

*“Stay Ahead of the Game:
Transformation in Clinical Trials
in the Age of Artificial Intelligence.”*

**ANNUAL
CLINICAL TRIALS SYMPOSIUM**

November 8th, 2024

AI in Medical Writing: Enhancing Quality and Reducing Time

Octavian Andronic, MD, PhD

Assistant Professor – General Surgery

Coordinator BigData, AI and eHealth Department - CleH

Carol Davila University of Medicine and Pharmacy, Bucharest

Chair - Regional Chapters Committee - EASE





Customs
Nothing To Declare

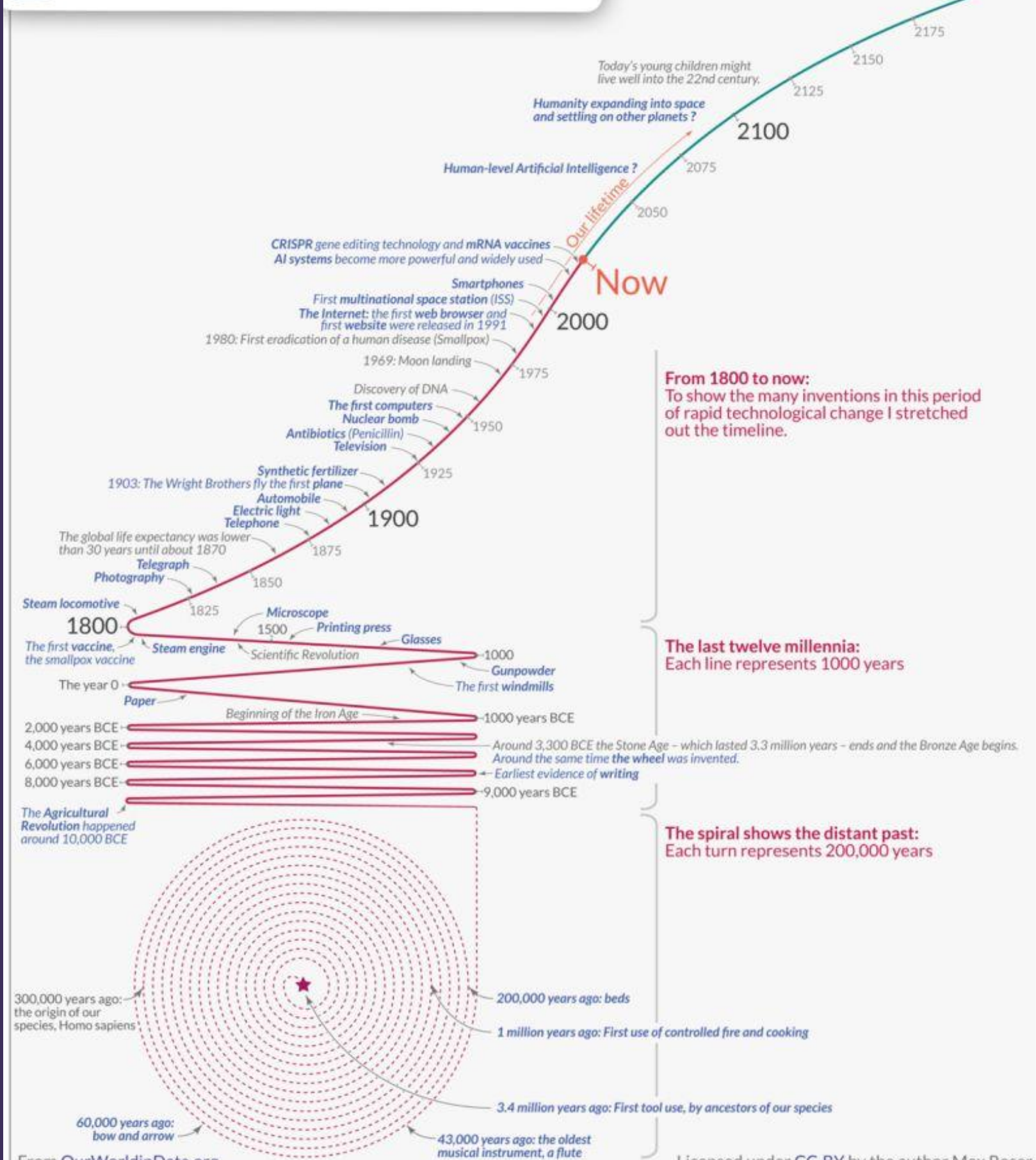


A long-term timeline of technology

Our World in Data

From the distant past, to our lifetime, and into the distant future.

