Reflection

Awad distinguishes between different “types” of AI. What classification scheme does the paper use and why do these types matter for scientific research?

Awad talks about AI in science as a “constellation of paradigms”. She organizes them into 3 distinct groups, foundational, decision-oriented, cross-cutting, and “meta-scientific”. These types matter for scientific research because they specialize or are best used for different tasks. For example you would use one type for modelling and different type for pattern discovery. Awad believes that having these different types of AI helps scientists and researchers decide which type to use for which specific goal instead of treating AI as one for all uses.

Does Awad make a clear distinction between AI as a tool and AI as a scientific collaborator? If so,what are the differences and what are some examples given to support the differences? Do these examples suggest a real shift in how science is conducted, or mostly an extension of existing methods?

Awad makes a clear distinction that AI is not only a collaborator but also is able to function as an “epistemic agent”that can change what counts as evidence and how reasoning is formed. During her talk about an agentic meta-scientific AI, which would basically behave like a “junior researcher” that can plan, reason, and finish tasks, Awad uses the example of Google Co-Scientist. On the other hand there are many examples of using AI exactly like a tool, such as code-generation. The article focuses on using partial automation along with strong validation as a way to use AI efficiently as a tool .

What are some limitations or risks of using AI in science? How do these relate to issues such as interpretability, bias, reproducibility, or theory formation?

Awad addresses many limitations, such as predictive models being vague and small models resulting in unreliable outputs. She talks a lot about integrity, social issues, and LLM’s hallucinations. These issues are directly related to interpretability and reproducibility, Awad argues for more casual or interpretable methods so it is easier to justify the results from AI. She also talks about how different tools can give different answers so their explanations must be tested carefully

According to Awad’s arguments, is AI more likely to accelerate scientific discovery or to reshape the scientific method itself? Do you agree or disagree?

Awad thinks both, but I feel she thinks that AI is more likely to accelerate scientific discovery. She talks about how AI supports hypothesis generation, reasoning and even something like experimental design. This can change how knowledge is created and validated. I agree that AI is more likely to accelerate scientific discovery by streamlining the method and making it faster and easier to test theories.