LLM Impact and Integration on Software Engineering Through the Lens of Programming Education

Description

- This research aims to assess the practical applications of LLMs within various IT contexts, from development projects to educational material generation.
- The idea is to tie the research on LLM potential and limitations on coursework, exercises, and study materials to discover and identify potential LLM use cases. The benefit of using course exercises as context is that they reveal potential pitfalls and possibilities more easily due to the large number of students solving the same problem in different ways.

Who am I?

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Research Plan

Should LLMs be Used as Aid for Designing Code Architecture and for Refactoring?

Research environment

Using exercises in multiple courses, it is explored if an LLM can correctly assess code architecture, as well as quality of its suggestions.

Research utilizes survey and comparison to full-mark model answers.

Goal

Identify possible limitations and benefits of using LLM as aid for designing software architecture.

How LLMs and Generative AI is Changing the Landscape of Finnish IT industry: Companies Perception

- The needs of companies are explored in a series of interviews. Results of these interviews can alter the research setting.
- As we have also gathered data on open job positions, we can also compare them to the interviews.

LLMs: Aid or Hindrance on Pilot Development? A Case Study on Capstone and Lean Platform Development -courses

Students use LLM in courses when developing solutions. Additionally, some of the participating student groups can be restricted from using LLMs.

Throughout the courses, a questionnaire is answered by all relevant stakeholders (the course instructors, students and companies employees).

Exploring Generation of Learning Materials Using Autonomous Agents

Exploring the use of role-based AI agents in autonomously generating and assessing course materials. The unique challenge of generative AI is hallucination, and the ease of generating new material drastically changes the working processes.

The role's are

1. Supervisor (how well does the teacher agent follow the given curriculum)
2. Teacher (generates the actual material)
3. Hallucination detector.

From Excel to MVP: Accelerating Back-End Development By Utilizing LLMs

Many small companies start out by writing their data to Excel. As the company grows, this often becomes impractical. This also means that there is a lot of data. This data can be used as test cases to validate functions created by a LLM.

The question is: Can LLMs be used to to convert Excel sheets automatically into a working back-end?

- First, the validation is done by giving students on a course a task to convert Excel sheet to a working back-end with a language of their choosing.
- They are also asked to convert functions used in the Excel sheet.
- Students need to report their workflow and LLM usage.
- Using insights gained with this approach, an automated pipeline is created. The created pipeline is then tested in a real-world scenario by trying to automatically convert an existing small company's Excel sheets into a Python back-end.