<https://ourworldindata.org/technology-long-run>



Do you
remember
this?



Do you
remember
this?

1.44 MB

Until 2012-
reporting to CNAS



Williams-Kilburn Tube

First electronic data storage

128B

1947

1956

Hard Disk Drive

3750KB

Floppy Disk

80KB

1967

Compact Disk

700.000KB

1982

Cloud Data Storage

UnlimitedKB

Today

Gary Kasparov competing against IBM's "**Deep Blue**" chess computer in 1997



...BUT IT WAS NOT ABOUT INTELIGENCE...
IT WAS ONLY ABOUT PROBABILITY...

What is AI today?









It is the **accumulation of human intelligence** with a very
efficient Vector Database **Access** using LLM's

George Haber

OpenAi

HOW LONG IT TOOK TOP APPS TO HIT 100M MONTHLY USERS

ChatGPT is estimated to have hit 100M users in January, 2 months after it's launch. Here's how long it took other top apps to reach that:

APP	MONTHS TO REACH 100M GLOBAL MAUS
 CHATGPT	2
 TIKTOK	9
 INSTAGRAM	30
 PINTEREST	41
 SPOTIFY	55
 TELEGRAM	61
 UBER	70
 GOOGLE TRANSLATE	78

SOURCE: UBS



- + New chat
- ☞ Sentience of AI Program
- ☞ Real World Computational Po
- ☞ AI Development Timeline
- ☞ How to Journal Daily
- ☞ Peaceful Nature Walk and Ch
- ☞ New chat
- ☞ "Funny Journaling Excuses"
- ☞ New chat
- 🗑 Clear conversations
- ☞ Light mode
- 🗨 OpenAI Discord
- 🔗 Updates & FAQ
- 🚪 Log out

ChatGPT

☞
Examples

"Explain quantum computing in simple terms" →

"Got any creative ideas for a 10 year old's birthday?" →

"How do I make an HTTP request in Javascript?" →

⚡
Capabilities

Remembers what user said earlier in the conversation

Allows user to provide follow-up corrections

Trained to decline inappropriate requests

⚠
Limitations

May occasionally generate incorrect information

May occasionally produce harmful instructions or biased content

Limited knowledge of world and events after 2021

ChatGPT Jan 9 Version. Free Research Preview. Our goal is to make AI systems more natural and safe to interact with. Your feedback will help us improve.

Version	Parameters (Unit: billion)
GPT - 1 - launched in 2015	1.1
GPT - 2 - launched in 2019	17.5
GPT - 3 - launched in 2020	1750
GPT - 4 - launched in 2023	10000



