

PYTHON & ARTIFICIAL INTELLIGENCE

Python & AI

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Outline

1 Artificial Intelligence

2 What is Python?



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Some people have too much imagination

Sarah Connor seeing you become
friends with ChatGPT



Artificial Intelligence, Machine Learning, Deep Learning

- **Artificial Intelligence (AI)** is the ~~simulation~~ of human intelligence processes by **machines**, especially computer systems.
- **Machine Learning (ML)** is a subset of AI that provides systems the ability to automatically learn and improve from experience without being explicitly programmed.
- **Deep Learning (DL)** is a subset of ML that uses neural networks with many layers. It is used to learn complex patterns in large amounts of data.



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70's
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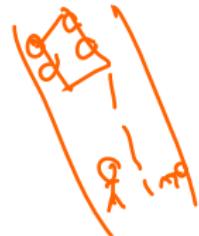


The Dilemma of the Baby and the OldMan

Robot autónomo es atropellado por auto en piloto automático

Por **Temo Navarro** - ENERO 9, 2019

19315



Welcome to the world of the unreal

The best programming language

Andrej Karpathy wrote: currently the best programming language is **English**.

Give me the money!!!

The consulting firm *McKinsey* estimates that AI will generate between 2 and 4 trillion USD in the **global economy** annually (by 2060, 50% of tasks with GenAI).



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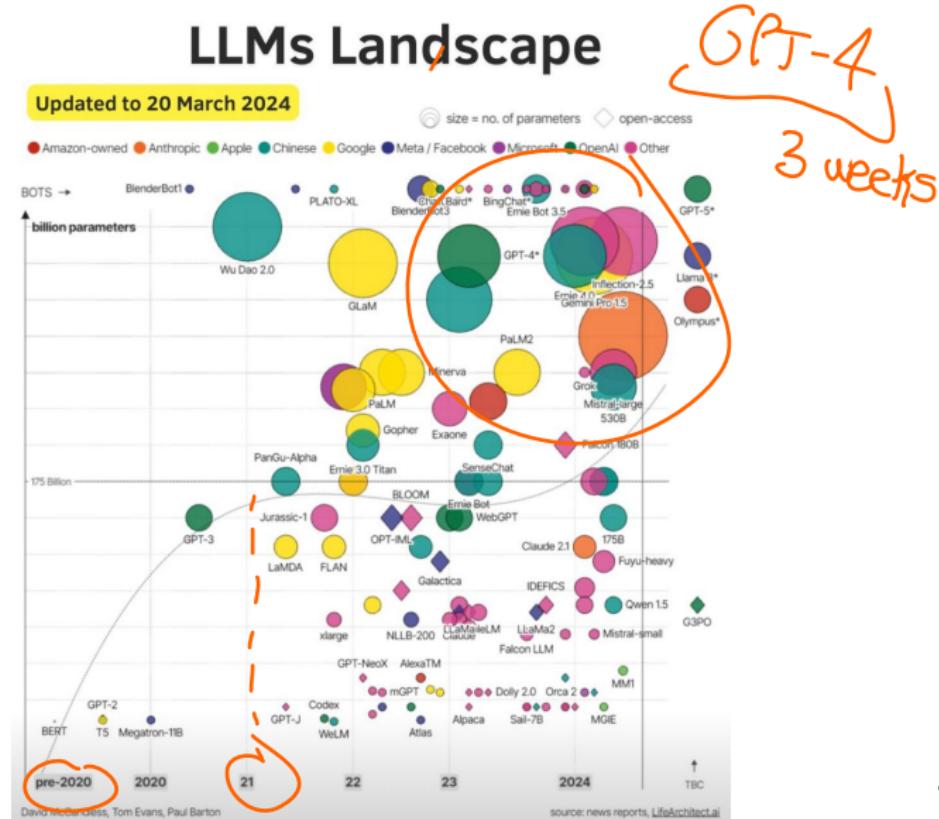
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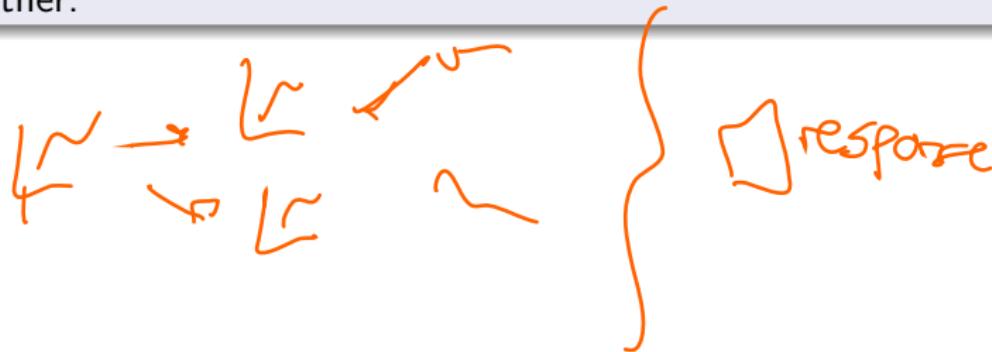
Large Language Models



Neural Networks

Key Concepts

- **Artificial Neural Networks** are a computational model inspired by the **human brain**.
- They are based on a **collection** of connected units or nodes called **artificial neurons**.
- Each connection can **transmit a signal** from one artificial neuron to another.



