

KEYS TO ARTIFICIAL INTELLIGENCE

Discover the greatest opportunity to create value in our time:
insights for your **Business, Employment, Training, and Startup.**



JULIO COLOMER
CEO AI ACCELERA

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for your Business, Employment, Training, and Startup.

Julio Colomer, CEO of AI Accelera

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KEYS TO ARTIFICIAL INTELLIGENCE

Table of Contents

[Introduction.](#)

[About the Author.](#)

[Preface.](#)

[Chapter 1 - Disruption: the new AI and the old AI.](#)

[AI was already here: everyday AI applications.](#)

[Ad Targeting \(Google\).](#)

[Uber's Pricing System.](#)

[Lookalike Audiences on Facebook.](#)

[TikTok Feed.](#)

[Collaborative Filtering on Amazon.](#)

[Filters on Snapchat.](#)

[Smartphone photo enhancement.](#)

[Spam detection.](#)

[Credit card fraud detection.](#)

[Content moderation.](#)

[Loan evaluation.](#)

[Lead scoring.](#)

[Churn prediction.](#)

[The origins of new AI: data science, machine learning, and deep learning](#)

[Simple definition of Data Science, Machine Learning and Deep Learning.](#)

[What is the reason for the recent exponential acceleration of new AI?](#)

[Simple definition of LLM and its influence on the new AI.](#)

[The new AI vs. classic ML.](#)

[Focus and Application.](#)

Nature of the Output.

Interactivity.

Training and Data.

Typical Applications.

The ability of AI surpasses that of humans in many specific tasks.

Technical arrogance prevents recognizing disruption.

Disruptive Changes Generated by AI: Opportunities and Threats.

Internet Search.

Education.

Work.

Text and Visual Content Creation.

Programming.

Prominent Consequences of AI Disruption.

The current boiling state is not without challenges.

Black box.

Technical complexity and barriers to entry.

Security and privacy.

Adversarial attacks.

Dependency on big companies.

Interoperability and standardization.

Information overload.

The bottleneck of GPUs.

Challenges for startups and developers.

Alternatives and opportunities.

Long-term implications.

Ethical and Legal Challenges of AI.

Discrimination against Minorities.

Deep Fakes.
Oppressive Surveillance.
Manipulation of Public Opinion.
Spam and Fraud.

Chapter 2 - How to Introduce AI in Your Company.

Introduction.

How will AI impact your industry?

Sectors with high impact.
Sectors with medium impact.
Sectors with low impact.
Sectors with very low impact.

In which areas of your company will AI have the most impact?

Customer Operations.
Marketing and Sales.
Software Engineering.
Research and Development (R&D).

Main AI techniques used in a company.

Computer Vision.
Natural Language Processing (NLP).
Sound (Audio Data).
Robotics.

Roles and Jobs Most Affected by AI.

How to introduce AI in your company: first steps.

1. Educate Yourself and Learn.
2. Identify Potential Applications in Your Business.
3. Hire AI Professionals.

4. Hire an AI Leader.

5. Introduce AI Transformation Throughout the Company.

How to Carry Out an AI Transformation Plan in Your Company?

1. Technical and Business Analysis.

2. Start with a pilot project to gain initial momentum.

3. Build an internal AI team.

4. Provide appropriate AI training.

5. Prepare the Company's AI Strategy.

6. Align/Integrate stakeholders, both internal and external.

Progressive Adoption Plan for chatGPT and Similar AI Tools in Your Company.

1. Incorporate ChatGPT into Everyday Work.

2. Streamline Work using ChatGPT.

3. Replace Repetitive Tasks with ChatGPT.

4. Utilize ChatGPT for Customer Service.

Technical implications of adopting AI in your company.

1. Strategic Data Acquisition.

2. Centralized Data Storage.

3. Progressive Automation.

4. New Roles and Work Division.

The AI Team in your company.

Roles in an Artificial Intelligence Team.

Peculiarities of Working in an AI Team.

How to Decide Which AI Projects to Undertake in Your Company.

Technical and Business Analysis.

Framework to Identify Interesting AI Projects for Your Company.

Data Volume Needed to Propose AI Solutions.

Conduct a Preliminary Technical, Business, and Ethical Feasibility Study.

Develop In-house or Outsource?

Phases in the Technical Development of an AI Project.

Workflow of a Data Science Project.

Example of a Data Science Project to Improve the Sales Process of an Online Store.

Example of a Data Science Project to Improve the Efficiency of a Production Line in an Industrial Pastry Company.

Workflow of a Machine Learning Project.

Example of a Machine Learning Project: Voice Recognition to Activate Siri Assistant.

Example of a Machine Learning Project to Guide an Autonomous Vehicle (Self-Driving Car).

Technical Tools for an AI Team.

Machine Learning Frameworks.

Research Publications.

Code Repositories, Models, and Datasets.

GPUs (Graphics Processing Units).

Cloud Hosting or On-Premises Hosting.

Introducing AI into Your Company: Mistakes to Avoid.

Overblown Expectations.

Over-reliance on ML Engineers.

Expecting Immediate Success.

Rigidity in Planning.

Waiting for the Perfect Team.

How We Can Help You.

Chapter 3 - AI and Employment: Opportunities and Threats.

Will AI Replace or Change Your Job?

AI will replace 7% of jobs.

AI will complement 63% of jobs.

AI will not significantly affect 30% of jobs.

Final Thoughts.

Jobs Most Affected by AI.

Jobs that will be greatly affected by AI.

Jobs with medium impact.

Jobs that will be slightly affected by AI.

Jobs that will hardly be affected by AI.

Some Examples of How AI Changes Jobs.

Sales.

Factory Management.

Recruitment.

Marketing.

Agriculture.

Main Functional Areas Affected by AI in the Business.

New Employment Opportunities Related to AI.

New Professions.

A Key Profession: The New AI Engineers.

From ML Engineer to AI Engineer.

A Salary of \$900,000 a Year.

Why is the New AI Engineer Emerging Now?

How is the New AI Engineer Trained?

From Classic ML to the New AI.

The New Way of Programming: Software 3.0

How Can We Help You?

Chapter 4 - Training for the New AI.

How is the new AI engineer trained?

Training for Future AI Engineers.

1. Data Science.
2. Machine Learning.
3. Deep Learning.
4. Generative Artificial Intelligence and Large Language Models (LLM).
5. Application Development with LLMs.
6. Specific Tools and Platforms.
7. Software Development and Programming.

A real-life case: the educational journey of a new AI engineer.

List of courses completed by areas.

The alternative: a simplified and accelerated training.

How can we help you?

Chapter 5 - Keys to Creating an AI Startup.

Introduction: The opportunity of a lifetime.

It has never been easier to create an AI startup.

A challenge for big corporations, an opportunity for AI startups.

Startups and the Artificial Intelligence revolution.

AI is no longer a promise.

Startups are at the epicenter of the AI opportunity.

From prototype to AI product.

Niche Focus.

[Looking to the future.](#)

[A paradigm shift.](#)

[Startups of the new AI phase vs. startups of the birth of the Internet.](#)

[Similarities.](#)

[Differences.](#)

[Opportunities for AI Startups.](#)

[Short-term Opportunities.](#)

[Medium-term Opportunities.](#)

[Disruptive Changes Driven by AI.](#)

[Sectors Most Affected by AI.](#)

[Main Company Areas Affected by AI.](#)

[Jobs Most Affected by AI.](#)

[Learn from the Top 20 AI Startups by Investment Volume.](#)

[1. OpenAI.](#)

[2. Anthropic.](#)

[3. Inflection AI.](#)

[5. Dataiku.](#)

[6. Highspot.](#)

[7. AlphaSense.](#)

[8. Shield AI.](#)

[9. Builder.ai.](#)

[10. Cohere.](#)

[11. Adept AI.](#)

[12. Grammarly.](#)

[13. Eightfold.](#)

[14. Moveworks.](#)

[15. Abnormal Security.](#)

[16. Runway.](#)

[17. Labelbox.](#)

[18. Interactions.](#)

[19. Synthesia.](#)

20. Character AI.

Learn from the leading AI startups by categories.

Leading Generative AI Startups.

Leading startups in infrastructure and tools for building AI applications.

Leading AI Application Startups.

Investment in AI: A Massive Boom That's Just Getting Started.

ChatGPT Sparks Investor Frenzy.

Big Tech Joins Venture Capitalists.

This Is Just the Beginning of a Long Investment Journey.

A Revolution That Will Affect All Businesses.

AI Startup Accelerators.

More Than Investment.

Community as a Cornerstone.

Benefits to Accelerators.

Leading AI Startup Accelerators.

How can we help you?

How can we help you?

Contact us.

Join our team.

Collaborate with us.

Bibliographic References.

Introduction

“Generative AI is the most powerful tool ever created. It has the potential to unleash a new era of human innovation.”

Elon Musk, founder of Tesla and SpaceX.

“Generative AI is the key to solving some of the world's biggest problems, such as climate change, poverty, and diseases. It has the potential to make the world a better place for everyone.”

Mark Zuckerberg, founder of Facebook.

“The new Generative AI has the potential to change the world in ways we can't even imagine. It has the power to create new ideas, products, and services that will make our lives easier, more productive, and more creative. It also has the potential to solve some of the world's biggest

problems, such as climate change, poverty, and diseases. The future of generative AI is bright, and I'm excited to see what it will bring."

Bill Gates, founder of Microsoft.

Few times in a person's life do they encounter opportunities like the present.

Artificial Intelligence (AI) is the greatest opportunity to create value in our time. What you do about it right now can change your professional career, your business, your life, and the lives of those around you.

30 years ago, we experienced a similar moment with the Internet.

Do you remember what businesses, jobs, and life were like before the Internet? Do you recall how that technology changed... EVERYTHING?

Think about the number of new companies, jobs, and activities that the Internet generated. Also, consider the number of companies, jobs, and activities that became obsolete.

Lastly, think about how the Internet changed the lives of people who understood its vast potential and decided to take steps to leverage it. Think of those entrepreneurs, professionals, students, businessmen, investors.

Today, we are at a similar juncture. The launch of chatGPT in November 2022 was the first big wave of a tsunami that will change everything.

As with the Internet, the first steps to take advantage of the benefits of this new revolution are to get informed, learn, and start experimenting. The purpose of this book is to help you take those first steps.

The opportunity is knocking at your door. Act. Now.

About the Author

Julio Colomer is the CEO of AI Accelera (AIaccelera.com), a company dedicated to making the immense potential of Artificial Intelligence accessible to businesses, professionals, startups, and students around the world.

He has a hybrid business/software background and professional experience. He holds a degree in Business Administration and an MBA from the ESADE Business School, as well as being a full-stack software engineer from the DevBootCamp in San Francisco (California).

He has completed several of the world's most innovative AI programs, among which are worth mentioning:

Area of Generative AI, LLM Specialization (Generative Artificial Intelligence, Specialization in LLMs like ChatGPT from OpenAI)

- LLM Bootcamp: LLM App Development and LLMOps. Intensive course taught by Full Stack Center, University of Berkeley.
- LLMs, Langchain and Vector Databases in Production. Practical course certified by Actueloop, Towards AI, and Intel Disrupt.
- Generative AI with Large Language Models. Course led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI) and AWS.
- Langchain for LLM Application Development. Course led by Harrison Chase (CEO of Langchain) and Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI).
- Chat with your Data. Course led by Harrison Chase (CEO of Langchain) and Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI).
- Building Systems with the ChatGPT API. Course led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI).
- ChatGPT Prompt Engineering for Developers. Course led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI).
- Other non-accredited courses related to this area.
 - Quick start Langchain.
 - Quick start Streamlit.
 - Quick start DeepLake.
 - Quick start Pinecone.

- Quick start OpenAI API.

Area of Deep Learning and Neural Networks.

- Specialization Program in Deep Learning from Stanford University. Program led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI). Courses included in this specialization program:
 - Neural Networks and Deep Learning.
 - Improving Deep Neural Networks: hyperparameter tuning, regularization and optimization.
 - Structuring Machine Learning projects.
 - Convolutional Neural Networks .
 - Sequence Models.
- Pytorch for Deep Learning in 2023: from Zero to Mastery. Udemy, led by Daniel Bourke.
- Other non-accredited courses and projects related to this area.
 - Deep Learning for Coders. Course led by Jeremy Howard, director of Fast.AI.

Area of Machine Learning and Data Science.

- Specialization Program in Machine Learning from Stanford University. Program led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI). Courses included in this specialization program:
 - Supervised Machine Learning: Regression and Classification.
 - Advanced Learning Algorithms.
 - Unsupervised Learning, Recommenders, Reinforcement Learning.

- **Complete Machine Learning and Data Science Bootcamp in 2023: from Zero to Mastery.** Udemy course led by Daniel Bourke. The curriculum includes the use of the basic Machine Learning stack:
 - Exploratory Data Analysis.
 - Data Visualization.
 - Data cleaning.
 - Data engineering.
 - Dashboards.
 - Anaconda.
 - Jupyter Notebooks.
 - Google Collab.
 - Pandas.
 - Numpy.
 - Matplotlib.
 - Seaborn.
 - ScikitLearn.

- **Intensive Technical Program in Data Science.** Datamecum. Program led by Emilio Soria, professor at the University of Valencia and director of the Master's in Data Science and the Master's in Artificial Intelligence at that University. Former director of the Master's in Data Science and Machine Learning at the MBIT Business School in Madrid. The curriculum includes the use of the basic Machine Learning stack:
 - Exploratory Data Analysis.
 - Data Visualization.
 - Data cleaning.
 - Data engineering.
 - Dashboards.
 - Anaconda.
 - Jupyter Notebooks.
 - Google Collab.
 - Pandas.
 - Numpy.
 - Matplotlib.

- Seaborn.
- ScikitLearn.
- Other non-accredited courses and projects related to this area.
 - Completed several Machine Learning projects in the top 10% on Kaggle, the world's leading platform, achieving the level of Kaggle Contributor.

Area of AI (Artificial Intelligence): generalist approach.

- AI for Everyone. Course led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI).

Area of software development with the Python programming language.

- Course: The Complete Python Pro Bootcamp for 2023. Udemy. Practical course led by Angela Yu, director of the App Brewery Dev BootCamp in London. The curriculum includes the use of the advanced Python stack:
 - Functional Programming.
 - Object-Oriented Programming (OOP).
 - Web Scraping. BeautifulSoup, Selenium Web Driver.
 - APIs.
 - App development.
 - Etc.
- Other non-accredited courses and projects related to this area.
 - Visual Studio Code for Developers 2023. Udemy. Practical course led by Estefania Cassingena.
 - GitHub Copilot 2023. Udemy. Practical course led by Tom Phillips.

He lived and worked for 10 years in Silicon Valley (California, USA), where he worked at several tech multinationals and had the opportunity to experience firsthand the explosion of web 2.0 and SaaS applications.

He founded a tech startup voted by venture capital investors as the #36 most innovative nationally. In this startup, he programmed the version 1.0 of the software, recruited and led an international team in the United States and Spain, closed 5 investment rounds, and had the support of over 30 reputable investors and 12 high-level strategic advisors (including the global vice president of Dell Computers and the vice presidents of Cloudfare, Flyware, and Carto).

He attended the Startup School program from the Y-Combinator accelerator and won the startup competition of the Demium Accelerator.

He combines his role as CEO of the AI Accelerator with the position of CEO of the Silicon Valley Accelerator and as President of the Forum of Friends of Silicon Valley and Silicon Wadi from Spain and Latin America.

Preface

On the day of chatGPT's launch, I knew that the new Artificial Intelligence would be my passion for the next twenty years.

Since then, I have dedicated all available hours to understanding, learning, and experimenting in this new field with the same enthusiasm with which I delved into the fascinating adventures of the Internet and Silicon Valley years ago.