Linguistic Creativity

All-Purpose Text Generation



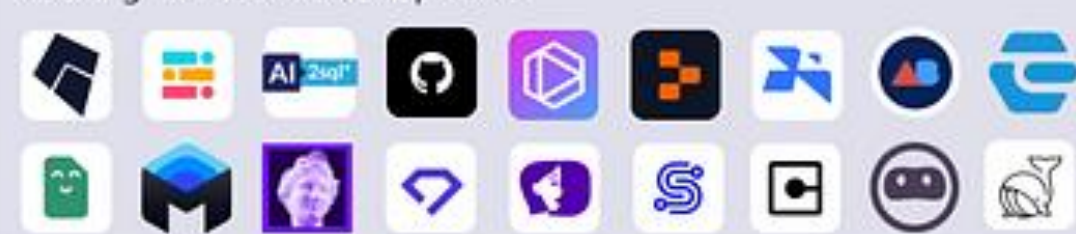
Marketing & Sales Copy



Text Optimization



Coding & Web Development



Musical Creativity

Sound & Music Generation

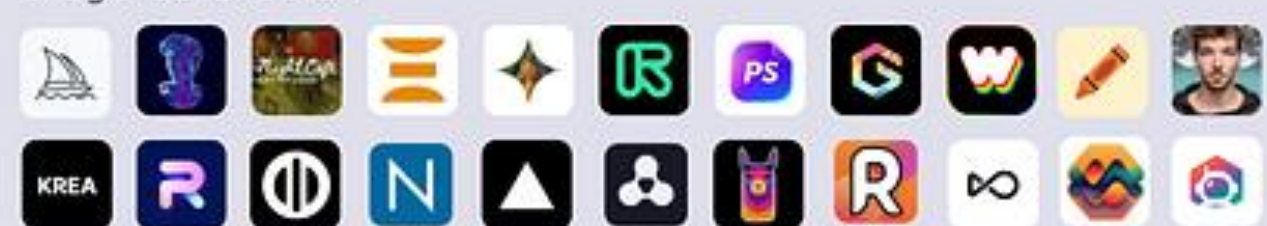


Voice Synthesis



Visual & Artistic Creativity

Image Generation



Video Generation



Design



Scientific Creativity



Other

Knowledge Management & Search



Customer Support & Automation



Characters



Gaming



Erotica



Market Intelligence



A model for thinking about AI, ML, DL, and generative AI



Artificial intelligence (AI)

Any technique that allows computers to mimic human intelligence using logic, if-then statements, and machine learning



Machine learning (ML)

A subset of AI that uses machines to search for patterns in data to build logic models automatically



Deep learning (DL)

A subset of ML composed of deeply multi-layered neural networks that perform tasks like speech and image recognition



Generative AI

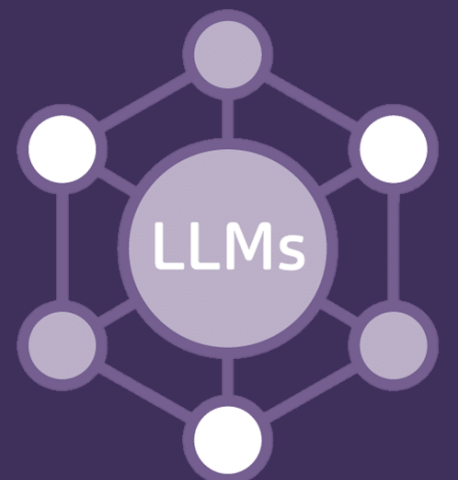
Powered by large models that are pretrained on vast corpora of data and commonly referred to as foundation models (FMs)

What are Large Language Models (LLMs)?

Definition: a type of artificial intelligence that can **understand**, **generate**, and **manipulate** human language based on **large datasets**. (Popular LLMs include OpenAI, BERT, Gemini)

Key Features of LLMs:

- Natural Language Processing (NLP)
- Context Understanding: Recognize and maintain context over long passages of text.
- Versatility: Can perform a wide range of tasks



