers to better understand how the AI model or service was created.

AIinnovation



Artificial intelligence & Innovation

Artificial intelligence (AI) drives innovation by automating routine tasks, analyzing large datasets for insights, and optimizing operations across industries.



Artificial intelligence & Innovation

It acts as a "method of invention," accelerating R&D, enhancing product development speed, and fostering new business models, particularly through generative AI.

Key areas include healthcare diagnostics, predictive maintenance in manufacturing, and improved customer experiences.

Key Aspects of AI-Driven Innovation:

- Process Optimization: AI increases efficiency, reduces waste, and lowers costs by optimizing supply chains and production schedules.
- Data-Driven Insights: AI extracts actionable insights from vast data, improving decision-making.

Key Aspects of AI-Driven Innovation

- Accelerated R&D: AI functions as a "method of invention," speeding up the innovation cycle, particularly in sectors like pharmaceuticals and technology.
- Generative AI: Emerging as a tool to make roles more fulfilling and innovation more radical.



Challenges of Artificial Intelligence



Top Challenges for
**Artificial
Intelligence**



Challenges and Considerations

- Data & Strategy: Success depends on the quality of data and the ability to interpret AI algorithms.
- Ethical/Governance: Issues around bias, fairness, privacy, and security require robust governance frameworks.

Challenges and Considerations

- Human-AI Collaboration: Effective innovation requires blending AI capabilities with human insight.

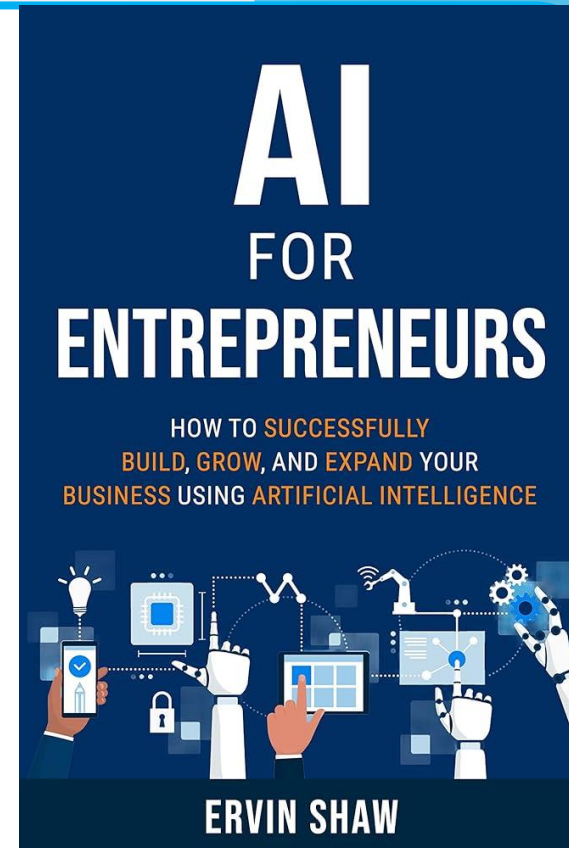
AI is rapidly evolving from a supporting tool to a core component of innovation strategy, significantly affecting how firms compete and grow



HOW TO BECOME AN AI ENTREPRENEUR

Becoming an AI entrepreneur:

involves identifying specific business problems, mastering no-code AI tools (like APIs and automation platforms), and building a minimum viable product (MVP) to solve them. Focus on acquiring industry knowledge, validating your idea with early customers, and scaling with AI automation rather than just technical expertise



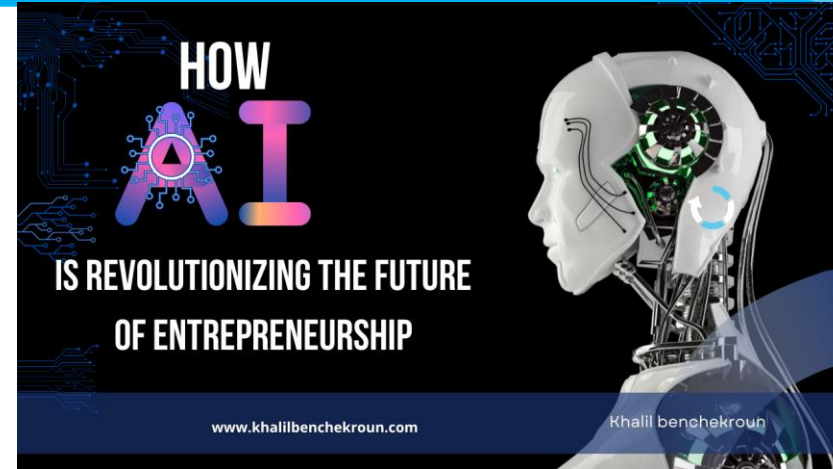
Key Steps to Become an AI Entrepreneur:

- **Identify a Specific Niche:** Find a specific, high-value problem in a sector you understand (e.g., healthcare, real estate) where AI can reduce costs or save time.
- **Acquire Technical Knowledge:** Understand AI essentials, including Large Language Models (LLMs), APIs, and no-code automation platforms like Zapier or Make, rather than needing to be a software engineer.
- **Validate Before Building:** Develop an MVP or a simple automation workflow to solve a problem for clients *before* investing in complex development.



Key Steps to Become an AI Entrepreneur:

- **Build Your Toolset:** Use tools that allow for AI integration without heavy coding, focusing on building custom connections to services via APIs.
- **Create a Business Plan:** Refine your model to show value to customers and investors, focusing on actionable steps.
- **Leverage Existing Connections:** Utilize your professional network in a specific industry to find your first few clients



Key Skills to Develop:

- **AI Prompting & Automation:** Learning to effectively guide AI tools (ChatGPT, Claude) to produce business-valuable outputs.
- **API Management:** Understanding how to connect different platforms using APIs.
- **Sales & Client Acquisition:** Developing skills to sell the *value* of AI solutions, not just the technology.



The 6 pitfalls of AI

1. Stereotyping
2. Hallucination
3. Don't do nothing
4. False accusations
5. AI deepfake
6. The elusiveness of truth

Written by Tim Thijse
Customer Experience Manager



Common Pitfalls to Avoid:

- **Overcomplicating the Solution:** Avoid spending months building "fancy" tech; focus on simple, functional automation.
- **Ignoring Business Fundamentals:** Remember that client acquisition, sales processes, and customer service are as critical in AI as in any other business.



Thank You