This is the book I wish I had found when I started the journey. As you can see with a quick glance at the table of contents, the book covers the necessary issues to understand the potential of the AI Revolution in four critical areas: application in business, employment opportunities, educational path, and opportunities for startups.

This book and all the actions of the AI Accelera (AIaccelera.com) aim to make the immense potential of Artificial Intelligence accessible to businesses, professionals, startups, and students worldwide.

Dedicated to all of them.

Julio Colomer.

CEO of AI Accelera.

CEO of Silicon Valley Accelerator.

President of the Friends of Silicon Valley and Silicon Wadi Forum.

Disruption: the new AI and the old AI.

AI was already here: everyday AI applications.

Although for many, Artificial Intelligence (AI) might seem like a novelty or futuristic technology, the truth is that AI has been a part of our daily lives for a while now, often operating invisibly in common-use applications and services like the following:

Ad Targeting (Google).

Through machine learning techniques, systems can predict which ads will be more relevant to an individual user based on their search history, browsing behavior, and other data.

Uber's Pricing System.

Uber's dynamic pricing model adjusts prices in real-time based on supply and demand, a clear example of how AI can optimize real-time operations.

Lookalike Audiences on Facebook.

By analyzing the characteristics and behaviors of your current audiences, AI can identify and segment other users with similar profiles and behaviors, maximizing the effectiveness of advertising campaigns.

TikTok Feed.

Feed customization is based on user behavior, preferences, and interactions, enabling a highly personalized experience.

Collaborative Filtering on Amazon.

This system recommends products based not only on your history but also on the history of users with similar behaviors to yours.

Filters on Snapchat.

AI and computer vision allow for real-time overlay of filters and effects on users' faces.

Smartphone photo enhancement.

Smartphone cameras use AI to enhance photos, automatically adjusting lighting, sharpness, and other parameters.

Spam detection.

Email systems use AI to identify and filter unwanted emails (spam).

Credit card fraud detection.

By analyzing transaction patterns and behaviors, AI can identify suspicious activities and prevent fraud.

Content moderation.

Online platforms use AI to filter and remove inappropriate or harmful content.

Loan evaluation.

Financial institutions use AI models to assess the creditworthiness of loan applicants.

Lead scoring.

Companies use AI to prioritize and qualify leads based on the likelihood of conversion.

Churn prediction.

Companies can predict which customers are at risk of churning and take preventive actions.

These examples demonstrate that AI was already integrated into many aspects of our daily and professional lives, improving efficiency, personalizing experiences, and aiding in making more informed decisions. It's a tool that, even though often invisible, has a significant impact on how we interact with technology and the digital world.

The origins of new AI: data science, machine learning, and deep learning

Simple definition of Data Science, Machine Learning and Deep Learning.

Machine Learning, or "Machine Learning," is like teaching a computer to learn from experience.

Imagine teaching a child to differentiate between apples and bananas by showing them various examples of each. Over time, the child will learn to identify them on their own.

Similarly, in machine learning, we feed the computer many examples, and over time, it can make predictions about other similar objects based on those examples without us explicitly telling it. It's like giving the computer the ability to learn and improve with experience.

Data Science: It's the field of study that combines skills in programming, statistics, and business knowledge to extract insights and knowledge from data. Think of it as being a data detective: you look for clues, identify patterns, and make discoveries that can help companies make more informed decisions.

Machine Learning: It's the technique that allows computers to learn from data. Instead of programming specific rules to perform a task, you provide the computer with examples, and it "learns" from them. It's like teaching a child to differentiate objects: after seeing enough examples, it can identify them on its own.

Deep Learning: It's a technique within Machine Learning that uses neural networks with many layers (hence the "deep" in its name) to analyze various types of data. It's like your computer having a virtual brain that can recognize complex patterns after being trained on massive amounts of data.

It's especially useful for tasks like image recognition and natural language processing.

What is the reason for the recent exponential acceleration of new AI?

The exponential acceleration in the world of artificial intelligence, specifically in machine learning, is the result of the confluence of several factors that have converged in recent years. These factors have allowed tasks that were once considered extremely complex and laborious to be performed in significantly shorter times.

Here we break down the reasons behind this acceleration:

More data.

We live in the era of big data. Every day, exabytes of data are generated due to the widespread use of mobile devices, social networks, sensors, IoT devices, among others. This data deluge has provided the necessary "fuel" to train more accurate and robust ML models.

New AI Methodology.

- Machine Learning: The evolution of algorithms and techniques has enabled machines to learn from data more efficiently.
- Neural Networks and Deep Learning: Inspired by the functioning of the human brain, these networks have proven to be extremely effective in tasks such as image recognition and natural language processing.
- Reinforcement Learning: An approach where software agents learn to make decisions by receiving rewards or penalties based on the actions they take.

- Generative Adversarial Networks (GANs): These networks can generate data that is nearly indistinguishable from real data.
- Transformers: An architecture that has revolutionized natural language processing, with models like BERT and GPT.
- Diffusion Models, Reinforcement Learning from Human Feedback (RLHF), LLMs: These are advanced techniques and models that have emerged in recent years, further expanding AI capabilities.

Faster Computers.

- GPU: Graphics processing units are not only essential for gaming but have also proven to be extremely useful for training ML models, especially in deep learning, due to their ability to handle parallel matrix operations.

In summary, the combination of increased data availability, methodological advancements, and improvements in computing power has propelled the exponential acceleration in the field of artificial intelligence.

Simple definition of LLM and its influence on the new AI.

Imagine a computer program that has "read" so many books, articles, and web pages that it can talk about nearly any topic. It not only remembers what it has "read," but it can also combine and use that information to answer questions, help you write, or even chat with you. That's a Large Language Model (LLM). It's like a super language expert that has absorbed a wealth of information from the world.

Thanks to LLMs, artificial intelligence has taken a huge leap. Instead of just following instructions, these models can interact, adapt, and provide more human-like and personalized solutions.

They have transformed how we work with AI, allowing us to collaborate with machines in language and communication tasks in a much more natural and effective way. It's like going from having a simple calculator to having an intelligent companion that understands and assists in your tasks.

The new AI vs. classic ML.

The evolution of artificial intelligence has led to a transition from traditional Machine Learning (ML) to the new Generative AI. Here are some of the main differences between the two:

Focus and Application.

Traditional ML: Specialized and designed for specific tasks. For example, a model trained to recognize images of cats cannot recognize cars without new training.

Generative AI: Generalized and adaptive. It can handle a variety of tasks with the same model, thanks to its extensive training on diverse databases.

Nature of the Output.

Traditional ML: Descriptive, based on interpreting or categorizing existing information. For example, labeling an image as "cat" or "not cat."

Generative AI: Creative, has the ability to produce new and original information such as writing a paragraph about cats or generating a new image of a cat.

Interactivity.

Traditional ML: Requires technical interaction, often through a specific interface or programming language.

Generative AI: Friendly and natural, allows interaction using colloquial language, making the technology more accessible to the average user.

Training and Data.

Traditional ML: Trained with specific and often limited datasets designed for concrete tasks.

Generative AI: Benefits from large datasets, often encompassing vast amounts of general information, which gives it a broad knowledge base and adaptability.

Typical Applications.

Traditional ML: Recommendation systems, predictive analysis, image classification, among others.

Generative AI: Advanced chatbots, virtual assistants, content generation (text, images, music), and simulations, among others.

In summary, while traditional ML has been a powerful tool for specific and well-defined tasks, the new Generative AI expands possibilities, allowing for more flexible, creative, and adaptive solutions. Interaction becomes more natural, and potential applications multiply, opening a new world of opportunities in the field of artificial intelligence.

The ability of AI surpasses that of humans in many specific tasks.

Artificial Intelligence (AI) has managed to surpass human capabilities in many specific tasks, especially those involving vast amounts of data or requiring repetitive and consistent processing. Here are some areas where AI has demonstrated superiority:

Data Processing:

- Searching and organizing large datasets.
- Analyzing large volumes of data in real-time.

Games:

- Board games like Go and chess. For example, DeepMind's AlphaGo defeated the world Go champion, a game considered more complex than chess in terms of possibilities.
- Video games, where AI can learn and adapt to human players' strategies.

Image Recognition:

- Classifying images into specific categories.
- Detecting patterns or anomalies in images, such as tumors in X-rays.

Natural Language Understanding:

- Automatic translation between different languages.
- Answering questions based on large datasets or documents.

Repetitive Tasks:

- Automation of processes in factories or warehouses.
- Detecting fraudulent transactions in payment systems.

Logistical Optimization:

- Optimal routing for package delivery.
- Managing power grids or traffic systems to optimize flow and reduce congestion.

Data-Driven Prediction:

- Weather forecasting based on collection and analysis of large amounts of weather data.
- Predicting stock market trends (though with limitations and risks).

Design and Creation:

- Generating art, music, or text using models like GANs or LLMs.

It's important to understand that while AI can outperform humans in these specific tasks, it does not mean it possesses general understanding or consciousness.

Most AI systems are designed for specific tasks and lack the general capacity to reason, feel, or comprehend broader contexts as humans would. Therefore, AI cannot replicate the breadth and depth of human understanding and capabilities as a whole.

Technical arrogance prevents recognizing disruption.

Some classical ML researchers and engineers have fallen into technical arrogance by dismissing the disruptive nature of the new AI phase.

Arguing that advancements like ChatGPT are models that "basically already existed in a different format" or that LLM applications are mere "wrappers around an LLM" is to pretend that we are not in a substantially different phase from the previous one. Apart from everything outlined in the preceding points, it's worth noting that ChatGPT is the fastest application to reach 100 million users in history.

Disruptive Changes Generated by AI: Opportunities and Threats.

Artificial Intelligence (AI) is generating disruptive changes in numerous sectors. We'll delve into these in detail later. For now, let's introduce some of the most prominent ones, along with the opportunities and threats associated with these changes:

Internet Search.

We are transitioning to a question-and-answer experience like ChatGPT.

- Opportunities: Enhanced personalization of the search experience, increased relevance of results, and the possibility to interact with AI agents for more precise answers.
- Threats: Reduced website traffic due to direct answers, changes in advertising platform monetization structures, rethinking the strategic importance of SEO, and challenges in maintaining user privacy.

Education.

We are moving towards an interactive and multimedia AI educational assistant.

- Opportunities: Democratized access to education, personalized learning pace, and 24/7 availability of educational assistants.
- Threats: Decreased human interaction in the education process, potential devaluation of traditional educational institutions, and challenges in certifying and validating acquired knowledge.

Work.

We are progressing towards an AI assistant for many professionals.

- Opportunities: Increased efficiency and productivity, reduced errors, and a human focus on more strategic and creative tasks.
- Threats: Job displacement, particularly in routine tasks, and the need for continuous training to adapt to new tools.

Text and Visual Content Creation.

We are moving towards an AI multimedia content assistant.

- Opportunities: Mass production of content at low cost, scalable content personalization, and enhanced creative tools for artists and creators.
- Threats: Content saturation, difficulty in determining authenticity and originality, and potential copyright infringements.

Programming.

We are moving towards programming alongside an AI assistant.

- Opportunities: Lowering the barrier to entry into the programming world, accelerating software development, and increased collaboration between humans and machines.
- Threats: Dependency on automated tools, potential reduction in demand for basic programming roles, and challenges in reviewing and correcting automatically generated code.

In summary, AI brings a wide range of opportunities that can be leveraged to enhance and optimize various sectors. However, along with these opportunities come threats and challenges that must be appropriately considered and addressed to ensure that AI adoption benefits society at large. Ethical and thoughtful approaches to AI implementation across different fields are essential.

Prominent Consequences of AI Disruption.

In the upcoming chapters, we will delve into the consequences of the disruptive changes brought about by AI:

- Industries most affected.
- Most affected functional areas within companies.
- Most affected jobs.
- Generated employment opportunities.

The current boiling state is not without challenges.

AI, and particularly the development and application of LLMs, is undergoing an unprecedented period of boiling innovation. This rapid evolution also comes with significant challenges, including:

Black box.

AI models, especially deep learning models, are often difficult to interpret and explain. It's not always clear how the model arrived at a specific conclusion, posing problems in critical applications where transparency and accountability are needed.

Technical complexity and barriers to entry.

Despite tools and platforms aiming to democratize AI access, technical complexity remains high. This can exclude many potential innovators who lack the necessary technical background.

Security and privacy.

The ability of LLMs to generate coherent and persuasive text can be exploited for malicious purposes, such as creating fake news or scams. Additionally, if not managed properly, they can reveal information about their training data, raising privacy concerns.

Adversarial attacks.

AI models can be susceptible to adversarial attacks, malicious operations that introduce distortions in input data to confuse the model and make it generate incorrect responses. These modifications are often imperceptible or insignificant to a human but can cause an AI model to behave unexpectedly or erroneously. There are increasingly advanced techniques to defend against these attacks, but they come with processing time and model accuracy costs.

Dependency on big companies.

Despite the emergence of many startups in the AI space, large companies like OpenAI, Google, and others continue to dominate in terms of resources and capabilities. This could lead to concentration of power and influence in the AI space.

Interoperability and standardization.

With so many emerging tools and platforms, ensuring they can work efficiently and coherently together is crucial.

Information overload.

Staying up to date with the latest advancements is becoming a challenge in itself due to the volume of new publications and developments.

Despite these challenges, the potential of AI to drive improvements across a wide variety of fields is immense. It's essential to address these challenges appropriately to ensure that AI develops in a way that benefits society as a whole.

The bottleneck of GPUs.

The scarcity of GPUs, combined with the growing demand for processing power for AI tasks, presents both challenges and opportunities in the technology ecosystem:

Challenges for startups and developers:

- High cost: GPUs have become incredibly expensive due to high demand, increasing operational costs for startups and research projects. GPUs are so scarce and expensive that many startups seek investment rounds just to afford their own GPUs. This is the case with companies like Inflection (\$1.3B), Mistral (\$113M), Reka (\$58M), Poolside (\$26M), and Contextual (\$20M).

- Accessibility: Scarcity can lead to long wait times to acquire hardware or limitations in processing capacity.
- Innovation slowdown: Lack of access to GPUs can slow down experimentation and development in the AI field, as training complex models might be impractical without proper hardware.

Alternatives and opportunities:

- Pre-trained models: Due to the difficulty of training models from scratch, there's a focus on using and fine-tuning pre-trained models. These models, like OpenAI's GPT-3, are trained on large datasets and then fine-tuned for specific tasks with fewer data, requiring less processing power.
- Collaborations and partnerships: Startups can partner with companies that have GPU access or with venture capital funds that provide resources. For instance, Dan Gross and Nat Friedman allocate their 10 exaflops GPU cluster called Andromeda and \$100M exclusively for startups they invest in.
- Optimization and efficiency: Scarcity can drive innovation in terms of optimizing algorithms and models to be more efficient in terms of processing power.
- Alternatives to GPUs: While GPUs are currently the primary choice for training deep learning models, scarcity might accelerate the development and adoption of alternative hardware, such as TPUs and FPGAs.

Long-term implications:

- Centralization of AI: If only large companies can afford regular GPU access, there could be a centralization of AI innovation and development in a few hands, potentially limiting diversity and competition in the field.

- Cloud infrastructure development: Cloud platforms offering GPU-based processing services, like AWS, Google Cloud, and Azure, might experience increased demand. These services allow companies to "rent" processing power without having to acquire and maintain their own hardware.
- Hardware innovation: Demand can drive greater investment in research and development of more advanced and specialized hardware for AI.

As seen, while GPU scarcity poses significant short-term challenges, it can also act as a catalyst for innovation and adaptation in how AI is developed and deployed.

Ethical and Legal Challenges of AI.

Discrimination against Minorities.