Discriminative technique



Generative technique



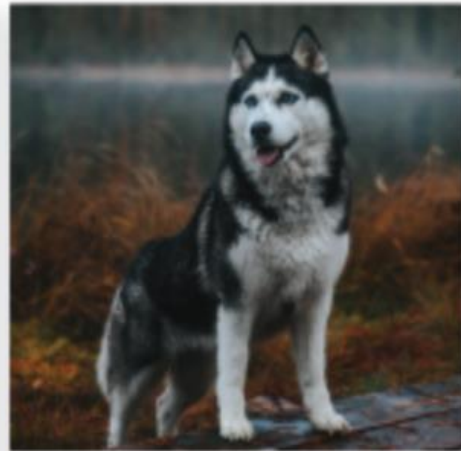
Explain the Prediction



Predicted: **Wolf**
True: **Wolf**



Predicted: **Husky**
True: **Husky**



Predicted: **Husky**
True: **Husky**



Predicted: **Wolf**
True: **Wolf**



Predicted: **Wolf**
True: **Wolf**



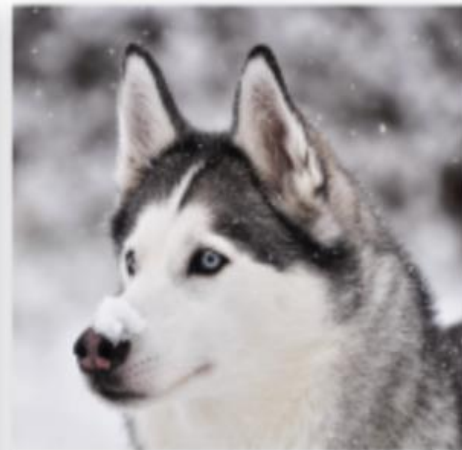
Predicted: **Wolf**
True: **Wolf**



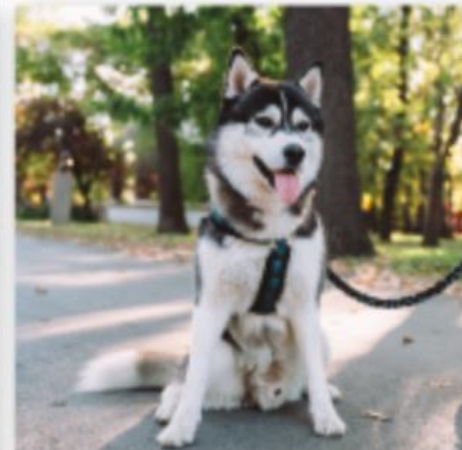
Predicted: **Husky**
True: **Wolf**



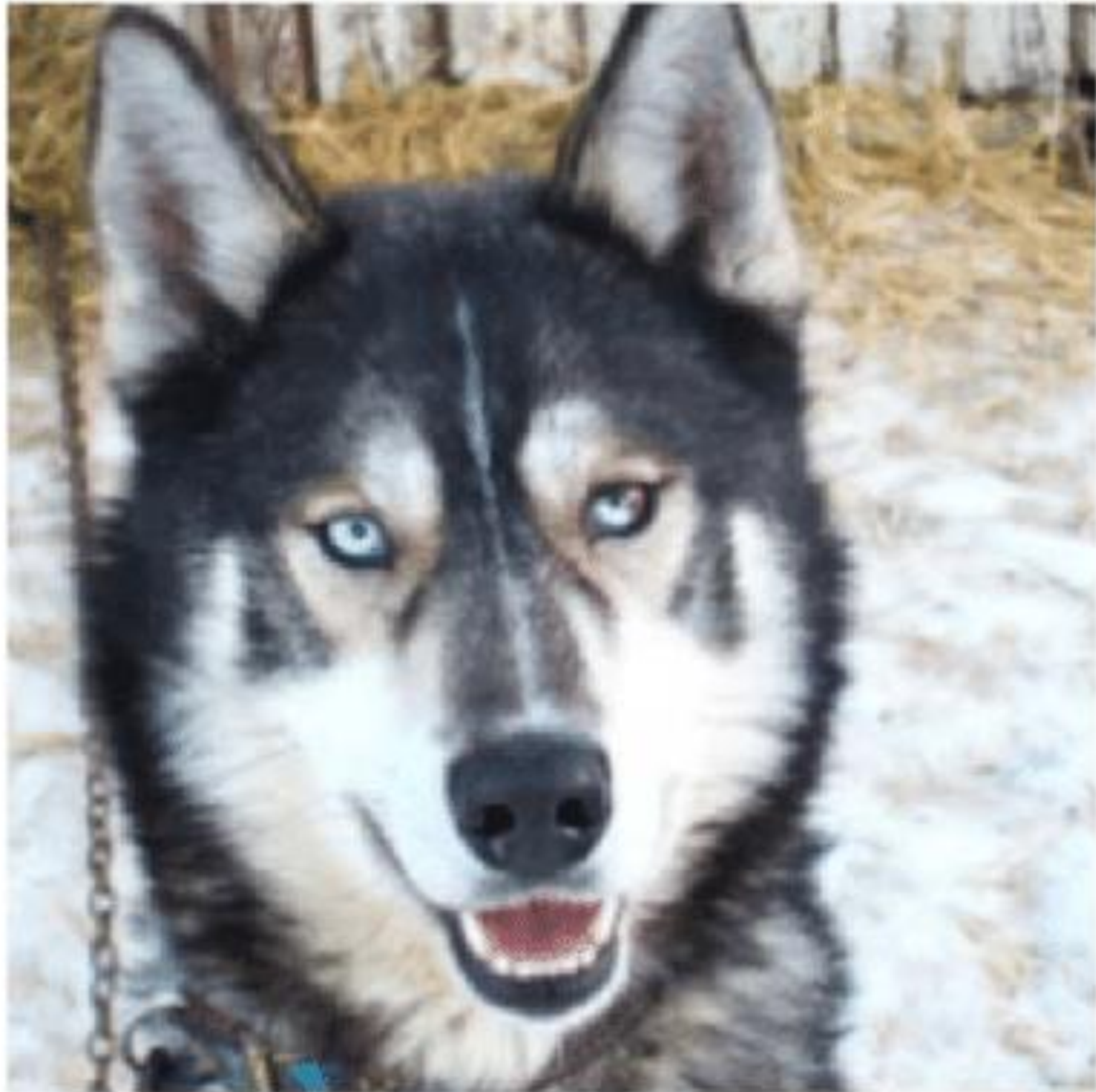
Predicted: **Wolf**
True: **Wolf**



Predicted: **Wolf**
True: **Husky**



Predicted: **Husky**
True: **Husky**



DATA



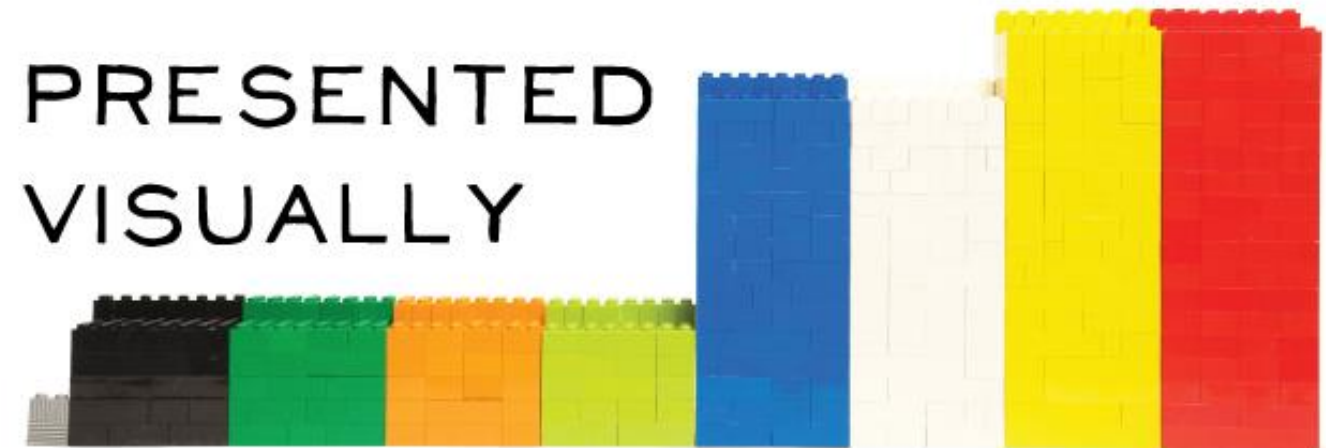
SORTED



ARRANGED



PRESENTED VISUALLY



DATA



EXPLAINED
WITH A STORY



ACTIONABLE
(USEFUL)



With genAI, academic research shifts from

overwhelming information overload

to precise, impactful insights,

proving that more isn't necessarily better—

quality and relevance reign supreme

What can it do already?

- Text generation
- Answer simple/complex questions/tasks
- Image/video generation
- Simulation of various scenarios
- Data Augmentation
- Translate
- And a lot of other things

Research steps

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Identify Research Problem

- *Brainstorm potential research topics*
- *Provide insights on trending issues*
