Software engineering

with Dr Thibaud Lutellier

Talking *points*

Knowledge

1. What is a software bug?
2. What is code refactoring?

Comprehension

3. What are some possible consequences of software bugs?
4. Why are Jupyter Notebooks more difficult to debug than traditional code?

Analysis

5. What are the differences in how human developers and AI agents refactor code? And what do these differences reveal about the ways humans and AI approach problem-solving?
6. AI agents perform many more refactoring actions than human developers, but why might this not lead to higher quality software?

Evaluation

7. As AI becomes more involved in software development, the role of software engineers may shift from writing code to reviewing and improving AI-generated code. How do you think this change will affect the skills needed by future software engineers?
8. Software is essential in critical areas such as healthcare, banking and transport. How much responsibility do you think humans should have when AI is used to create software that affects people's lives?

More *resources*

- This article explains how Thibaud is using AI to detect software bugs: **ualberta.ca/en/augustana/news/2023/01/harnessing-ai to-catch-bugs-lutellier.html**

Activity

Thibaud's research highlights the opportunities and challenges of using AI in software development. AI tools can help developers detect bugs, write code and improve software more quickly. However, AI-generated changes do not always improve software quality, meaning human judgement and review remain essential.

Choose an area where AI is being used (e.g. software development, healthcare, education, transport, finance). Split into two groups for a debate. Group 1 will argue in favour of using more AI in your chosen area, while Group 2 will argue against increasing the use of AI. Before beginning the debate, conduct some research into the topic and gather your ideas and arguments:

- Research the benefits of using AI in your chosen area, including how it could improve efficiency, solve problems or support human decision-making:
  - How is AI currently being used in this area?
  - What tasks can AI complete faster or more accurately than humans?
  - How could AI help people make better decisions or solve difficult problems?

- Research the challenges of using AI, including potential risks, mistakes, security concerns or over-reliance on AI systems:
  - What could happen if AI makes a mistake?
  - Are there situations where human judgement is more important than AI?
  - What risks could come from relying too heavily on AI?

- Can you find real-world examples where AI has been helpful or caused challenges? How do these examples support your argument?

Conduct a respectful debate about whether or not AI use should be increased in your chosen area. During the debate, discuss the following:

1. What are the biggest benefits and risks of using AI in your chosen area?
2. Why are human knowledge and judgement still important when using AI?
3. What tasks should AI be responsible for and what tasks should humans be responsible for?

After the debate, individually or in groups, reflect on the following:

1. How did considering both sides of the debate affect your opinion of AI?
2. How do you think AI will change the way people work in the future?
3. As AI becomes more common in different industries, how do you think the skills people need for future careers will change?