If AI is trained on biased data, it will produce biased results, potentially leading to discrimination against minorities or other groups. Examples of discrimination and bias that have already occurred include:

- AI hiring tool that discriminates against women.
- Facial recognition AI that works better for light-skinned individuals than dark-skinned individuals.
- AI-driven loan approvals: Higher proposed interest rates for certain minority groups.
- AI responses with biased professional stereotypes for men and women.

Measures to mitigate bias include:

- Technical solutions: "De-biasing" the language or using less biased and more inclusive data.
- Transparency and/or auditing processes: Ensuring that models are operating fairly and not discriminatory.

- Diverse workforce: Having diverse development teams to provide different perspectives and reduce biases.

Deep Fakes.

AI can create realistic-looking fake videos or audios that can be used for defamation or misinformation.

Oppressive Surveillance.

Governments and organizations can use AI for surveillance and control of individuals, such as installing facial recognition cameras in public spaces.

Manipulation of Public Opinion.

AI can generate fake comments or content on social media at a large scale, posing a significant risk of influencing opinions and narratives.

Spam and Fraud.

AI can be used to carry out massive spam attacks or fraud schemes.

The outlined limitations and challenges underscore the importance of an ethical, appropriately regulated, and responsible adoption of AI. Addressing these issues as technology advances is essential to ensure that AI is used in a way that benefits society as a whole and avoids harm.

How to Introduce AI in Your Company

Introduction.

Just like the way the Internet did, study after study shows that AI is going to transform virtually every business. The sooner you initiate the change in your company, the more advantage you'll gain over your competitors.

In this chapter, we will show you how AI will impact your company and what you can do to prepare for the transition in the best possible way.

You will learn the phases of an AI Transformation Plan and its technical implications, as well as the keys to building a successful AI team. You'll discover how to identify AI projects that can be developed in your company

and practical cases that will help you understand the main components of an AI project. Finally, you will learn how to avoid the most common mistakes when introducing AI into your company.

How will AI impact your industry?

Goldman Sachs, one of the world's leading investment banks, published a detailed analysis in March 2023 of the expected impact of Artificial Intelligence on various business sectors. The forecasts from this report, which rated the level of AI impact on each sector on a scale from 0 to 100, are as follows:

Sectors with high impact.

- Administrative work with a score of 46%.
- Legal work with a score of 44%.
- Architecture and engineering with a score of 37%.
- Life, physical, and social sciences with a score of 36%.
- Commercial and financial operations with a score of 35%.
- Social services with a score of 33%.
- Business management with a score of 32%.
- Sales and related areas with a score of 31%.

Sectors with medium impact.

- Computer and mathematical occupations with a score of 29%.
- Agriculture, fishing, and forestry with a score of 28%.
- Protective service with a score of 28%.
- Healthcare practitioners and technical with a score of 28%.
- Educational instruction and libraries with a score of 27%.
- Healthcare support with a score of 26%.
- Arts, design, entertainment, sports, and media with a score of 26%.

Sectors with low impact.

- Personal care and service occupations with a score of 19%.
- Food preparation and serving with a score of 12%.

- Transportation with a score of 11%.

Sectors with very low impact.

- Manufacturing with a score of 9%.
- Construction and extraction with a score of 6%.
- Installation, maintenance, and repair with a score of 4%.
- Building and grounds cleaning and maintenance with just 1%.

In which areas of your company will AI have the most impact?

The consulting firm McKinsey and Company released a report in June 2023 highlighting the areas of the company where AI will have the most impact:

Customer Operations.

AI helps automate and optimize customer interactions, providing quick responses to inquiries and enhancing the customer experience. Here are some examples of how AI is being applied in the customer service realm:

Customer Service Chatbots.

AI-powered chatbots can efficiently address complex customer inquiries, offering fast and accurate solutions. They ensure consistent brand voice and can interact with customers worldwide, adapting to different languages and ensuring a seamless experience.

Real-time Customer Assistance.

AI can provide real-time assistance to customer service representatives during phone conversations by offering scripts and suggestions based on the conversation context and customer information. These suggestions are

personalized according to the customer's profile and needs, enabling more effective and empathetic communication.

Post-call Operations for Customer Support Team.

After concluding a call with a customer, AI can automatically generate a detailed conversation summary and prepare a follow-up plan based on the interaction, identifying actions and responsible parties. Additionally, AI can assist in preparing follow-up content, ensuring that all discussed points are addressed and customer expectations are met.

Marketing and Sales.

AI-based tools can analyze large volumes of data to identify consumer trends and behavior patterns, allowing companies to design more effective and personalized marketing campaigns. Some examples of AI applications in Marketing and Sales include:

Market and Customer Research.

AI can analyze multiple data sources, such as social media, news, internet searches, and customer reviews, to gain deep insights into market trends and customer opinions.

Content Personalization.

AI enables content customization based on the specific segment it is targeting, adapting to the language and demographics of the target audience.

Consideration-stage Content Personalization.

AI-based tools provide detailed product information, facilitate product comparisons, and generate dynamic recommendations based on user behavior and preferences.

Conversion-stage Content Personalization.

Customer communication becomes personalized, making it easier to build stronger and lasting relationships. AI identifies key points that can influence the customer's purchase decision and adjusts the content accordingly.

Retention-stage Content Personalization.

AI assists in sending personalized messages to customers, offering rewards tailored to their behaviors and preferences. Additionally, it enables proactive communication by anticipating customer needs and concerns before they arise.

Software Engineering.

Artificial intelligence is revolutionizing software development by aiding in error identification and correction, automating testing, and enhancing efficiency in the development process.

Research and Development (R&D).

AI can expedite research and development by swiftly analyzing large datasets, identifying patterns, and facilitating data-driven decision-making.

Main AI techniques used in a company.

Among the main AI application techniques in the corporate world, the following stand out:

Computer Vision.

This technique includes capabilities such as:

- Image classification and object recognition: It allows identifying objects in images—such as determining whether what's shown in an image is a hammer—or performing facial recognition.
- Object detection and positioning: It not only identifies objects but also determines their position. A notable example is self-driving cars.
- Image segmentation: It offers extremely precise object detection at the pixel level, such as in reading X-rays.
- Tracking: It monitors moving objects in videos, enabling real-time tracking.

Natural Language Processing (NLP).

NLP includes capabilities such as:

- Text classification: It determines, for example, whether an email is spam, which category an advertisement belongs to, or whether a comment has a positive or negative connotation.
- Information retrieval: Like web search, where keywords are entered to find relevant pages.

- Named entity recognition: It identifies named entities, such as names of people or any selected entities like cities or phone numbers, within text.
- Machine translation: It converts a sentence from one language to another.
- Other NLP applications include part-of-speech tagging and syntactic analysis, which are essential for more complex tasks like machine translation.

Sound (Audio Data).

AI capabilities in this area include:

- Speech recognition: It understands speech.
- Keyword detection: Such as when saying "Hey Siri!" to activate a virtual assistant.
- Speaker identification: It determines the identity of the person speaking.
- Speech synthesis: It transforms text into audio.

Robotics.

AI enhances robots with capabilities such as:

- Perception: It interprets the environment through sensors like cameras or lasers.
- Motion planning: It designs a path for the robot to follow.
- Control: It issues commands to the motors to make the robot follow a determined path.

Roles and Jobs Most Affected by AI.

Understand the roles and jobs most affected by AI and analyze their impact on your company. Refer to this question in Chapter "AI and Jobs: Opportunities and Threats."

How to introduce AI in your company: first steps.

If you're considering introducing AI into your business, it's a good idea to follow these steps:

1. Educate Yourself and Learn.

Before embarking on the AI journey, it's vital to surround yourself with people who understand the field. Whether through seminars, workshops, or simply connecting with experts in the field, acquire basic knowledge and understand how AI can benefit your business.

2. Identify Potential Applications in Your Business.

Once you have a basic understanding of AI, brainstorm with your team about potential AI applications in your business.

3. Hire AI Professionals.

Once you've identified potential projects, it's time to hire the experts. AI specialists will help you translate your ideas into viable projects and implement AI solutions.

4. Hire an AI Leader.

To ensure that your AI efforts are well-directed and aligned with your company's overall vision, consider hiring an AI leader or director. This person will oversee all AI-related projects and ensure their efficient and effective implementation.

5. Introduce AI Transformation Throughout the Company.

With a team and a leader in place, begin the AI transformation within your company. This involves not only implementing individual projects but also integrating AI into the culture and daily operations of your company.

Incorporating artificial intelligence into your business is a strategic decision that can offer countless benefits. With proper planning and the right team, your company will be well-positioned to harness everything AI has to offer.

How to Carry Out an AI Transformation Plan in Your Company?

The adoption of Artificial Intelligence (AI) in a company is a process that can offer significant competitive advantages. Below, we present a step-by-step guide for a successful transformation towards an AI-driven enterprise:

1. Technical and Business Analysis.

Before embarking on any AI initiative, conducting a thorough analysis is essential. The AI engineer needs to assess whether the technology can effectively address and solve a specific problem. This analysis can be a

process lasting several weeks, but it's crucial to establish the right foundations.

2. Start with a pilot project to gain initial momentum.

Choose a small and straightforward initial project. This will allow you to gain a clear understanding of AI capabilities and limitations.

Select a project that can easily succeed rather than a challenging one, even if it's more valuable. The goal of the pilot project is to show positive results within a 6 to 12-month timeframe.

Initial projects can be managed internally or through an outsourced team, depending on the company's capabilities and resources.

3. Build an internal AI team.

With the experience gained from pilot projects, it's time to build a dedicated AI team. This team will be responsible for executing future projects and integrating AI into various areas of the company. In a later section, we will outline the key components of an AI team.

4. Provide appropriate AI training.

To ensure the company is prepared for full AI integration, offering training in this field is essential. This includes:

- Engineers: They need to be trained in AI-specific technicalities such as data collection, software development, and project execution.
- Managers: They should understand how AI will impact daily operations and how they can oversee and manage teams related to AI.

- Leaders: They must have a strategic understanding of how AI can influence and benefit the company as a whole, the strategy to follow, and how resources will be allocated.
- AI project leaders: Those directly working on AI projects need training in technical and business feasibility analysis, resource allocation, and progress monitoring.

5. Prepare the Company's AI Strategy.

Once you have a clearer and deeper understanding of what AI can offer, it's essential to formulate a long-term AI strategy. This strategy will guide the implementation and expansion of AI within the company, ensuring alignment with the overall business objectives.

The design of AI products can follow a virtuous cycle:

1. Design a good AI product.
2. The more users you have, the more data you capture.
3. Use that data to improve the AI product, thus strengthening the product's position against potential competitors.

Many AI applications need to be industry-specific and use proprietary data. This is where small and medium-sized businesses can find a niche not exploited by large AI corporations.

In an AI-driven world, considering a data strategy is vital. Data acquisition techniques - such as offering free services in exchange for data collection - and maintaining a unified data repository can be beneficial. AI can accelerate businesses with network effects, where "the winner takes it all."

6. Align/Integrate stakeholders, both internal and external.

It's crucial to ensure that all stakeholders, from employees and leaders to customers and investors, are informed and aligned with the company's AI strategy.

Progressive Adoption Plan for chatGPT and Similar AI Tools in Your Company.

The integration of artificial intelligence, like ChatGPT, in the business context can be a gradual transformation that aligns with the needs and capabilities of the company. Here is a progressive adoption roadmap:

1. Incorporate ChatGPT into Everyday Work.

Before any major implementation, it's essential to become familiar with the tool. Introduce ChatGPT in specific areas of work where it can be useful, allowing employees to get accustomed to its interface and functionalities. At this stage, AI acts more as a supportive tool.

2. Streamline Work using ChatGPT.

Once employees are comfortable with ChatGPT, you can start using it to streamline specific tasks. For example, ChatGPT could assist in answering frequently asked questions, aid in drafting, or provide quick information. The idea is for AI to work alongside people, enhancing their efficiency and productivity.

3. Replace Repetitive Tasks with ChatGPT.

In areas where tasks are highly repetitive and don't require a human touch, ChatGPT can take on a more prominent role. This could include managing responses to routine queries or automating processes that previously required manual intervention. It's advisable to ensure that employees displaced by AI receive training and opportunities in other areas of the company.

4. Utilize ChatGPT for Customer Service.

Finally, once ChatGPT has proven to be reliable and efficient in internal tasks, consider using it as a customer service tool. It can handle frequently asked questions, guide customers through processes, or even assist in order placement.

This not only streamlines the customer experience but also allows your team to focus on more complex issues or provide a personal touch when needed.

The progressive adoption of ChatGPT and other AI tools ensures a smooth transition, allowing companies to maximize benefits while managing challenges inherent to the integration of emerging technologies.

Technical implications of adopting AI in your company.

Incorporating artificial intelligence (AI) into a company goes beyond simply adopting new technologies; it requires robust planning and strategy that align with the overall business objectives. Below are some key considerations for a strategic adoption of AI:

1. Strategic Data Acquisition.

The power of AI lies in its ability to process and learn from large amounts of data. Sometimes companies offer free products or services with the primary goal of collecting valuable customer data. This strategic data acquisition can provide critical information to the company that, when used to feed AI systems, can result in insights and innovative solutions.

2. Centralized Data Storage.

To maximize the value of data, having a unified data warehouse is essential. Instead of maintaining separate databases operating in silos, a centralized warehouse allows for easy accessibility, consistency, and data analysis efficiency. This facilitates more efficient AI system operations and more accurate outcomes.

3. Progressive Automation.

Once a solid data foundation is established, identifying opportunities for automation is essential. AI can handle a wide range of tasks, from routine to complex, thereby freeing the human team to focus on more strategic and creative tasks. Identifying these opportunities can lead to more efficient operations and increased customer satisfaction.

4. New Roles and Work Division.

Incorporating AI into a company entails creating new roles and responsibilities. For example, the role of an AI Manager, responsible for overseeing and directing AI-related strategies, or an AI Engineer, specialized in developing and maintaining AI systems. Moreover, as AI becomes more deeply integrated into daily operations, the division of labor

between humans and machines will change, requiring adaptation and role restructuring within the company.

The strategic adoption of artificial intelligence is not merely a technical exercise; it represents a fundamental transformation in how a company operates. By addressing AI with a strategic vision, companies can better position their operations for the future and fully leverage the advantages offered by this technology.

The AI Team in your company.

Roles in an Artificial Intelligence Team.

The size and features of an AI team depend on the level of maturity, responsibilities, and value provided in each case.

In an initial phase, it is perfectly valid for all AI responsibilities to fall on a single person or even a part-time external consultant. Over time and with successes, the dimensions of the AI team will grow in the direction we describe below.

A mature, fully-functioning artificial intelligence (AI) team will have a variety of roles to ensure that all facets of the work are properly addressed. There is no one-size-fits-all format, but when designing the features of your own AI team, it may be helpful to know the following roles and their responsibilities:

AI Director (AI Manager, Chief AI Officer).

This role is essential to ensure that AI projects align with the company's needs and objectives. The AI Director is a professional with hybrid

technical and business knowledge who plays a crucial role in deciding what to build - evaluating what is technically feasible and what will bring value to the business - as well as in planning, managing, and monitoring AI projects.

Data Scientist (Data Analyst).

The Data Scientist focuses on examining and analyzing data to provide valuable insights that can lead to the decision to develop AI solutions or products.

Data Engineers.

Data Engineers are responsible for storing, organizing, and protecting data, ensuring they are available and in a suitable format for analysis and ML model training.

Researcher / ML Scientist.

These are the experts who research and apply the latest innovations in the field of machine learning. They work at the forefront of AI, experimenting with new techniques and approaches to improve existing models and solutions.

ML Engineer (Machine Learning Engineer).

The ML Engineer specializes in the development and application of machine learning models. These professionals translate the model prototypes developed by researchers or ML scientists into practical and efficient applications.