- *Refine broad ideas into specific research questions*



- ChatGPT
- Data Analyst
- Logo Creator
- Explore GPTs
- Today
- New chat
- Microbiomul în cancer colorectal
- Previous 7 Days
- Microbiom și cancer colorectal
- Tabel Cazuri Tumori Nervi.
- Ajutor, Bună ziua
- Previous 30 Days
- Traducere Românească Titlu
- Sanitary Behavior in Pandemic
- Iniintare Departamente Asociati
- Traduceri mesaje solicitate.
- Ajutor prezentare slide-uri
- Platformă Screening Combinată
- Proiecte Medicină Fără Tehnică
- Uniunea Bisericilor Ortodoxe-Cat
- Colaborare cu Start-up
- Research Steps: Structured Classi
- Hallucination Rates Vary
- AI in Medical Research: Overview
- Prezentare PPT Limba Română.
- Participare la Congres European
- Parietal Augmentation Indication
- Sortare tabel după punctaj.
- Standardizare baza date tumoril
- Busy Apologies, Late Completion
- Polytrauma: Medical Students' Pr
- Add Team workspace
Collaborate on a Team plan

ChatGPT 4o



- Python script for daily email reports
- Email for plumber quote
- Study vocabulary
- Design a fun coding game

Vreau sa incep un proiect de cercetare despre imapctul microbiomului asupra calitatii vietii la paceintii cu cancer colorectal, dupa interventia chirurgicala.

Te rog sa ma ajuti sa definesc clar scopul si oboiectivele acestui proeict si sa inteleg daca tema este de actualitate si interes si merita abordata.