Natural Language Processing

Key Concepts

- **Natural Language Processing** (NLP) is a subfield of linguistics, computer science, and artificial intelligence.
- It is concerned with the interactions between computers and human language.
- In particular, the programming of computers to **process and analyze** large amounts of natural language data.

Chat GPT → text
English



Every day seeking more simplicity

The best invention of 2023(?)

According to *Times* magazine: the **Humane AI pin** (created by a former Apple employee).



Imran Chaudhri



Ted Talk link

What is Data Science?



- **Data Science** is an **interdisciplinary** field that uses **scientific methods, processes, algorithms, and systems** to **extract knowledge** and insights from structured and unstructured data.
- It involves techniques and theories drawn from many fields within the context of *mathematics, statistics, computer science, and information science*.
- **Data Science** process includes: data exploration, data cleaning, data analysis, visualization, building predictive models, and testing and deploying those models.
- It is primarily used to make decisions and predictions making use of predictive causal analytics, prescriptive analytics, and machine learning.
- It is about uncovering findings from data, and it's about surfacing hidden insights that can help enable companies to make smarter business decisions.



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Computing Roles Skills

Types of Data Professionals

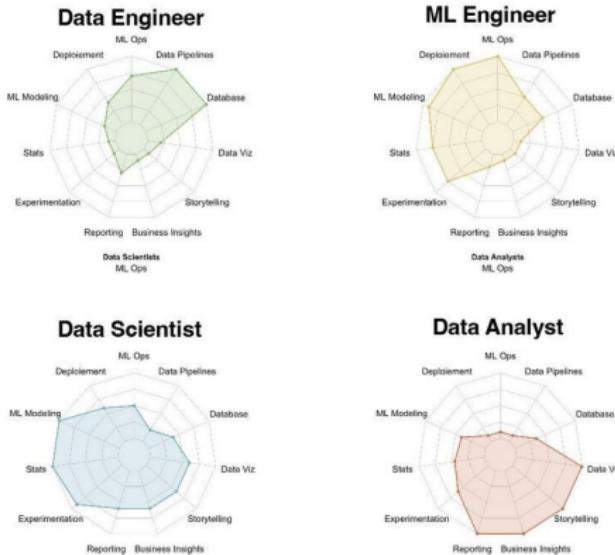


Figure: Source LinkedIn: Lucas Walker profile.

The Bad Omens



*"goldman sachs anthropomorphized
writing a movie script"*



- Goldman Sachs believes that **300 million full-time jobs** are at risk.
- The Hollywood writers' union went on strike, in part, to demand control over Generative AI for scripts and content for movies and TV.
- Each new era of technology brings significant social changes: the industrial revolution, calculators, computers, the internet.



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Close Encounters of the Third... Subject

- Everyone is happy with Generative AI, they feel it is more **democratic**: results based on *programming without knowing how to program*.
- There are applications that are using *bots* to **improve** people's ability to **relate**, and it's not about *Tinder*: *Blush, Iris, Breakup Buddy, RomanticIA*, among others.
- Tumor surgery in Amsterdam: **DNA sequencing** (90 min taking sample and 90 classifying using *ANN*) allowing **decision making** during surgery.
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Artificial Intelligence for Journalism

NY Times

Journalists experiment with **Generative AI** for **writing** news, **generating images** related to articles, and AI-based **search engines** to verify information. They also use it to **investigate** news, **review** the competition, and **distribute** their own news.

→ One of the biggest concerns is allowing AI to generate a complete news article, which can be completely false... or plagiarized.

→ Some editors believe that Generative AI will decrease the quality of writing and the trust of readers.

→ Another concern is the potential for AI to spread fake news or manipulate existing news stories.



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- An interesting point is the lack of **context** in **regions** where the training data is not originally from... basically everything **outside** of the **USA**.



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*Alphabet has introduced Pixel 8, a smartphone heavily supported by AI, especially for **image** and **video processing**.*



Oct 2023

The Best Take option allows you to select elements from various images and generate a new one. No more do your magic.

Magic Editor allows you to take images and use Generative AI to alter that image.



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- **Video Boost** improves **video quality** with auto-stabilization, color correction, lighting, among others.

Coca-Cola Caravan for more years. . .

Coca-Cola used **Generative AI**, along with consumer information, to **create a new flavor: Coca-Cola Y-3000.**

- A **flavor** that aims to evoke the **future**, a flavor associated by people with something futuristic.
- The **visual design** of the soda was also produced using AI.
- It serves to **expand the market**, keeping connected with **new generations**.



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- Offers searches oriented to the needs of doctors.
- Access to a vast amount of clinical information.

