

PYTHON & ARTIFICIAL INTELLIGENCE

Python & AI

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Universidad Distrital Francisco José de Caldas

2024-Nov



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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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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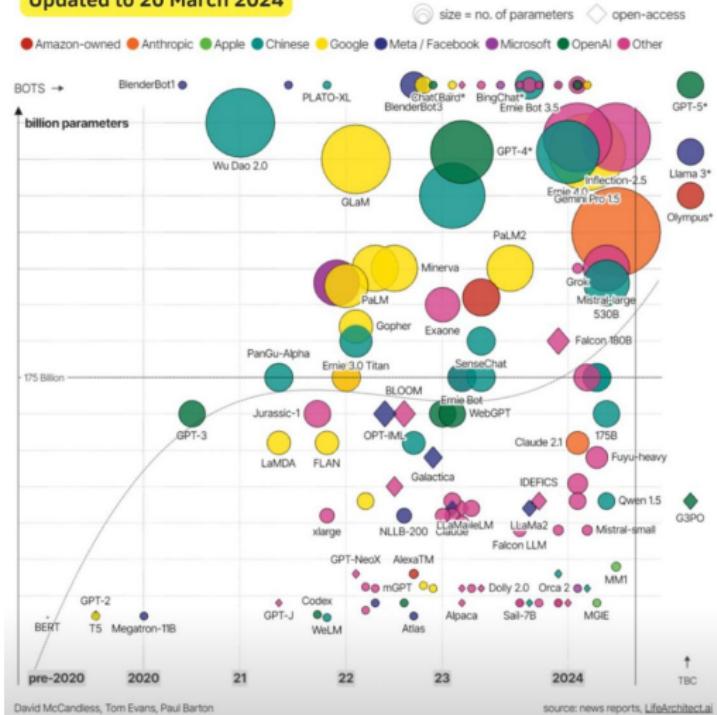
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Large Language Models

LLMs Landscape

Updated to 20 March 2024



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

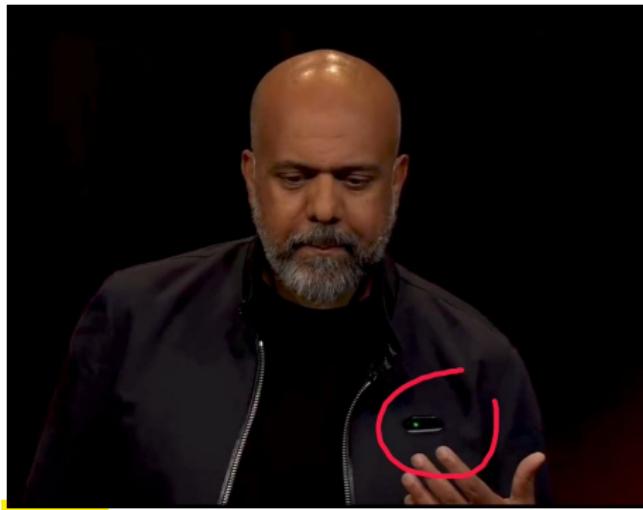
- **Natural Language Processing** (NLP) is a subfield of linguistics, computer science, and artificial intelligence.
- It is concerned with the interactions between computers and human language.
- In particular, the programming of computers to **process and analyze** large amounts of natural language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



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



UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

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

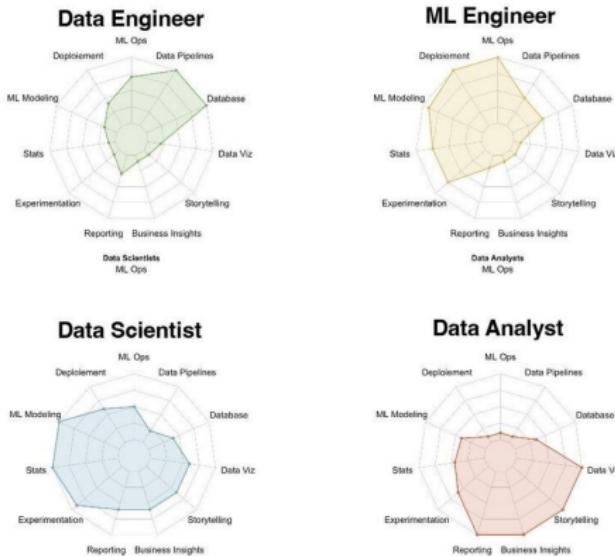


Figure: Source LinkedIn: Lucas Walker profile.

The Bad Omens



*"goldman sachs anthropomorphized
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- 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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- 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

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.

- Some journalists believe that using 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.
- Journalists are also using AI to analyze large amounts of data to identify trends and patterns in news stories.
- AI can help journalists to quickly fact-check information and verify sources.
- AI can also help journalists to generate news headlines and summaries.



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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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Google has bet on particular areas, one example is Vertex AI Search for Healthcare and LifeSciences.



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- Access to a vast amount of clinical information.

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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*.



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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Ensure that artificial general intelligence (AGI) benefits humanity.

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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.



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Python Software Foundation — PSF

- 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.
- The PSF is also responsible for the **promotion** and **advancement** of Python.



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Popular Developer Tools

Life is Short, Use Dev 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  Tabnbine  Claude  ollama  Midjourney  Stable Diffusion	 Hosting & Deployment  AWS  Cloudflare  GitHub  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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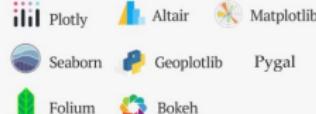
Data Science Python Tech Ecosystem

Life is Short, I Use Python

Data Manipulation



Data Visualization



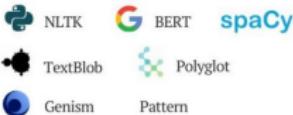
Statistical Analysis



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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