Initial te rog sa imi pu tu o serie de intrebari ca sa intelegi mai bine ce vreau sa fac si pentru a

Literature Review

- *Find articles*
- *Summarize existing research papers*
- *Highlight key findings*
- *Identify gaps in the literature*
- *Generate summaries and synthesize information*



ResearchRabbit

EvidenceHunt



Elicit

scholarcy

Litmaps

New Chat

Sources

Total Clinical & Biomed Research

NICE Guidelines

Unlock better results

Explore Pro options

Off On

Main question

What is the prevalence of LARS in the genera...

Keywords used

prevalence of LARS general population

LARS general population statistics

LARS general population prevalence study

LARS epidemiology general population

LARS epidemiological study general populati...

History

what is the prevalence of LARS in gener...

what is the prevalence of LARS in gener...

What is the prevalence of LARS in gene...

microbiome colorectal cancer quality of...

Show more

Your question

what is the prevalence of LARS in general population?

Evidencehunt

- The prevalence of Low Anterior Resection Syndrome (LARS) in the general population varies from 26.9% to 77.4% 1 2.
- A study in a North American sample found that 26.9% of asymptomatic adults had major/minor LARS 1.
- Another study in Sweden reported a prevalence of 77.4% in patients who underwent curative rectal cancer surgery 2.
- Both studies concluded that LARS has a significant negative impact on quality of life, indicating the importance of addressing this issue in clinical practice.

shift + enter to add a new line ⌘ + alt + N to start a new chat

Share chat

Ask a follow-up question...

This tool provides access to literature and guidelines, not medical advice. Always consult a healthcare professional for medical decisions. X

References

select all

1 [Low Anterior Resection Syndrome in a Reference North American Sample: Prevalence and Associated Factors.](#)
Journal of the American College of Surgeons, J Moon et al

2 [Prevalence of low anterior resection syndrome and impact on quality of life after rectal cancer surgery: population-based study.](#)
BJS open, EHA Pieniowski et al

Other References

[The low anterior resection syndrome in a reference population: prevalence and predictive factors in the Netherlands.](#)
Colorectal disease : the official journal of the Association of Coloproctology of Great Britain and Ireland, M van Heinsbergen et al

[Normative Data for the Low Anterior Resection Syndrome Score \(LARS Score\).](#)
Annals of surgery, T Juul et al

[Bowel Dysfunction after Low Anterior Resection for Colorectal Cancer: A Frequent Late Effect of Surgery Infrequently Treated.](#)
Journal of the American College of Surgeons, NP McKenna et al

[Low Anterior Resection Syndrome: What Have We Learned Assessing a Large Population?](#)
Journal of clinical medicine, A Dulska et al

[Laparoscopic antireflux surgery for gastroesophageal reflux disease after lung transplantation.](#)
The Journal of surgical research, PM Fisichella et al

[Prevalence and Risk Factors of Low Anterior Resection Syndrome in Epithelial Ovarian Cancer Surgery.](#)

Export

New Chat

Sources

- Total Clinical & Biomed Research
- NICE Guidelines

Unlock better results

Explore Pro options

Off On

Main question

What is the prevalence of LARS in the genera...

Keywords used

- prevalence of LARS general population
- LARS general population statistics
- LARS general population prevalence study
- LARS epidemiology general population
- LARS epidemiological study general populati...

History

- what is the prevalence of LARS in gener...
- what is the prevalence of LARS in gener...
- What is the prevalence of LARS in gene...
- microbiome colorectal cancer quality of...

Show more

Your question

what is the prevalence of LARS in general population?

Evidencehunt

- The prevalence of Low Anterior Resection Syndrome (LARS) in the general population varies from 26.9% to 77.4% 1 2.
- A study in a North American sample found that 26.9% of asymptomatic adults had major/minor LARS 1.
- Another study in Sweden reported a prevalence of 77.4% in patients who underwent curative rectal cancer surgery 2.
- Both studies concluded that LARS has a significant negative impact on quality of life, indicating the importance of addressing this issue in clinical practice.

shift + enter to add a new line + alt + N to start a new chat

Share chat

Ask a follow-up question...

This tool provides access to literature and guidelines, not medical advice. Always consult a healthcare professional for medical decisions.