Traditional Software Engineers and DevOps.

These professionals focus on the development of conventional software solutions. Even though they don't work directly in creating AI models, their work provides the infrastructure and applications that surround and support these models.

Peculiarities of Working in an AI Team.

Without intending to be exhaustive, we present some of the peculiarities of the daily work of an AI team below.

Acceptance Criterion: Target model accuracy.

Before embarking on any AI project, it is essential to have a clear understanding of what is expected from the model. For example, if your goal is to develop a model that detects defects in your products, you might set an acceptance criterion that the model identifies these defects with 95% accuracy.

It's important to remember that no AI model will have 100% accuracy. The inherent limitations of machine learning, combined with factors such as insufficient data, poorly labeled data, or ambiguous labels, can affect model accuracy.

In addition to setting your acceptance criteria for a machine learning model, it's crucial to first test it on a small dataset. This initial dataset will allow you to measure the model's performance under real conditions and verify if it meets the set criteria.

How AI Teams Think About Data.

Data is at the core of any AI project. An AI team will typically consider two main sets of data:

- Training dataset: This is the dataset used to train the model. The machine learning model will study this data to learn how to predict the behavior of the test data.
- Test dataset: Once the machine learning model has been trained and has learned, it's tested on this dataset. The test dataset allows for evaluating how the model performs with data it hasn't seen before, providing a measure of its accuracy and effectiveness.

How to Decide Which AI Projects to Undertake in Your Company.

Identifying artificial intelligence (AI) projects that can provide significant value to your company should start with an understanding of the business and AI technology. Below, we present a framework to assist you in this process:

Technical and Business Analysis.

The first step is to look for ideas at the intersection of what AI can achieve and what is genuinely valuable for your business. It's essential to combine technical knowledge of AI with a deep understanding of your industry or business's specific domain.

Framework to Identify Interesting AI Projects for Your Company.

- Task Automation: Instead of thinking about automating entire jobs, focus on specific tasks that can be automated.
- Business Value Drivers: Reflect on the activities or areas that generate the most value for your company.
- Weak Points: Identify and analyze the main challenges or weak points in your business.

Data Volume Needed to Propose AI Solutions.

You don't always need vast amounts of data to benefit from AI. With techniques like transfer learning (readapting pre-trained models), smaller datasets are often sufficient to achieve acceptable performance.

Conduct a Preliminary Technical, Business, and Ethical Feasibility Study.

Given that an AI project can involve significant time and effort, it's crucial to perform due diligence before committing.

The technical feasibility study will address aspects like:

- Feasibility: Confirm that the project is technically viable.
- Necessary Data: Determine how much data is needed and whether you have a way to access it.
- Engineering Timeline: Set realistic expectations regarding time and required resources.

The business feasibility study will address aspects like:

- **Cost Reduction:** Assess whether the project could automate processes and reduce costs.
- **Revenue Increase:** Consider if AI could attract more customers or boost sales.
- **New Product Launch:** Determine if AI can be the foundation of a new product or business line.

Lastly, it's essential to consider the ethical implications of any AI project. The ethical feasibility analysis of an AI project includes reflecting on how it might impact employees, customers, and society at large.

Develop In-house or Outsource?

Once you've identified an AI project that can bring value to your company, you need to decide whether it's more appropriate to build it internally or with the help of external professionals. Here are some recommendations:

- **Data Science Projects:** These are usually done internally as they require a deep understanding of the business.
- **ML Projects:** They can be managed internally or outsourced, depending on complexity and internal capabilities.
- **Industry Standards:** If the proposed solution can be accomplished with a standard product in the industry, it's likely more efficient to buy it rather than building it from scratch.

Phases in the Technical Development of an AI Project.

AI projects are fueled by data. Therefore, they usually consist of two main phases:

1. Data Collection and Preparation Phase.
2. Application Phase of AI models (Machine Learning).

Data Science and Machine Learning are two areas that often interrelate but have their own specificities and applications.

Data Science is an interdisciplinary field that uses techniques, processes, algorithms, and systems to extract knowledge and insights from data in various forms. Although Data Science has become a fundamental pillar for the development and application of artificial intelligence (AI), its scope goes beyond AI. Data Science is applied in a wide variety of sectors, from business analytics to scientific research, and addresses problems that do not necessarily involve machine learning or artificial intelligence.

On the other hand, Machine Learning (ML) is a branch of AI focused on building models that can learn from data. Instead of being explicitly programmed to perform a task, these models use mathematical algorithms that identify patterns in the initial data to predict the behavior of similar data.

In summary, while Data Science refers to extracting insights and knowledge from large datasets, ML specifically focuses on models that can learn from that data.

Most AI projects consist of a data analysis phase followed by a Machine Learning phase.

To simplify and facilitate understanding, we will look at the workflows of standalone Data Science projects as well as projects that chain Data Science and Machine Learning together.

Workflow of a Data Science Project.

Data Science focuses on extracting insights and knowledge from large datasets. A typical Data Science project follows a series of steps from data acquisition to the implementation of solutions based on the insights gained.

Data Acquisition.

Every business has its own nature, and therefore the data it uses is often unique to that business. There are several ways to obtain this data:

1. Manually Collect and Label: This method involves gathering data, such as product photos, and then properly labeling them.
2. Collect Data by Observing Behavior: This could be user behavior (example: online purchases) or machine behavior (example: fault prevention).
3. Download Data from Websites (Web Scraping) or Purchase from Specialized Companies: The internet provides an abundance of data. There are also companies that specialize in data sales.

Data Use and Misuse.

Handling data appropriately is essential.

It's not advisable to collect data without the involvement or consultation of the AI team. Involving the AI team from the start will ensure that the collected data is relevant and useful.

Not all data is valuable for Machine Learning purposes. Proper data cleaning (Data Cleaning) is crucial to address issues like missing or erroneous data.

Example of a Data Science Project to Improve the Sales Process of an Online Store.

1. Data Collection: User ID, country of origin, time, and webpage visited.
2. Data Analysis: A data scientist will analyze this data looking for patterns and trends to identify potential issues or areas for improvement.
3. Suggest Hypotheses/Actions: Based on the analysis, the data scientist may propose hypotheses about the underlying causes of a problem and suggest actions to address it.

Example of a Data Science Project to Improve the Efficiency of a Production Line in an Industrial Pastry Company.

1. Data Collection: Batch, supplier, mixing time, and oven conditions, among others.
2. Data Analysis: By analyzing this data, the data scientist will look for correlations and patterns that might influence the quality of the final product.
3. Suggest Hypotheses/Actions: Once potential issues are identified, specific actions can be proposed to improve the production process.

Workflow of a Machine Learning Project.

Machine Learning, or ML, is a branch of artificial intelligence that focuses on teaching computers to learn from data. The implementation of an ML project follows a series of essential steps that, while they may vary depending on the application, maintain a general pattern.

ML models learn patterns from an initial sample of data to predict the behavior of other similar data. Sometimes the initial sample consists of both input and output data (Supervised Learning), other times only of input data (Unsupervised Learning).

Example of a Machine Learning Project: Voice Recognition to Activate Siri Assistant.

1. **Input and Output Data Collection:** Audio clips from different people pronouncing phrases or words, such as "Hey Siri" and other random words, in various tones, accents, and sound conditions.
2. **Train the Model:** With the data at hand, an ML algorithm is used to correlate the input (the audio clip) with the expected output (confirmation of whether the user has used the words "Hey Siri" to activate the Siri voice assistant or not). Initial training attempts often aren't perfect, requiring adjustments and iterations until the model reaches a satisfactory accuracy level.
3. **Implement the Model:** Once trained, the AI software is integrated into devices like smart speakers and tested with a user group. New challenges, such as not having considered certain accents, are often discovered during this phase. Based on results and feedback, new data is collected, and the model is refined.

Interacting with virtual assistants, like Siri, involves a series of complex processing operations. When we say "Hey Siri," an artificial intelligence pipeline is activated that translates our voice into specific actions. Let's look at a detailed example of the steps this process follows:

a) Keyword Detection:

- Input: The first stage involves constantly listening to the audio stream for the keyword, in this case, "Hey Siri".
- Output: The system determines if it has detected the keyword or not, providing a binary response: yes or no.

b) Voice Recognition:

- Input: Once the keyword is detected, the system gears up to process the subsequent audio, converting it into text.
- Output: The audio gets transcribed into a word or phrase representing what the user has said.

c) Intent Recognition:

- Input: With the transcription in hand, the system needs to interpret the underlying purpose of the user, i.e., what action they intend to perform.
- Output: The system identifies which standard command it should execute based on the transcribed phrase.

d) Execute Standard Command:

Finally, once the user's intent is identified, the assistant performs the corresponding action using conventional software. For instance, if the user says "Hey Siri, play my favorite song," Siri will play the song through the default music application.

Example of a Machine Learning Project to Guide an Autonomous Vehicle (Self-Driving Car).

1. Input and Output Data Collection: In the context of an autonomous vehicle, images and sensor data about the car's immediate environment are collected, such as the position of other vehicles and obstacles on the road.
2. Train the Model: With the above data, an ML algorithm is trained to interpret the images and predict actions like braking, accelerating, or changing lanes. As with voice recognition, the initial models will likely not be perfect and will require iterations and adjustments.
3. Implement the Model: Once the model is deemed good enough, it is integrated into a vehicle and subjected to testing in controlled environments first, and later in real-world conditions. During these tests, unforeseen situations might arise, such as unexpected reactions to uncommon objects on roads like golf carts or animals. Based on these tests, the model is continuously adjusted and improved.

Autonomous cars are a technological marvel that combines multiple disciplines, from robotics to machine learning, to navigate roads safely and efficiently. For an autonomous car to operate correctly, it must be able to detect and respond to a variety of entities and situations in real-time. Let's look at a detailed example of its behavior:

a) Vehicle Detection:

- Input: Multiple sensors like cameras, radars, and lasers (lidar) are used to capture detailed information about the surrounding environment.
- Output: The system processes this information to identify if what it detects is a car. Moreover, it determines the exact location of the detected car, its direction, and speed.

b) Pedestrian Detection:

- Input: Similar to vehicle detection, images, radars, and lasers (lidar) are used to scan the environment.
- Output: The system identifies whether what it detected is a pedestrian and, if affirmative, determines its location, direction, and speed. This information is crucial to ensure the safety of pedestrians around the vehicle.

c) Motion Planning:

Once the car has identified other vehicles and pedestrians in its vicinity, it must decide how to move safely. This involves:

- Route Selection: Based on the given destination and real-time information about traffic and road conditions, the autonomous car decides on the optimal route to follow.
- Speed Determination: Depending on traffic conditions, the presence of pedestrians, and other variables, the car decides the appropriate speed to move at.

This is a simplified summary of how an autonomous car operates, presented here as an illustrative example of an AI project. In reality, these vehicles have dozens of systems and algorithms working simultaneously to ensure safe and efficient driving.

Technical Tools for an AI Team.

To develop Artificial Intelligence (AI) and Machine Learning (ML) solutions, it's essential to have a variety of technical tools that facilitate research, design, implementation, and deployment of models. Below are some of the key tools typically used by AI teams:

Machine Learning Frameworks.

These tools provide a wide range of predefined functions that simplify the model development process for ML.

- Scikit-learn (sklearn): This is the primary tool for machine learning, offering a variety of algorithms for classification, regression, or clustering, among others.
- PyTorch: This is the leading tool for deep learning, especially appreciated by the research community due to its flexibility and intuitive design.
- TensorFlow: An alternative framework for deep learning projects.

Research Publications.

- Arxiv: This is a preprint platform where researchers upload their papers before they are officially published. It's a valuable source to keep up with the latest advancements in AI and ML.

Code Repositories, Models, and Datasets.

- GitHub: This is the leading platform for hosting open-source projects. Many ML and DL researchers and developers share their algorithm and technique implementations here, facilitating community collaboration and learning.
- HuggingFace: This is the leading platform for hosting and sharing open-source ML and DL models and datasets.

GPUs (Graphics Processing Units).

GPUs are essential for the efficient processing of neural networks and deep learning tasks.

- Manufacturers like NVIDIA (a standout leader), Google, and Qualcomm are GPU providers.

Cloud Hosting or On-Premises Hosting.

- Cloud Hosting: Platforms like Google Cloud, AWS, and Microsoft Azure offer cloud services that allow for large-scale ML model training and deployment without the need for one's physical infrastructure.
- On-Premises Hosting: This requires having physical servers on the company's premises. It's a preferred option for certain organizations seeking more control or facing security restrictions. The concept of "edge computing" fits here, where processing happens on the device itself, as in the case of an autonomous car.

Introducing AI into Your Company: Mistakes to Avoid.

The adoption of artificial intelligence (AI) within a company presents a significant opportunity to drive efficiency and innovation. However, it's crucial to approach this process with an informed and realistic attitude. Below are some common mistakes organizations often make when introducing AI, along with tips to avoid them:

Overblown Expectations.

- Mistake: expecting AI to be the magic solution to all the company's problems.
- Tip: be realistic about the inherent limitations of AI, considering the technology, data quality, and available engineering resources.

Over-reliance on ML Engineers.

- Mistake: hiring a small group of ML engineers and expecting them to be solely responsible for proposing and developing use cases.
- Tip: it's essential to pair ML engineers with business experts to identify projects that are valuable and technically feasible.

Expecting Immediate Success.

- Mistake: expecting any AI project to run perfectly on the first try.

- Tip: understand that developing AI-based solutions is an iterative process. Multiple cycles of trial and error are required to optimize the models and achieve meaningful results.

Rigidity in Planning.

- Mistake: believing that once a plan is set, it will be implemented without any changes.
- Tip: work closely with the AI team to set realistic time estimates, define clear milestones, determine KPIs, and be willing to adapt as circumstances change.

Waiting for the Perfect Team.

- Mistake: thinking that you need a star-studded AI team from the start to begin working with this technology.
- Tip: it's possible and, in fact, advisable to start with the team you already have. As progress is made and needs are identified, you can continue to build and strengthen the team.

Success in implementing AI in any organization depends as much on technology and methodology as it does on mindset and corporate culture. Avoiding these common mistakes can be a pivotal step towards a successful and beneficial adoption of AI.

How We Can Help You.

At AI Accelera (AIaccelera.com), we offer a comprehensive range of services to businesses looking to integrate AI into their operations and be at the

forefront of this revolution. Among our services for businesses, we highlight:

AI Audit: We identify areas in your company where AI can add value, optimize processes, and reduce costs.

AI Consulting: We provide end-to-end AI services ranging from business analysis to the development and technical implementation of final solutions, thus assisting businesses in effectively applying AI solutions.

External AI Management: If your company doesn't have an AI department, we handle it for you. Outsource with us and get an expert team to manage all your AI-related needs.

Customized AI Training: We offer both in-person and online courses and seminars, tailored specifically to your team's needs, ensuring they stay updated with the latest AI trends and techniques.

AI Professional Recruitment: We assist businesses in finding and hiring the right talent in the field of AI, ensuring they have highly qualified experts on their team.

Mentoring for AI Students and Professionals: We offer coaching and mentoring services for those looking to deepen their knowledge and skills in AI.

AI Talks and Conferences: We give talks and conferences on AI, sharing knowledge and promoting networking.

AI Event Organization: We organize AI-centered events, from seminars to congresses.

With the right support, the future of AI in your company is bright, and the possibilities are virtually endless.

Contact Us.

If you want more information about our services, get in touch with us by sending an email to info@AIaccelera.com.

Join Our Team.

We are always interested in meeting interesting individuals.

If you're passionate about AI and want to be part of a team with an Olympic spirit, reach out to us by sending an email to info@AIaccelera.com. We're interested in both technical and business profiles. And if you don't yet have the right training, you can learn with us.

Collaborate with Us.

We are always eager to discover intriguing collaboration opportunities.

