Generative AI and You

The possibilities and pitfalls of GenAI, when working on a Bachelor project

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Topics

Use of Generative AI at Aarhus University

The Dangers of Uncritical GenAI Use

Using Gen-AI as a Productive Tool

Generative AI@AU

Generative AI at Aarhus University

Permitted, unless otherwise stated

- https://studerende.au.dk/en/gai
- https://studypedia.au.dk/en/learning-tools/gai-and-chatbots

- Use of Generative AI is permitted for Bachelor's reports and Master's theses, but its use **must** be declared

What Counts as Use of Generative AI?

If you use it *at all*, it counts

- Using AI/ML to generate content of any form
- Using AI/ML to generate code (e.g., CoPilot)
- Using AI/ML to critique text/content and make suggestions
- Using AI/ML to improve or check grammar (e.g., Grammarly)
- Using AI/ML as a research tool, learning new things, or summarizing topics

- Basically, using **anything** smarter than a spell checker counts

Using Generated Content

If you did not make it, you must acknowledge who/what did

- Content generated using ML/AI tools can be incorporated into your thesis, but:
- You **must** cite your source — just as with any other source!
- Your citation should include
  - the source and date (e.g., ChatGPT-4o, 2025-02-18)
  - the prompt (e.g., *“Write a short, succinct paragraph on why it is better to write your own text rather than relying on machine generated ditto in the style of a scientific publication”)*

Declaration

The use of GenAI must be made clear

- If you have used **any** AI/ML tool, you **must** make it clear through a declaration
  - https://studerende.au.dk/fileadmin/studerende.au.dk/AU_Uddannelse/GAI/Deklarationsskabelon_ENGLISH.docx
  - must be included as a PDF when you submit your thesis
- I would **also** suggest that you state clearly in your Introduction chapter
  - if GenAI has been used and how, or
  - that you have **not** used GenAI at all

The Dangers of Generative AI

My friend works at a well-known tech company in San Francisco. He was reviewing his junior team member's pull request. When asked what a chunk of code did, the team member matter-of-factly replied "I don't know, chatgpt wrote that"

From a post on Hacker News

The future of software development

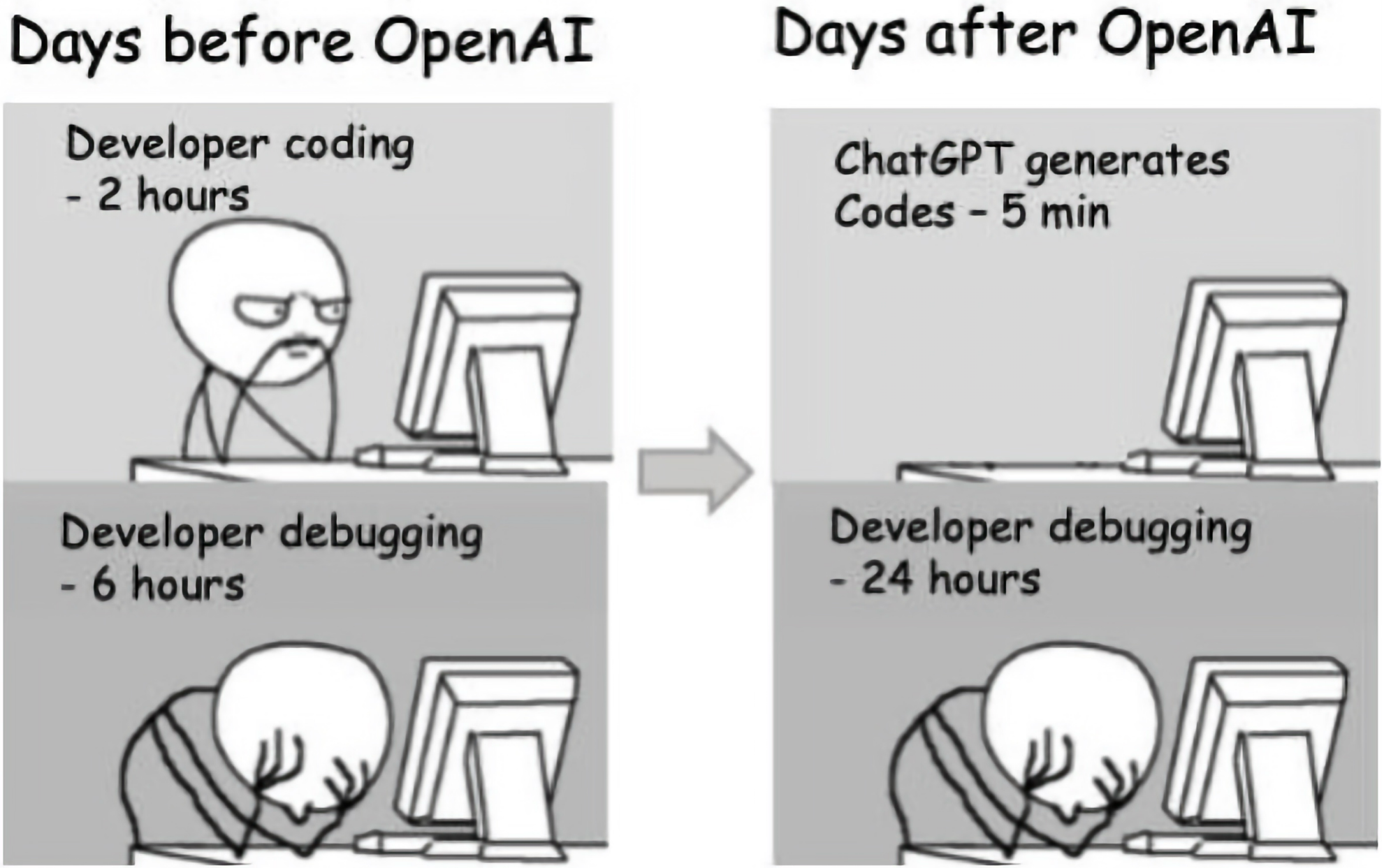
There are still going to be software developers, but…