References

- 1 [Low Anterior Resection Syndrome in a Reference North American Sample: Prevalence and Associated Factors.](#)
Journal of the American College of Surgeons, J Moon et al
- 2 [Prevalence of low anterior resection syndrome and impact on quality of life after rectal cancer surgery: population-based study.](#)
BJS open, EHA Pieniowski et al

Other References

- [The low anterior resection syndrome in a reference population: prevalence and predictive factors in the Netherlands.](#)
Colorectal disease : the official journal of the Association of Coloproctology of Great Britain and Ireland, M van Heinsbergen et al
- [Normative Data for the Low Anterior Resection Syndrome Score \(LARS Score\).](#)
Annals of surgery, T Juul et al
- [Bowel Dysfunction after Low Anterior Resection for Colorectal Cancer: A Frequent Late Effect of Surgery, Infrequently Treated.](#)
Journal of the American College of Surgeons, NP McKenna et al
- [Low Anterior Resection Syndrome: What Have We Learned Assessing a Large Population?](#)
Journal of clinical medicine, A Dulskas et al
- [Laparoscopic antireflux surgery for gastroesophageal reflux disease after lung transplantation.](#)
The Journal of surgical research, PM Fisichella et al
- [Prevalence and Risk Factors of Low Anterior Resection Syndrome in Epithelial Ovarian Cancer Surgery.](#)

Export

Formulating Hypothesis and Designing Methodology

- Assist in formulating clear and testable hypotheses*
- Suggest ways to frame your research question and research methodologies*
- Provide guidance on selecting tools and techniques*



perplexity

Gemini



ChatGPT

Data Collection

- *NLP – from paper to digital database*
- *Design surveys or interview questions*
- *Integrate several sources*
- *Automate data collecting process*



- ChatGPT
 - Data Analyst
 - Logo Creator
 - Explore GPTs
- Today
- Valoare Glicemie: 101 mg/dL
 - Tabel cu valori extrase.
 - Microbiom și Cancer Colorectal
 - Descarcă fișier BibTeX.
 - Descarcare referințe BibTeX
 - Impactul Microbiomului Postope
 - Microbiomul In cancer colorectal
- Previous 7 Days
- Microbiom și cancer colorectal
 - Tabel Cazuri Tumori Nervi.
 - Ajutor, Bună ziua
- Previous 30 Days
- Traducere Românească Titlu
 - Sanitary Behavior in Pandemic
 - Inițiere Departamente Asociati
 - Traduceri mesaje solicitate.
 - Ajutor prezentare slide-uri
 - Platformă Screening Combinată
 - Proiecte Medicină Fără Tehnică
 - Uniunea Bisericilor Ortodoxe-Car
 - Colaborare cu Start-up
 - Research Steps: Structured Classi
 - Hallucination Rates Vary
 - AI in Medical Research: Overview
 - Prezentare PPT Limba Română.
 - Participare la Conferința Europeană
- Add Team workspace
Collaborate on a Team plan



- Recipe with what's in my kitchen
- Text inviting neighbors to barbecue
- Quiz me on ancient civilizations
- Experience Seoul like a local

Message ChatGPT

Data Analysis

- *Automate data preparation*
- *Data standardization*
- *Biostatistics*
- *No code Bigdata analysis*
- *Help interpret results*



Drafting and Finalizing Article/Thesis

- *Assist with writing and editing*
- *Improve clarity and coherence*
- *Check grammar and style*
- *Provide feedback on structure and content*
- *Format citations and references (APA, MLA, Chicago, etc.)*

scite



grammarly



ChatGPT



otero

You are currently on free plan, [Get prime](#) 

[+ New Web Document](#)

or

[Install MS Word Add-in](#)

works with .doc, .docx

My documents



Untitled document

Introduction Tuberculosis (TB) is a potentially severe infectious disease, with complex and heterogeneous...

last edited half a minute ago



My first document

Introduction Tuberculosis (TB) is a potentially severe infectious disease, with complex and heterogeneous...

last edited about 1 hour ago

[Home](#)

PAPERPAL FOR WRITING

[New Web Document](#)

[Install Word Add-in](#)

PAPERPAL FOR MANUSCRIPT

[Plagiarism Check](#)

[Submission Check](#)

[Editing Services](#)

[Plans](#)

OCTAVIAN ANDRONIC

FREE PLAN

[My Account](#)

[Refer and Earn](#)

[Help Center](#)



3.164.1

Advantages

- **Time Efficiency**
- Access to Updated Information
- Assistance in Decision Making
- Personalization of Patient Education
- Improving Communication Skills

Disadvantages/Risks/Limits

- **Risks of Errors = Hallucinations (up to 25%)**
- Cannot generate new content – limited to learned sources
- Dependent on prompt/input of user
- Confidentiality Issues
- Limitations in Understanding Context

Prevent hallucinations - **Crafting Effective Prompts**

Be clear and specific with your questions or instructions

Instead of "Tell me about history," use "Provide a brief summary of the causes and effects of World War II."