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- Offers **searches** oriented to the **needs** of doctors.
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- Includes *Med PaLM 2* (LLM) which provides more **context** to the processing of **medical information**.
- Provides suggestions to improve **decision making**, including the analysis of some types of **diagnostic images**.

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The big ones winning bets

Part of *Meta's* initiatives is the topic of **glasses** to navigate the **metaverse**, the latest release: *Ray-Ban smart glasses* using *LLaMa2* and in *Meta's Quest VR Headset*.



Llama



The big ones winning bets

- The **resurgence** of *Microsoft*: **1 million** users paying for *Github Copilot*, *Bing* integrated with *GPT*, *Edge* increasing market share over 2.5 years.
- *Microsoft* is using *Copilot*, and *OpenAI* models, to enhance *Windows*, *Office 365*, *Github*, and all its products.

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Microsoft
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GPT-3, GPT-4
Generate and Understand Text

Codex
Generate and Understand Code

DALL-E preview*
Generate images from text prompts

ChatGPT preview*
Generate conversational responses

copilot (written below Codex)
models (written above ChatGPT)



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Python Programming Language

- Python is a **high-level** programming language, with **dynamic semantics**.
- Interpreted means that Python code is executed line by line, rather than being compiled into machine code.
- Weakly typed means that Python does not require you to declare the type of a variable.
- Multiparadigm means that Python supports object-oriented, imperative, and functional programming styles.



Figure: Prompt: Draw a cartoon about Guido Von Rossum watching Monty Python tv show and thinking in create python programming language.

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- The **Python Software Foundation** is the organization behind **Python**.
- It is a **non-profit organization** that holds the **intellectual property** rights behind Python.
- The PSF is responsible for the **development** and **maintenance** of Python.
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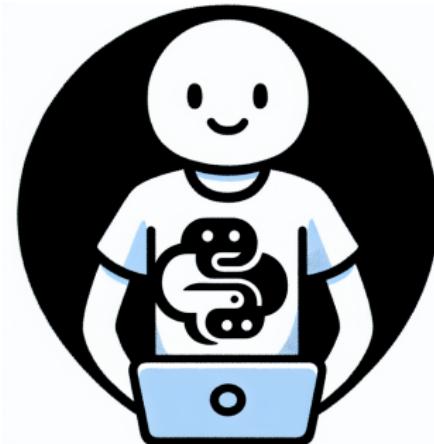


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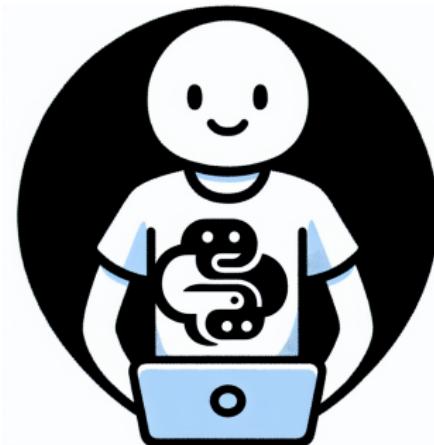


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Popular Developer Tools

Life is Short, Use Dev Tools

Category	Tools
Development Env	VS Code, Visual Studio, IntelliJ IDEA, Notepad++, Vim, PyCharm, Jupyter Notebook
Diagramming	draw.io, excalidraw, mindmap, Mermaid, PlantUML, Microsoft Visio, Miro
AI Tools	ChatGPT, GitHub Copilot, Tabnine, Claude, ollama, Midjourney, Stable Diffusion
Hosting & Deployment	aws, AWS, Cloudflare, Git Hub, Fly.io, Heroku, Digital Ocean
Code Quality	Jest, ESLint, Selenium, sonarQube, FindBugs, Checkstyle
Security	1Password, LastPass, OWASP, snyk, Nmap
Note-taking	Notion, Markdown, Obsidian, Roam, Logseq, Tiddly Wiki
Design	Figma, Sketch, Adobe Illustrator, Canva, Adobe Photoshop



Python Libraries for Data Science

- Python has a rich ecosystem of **libraries** for **data science**.
- Some of the most popular libraries for **data science** in Python are:
 - NumPy: Numerical computing in Python.
 - Pandas: Data manipulation and analysis in Python.
 - Matplotlib: Data visualization library.
 - Scikit-learn: Machine learning library.
 - TensorFlow: Deep learning library.
 - PyTorch: Deep learning library.



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 - PyTorch: **Deep learning** in Python.



Data Science Python Tech Ecosystem

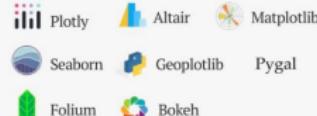
Life is Short, I Use Python



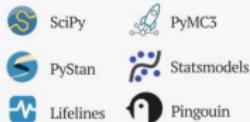
Data Manipulation



Data Visualization



Statistical Analysis



Machine Learning



Natural Language Processing



Database Operations



Time Series Analysis



Web Scraping



Outline

1 Artificial Intelligence

2 What is Python?



Thanks!

Questions?

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