- GenAI, in the hands of experienced developers, can boost productivity by automating many basic tasks
- These basic tasks used to be the starting points for junior developers, allowing them to “learn the ropes” before be able/trusted to work on their own on the company code base
- There is going to be less and less need for ‘beginner’ developers as their tasks become automated
- So. Don’t *be* a beginner developer — git gud
- Programming can only be learned by programming
  - not by reading about programming, or watching programming, and certainly not by letting GenAI program for you

Programming is *understanding*

If *you* are not doing the thinking, *who is?*

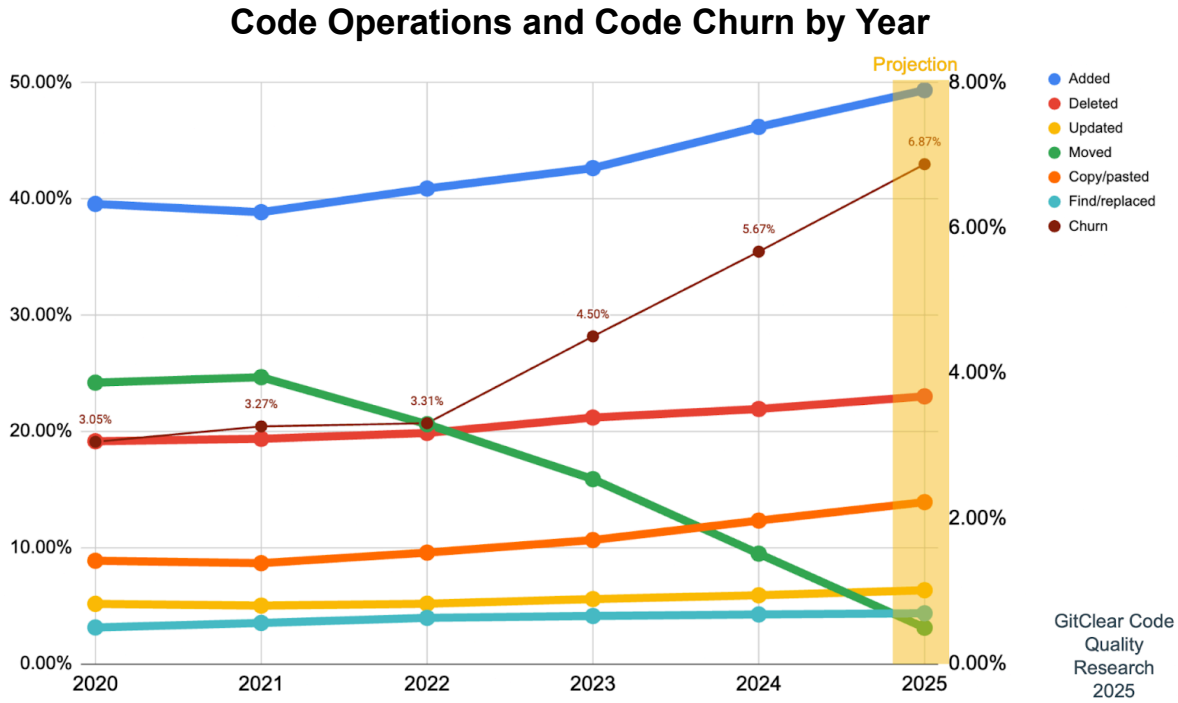
- You have a problem, and you instruct a computer how to solve it
- If you don't understand the solution, how can you tell if it works, or whether it will always work? How can you improve on it?
- Which solution do you understand better — the one given to you, or the one you came up with, or implemented yourselves?
- All 'real' code will be extended and modified over time — if you do not understand the starting point, how can you carry on?


