

# A?

Aalto University  
School of Electrical  
Engineering

# LLMs in Research and Academic Writing

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# Outline

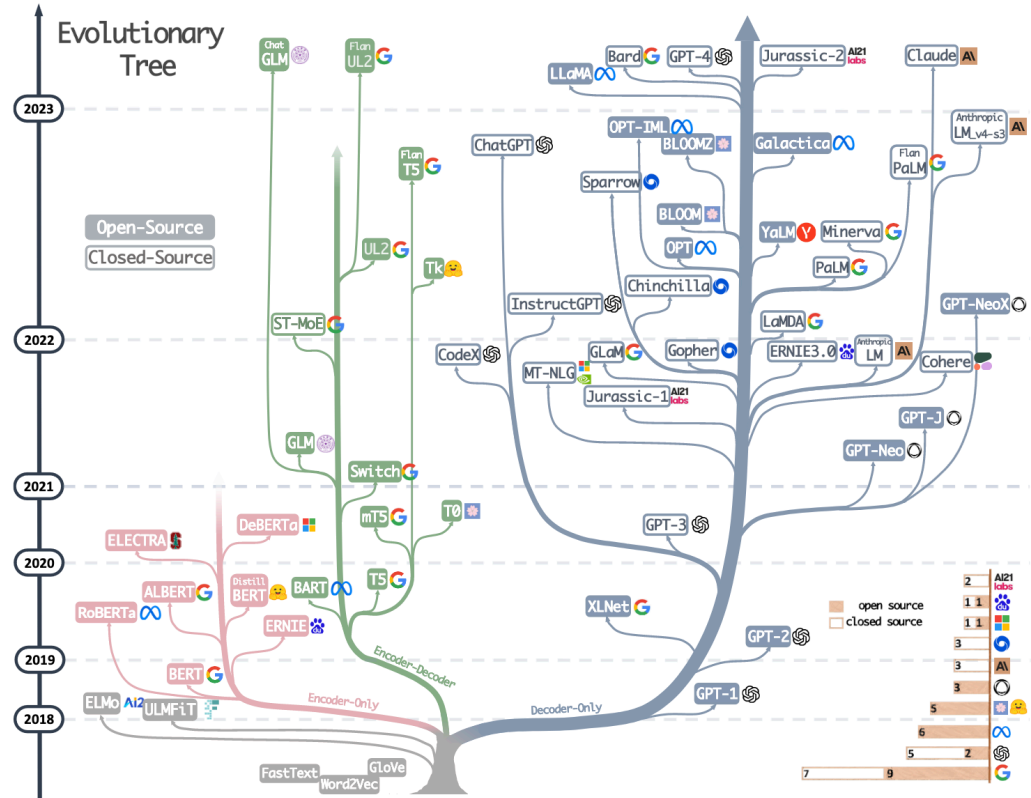
- **LLM Overview**
- **Aalto Guidelines**
- **Use case examples**

# Large language models (LLMs)

- **Language Models are computational models capable of understanding and generating human language.**

Training: Autoregressive Language Models  
 Model type: Generative  
 Pretrain task: Predict next word

Decoder-only (GPT-style)



# Aalto Guidelines

## Responsible Use

- **AI cannot be given authorship, as it is considered as a tool, and authorship always involves responsibility that AI cannot cover. You are responsible for the correctness of the results you present, and you need to respect the authorship of other researchers by citing their work where appropriate.**
- **The use of AI should be transparent by openly describing how AI is used in the research process so that others can reproduce your results.**

# Benefits

- **Learning concepts, receiving feedback, connecting ideas**
- **Text generation, summarization, and contextual understanding**
- **Literature review, idea generation, and report writing**

# Use Cases

## Learning

- How is concept X different from concept Y?
- My current understanding of X is (...). Can you critique it?
- Here is a phenomenon I'm interested in. What are keywords?
- *What is the difference between panning using level or time differences?*
- *It seems that hearing directions underwater is difficult for humans. Can you help me the right keywords?*

# Use Cases Literature

- Efficiently comprehend and summarize research papers
  - Needs paid version
- Keyphrase extraction
- Asking for literature directly does not work









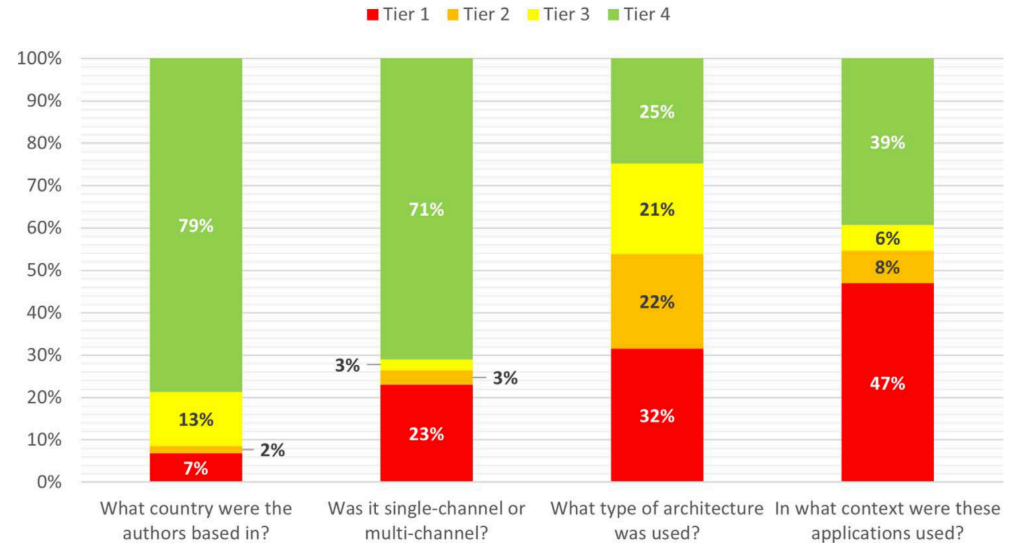
Farina, A. Simultaneous Measurement of Impulse Response and Distortion with a Swept-Sine Technique. in 1–23 (2000).

# Use Cases Literature

- Recent article tests this idea

## An experiment on an automated literature survey of data-driven speech enhancement methods

Arthur dos Santos<sup>1,\*</sup> , Jayr Pereira<sup>2</sup> , Rodrigo Nogueira<sup>2</sup> , Bruno Masiero<sup>1</sup> , Shiva Sander Tavallaey<sup>3,4</sup> , and Elias Zea<sup>4</sup> 



Analysis from 117 papers



# Use Cases

## Coding

- **Generating ideas and prototypes for seminar demos**
- **Use as a coding co-pilot.**
  - **Smooth experience with GitHub Co-Pilot in VS Code**
- ***My topic is higher order ambisonics recording. I like to create a small demo using Python. Do you have ideas for a small-scale project?***
- ***I like to do Ambisonic Sound Field Visualization. Generate a Python script which loads a file and plots the directional energy.***

# Use Cases

## Writing

- **Streamline the process of writing seminar reports**
- **Providing assistance in drafting, structuring, and revising content**
- **Language refinement - adjust to your taste**
- *Here are a few bullet points so far. What is missing?*
- *Draft a paragraph based on these points. Include equations in Latex.*
- *Improve the logical flow of this text. Use simpler language.*

# Summary

- **Explore and experiment**
  - **Keep text concise**
  - **Interact through refinements**
  - **Generic prompt = generic answer**
- **Be responsible**
  
- **Questions?**