CS562 Foundations of AI Manal Faisal

Reflection

1. In the paper, Awad talks about different "types" of AI based on how involved the AI is in the scientific process. One main distinction is between AI as a tool and AI as a collaborator. AI as a tool mainly automates tasks like data processing, simulations, or pattern recognition. In that case, it's basically helping scientists work faster and handle larger amounts of data. But AI as a collaborator is different. That's when AI starts contributing to reasoning, hypothesis generation, or interpretation. That feels like a much bigger shift.
2. I think this distinction matters because using AI as a tool doesn't really change how science works, it just makes it more efficient. But if AI starts acting more like a collaborator, that could actually change how research is conducted. It raises questions about who is really "doing" the science and how much decision-making we're comfortable handing over to machines.
3. The paper also discusses several risks of using AI in science. One big issue is interpretability. A lot of advanced AI systems function like black boxes, meaning scientists might not fully understand how the AI reached a conclusion. That's concerning because scientific knowledge is supposed to be transparent and explainable. There's also the issue of bias. Since AI systems are trained on data, they can reproduce or even amplify biases in that data. That could influence research outcomes in ways we don't immediately notice. Reproducibility is another concern, especially if models rely on randomness or proprietary training data. And finally, there's the question of theory formation. If AI finds patterns that humans can't easily interpret, it becomes harder to know whether we've actually gained understanding or just identified correlations.
4. Overall, the paper suggests that AI is currently more likely to accelerate scientific discovery than completely reshape the scientific method. It clearly makes research faster and more efficient, especially in data-heavy fields. However, I do think there's potential for AI to gradually reshape science over time, especially if it becomes more involved in generating hypotheses or guiding experiments. Still, I believe human oversight will remain essential, because science isn't just about detecting patterns — it's about explaining them and making sense of them.