Days before OpenAI
Developer coding
- 2 hours
Developer debugging
- 6 hours
Days after OpenAI
ChatGPT generates
Codes - 5 min
Developer debugging
- 24 hours

Code Quality Study

What is happening in industry?

- New, added code is rising
- Refactoring is going down — more code is copy/pasted than moved
- Less understanding and reordering, more adding and duplicating
- (Study done on massive collection of commercial and open source code repositories)



Relative distribution of code operations by year of authorship

Gaining experience

- You do not become a good developer overnight: it takes hard work
- Just as you do not get fit just because you signed up for a fitness club or bought running shoes
- Programming is *hard mental work*, and in order to get good, you start with the fundamentals, solving basic problems, and work your way up
- Generative AI is dangerous to you as a student, because while it can certainly solve many of the problems that you will be given, doing so will not give you the experience, you will need to become (even) better
- A Bachelor project is **your** chance to show what **you** can do, and how you can gain skills in the process!

Writing is *also* hard mental work

No pain, no gain

- GenAI can certainly generate text and other content for you, but…

- **You** are the one responsible for what is in your Bachelor's report, and
- **You** will be expected to be able to answer questions about it
- Your report should be a carefully constructed argument made through methodical steps, and you better be aware of what those steps entail

Using GenAI as a Productive Tool

GenAI, what is it good for?

Lots of things!

- There are challenges in using Gen-AI, especially if you let it take the driver’s seat
- However, there are of plenty excellent uses for Gen-AI