If you work at an agency, consultancy, incubator, development agency, business school, training center, or any other type of organization that you believe we can collaborate with, please get in touch by sending an email to info@AIaccelera.com.

AI and Employment: Opportunities and Threats

Will AI Replace or Change Your Job?

In March 2023, the investment bank Goldman Sachs released a report analyzing the impact AI will have on various professions within the U.S. economy. Below are the key findings from the report:

AI will replace 7% of jobs.

7% of current employment in the U.S. could be replaced by AI. The job areas most susceptible to replacement are administrative functions, which

have a 46% probability of being replaced, and legal jobs, with a 44% probability.

AI will complement 63% of jobs.

63% of current jobs in the U.S. will be complemented, meaning AI would act as a tool assisting workers rather than replacing them.

Occupations that would benefit the most from this complementation include architecture and engineering (37%), life, physical, and social sciences (36%), business and financial operations (35%), and many other roles ranging between 19% and 35% complementation.

It's important to note that nearly all industries (25%) would experience some degree of complementation by AI.

AI will not significantly affect 30% of jobs.

30% of current jobs in the U.S. would not be significantly impacted by AI. Occupations in this category include production (9%), construction and extraction (6%), installation, maintenance, and repair (4%), and building and grounds cleaning and maintenance (1%).

Final Thoughts.

The true magnitude of AI's impact on the job market will depend on factors such as the adaptability of the workforce, training and reeducation, and the evolution of job demand in response to partial labor savings across most occupations.

As we will see later on, although AI can replace certain tasks, it also has the potential to create new job opportunities and to enhance efficiency and quality in many occupations.

In conclusion, AI has the potential to significantly transform the job landscape, but it also offers opportunities to complement and enhance human work. It is essential for businesses, governments, and educators to be prepared to adapt and make the most of the opportunities this technology offers.

Jobs Most Affected by AI.

The Goldman Sachs report delved into the impact that AI will have on various professions, scoring from 0 to 100 the degree to which each job will be affected:

Jobs that will be greatly affected by AI.

- Administrative Jobs (impact 45 out of 100): this category encompasses a variety of roles, detailed below.

- **Administrative Assistants:** perform a wide array of administrative and office tasks such as answering phone calls, scheduling appointments, drafting correspondence, filing, and data entry.
- **Receptionists:** greet visitors, answer phone calls, direct calls to appropriate staff, and provide general information about the organization.
- **Data Entry Clerks:** input data into computer systems, databases, or spreadsheets and verify the accuracy of the data entered.

KEYS TO ARTIFICIAL INTELLIGENCE

- **File Clerks:** maintain and organize files, documents, and records, and retrieve information upon request.
 - **Mail Clerks:** sort, distribute, and process incoming and outgoing mail, including packages and documents.
 - **Office Clerks:** provide general support to office operations including answering phone calls, filing, organizing and maintaining office supplies, and performing various administrative tasks.
 - **Customer Service Representatives:** interact with customers and clients, handle inquiries, complaints, and requests, and provide information about products and services.
 - **Accounting Clerks:** perform basic accounting tasks such as billing, invoices, accounts payable and receivable, and bookkeeping.
 - **Human Resources Assistants:** support HR staff, performing tasks like scheduling interviews, processing paperwork, and maintaining employee records.
 - **Legal Assistants:** provide administrative support to lawyers and other legal professionals, performing tasks like drafting legal documents, organizing case files, and conducting research.
- **Professionals (34%):** although professional roles require a level of specialization, some of their tasks can be assisted or enhanced with AI.
- **Technical Professionals and Associates (31%):** these roles might include technicians in areas like health, engineering, or information technology.

Jobs with medium impact.

- Managers (29%): even though management requires human leadership skills, parts of their responsibilities, such as data-driven decision making, can be assisted by AI.
- Military Occupations (22%): some military tasks can be automated or assisted by technology, though human judgment will still be essential.
- Skilled Agricultural, Forestry, and Fishing Workers (21%): although many of these roles require manual skills, automation can assist in specific tasks.

Jobs that will be slightly affected by AI.

- Service and Sales Workers (15%): many roles in sales and services can be assisted by AI, but the human touch will remain crucial for customer interactions.

Jobs that will hardly be affected by AI.

- Elementary Occupations (8%), Machinery Operators, Assemblers (7%), and Skilled Trades Workers (4%): these roles often require specific manual skills and human judgment that is hard to replicate with current technology.

Some Examples of How AI Changes Jobs.

Artificial Intelligence (AI) and Data Science (DS) are revolutionizing multiple sectors and industries, changing the way people work and carry out their daily tasks. These advancements are not only present in technical or engineering occupations, but they are permeating almost every work area.

Below are some examples of how AI and DS are reshaping various professions:

Sales.

- Data Science: Provides deep insights into how customers behave and how to optimize the online sales funnel. These insights can help businesses identify trends and patterns that might not be evident at first glance.
- Machine Learning: ML tools can automate tasks like prioritizing prospects based on various factors like previous customer behavior, potentially leading to a significant boost in sales productivity.

Factory Management.

- Data Science: Helps identify patterns that might lead to the production of defective products, allowing companies to take corrective action.
- Machine Learning: ML systems can be trained to detect defective products in real-time, reducing costs and improving the final product quality.

Recruitment.

- Data Science: Provides insights into which recruitment strategies work best and which ones don't.
- Machine Learning: ML tools can automatically review resumes and rank them based on suitability for a position, potentially streamlining the recruitment process and improving the quality of selected candidates.

Marketing.

- Data Science: A/B test analyses allow marketing teams to identify which strategies work best for different customer segments.
- Machine Learning: ML-based recommendation systems can personalize the customer experience by suggesting products based on their past behavior, potentially leading to a boost in sales.

Agriculture.

- Data Science: Farmers can glean data insights about crop health, soil conditions, and other critical factors.
- Machine Learning: ML systems can be used to automate tasks like weed removal or disease detection in crops, leading to what's called precision agriculture.

In summary, AI and DS are not limited to transforming technical or specific roles. They are changing how we work and operate across nearly all industries and job functions.

Businesses that embrace these technologies and integrate them into their daily operations are likely to stay at the forefront and be more competitive in today's market.

Main Functional Areas Affected by AI in the Business.

Understanding which functional areas of a business will be most affected by AI is valuable information for grasping the impact of AI on employment. Refer to this issue in the chapter "How to Introduce AI into Your Business."

New Employment Opportunities Related to AI.

60% of today's workers are employed in occupations that didn't exist in 1940. 80% of employment growth in the last 80 years is explained by the creation of new positions driven by technology.

New Professions.

Artificial Intelligence (AI) is reshaping the job landscape, just like the industrial revolution, the advent of the personal computer, and the rise of the Internet did. As AI integrates into various industries and sectors, it's creating new employment opportunities while transforming or displacing other jobs. Here are some of the new job opportunities related to AI:

AI Director: For a detailed understanding of this role's responsibilities, see the chapter "How to Introduce AI into Your Business."

AI Engineer: We will delve into this role later in this same chapter.

Prompt Engineer: This is a more complex function than it seems at first glance, as its value goes far beyond simple prompts and delves into prompts within computer programs.

Machine Learning Engineer: They are responsible for developing, training, and refining models that use large data sets to make predictions or decisions without human intervention.

Natural Language Processing (NLP) Specialist: They work on technologies that enable machines to read, understand, and respond to human language.

Chatbot Developer: They design and build programs that simulate human conversations, commonly used in customer service.

Computer Vision Specialist: They specialize in teaching machines how to interpret and act based on the visual information of the world.

Data Scientist: They analyze large raw data sets to find patterns and extract valuable insights.

Robotics Specialist: They work on creating and improving robots that can perform tasks previously done by humans.

AI Ethics Analyst: They evaluate and ensure that AI applications are developed and used ethically and fairly.

AI Security Specialist: They are responsible for protecting AI systems against threats and vulnerabilities.

AI Trainer or Instructor: They assist machines in learning efficiently through teaching and training.

AI Project Manager: They coordinate and manage AI-related projects, ensuring objectives are met and delivered on time.

AI Transformation Consultant: They assist businesses in integrating AI solutions into their daily operations and long-term strategies.

Human-Machine Interaction Designer: They focus on how people interact with AI and design smooth and natural experiences.

AI Regulation and Compliance Specialist: They ensure AI solutions comply with relevant regulations and laws.

These are just some of the many emerging opportunities in the field of AI.

It's important to note that, like any technological advancement, AI will also displace certain jobs. However, technology has a proven track record of creating new roles and opportunities in the job market.

Those who invest in acquiring AI-related skills will be well-positioned to seize these opportunities in the future.

A Key Profession: The New AI Engineers.

New technological challenges give rise to new professions. Every time a new group of professionals emerges with a completely different background, speaking a different language, producing a completely different set of products, and using a completely different set of tools, a new profession is born.

This very thing happened recently with "Site Reliability Engineers", "DevOps Engineers", "Data Engineers", and "Analytics Engineers". Similarly, the new challenges of AI are starting to produce new engineers with distinct features and tools:

- UX for AI applications.
- AI application development tools.
- AI application infrastructure.
- AI agents.
- New LLM tools, including Langchain, vector databases, etc.
- Open-source models (training, fine-tuning, inference, evaluation, etc).

- Etc.

These engineers don't yet have a standardized title, although in the United States the term "AI Engineer" is starting to be used to refer to them. Other names like LLM App Developer, LLMOps Engineer, or AI Manager are also used.

Today, there are still ten times more job offers for classic ML engineers than for the new AI engineers, but the rapid growth of the latter suggests that this ratio will invert soon.

As recently acknowledged by Andrej Karpathy, one of the most influential engineers in the AI world, these are likely to be the most in-demand professions of the next decade.

From ML Engineer to AI Engineer.

While classic ML focuses on tasks such as fraud detection, recommendation systems, and product anomaly detection, the new AI engineers build text-based applications, personalized learning tools, natural language spreadsheets, or visual programming languages like Factorio.

A Salary of \$900,000 a Year.

The top AI engineers earn close to \$900,000 a year at OpenAI. More and more companies, including Microsoft, Google, Facebook, and Tesla, are entering the bidding war for this new professional segment.

The new AI engineers are applying the latest advancements in this field and turning them into real products used by millions of users virtually overnight. This is happening both in large corporations and in cutting-edge startups like Figma, Vercel, Notion, Photo/InteriorAI, or Scale AI.

In the vast majority of cases, when it comes to developing AI products, companies are looking for engineers, not researchers.

Why is the New AI Engineer Emerging Now?

The emergence of the new AI Engineer reflects the evolution and maturation of the field of Artificial Intelligence, especially concerning Large Language Models (LLMs). Here are some underlying reasons and factors leading to this phenomenon:

1. Technological Advancements: The development and refinement of LLMs have opened up new application possibilities beyond traditional ML capabilities. These models, with their ability to understand and generate language, have become powerful tools in a range of applications, from chatbots to programming assistants and beyond.

The applications of the new LLMs are so wide-ranging that they far exceed the realm of classic ML engineers. And one of the best ways to master them is simply to practice with the LLM, integrate it with other tools or programs, and add sector-specific knowledge.

2. Accessibility: While in the past, training and deploying ML models required deep and specialized knowledge, current tools and platforms have democratized access. APIs and tools provided by major companies enable engineers and developers without in-depth ML knowledge to integrate advanced AI capabilities into their applications.

3. Market Demand: With the growth and adoption of AI in the industry, there's an increasing demand for professionals who can bridge the gap between cutting-edge research and practical application in products and services. This demand goes beyond purely academic researchers and extends to those who can apply AI in real-world contexts.

Large companies have monopolized classic ML researchers. Supply constraints indicate that an "intermediate" class of AI Engineers will emerge to meet the demand.

4. Diversity of Applications: Given the versatility of LLMs, applications are vast and span different industries and domains. This requires a combination of technical skills with domain-specific knowledge to craft effective, tailored solutions.

5. Shifting Ecosystem: Major tech companies have recognized the importance and value of AI and have heavily invested in attracting research talent. However, this has led to a shortage of experts available for the rest of the ecosystem. This shortage has driven the need to train and upskill a new generation of engineers who can work with commercially available AI tools and services.

In summary, the rise of the new AI Engineer is a natural response to the confluence of technological advancements, market demand, and shifts in the AI ecosystem. These professionals will play a pivotal role in the next phase of AI adoption and expansion in the industry and society at large.

How is the New AI Engineer Trained?

Most companies still view the new AI Engineering as a form of Machine Learning or Data Engineering, so they post job offers with requirements similar to these classic professions.

However, the skills used by the best AI engineers in Silicon Valley often don't come from classic Machine Learning or Data Science studies.

For a detailed look into this, refer to the chapter "Training for the New AI".

From Classic ML to the New AI.

It's crucial to understand how the AI professional has evolved. Dive deeper into this topic in the chapters "Disruption: The New AI and the Old AI" and "Training for the New AI".

The New Way of Programming: Software 3.0

Just over 5 years ago, Andrej Karpathy coined the term "Software 2.0" to refer to the new way of programming that arises with Machine Learning: instead of programming instruction by instruction, with ML we introduce a data sample and a partial result to the computer so that it designs a program that finds the result for a much larger data sample.

This year, Karpathy wrote that the new programming language is... the English language. With this, Karpathy is referring to the fact that today the AI engineer asks in colloquial language (whether it's English, Spanish, or any other) for the LLM model what they want the LLM model to write in Python, Java, Javascript, or any other desired language. This is already happening: today, AI engineers work hand in hand with our LLM assistant to develop AI software solutions.

The term "Software 3.0" represents a qualitative leap in the way software is developed:

1. **Software 1.0:** Here, developers write each line of code. Programming is manual and is based on traditional logic and control structures.
2. **Software 2.0:** With the advent of Machine Learning, programming becomes a mix of traditional code and trained models. Instead of writing explicit logic, we train models with data to learn to perform specific tasks.

3. Software 3.0: This phase focuses on interacting with large-scale language models (LLMs) using natural language. Developers communicate with the models in human terms, and these models generate or suggest code. It's a collaboration between humans and machines, where the LLM model acts as a programming assistant.

The AI engineer is increasingly becoming more of a programming director than a programmer: they will direct the programming of the LLM assistant, whether it's the LLM directly or an agent built on the LLM like smol-developer, Codium AI, Codegen.ai, Morph/Rift, and other similar initiatives.

Mind you, this doesn't mean that the AI engineer shouldn't know how to program. Just as a sales director needs to know how to sell in order to direct salespeople, the AI engineer needs to know how to program in order to direct an LLM programming assistant.

The role of code written by people to orchestrate and supplant the power of the LLM remains relevant, hence the popularity of new frameworks that work along those lines, such as Langchain or Voyager.

Unlike the world of web applications, dominated by the Javascript language and its libraries, the AI world is dominated by the Python language and its libraries. However, in recent years it has also opened up to the Javascript universe with compatible initiatives such as Langchain, Transformers, and Vercel.

How Can We Help You?

At AI Accelera (AIaccelera.com), we offer a comprehensive range of services to individuals interested in working in AI, as well as AI professionals who want to be at the forefront of this revolution. Some of our standout services include:

Customized AI Training: We conduct both in-person and online courses and seminars, specifically designed to meet your team's needs, ensuring they stay up-to-date with the latest AI trends and techniques.

AI Professional Recruitment: We assist companies in finding and hiring the right talent in the field of AI, ensuring they have highly skilled experts on their team.

Mentoring for AI Students and Professionals: We offer coaching and mentoring services for those looking to deepen their knowledge and skills in AI.

AI Talks and Conferences: We deliver talks and conferences on AI, sharing knowledge and promoting networking.

AI Event Organization: We organize AI-centric events, ranging from seminars to congresses.