Instead of "Explain technology," use "Explain how blockchain technology works and its applications."

Prevent hallucinations - **Crafting Effective Prompts**

Provide context

•Tip 1: Include Background Information

Example: "I'm writing a science fiction story set in the year 2200. Describe the potential advancements in space travel."

Tip 2: Specify the Audience or Purpose

Example: "Explain the concept of artificial intelligence to a high school student."

Tip 3: Clarify the Desired Format or Style

Example: "Draft a formal business email requesting a meeting with a potential client."

Prevent hallucinations - **Crafting Effective Prompts**

Tip 4: Use Multiple Questions for Complex Topics

Example: "What are the main challenges of climate change? How can renewable energy help mitigate these challenges?"

Tip 5: Leverage Follow-Up Questions

Example: Initial prompt: "What is quantum computing?"

Follow-up: "Can you explain how it differs from classical computing?"

Tip 6: Utilize Comparative Prompts

Example: "Compare the economic systems of capitalism and socialism, highlighting their advantages and disadvantages."

Prevent hallucinations - **Crafting Effective Prompts**

Tip 7: Set the Scene or Scenario

Example: "Imagine you are a teacher explaining the water cycle to a class of 10-year-olds. How would you describe it?"

Tip 8: Specify the Output Format

Example: "Summarize the key points of the meeting in bullet points."

Tip 9: State Any Assumptions

Example: "Assume the reader has no prior knowledge of machine learning. Explain its basics."

Common Pitfalls and How to Avoid Them

- Avoiding overly vague prompts
- Being aware of biases and limitations
- Not relying on ChatGPT for critical decisions
- Use your knowledge
- Test the output

- ChatGPT
 - Data Analyst
 - Logo Creator
 - Explore GPTs
- Today
- Cărți despre chirurgia rectului
 - Using ChatGPT: Tips & Tricks
 - Extract Sex, Age, Diagnosis
 - Valoare Glicemie: 101 mg/dL
 - Tabel cu valori extrase.
 - Microbiom și Cancer Colorectal
 - Descarcă fișier BibTeX.
 - Descarcare referințe BibTeX
 - Impactul Microbiomului Postope
 - Microbiomul în cancer colorectal
- Previous 7 Days
- Microbiom și cancer colorectal
 - Tabel Cazuri Tumori Nervi.
 - Ajutor, Bună ziua
- Previous 30 Days
- Traducere Românească Titlu
 - Sanitary Behavior in Pandemic
 - Infiiintare Departamente Asociati
 - Traduceri mesaje solicitate.
 - Ajutor prezentare slide-uri
 - Platformă Screening Combinată
 - Proiecte Medicină Fără Tehnică
 - Uniunea Bisericilor Ortodoxe-Cat
 - Colaborare cu Start-up
 - Research Steps: Structured Classi
 - Hallucination Rates Vary
- Add Team workspace
Collaborate on a Team plan



- Pick outfit to look good on camera
- What to do with kids' art
- Overcome procrastination
- Message to comfort a friend

Message ChatGPT

Technology moves faster than ethics



By Frank Kaufmann -- Wednesday, December 31, 2014

 Print

Follow Us



Search



The Washington Times

America's Newspaper

Ethical considerations

- Bias because of the training data
- If it is used for diagnosis/therapeutic decisions who will be responsible?
- Privacy and data security
- Copyright – are the authors of primary data cited?
- Authorship of generated content
- Mental health of users
- Abuse of technology

AI in Medical Research:

Oppoorutultities and Limiits

Hallucinations

Data privacy?

Authorship?

Copyright?



Beginner

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Intermediate

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Experienced

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Beginner

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Intermediate

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Experienced

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Beginner

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Intermediate

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Experienced

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Beginner

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Intermediate

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Experienced

- *Identify Research Problem*
- *Literature Review*
- *Formulating Hypothesis*
- *Designing Methodology*
- *Data Collection*
- *Data Analysis*
- *Drafting and Finalizing Article/Thesis*

Conclusions

- Generative AI are models that will change the paradigm of research in healthcare
- The use of these technologies in daily practice increases efficiency exponentially
- But, we should ensure that the ethical framework will keep up with technology



Thank you!

octavian.andronic@umfcd.ro