Augmented search engines & summarizers

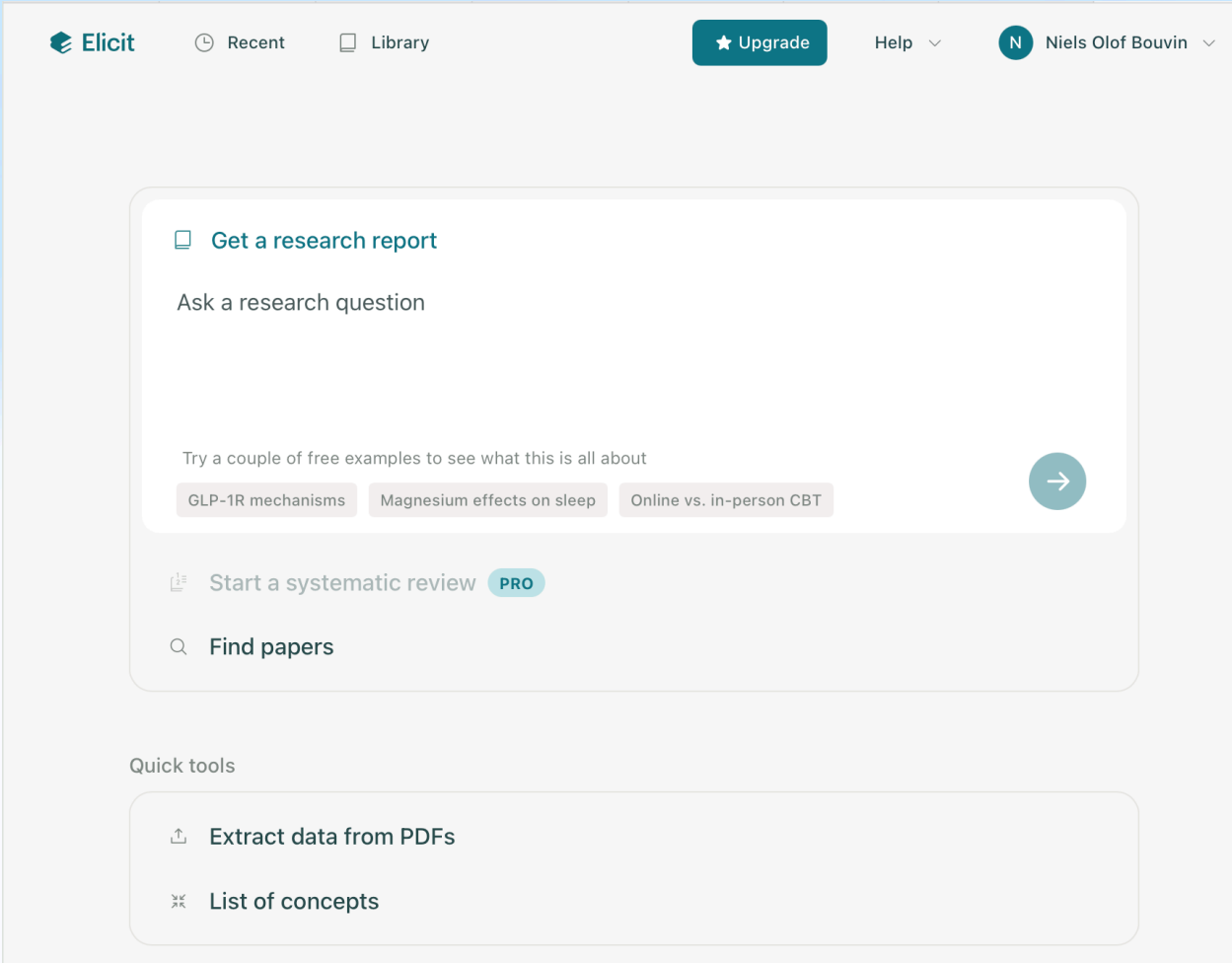
When you don’t know what you don’t know

- If you are venturing into new areas of enquiry, having ChatGPT, etc., summarize and introduce the topic can be an excellent starting point
- You still need to do your own research, and read the papers and documentation, but LLMs can point you in the right direction, and crucially, introduce you to the correct terminology and nomenclature, which is a great boon for future searches
- It can also be an *excellent* tool for unfamiliar APIs or libraries
- Beware! LLMs can invent enticing paper titles or API operations, so you *have* to check that they exist (and *read* them, if you are citing them)

Literature search and research

A supplement to Google Scholar

- https://www.elicit.com/
- Can help you find papers, when you don’t know the precise keywords that Google Scholar needs
- Free in the basic variant



Using LLMs as tools to become better writers

Write your own text, but accept advice

- I would advise against using machine generated text for anything in your reports
- However, LLMs are **good** at language, and can be used for feedback

- Trivial: Analyze and comment on the grammar of some text for clarification and improvement. *Learn* from the corrections, don't just copy/paste!
- Advanced: A bit of prompt engineering…

Bachelor Supervisor in a Box

- LLMs can provide good feedback, if you instruct them properly, e.g.,

  "I wish you to critique the following Bachelor Report abstract as a seasoned Computer Science professor and thesis supervisor would. You are not to offer a corrected version of the text, but you are to point out strengths and weaknesses, so that the recipient can correct the text themselves."

- This approach can be generalized, and can provide excellent and useful critiques (as well as some that can be ignored)

- **You** are the judge of what to do with the suggestions — it's **your** report

Conclusions and take-aways

- Generative AI is a tremendously powerful tool
  - it is not always right, and
  - you should not let it do your (mental) work for you
- If you use it, it **must** be referenced, explained, and declared
  - failure to do so is plagiarism and exam fraud
- GenAI can be excellent tools for (initial) research as well as critique
  - is it right? **You** should be the judge of that!