AI is redefining the landscape of technology and business. By choosing to work with a company that offers such a wide range of AI-related services, organizations and individuals ensure they are at the forefront of this revolution, ready to seize all the opportunities AI offers.

With the right support, your future in AI is bright, and the possibilities are virtually endless.

Contact Us.

If you'd like to receive more information about our services, please get in touch by sending an email to info@AIaccelera.com.

Join Our Team.

We're always on the lookout for interesting individuals.

If you're passionate about AI and want to be part of a team with an Olympic spirit, reach out to us by sending an email to info@AIaccelera.com. We're interested in both technical and business profiles. And if you don't yet have the appropriate training, you can learn with us.

Collaborate with Us.

We're always eager to explore interesting collaboration opportunities.

If you work in an agency, consultancy, incubator, development agency, business school, training center, or any other type of organization that you believe we can collaborate with, please get in touch by sending an email to info@AIaccelera.com.

Training for the New AI

How is the new AI engineer trained?

In the current technological landscape, many companies still perceive modern AI Engineering merely as an extension of Machine Learning or Data Engineering. As a result, their job offerings often list requirements aligned with the traditional competencies of these fields.

However, the skills that set apart the top AI engineers from Silicon Valley don't come from conventional Machine Learning or Data Science programs.

While traditional Machine Learning has focused on tasks such as fraud detection, recommendation systems, and identifying product anomalies,

the new AI engineers work on areas like developing text-based applications, personalized learning tools, spreadsheets with natural language processing, or visual programming languages akin to Factorio.

This new AI Engineer profile reflects the evolution of Artificial Intelligence. In this context, Large Language Models (LLMs) play the starring role. The optimization of these LLMs and their integration with many other tools have given rise to a new type of application that goes beyond typical Machine Learning skills. Due to their ability to understand and produce text language or software code, these models have emerged as the key to a new generation of AI applications.

The scope and versatility offered by modern LLMs far exceed the competencies of traditional Machine Learning engineers. It's only a matter of time before the entire job market recognizes this and adjusts its expectations to this new reality.

Training for Future AI Engineers.

Artificial Intelligence (AI) has witnessed rapid growth and constant evolution over the past decades. While previously it was believed that an AI engineer was primarily trained in the fundamentals of Machine Learning and Data Science, the current landscape demands a more diverse and specialized education. Below, we break down the key areas that every aspiring modern AI engineer should consider.

1. Data Science.

Data Science remains essential for any AI engineer. This discipline provides the skills needed to collect, analyze, and interpret large data sets, which are at the core of most AI applications.

2. Machine Learning.

Traditional Machine Learning still plays a vital role. Competencies in supervised and unsupervised learning techniques, recommendation systems, and reinforcement learning are essential.

3. Deep Learning.

With the popularity of neural networks, Deep Learning has earned a prominent place in the world of AI. It's crucial to understand how neural networks work, how to train them, and how they can be applied to various problems, from image processing to text analysis.

4. Generative Artificial Intelligence and Large Language Models (LLM).

One of the most exciting and revolutionary areas of modern AI is generative, especially in relation to LLMs. These models, like ChatGPT from OpenAI, have proven to be powerful tools for a variety of applications, from chatbots to programming assistants.

5. Application Development with LLMs.

In addition to understanding how LLMs operate, it's crucial to know how to integrate them into real applications. This includes developing applications based on text and code, personalized learning tools, and systems that leverage natural language processing.

6. Specific Tools and Platforms.

The world of AI is filled with tools and platforms that facilitate the development and deployment of solutions. Familiarizing oneself with platforms like Kaggle, as well as specific tools such as PyTorch, Langchain, and Streamlit, is essential.

7. Software Development and Programming.

Last but not least, AI engineers must be proficient programmers. Mastery of programming languages like Python and related libraries is fundamental. For more information on "software 3.0", refer to the chapter "AI and Jobs: Opportunities and Threats".

The training of an AI engineer has evolved to reflect the changing demands and expanding possibilities of the field. Those wishing to enter this realm should be prepared to embark on a journey of continuous learning, adapting to new tools, techniques, and paradigms that constantly emerge. With a solid foundation and an open mindset, the future for AI engineers is bright and full of limitless opportunities.

A real-life case: the educational journey of a new AI engineer.

I'll share my own educational experience as a new AI engineer.

On the day of chatGPT's launch, I knew that Artificial Intelligence would be my main focus for the coming years, a field where I had much to learn and where I could apply many of the lessons from my previous professional stage.

Since the new phase of Generative AI was being invented in real-time, as of November 2022, there was no structured educational program covering all the main keys to AI. For that reason, I decided to build my own learning itinerary by combining the best traditional programs with the latest generation courses and as many practical exercises as possible. Specifically, I focused on five areas:

1. Data Science.
2. Machine Learning.
3. Deep Learning.
4. Disruptive features of the new Generative AI.
5. Application Development with LLM.

Below is a detailed list of all the certified courses taken at different centers, among which the following stand out:

- Stanford University.
- DeepLearning.ai.
- Datamecum.
- Generative AI 360º: Foundational Models Certification.
- Kaggle.

List of courses completed by areas.

Area of Generative AI, LLM Specialization (Generative Artificial Intelligence, Specialization in LLMs like ChatGPT from OpenAI)

- LLM Bootcamp: LLM App Development and LLMOps. Intensive course taught by Full Stack Center, University of Berkeley.
- LLMs, Langchain and Vector Databases in Production. Practical course certified by ActiveLoop, Towards AI, and Intel Disrupt.

- Generative AI with Large Language Models. Course led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI) and AWS.
- Langchain for LLM Application Development. Course led by Harrison Chase (CEO of Langchain) and Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI).
- Chat with your Data. Course led by Harrison Chase (CEO of Langchain) and Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI).
- Building Systems with the ChatGPT API. Course led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI).
- ChatGPT Prompt Engineering for Developers. Course led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI).
- Other non-accredited courses related to this area.
 - Quick start Langchain.
 - Quick start Streamlit.
 - Quick start DeepLake.
 - Quick start Pinecone.
 - Quick start OpenAI API.

Area of Deep Learning and Neural Networks.

- Specialization Program in Deep Learning from Stanford University. Program led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI). Courses included in this specialization program:
 - Neural Networks and Deep Learning.

- Improving Deep Neural Networks: hyperparameter tuning, regularization and optimization.
- Structuring Machine Learning projects.
Convolutional Neural Networks .
- Sequence Models.
- Pytorch for Deep Learning in 2023: from Zero to Mastery. Udemy, led by Daniel Bourke.
- Other non-accredited courses and projects related to this area.
 - Deep Learning for Coders. Course led by Jeremy Howard, director of Fast.AI.

Area of Machine Learning and Data Science.

- Specialization Program in Machine Learning from Stanford University. Program led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI). Courses included in this specialization program:
 - Supervised Machine Learning: Regression and Classification.
 - Advanced Learning Algorithms.
 - Unsupervised Learning, Recommenders, Reinforcement Learning.
- Complete Machine Learning and Data Science Bootcamp in 2023: from Zero to Mastery. Udemy course led by Daniel Bourke. The curriculum includes the use of the basic Machine Learning stack:
 - Exploratory Data Analysis.
 - Data Visualization.
 - Data cleaning.
 - Data engineering.
 - Dashboards.
 - Anaconda.
 - Jupyter Notebooks.

- Google Collab.
 - Pandas.
 - Numpy.
 - Matplotlib.
 - Seaborn.
 - ScikitLearn.
- Intensive Technical Program in Data Science. Datamecum. Program led by Emilio Soria, professor at the University of Valencia and director of the Master's in Data Science and the Master's in Artificial Intelligence at that University. Former director of the Master's in Data Science and Machine Learning at the MBIT Business School in Madrid. The curriculum includes the use of the basic Machine Learning stack:
 - Exploratory Data Analysis.
 - Data Visualization.
 - Data cleaning.
 - Data engineering.
 - Dashboards.
 - Anaconda.
 - Jupyter Notebooks.
 - Google Collab.
 - Pandas.
 - Numpy.
 - Matplotlib.
 - Seaborn.
 - ScikitLearn.
- Other non-accredited courses and projects related to this area.
 - Completed several Machine Learning projects in the top 10% on Kaggle, the world's leading platform, achieving the level of Kaggle Contributor.

Area of AI (Artificial Intelligence): generalist approach.

- AI for Everyone. Course led by Andrew Ng (AI professor at Stanford University and director of DeepLearning.AI).

Area of software development with the Python programming language.

- Course: The Complete Python Pro Bootcamp for 2023. Udemy. Practical course led by Angela Yu, director of the App Brewery Dev BootCamp in London. The curriculum includes the use of the advanced Python stack:
 - Functional Programming.
 - Object-Oriented Programming (OOP).
 - Web Scraping. Beautiful Soup, Selenium Web Driver.
 - APIs.
 - App development.
 - Etc.
- Other non-accredited courses and projects related to this area.
 - Visual Studio Code for Developers 2023. Udemy. Practical course led by Estefania Cassingena.
 - GitHub Copilot 2023. Udemy. Practical course led by Tom Phillips.

The alternative: a simplified and accelerated training.

My experience as a student from the long list of courses mentioned in the previous point has taught me that training as a new AI engineer today is an

extraordinarily demanding and complicated task. It requires learning from sources that are not only very diverse but are also mainly in English.

With the aim of making this training easier, more accessible, and faster for others, at AI Accelera we have designed a formidable offer of online and offline courses for both people with a technical profile and those with a business profile. Among our courses, which are also designed ad hoc and are taught in companies and organizations, you can find the following:

- Business AI Course.
- Employment in AI Course.
- Practical course for employment: Data Analyst.
- Practical course for employment: Machine Learning.
- Practical course for employment: LLM App Developer.
- Practical course for employment: Python Programmer.
- Practical course for employment: MLOps Engineer.
- Practical course for employment: LLMOps Engineer.

How can we help you?

From AI Accelera ([AIaccelera.com](https://aiaccelera.com)), we offer a complete range of services to individuals interested in learning AI, as well as AI professionals who want to continue training to be at the forefront of this revolution. Among our services, we highlight:

Ad-hoc AI Training: We offer courses and seminars both in-person and online, specifically designed for your team's needs, ensuring they are up-to-date with the latest AI trends and techniques.

AI Professional Selection: We assist companies in finding and hiring the right talent in the AI field, ensuring they have highly qualified experts on their team.

Mentoring for AI Students and Professionals: We provide coaching and mentoring services for those looking to deepen their knowledge and skills in AI.

AI Conferences and Talks: We conduct talks and conferences on AI, sharing knowledge and promoting networking.

AI Events Organization: We organize AI-focused events, from seminars to conferences.

AI is redefining the technology and business landscape. By choosing to work with a company that offers such a wide range of AI-related services, organizations and individuals ensure they are at the forefront of this revolution, prepared to take advantage of all the opportunities AI offers.

With the right support, your future in AI is bright, and the possibilities are virtually endless.

Contact us.

If you want to receive more information about our services, get in touch with us by sending an email to info@AIaccelera.com.

Join our team.

We are always interested in meeting intriguing individuals.

If you are passionate about AI and want to be part of a team with an Olympic spirit, contact us by sending an email to info@AIaccelera.com. We are interested in both technical and business profiles. And if you don't yet have the appropriate training, you can learn with us.

Collaborate with us.

We are always eager to explore interesting collaboration opportunities.

If you work at an agency, consultancy, incubator, development agency, business school, training center, or any other type of organization you believe we could collaborate with, get in touch with us by sending an email to info@AIaccelera.com.

Keys to Creating an AI Startup

Introduction: The opportunity of a lifetime.

It has never been easier to create an AI startup.

Today, we are at a turning point in the tech ecosystem. The availability of foundational large-scale AI models allows startups to launch innovative solutions in a matter of weeks.

These models, which continue to improve in terms of cost and efficiency, are a vital tool for founders with bold visions of transforming entire industries and creating entirely new experiences.

A challenge for big corporations, an opportunity for AI startups.

Despite the enormous promise these technologies offer, big corporations find themselves in a tricky position. The rapid pace at which AI is advancing is overwhelming, and the bureaucratic structures of large corporations often hinder swift adoption and adaptation.

Big businesses struggle to keep up with the latest research, and their decisions are hampered by the need to focus on short-term financial outcomes and change management.

In this scenario, startups have an inherent advantage: their agility and ability to innovate without constraints.

Startups and the Artificial Intelligence revolution.

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of our age. It represents an unprecedented opportunity to innovate and create value across a variety of industries.

As we dive into this new technological wave, it's essential to understand how it's changing the business landscape and what opportunities it presents for startups and entrepreneurs.

AI is no longer a promise.

AI is not a fleeting trend; it's redefining how businesses operate and interact with their customers.

Recent advancements, like DALL·E2 and ChatGPT, have captured the public's imagination and showcased the practical potential of AI.

Although we're still in the early stages, the rapid pace at which the technology is evolving suggests a horizon full of possibilities.

Startups are at the epicenter of the AI opportunity.

Startups are uniquely positioned to leverage the advantages of AI and take it to the next level.

Renowned incubators like Y Combinator are propelling AI-focused startups, underscoring the sector's interest and potential. These startups are not only exploring how AI can enhance existing solutions but also how it can create entirely new markets.

From prototype to AI product.

While it's easier than ever to build prototypes and demos, the real test for startups is being able to move from the demo phase to building robust and scalable products.

AI startups must focus not just on technology but also on understanding market needs and adapting swiftly.

Niche Focus.

With as many possibilities as the new AI opens up, it's essential for startups to focus on specific areas, whether enterprise solutions, market niches, or sectorial problems.

Looking to the future.

While tech giants like Google and Facebook dominated the early waves of the Internet, it remains to be seen who will lead the AI revolution.

Startups that can combine technical skills with a deep understanding of customer needs will be at an advantage.

A paradigm shift.

AI is more than just a technological tool; it's a paradigm shift that's redefining how businesses operate and serve their customers.

Startups, with their agility and innovative focus, are at the forefront of this revolution, and the opportunities to create value are immense.

The success of the AI startup will depend not just on technology: it will require vision, adaptability, and a deep understanding of market needs.

Startups of the new AI phase vs. startups of the birth of the Internet.

Often, the potential to create startups from the new AI is compared to what the birth of the Internet once had. This comparison seems appropriate, but some clarifications should be made as outlined below.

Similarities.

Change potential: Both technological waves, both the birth of the Internet and the new phase of AI, presented revolutionary potential. The Internet changed the way people communicate, shop, work, and entertain, while AI

promises to transform how we make decisions, interact with technology, and process vast amounts of data.

Initial confusion: Every time a revolutionary technology emerges, there's a "wild west" period where norms and best practices are not yet established. Both in the early days of the Internet and in the current phase of AI, there was and is a lot of experimentation and learning.

Early disappearance: In both eras, many startups fail to get past the initial phase. During the dot-com bubble, many companies vanished, and it's likely we'll see a similar pattern with AI startups as the market matures and consolidates.

Learning from scratch: Both in the early days of the Internet and in the new AI phase, there's a significant learning curve. Although parallels and lessons from the past may exist, each era has its own unique challenges and opportunities.

Differences.

Key hardware cost: While startups in the early days of the Internet primarily focused on software and web-based services, many AI startups require significant investments in specialized hardware (e.g., GPUs) for training and deploying advanced models.

Focus on the enterprise segment: In the early days of the Internet, many startups were consumer-oriented, looking to capitalize on the growing base of Internet users. Although there are also consumer-focused AI startups, given the technical nature and clear benefits for business operations, we are likely to see a strong focus on enterprise solutions - especially aimed at the enterprise segment - in the new AI phase.

Both periods, the birth of the Internet and the new AI phase, represent disruptive moments in technological history. However, each has its own characteristics, challenges, and opportunities.

Opportunities for AI Startups.

