



Generative AI and Software Engineering

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GenAI in Software Development

Overview

GenAI can be a very helpful companion (or at some times saboteur) of a software engineer.

Through the Usage of AI tools, developers have the potential to execute their tasks faster, more efficiently, and (ideally) with less debugging involved.

GenAI and Software Engineering

What is GenAI? - Definition

Generative AI refers to algorithms and models that can **generate** new content, from text and images to code and music, based on **patterns** and data they have **learned** from training datasets

GenAI **did not / is not / will not**
replace software developers

(or other professions)

AI Tools can be used in different phases of the software development lifecycle:

- Design
- Implementation
- Testing
- Documentation
- Deployment

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Examples of Tools

- ChatGPT
- Devin
- Google Gemini
- GitHub Copilot
- Amazon CodeWhisperer
- DeepCode
- SonarQube
- And more...

GenAI in Software Development

Do's and Dont's

When used correctly, AI can be both a timesaver and streamliner:

- Optimizing and refactoring code
- Generating test data, as well as the tests themselves
- Documentation generation
- Using it as a sounding board / bouncing off ideas (Rubber ducking)
- Bug detection and correction
- Simplifying deployments

However, when used without proper care, lead to issues:

- Exposing private and/or confidential data
- Relying blindly on auto-generated code (hallucinations)
- Following the recommendations of AI code/bug checkers without questioning
- Expecting AI to give contextual info in too large of a code base

GenAI in the Context of Software Development

Daily Usage of GenAI Tools / Demos



What is **ChatGPT**?

- ChatGPT is an AI language model developed by OpenAI, based on the GPT (Generative Pre-trained Transformer) architecture. It is trained on a diverse range of internet text to generate human-like text based on the prompts it receives.
- The model can understand and generate text in multiple languages, making it versatile in various applications.

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Daily Usage in Consultant Work (Joshua)

1. General education and information retrieval
2. Function generation and abstraction
3. Function optimization and refactoring
 - Functional design patterns
4. Quick scripting (Python)
 - Data analysis
 - Data visualization

Hands-on ChatGPT



What is **GitHub Copilot**?

- Copilot is an AI coding assistant that enables the developer to code faster and more efficiently by providing advice, code snippets, as well as an auto-complete feature for code
- It also offers a real-time chat in which one can discuss the code with it, and try to solve a problem
- One advantage that Copilot has over chatGPT is that it has knowledge of the context of the codebase you're working on

How does Ali use Copilot in his day to day?

- I use copilot mainly to help me write code or assist me in the more "mundane" parts of coding
- Copilot helps me add new functionalities to my code, as well as generate relevant test cases for the functions
- I also use Copilot as a sounding board (Rubber ducking) to explore potential solutions and ideas

Hands-on GitHub Copilot

GenAI in the Context of Software Development

Downsides and Inflated Expectations

Downsides and Inflated Expectations

Downsides

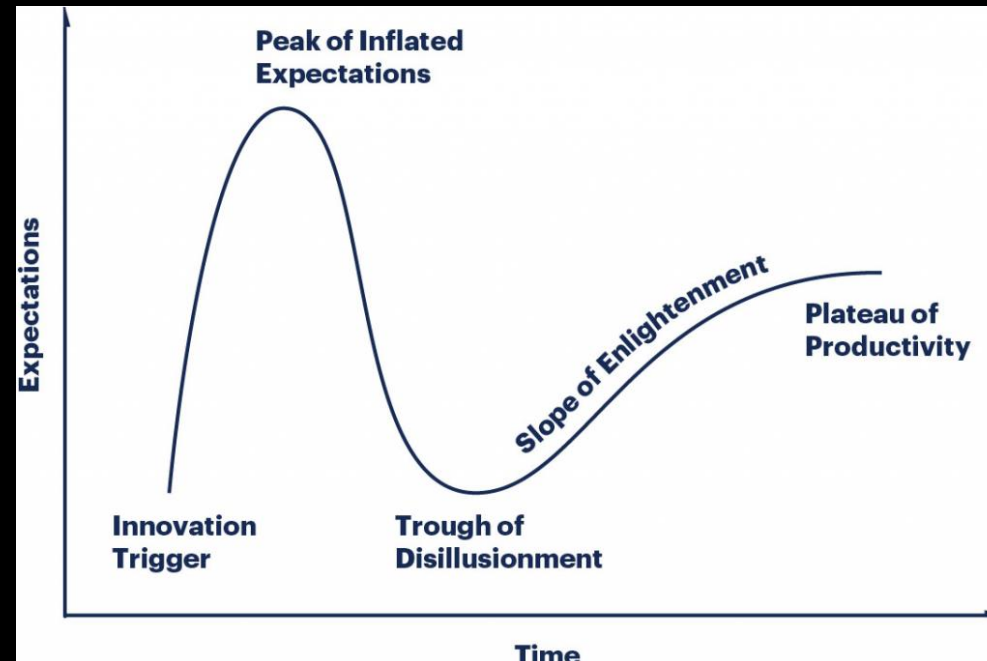
Several risks may appear if not carefully monitored:

- Lack of transparency
- Accuracy
 - Hallucinations
 - Optimization/performance
 - Garbage in garbage out
- Intellectual property (IP) and copyright
 - Data and queries should be considered public
- Over-reliance on quick solutions

Downsides and Inflated Expectations

Inflated Expectations

- Gartner has tracked GenAI since 2020 and believes tools have moved into the **Peak of Inflated Expectations** phase
- The hype will subside as the reality of **implementation** sets in



Questions and Answers



**Thank you for your
attention**