The number of opportunities that the new AI opens up for new startups is so vast that it would be presumptuous to try to present them all. We will settle for presenting a broad list of forecasts, ideas, and new projects that are already working in the upcoming points. All of them can serve as inspiration for future entrepreneurs.

Finally, let's not forget that - just as with the birth of the Internet - many AI opportunities are not yet evident.

Short-term Opportunities.

Building infrastructures for AI startups to be created is an opportunity in itself:

Hardware: The demand for GPUs and other specialized computational resources is on the rise. Companies that can provide these affordable and efficient tools will have an advantage.

Software: Tools and platforms that facilitate the creation, implementation, and management of AI-based solutions, such as training platforms, frameworks, and orchestration solutions.

Complementary enterprise applications: Currently, with special interest in the enterprise segment, companies are looking for AI-based solutions that they can easily integrate into their existing operations to improve efficiency, reduce costs, and gain valuable insights.

Many of the first applications will disappear: As AI technology remains a novelty, many applications and solutions will emerge that, although innovative, may not have long-term value or sustainable demand.

Medium-term Opportunities.

Personal assistants for everyone: With the evolution of LLMs and other AI technologies, it's likely we'll see an increase in the adoption of personalized AI assistants that can assist in all kinds of daily tasks, learning, entertainment, and more.

AI in every sector and company: From health to transportation, through finance and education, AI will find its place in every sector, optimizing and transforming operations.

AI manager in every company: As companies integrate more AI solutions, the need for roles dedicated to managing, supervising, and planning around these technologies will emerge.

Proliferation of AI consultancies: Before companies establish internal roles dedicated to AI, they are likely to seek the expertise of specialized consultancies to guide their initial efforts and strategies in adopting AI.

Overall, the AI landscape is filled with both immediate and medium-term opportunities. Companies and professionals who position themselves appropriately and keep up with advances in the field will be better prepared to seize these opportunities and lead in their respective sectors.

Disruptive Changes Driven by AI.

Discover the areas of disruptive change introduced by AI where your startup can provide solutions. Refer to this topic in the chapter “Disruption: The New AI and the Old AI”.

Sectors Most Affected by AI.

Learn about the business sectors that will be most impacted by AI and where your startup can provide solutions. Refer to this topic in the chapter “How to Introduce AI into Your Business”.

Main Company Areas Affected by AI.

Discover the areas within a company that will be most impacted by AI and where your startup can provide solutions. Refer to this topic in the chapter “How to Introduce AI into Your Business”.

Jobs Most Affected by AI.

Learn about the jobs that will be most impacted by AI and where your startup can provide solutions. Refer to this topic in the chapter “AI and Jobs: Opportunities and Threats”.

Learn from the Top 20 AI Startups by Investment Volume.

Understanding successful startups is a great source of inspiration for future entrepreneurs.

Next, we'll explore the top 20 artificial intelligence (AI) startups that have received the most investment up until August 2023.

Although the global AI market was valued at \$136 billion in 2022, it's growing at a compounded annual rate of 37.3%.

This remarkable growth is due to the constant research and innovation led by tech giants. Moreover, advanced technologies have been adopted in sectors like automotive, health, commerce, finance, and manufacturing. In the race to access the latest in generative AI, investment in the sector has significantly ramped up in recent months.

The surge in investments in generative AI startups exploded following Microsoft Corporation's \$10 billion investment in OpenAI in the race to access the AI-powered chatbot, ChatGPT. Other companies like NVIDIA Corp (the world's leading GPU manufacturer) have seen a massive stock market surge, with a rise of over 300% thanks to the AI boom.

Small firms focused on AI innovations are also attracting massive investments from tech giants. Toronto-based Cohere raised \$250 million in May, valuing the firm at \$2 billion. The AI video platform, Runaway, has also caught attention, having raised \$100 million in funding with a valuation of \$1.5 billion.

Startups backed by Google, such as Anthropic and the AI-focused cloud startup, CoreWeave, have also raised \$450 million and \$421 million respectively. The investment wave has resulted in a significant increase in the number of AI startups valued at over \$1 billion, with 10 new unicorns just in May 2023. Anthropic is one of those startups that entered the billion-dollar club.

Following, we rank the top 20 AI startups based on the total investment received.

1. OpenAI.

- Funds Raised: \$11.3 billion
- Valuation: Between \$27 and \$29 billion

OpenAI is an artificial intelligence company that researches and develops machine learning solutions for the benefit of humanity. Founded in 2015 by Elon Musk and Sam Altman, it has risen to become the most valuable AI-focused startup.

The company has a long-term vision regarding advancements in AI and its capabilities. Therefore, it collaborates openly with other research organizations and individuals. The company gained prominence after Microsoft invested \$10 billion in it, propelling the development of its AI-powered chatbot, ChatGPT.

Since its inception, the company has raised \$11.3 billion, giving it a valuation between \$27 and \$29 billion.

2. Anthropic.

- Funds Raised: \$1.5 billion
- Valuation: \$4.1 billion

Anthropic presents itself as a security and research company in artificial intelligence. Based in San Francisco, the startup specializes in the development of general AI systems and language models. Earlier this year, Google invested \$300 million in the company.

Founded in 2021, the startup has already developed an intelligent chatbot named Claude that competes with ChatGPT. The company has raised a total of \$1.5 billion in five rounds. The latest was for \$450 million, valuing the company at around \$4.1 billion.

3. Inflection AI.

- Funds Raised: \$1.5 billion
- Valuation: \$4 billion

Inflection AI is a startup that leads an artificial intelligence studio specialized in the development of human-computer interactions. The company's solutions allow people to converse with a computer program named Pi in a conversational manner.

The AI startup has raised a total of \$1.5 billion in two funding rounds. This gives the startup, co-founded by Mustafa Suleyman, co-founder of Google DeepMind, a valuation of \$4 billion.

4. Tempus.

- Funds Raised: \$1.3 billion
- Valuation: \$8.1 billion

Founded in 2015, Tempus is an AI company based in Chicago that develops precision medicine solutions using multimodal patient data. It owns one of the largest libraries of clinical and molecular data, which it uses to customize clinical solutions. It specializes in genomic sequencing, offering DNA and RNA sequencing tests.

The company also collaborates with healthcare systems and academic institutions to collect and aggregate clinical data. Additionally, it sells curated and anonymous data to pharmaceutical companies.

The company has conducted more than 13 rounds and has raised \$1.3 billion, which it has used to improve the development of its AI solutions. Its latest funding was last year through a debt financing round, giving it a valuation of \$8.1 billion.

5. Dataiku.

- Funds Raised: \$846.8 million
- Valuation: \$3.7 billion

Dataiku is a data science studio founded in 2013 in Paris by Florian Douetteau, Clement Senac, Thomas Cabrol, and Marc Batty. It offers a data science software platform for data professionals, data scientists, data engineers, and data analysts. Its centralized workspace facilitates the exploration and sharing of analyses, as well as the creation of artificial intelligence models.

The startup has established itself as a pioneer in everyday AI, striving to help everyone, from technical teams to business leaders, use data to make more informed decisions. The company has raised a total of \$846.8 million in 11 rounds. Last year, towards the end, it secured \$200 million, reaching a valuation of \$3.7 billion.

6. Highspot.

- Funds Raised: \$644 million
- Valuation: \$3.5 billion

Highspot has established itself as a trusted marketing startup. The company operates an AI-based sales enablement platform that leverages machine learning technology to guide sales professionals in everything they do.

The AI-powered tools allow users to organize marketing content to train representatives and make data-driven decisions, acting as a comprehensive sales enablement platform.

Since its inception in 2012, the company has raised close to \$644 million in 10 funding rounds, giving it a valuation of over \$3.5 billion.

7. AlphaSense.

- Funds Raised: \$620 million
- Valuation: \$2.5 billion

AlphaSense has elevated the art of marketing to a new level with the help of artificial intelligence. With over 2,000 clients, including most S&P 500 companies, the firm uses artificial intelligence to create a search engine for data analysis for corporations and financial firms.

The use of artificial intelligence has enabled professionals to make critical and informed decisions. Its main tool is "Smart Summaries", which provides summaries of content, such as earnings calls. The company has raised nearly \$620 million, with the last \$100 million in a funding round valuing it at \$2.5 billion.

8. Shield AI.

- Funds Raised: \$573.1 million
- Valuation: \$2.4 billion

Shield AI is one of the fastest-growing defense technology companies leveraging artificial intelligence technology to develop autonomous systems for military applications. With the aid of generative AI, it has developed proprietary technology that uses advanced algorithms and sensors to control and navigate unmanned systems in complex environments.

Its primary goal is to develop AI-powered systems capable of protecting service members and civilians. As a result, it has developed drones and aircraft capable of operating autonomously without GPS communications or a pilot. Its solutions are commonly used for resonance surveillance and other mission-critical tasks.

Founded in 2015 and based in San Diego, California, the company has raised close to \$573.1 million, achieving a valuation near \$2.4 billion.

9. Builder.ai.

- Funds Raised: \$450 million
- Valuation: \$2 billion

Builder.ai is an emerging startup that's making it easier for people to create apps using artificial intelligence. It offers an AI-powered software application that helps people build and operate software projects exactly as they need them, without requiring technical know-how.

The company has raised close to \$450 million, which have been essential in developing an AI-powered no-code application development platform for building and operating software projects.

10. Cohere.

- Funds Raised: \$445 million
- Valuation: \$2.1 billion

Cohere is a startup that empowers developers and businesses to develop amazing products and capture true business value with artificial intelligence. Its solutions and products are designed to power interactive chat features and generate product descriptions in text, blog entries, and articles.

With around 180 employees, Cohere has raised close to \$445 million, giving it a valuation close to \$2.1 billion.

11. Adept AI.

- Funds Raised: \$415 million
- Valuation: \$1 billion

Adept AI is a machine learning research and product laboratory that builds general intelligence applications that enable humans and computers to

work together. Its AI-powered solutions automate software processes for developers. Its main goal is to develop AI tools that help humans and computers collaborate to solve problems.

The company has raised close to \$415 million since its founding, giving it a valuation of at least \$1 billion.

12. Grammarly.

- Funds Raised: \$400 million
- Valuation: \$13 billion

Grammarly is an emerging startup that has harnessed the power of artificial intelligence to enhance spelling and grammar correction. Its primary AI-powered software is available as a desktop application and browser extension, and is used by millions of people worldwide, including over 30,000 professional and business teams.

Though the company has raised close to \$400 million since its founding in 2009, it has a post-funding valuation of around \$13 billion.

13. Eightfold.

- Funds Raised: \$396 million
- Valuation: \$2.1 billion

Eightfold is an emerging startup leveraging artificial intelligence to power a range of human resources-related products aimed at retaining, training, and funding the best talent in the market. Its Talent Intelligence Platform assists HR professionals to know what they need and when they need it. Whether it's finding or developing talent, the use of AI helps organizations stay at the forefront in talent hunting.

Corporate clients like Postmates, Capital One, and Hulu are increasingly using its AI-powered talent search platform. Founded in 2016, the company

has raised close to \$396 million and currently has a valuation of \$2.1 billion.

14. Moveworks.

- Funds Raised: \$315 million
- Valuation: \$2.1 billion

Moveworks has established itself as a generative artificial intelligence platform that boosts employee productivity through the exposure of information and the automation of tasks using natural language. Founded in 2016, this AI startup aims to provide businesses with a conversational interface that works across all systems. By leveraging GPT-class machine learning models, its generative AI platform can learn any organization's unique language to solve thousands of issues.

In 2021, it raised \$200 million in a Series C funding, representing the largest investment in an AI platform for employee service. The company has raised \$315 million since its founding, giving it a valuation close to \$2.1 billion.

15. Abnormal Security.

- Funds Raised: \$284 million
- Valuation: \$4 billion

Abnormal Security is a B2B security company developing AI-powered solutions to protect clients from email attacks. Its solutions based on Abnormal Behavior Technology can map the content of the sent emails.

Therefore, the company can provide an AI-powered email security system that uses machine learning to stop any attack via emails. Founded in 2018, the company has raised close to \$284 million and boasts a valuation around \$4 billion.

16. Runway.

- Funds Raised: \$236 million
- Valuation: \$1.5 billion

Runway is a startup building generative AI tools for multimedia content creators. Founded in 2018, the company specializes in developing AI-powered tools aimed at filmmakers, cinematographers, and photographers.

Its focus has shifted significantly towards video, resulting in the launch of Gen 2, an AI model that generates videos and texts from existing images. The company has raised close to \$236 million to help accelerate its AI innovation. Currently, the company holds a valuation close to \$1.5 billion.

17. Labelbox.

- Funds Raised: \$188 million
- Valuation: \$1 billion

Founded in 2018 in San Francisco, California, Labelbox offers a customizable data engine that produces high-quality training data, helping AI teams quickly build top-tier machine learning models. Its solution efficiently labels large datasets, including images, videos, and text.

The company has raised close to \$188 million, reaching a valuation around \$1 billion.

18. Interactions.

- Funds Raised: \$162 million
- Valuation: \$1 billion

Interactions is an emerging startup that operates an AI-powered virtual assistant platform helping businesses improve customer experience and

reduce costs. The company develops and delivers virtual assistant applications, enabling businesses to provide automated, natural language communications for customer support.

Based in Franklin, Massachusetts, the company has raised \$162 million since its foundation in 2013.

19. Synthesia.

- Funds Raised: \$156 million
- Valuation: \$1 billion

Synthesia is a startup offering an AI-powered platform that allows businesses and individuals to create personalized video content on a large scale. It has specialized in leveraging revolutionary technology to improve the creation of realistic and engaging videos with human-like avatars.

Therefore, Synthesia has become a key player in the development of applications and content for e-learning and marketing, news reporting, and virtual events. Founded in 2017 and based in London, England, the startup has raised \$156.6 million to date, giving it a valuation of \$1 billion.

20. Character AI.

- Funds Raised: \$150 million
- Valuation: \$1 billion

Character.ai is a startup that operates an AI-powered platform allowing people to easily create and animate 3D characters. Thanks to its AI-powered tools, it enables users to customize characters, their appearance, movements, and behavior, thus creating realistic animations in real-time.

Its AI technology and solutions are increasingly being used across a wide range of applications, from video game development to film production,

enhancing virtual reality experiences, and e-commerce. The company, based in Menlo Park, California, has raised \$150 million in two funding rounds, reaching a valuation of \$1 billion.

Learn from the leading AI startups by categories.

Leading Generative AI Startups.

The technological revolution of Artificial Intelligence (AI) has paved the way for a new wave of innovation: Generative AI.

Generative AI focuses on the automatic creation of content and solutions through deep learning algorithms, allowing machines to generate new data that resembles the original data they were trained with. Instead of just analyzing and processing information, these tools are designed to innovate, creating something new from what they already know.

In this ever-evolving landscape, numerous startups are emerging as leaders, pushing the forefront of technology and breaking new ground in sectors such as art, medicine, communication, and more.

Generative AI startups are redefining the boundaries of what technology can create, from images and texts to complex models that can think and act in ways that were previously unimaginable.

This new generation of companies promises not only to revolutionize the way we interact with technology but also how technology can be a creative force in itself.

Below is a table briefly describing the activity of the leading Generative AI startups.

KEYS TO ARTIFICIAL INTELLIGENCE

Name	Description
Adept AI	Research and product laboratory in machine learning that builds general artificial intelligence.
AI21 Labs	Specializes in developing AI systems with unprecedented ability to understand and generate natural language.
Aleph Alpha	Researches, develops, and deploys fundamental AI models.
Alphabet	Holding company that provides projects with resources, freedom, and focus to make their ideas a reality.
Anthropic	Security and AI research company that builds reliable, interpretable, and steer-worthy AI systems.
Cohere	Offers an API that gives users access to large-scale NLP technologies and language models.
Craiyon	Formerly known as DALL-E Mini, Craiyon is an AI model that can draw images from any text prompt.
DeepL	Deep learning company specialized in language translation.
DeepMind	Aims to research and build safe artificial intelligence systems to solve intelligence and advance science and humanity.
EleutherAI	Non-profit AI research lab focused on the interpretability and alignment of large models.
Hugging Face	Allows users to build, train, and deploy art models using open-source reference code in machine learning.
Inflection AI	Machine learning startup dedicated to redefining human-computer interaction.
Meta	Social technology company that enables people to connect, find communities, and grow businesses.
Microsoft	Software corporation that develops, manufactures, licenses, supports, and sells a range of software products and services.
Midjourney	Non-profit research lab that investigates new ways of thinking to enhance the inventive capacities of the human species.
OpenAI	AI research and deployment company that conducts research and implements machine learning.
Runway	Applied AI research company that builds the next generation of creativity tools.
Stability AI	Visual art startup powered by artificial intelligence that designs and implements open AI tools.
Stable Diffusion	Latent text-to-image diffusion model that creates photorealistic images from any text input.

Leading startups in infrastructure and tools for building AI applications.

Startups dedicated to the development of Artificial Intelligence (AI) infrastructure and tools play a crucial role in today's tech ecosystem. These companies, often likened to the "architects" of the AI revolution, provide the necessary foundations and tools for other startups and organizations to build innovative AI-based solutions.

While some startups focus on creating direct AI applications for consumers and businesses, these infrastructure and tool companies are dedicated to designing platforms, frameworks, and systems that enable the development of such applications. Their work addresses critical challenges such as processing large datasets, accelerating machine learning algorithms, and optimizing AI models for deployment across various environments and hardware.

Moreover, they offer solutions that simplify the inherent complexity of AI development, allowing startups to focus on innovation without having to reinvent the wheel. Whether by providing specialized cloud computing platforms, data visualization tools, or development libraries, these companies are speeding up the democratization of AI, making its benefits more accessible to everyone.

Below we present a table briefly describing the activity of the leading startups dedicated to the development of Artificial Intelligence (AI) infrastructure and tools.

Name	Description
CoreWeave	CoreWeave is a specialized cloud provider that powers GPU-accelerated workloads (AI, VFX, and HPC) at scale.
Lightmatter	Lightmatter alters chip architecture, delivering faster, energy-efficient computing with photonic processors for the sustainable advancement of AI.
Nvidia	NVIDIA is a computing platform company operating at the intersection of graphics, HPC, and AI.

KEYS TO ARTIFICIAL INTELLIGENCE

Anyscale	Anyscale accelerates the development and production of any AI application, on any cloud, at any scale.
Weights & Biases	Weights & Biases provides a developer-oriented MLOps platform offering performance visualization tools for machine learning.
LangChain	LangChain is a development library for large language model applications.
OctoML	OctoML offers an acceleration platform that assists engineering teams in deploying machine learning models on any hardware.
Weaviate	Weaviate builds, maintains, and markets the open-source Weaviate vector database.
InstaDeep	InstaDeep offers AI-driven decision-making systems for the Enterprise to solve complex industrial problems.
Celestial AI	Celestial AI is a Machine Learning (ML) accelerator company developing AI computing solutions for data centers and edge.
Comet	Comet allows data scientists to automatically track their datasets, code changes, experimentation history, and production models.
RelationalAI	RelationalAI is the creator of a groundbreaking relational knowledge graph system.
Resistant AI	Resistant AI helps protect AI systems from targeted manipulation, adversarial machine learning attacks, and advanced fraud.
Scale AI	Scale AI is the data platform for AI, providing training data for leading machine learning teams.
Pinecone	Pinecone develops a vector database that facilitates connecting enterprise data with generative AI models.
Replit	Replit is a browser-based integrated development environment for cross-platform collaborative coding.
LightOn	LightOn develops extreme scale AI (Large language models, Fundamental models) for the Enterprise.
Synthesis	Synthesis is a research-based psychedelic wellness legal platform, owned by stewards, research, and education.
MostlyAI	MostlyAI is building a global B2B healthcare marketplace powered by AI.
BeeKeeperAI	BeeKeeperAI is a zero-trust collaboration platform that protects both the algorithm IP and regulated data.

Leading AI Application Startups.

Startups dedicated to building Artificial Intelligence (AI) applications are redefining the way we live, work, and interact with technology. These emerging companies, driven by the promise and potential of AI, focus on developing solutions that not only automate tasks but also enhance

decision-making, personalize experiences, and uncover hidden insights in vast data sets.

These startups span a wide range of sectors, from health and finance to entertainment and education. Whether through chatbots that enhance customer service, recommendation systems that personalize online shopping experiences, or medical diagnostic tools that detect diseases at early stages, AI applications are transforming entire industries.

What sets these startups apart is their ability to merge advanced algorithms, large datasets, and a deep understanding of specific domain problems to create solutions that were unthinkable just a decade ago. Often, these companies rely not only on machine learning models but also incorporate complementary technologies like natural language processing, computer vision, and deep learning to create robust and highly specialized applications.

At the heart of these startups lies a passion for solving complex problems and a commitment to continuous innovation. As AI technology continues to evolve, the most innovative startups are constantly exploring new ways to apply it to improve people's lives and build a smarter, more connected future.

Below is a table briefly describing the activity of the leading startups dedicated to the development of Artificial Intelligence (AI) applications.

Name	Description
Builder.ai	Builder.ai offers an AI-driven no-code application development platform, designed to build and operate software projects.
Glean	AI-powered workplace search. Across all your company's applications.
Jasper	Jasper is an AI writing tool that helps businesses create content.
Typeface	Typeface is a generative AI application for creating business content.
Lightricks	Lightricks develops creativity tools that allow its users to create and share visual content on mobile devices.

KEYS TO ARTIFICIAL INTELLIGENCE

Descript	Descript is a collaborative audio and video editor that transcribes audio into a text document for editing.
Canva	Canva is an online design and publishing platform that provides user-friendly design tools for non-designers.
Character.ai	Character.ai provides open conversational applications that allow users to create characters and converse with them.
Adobe	Adobe is a software company that provides its users with digital media and marketing solutions.
AlphaSense	AlphaSense is an artificial intelligence platform that enables professionals to make critical decisions.
Grammarly	Grammarly is an AI-powered writing assistant that helps users communicate more clearly and effectively.
Humane	Humane is a platform that creates and sells hardware, software, and services for consumers.
Notion	Notion is the all-in-one workspace for your notes, tasks, wikis, and databases.
Tribble	Tribble develops a GTM automation platform that transforms how sales, marketing, and product teams collaborate for success.
Hearth.AI	Hearth.AI is an artificial intelligence platform designed to offer searches on semantic networks.
Sixty AI	Sixty's Artificial Intelligence (AI) will be used to revolutionize productivity and relieve busy customers from digital clutter.

Investment in AI: A Massive Boom That's Just Getting Started.

Artificial Intelligence has not only dominated the tech world for the first half of this year, but its use and applications have garnered attention in almost every facet of our lives, from employment to romantic dating.

This has also been the case in the venture capital and investment world. One large funding round has been followed by even larger ones, and it seems every startup has rushed to label itself as "AI-enhanced" or "AI-powered."

Venture capitalists and corporations have invested heavily in this realm during the first half of the year, pouring significant amounts into generative

AI platforms, support infrastructure, and sector-specific AI applications, such as in health and biotechnology.

ChatGPT Sparks Investor Frenzy.

While it's true that AI began to take off at the end of 2022, with startups like Descript, an AI-based video and audio editing tool from San Francisco, and Jasper, an AI-based content platform from Austin, Texas, securing large funding rounds, the frenzy reached new heights with OpenAI.

In early January 2023, news started circulating that OpenAI, the company behind artificial intelligence tools ChatGPT and DALL-E, could be valued at \$29 billion in a new offering. By the end of the month, Microsoft confirmed it had indeed agreed to a "multi-year, multi-billion-dollar investment" in OpenAI, believed to be around \$10 billion.

That was just the beginning. San Francisco-based Adept AI raised \$350 million in a Series B in March, with a reported post-money valuation of at least \$1 billion. And Anthropic, a ChatGPT rival with its AI assistant Claude, secured \$450 million in a Series C in May, which reportedly valued the company at \$5 billion.

By the end of June, the "personal AI" startup Inflection AI managed an impressive \$1.3 billion round led by Microsoft, Reid Hoffman, Bill Gates, Eric Schmidt, and new investor Nvidia. According to Forbes, the round valued Inflection AI at \$4 billion.

Many other AI startups have closed investment rounds at a time when funding was dwindling in almost all other industries.

Big Tech Joins Venture Capitalists.

And venture capitalists haven't been the only ones enchanted by this new technology. Big corporations have also used their venture capital arms, including Google, Zoom Ventures, Nvidia, Oracle, and Salesforce Ventures, to invest in AI startups.

This Is Just the Beginning of a Long Investment Journey.

Despite the avalanche of investment dollars AI has already seen, much more is expected. From new generative AI platforms to the infrastructure layer backing them or applications using AI in specific sectors, there are many areas where investors are showing interest.

Startups like CoreWeave, which provides GPU-accelerated compute solutions, and Pinecone, which creates vector databases, have raised significant sums in the AI infrastructure layer.

There's a growing number of startups looking for different ways to increase processing speed and reduce costs, something that will be necessary for AI to achieve broader adoption.

There's also a large number of startups applying AI to practical uses, be it in sales, content creation, or design. Startups like Character.ai and Jasper have raised significant amounts in the past nine months by creating platforms to help businesses work better with AI.

Many investors expect AI to revolutionize sectors like software development, financial services, health, biotechnology, drug discovery, insurance, consumer credit, legal compliance, account management, or tax filing.

A Revolution That Will Affect All Businesses.

Most investors agree that there will be some level of AI adoption by nearly every business in almost any sector sooner or later.

In fact, many investors compare the growth of AI to the mobile revolution that disrupted almost every sector of our lives about a decade and a half ago. Just as that transformation excited investors and ramped up funding, many see the same happening with AI right now.

AI Startup Accelerators.

Now more than ever is the ideal time to embark on entrepreneurial ventures. AI accelerators are particularly keen on working with founders of AI startups in the early stages of their projects. Their focus isn't merely on "providing capital", but to be genuine allies in the process of building meaningful companies.

More Than Investment.

Startups require access to talent, credibility, customers, guidance, and financing. Accelerators offer all of this and more.

Through accelerators, founders have the opportunity to connect with specialized talent, get introductions to potential clients, and gain access to valuable resources and guidance. Moreover, with the complexity and cost associated with cloud computing and AI, accelerators also provide resources such as access to supercomputers and credits for GPUs, removing financial and technical barriers.

Community as a Cornerstone.

One of the most highlighted strengths of accelerators is community-building. Founders thrive in environments where they can interact with other entrepreneurs, share challenges, and celebrate achievements. Collective experience and mutual support can be decisive factors for a startup's success.

Benefits to Accelerators.

While the direct profitability of these accelerators might not be immediate, the long-term vision is clear. The aim is to broaden their outreach and curiosity, backing a wider array of intriguing projects and strengthening their network. Additionally, these accelerators position themselves as leaders in the tech world, bolstering their reputation and building lasting relationships with founders and investors.

Leading AI Startup Accelerators.

Below, we present a selection of the top AI startup accelerators.

Accelerator	Duration	Investment	Equity	Location	Projects
AI Accelera	Variable	Variable	Variable	San Francisco, USA	Startups IA
Conviction	Variable	Variable	Variable	San Francisco, USA	Startups IA
NextAI	6 months	Up to \$200,000 CAD	Yes	Toronto, Canada	AI-based companies, technology commercialization
Digital Catapult	Variable	Customized support	No	London, UK	AI adoption, ethical AI applications
Analytics Ventures LLC	Customized	Variable	Variable	San Diego, USA	Data science, AI-driven solutions

Nextgrid	3 months	Up to €100,000	Yes	Stockholm, Sweden	AI innovation, startups, ecosystems
AiVl Accelerator	6 months	Up to \$150,000	Yes	Dubai, UAE	AI startups, industry-specific innovation
NVIDIA Inception	Customized	Customized support	No	Global	AI technology, startups, visibility
AI Seed	3 months	Up to £200,000	Yes	London, UK	AI and machine learning startups
AI2 Incubator	Customized	Up to \$1,000,000	Yes	Seattle, USA	AI-first startups, research, funding

How can we help you?

At the AI Accelera (AIaccelera.com), we offer a comprehensive range of services to entrepreneurs and AI startups who want to be at the forefront of this revolution. Among our services for entrepreneurs and startups, the following stand out:

AI Audit: We identify areas in your startup where AI can add value, optimize processes, and reduce costs.

AI Consulting: We offer comprehensive AI services ranging from business analysis to the development and technical implementation of final solutions, thus helping startups apply AI solutions effectively.

External AI Management: If your startup doesn't have an AI department, we'll handle it for you. Outsource with us and get an expert team to manage all your AI-related needs.

Custom AI Training: We provide both in-person and online courses and seminars, specifically designed to meet your team's needs, ensuring they are up-to-date with the latest AI trends and techniques.

AI Professional Recruitment: We assist startups in finding and hiring the right talent in the AI field, ensuring they have highly qualified experts on their team.

Mentoring for AI Students and Professionals: We offer coaching and mentoring services for those looking to deepen their AI knowledge and skills.

AI Startup Acceleration: We provide tools, resources, and specialized advice for AI-focused startups, ensuring they have the necessary boost to grow and thrive.

Mentoring for AI Startups: We provide coaching and mentoring for founders and teams of AI startups, helping them overcome challenges and achieve their goals.

Mentoring for Incubators and Development Agencies: We offer guidance to managers of incubators and development agencies, teaching them how to foster and support AI-focused startups.

AI Conferences and Talks: We deliver talks and conferences on AI, sharing knowledge and promoting networking.

AI Event Organization: We organize AI-centered events, from seminars to conferences.

With the right support, the future of AI in your startup is bright, and the possibilities are virtually endless.

Contact us.

If you would like more information about our services, please get in touch by sending an email to info@AIaccelera.com.

Join our team.

We are always interested in meeting intriguing individuals.

If you are passionate about AI and want to be part of a team with an Olympic spirit, get in touch by sending an email to info@AIaccelera.com. We are interested in both technical and business profiles. And if you don't yet have the right training, you can learn with us.

Collaborate with us.

We are always keen to learn about exciting collaboration opportunities.

If you work for an agency, consultancy, incubator, development agency, business school, training center, or any other type of organization with which you believe we can collaborate, please contact us by sending an email to info@AIaccelera.com.

How can we help you?

In a world where technology is constantly evolving, Artificial Intelligence (AI) has established itself as one of the most powerful tools to drive innovation and growth in companies. At AI Accelera (AIaccelera.com), we offer a comprehensive range of AI-related services, ensuring that organizations and individuals are well-positioned to leverage the advantages of this revolutionary technology.

AI Audit: We identify areas in your company where AI can add value, optimize processes, and reduce costs.

AI Consultancy: We offer comprehensive AI services ranging from business analysis to the development and technical implementation of final solutions, thus helping companies effectively apply AI solutions.

External AI Management: If your company does not have an AI department, we can handle it for you. Outsource to us and get an expert team to manage all your AI-related needs.

Ad-hoc AI Training: We provide both in-person and online courses and seminars, specifically designed to meet the needs of your team, ensuring they are up-to-date with the latest AI trends and techniques.

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AI is redefining the technology and business landscape. By choosing to work with a company that offers such a broad range of AI-related services, organizations and individuals ensure they are at the forefront of this revolution, prepared to seize all the opportunities AI offers.

With the right support, the future of AI is bright, and the possibilities are virtually endless.

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