

The Thinking Sidecar:  
Five Thoughts on Machine Learning, Medicine, and Future Physicians

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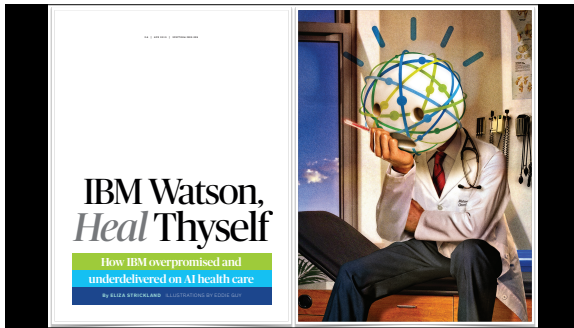
1. Today, I would like to talk about an alternative way of thinking how we relate to AI.

1. A Clockwork World

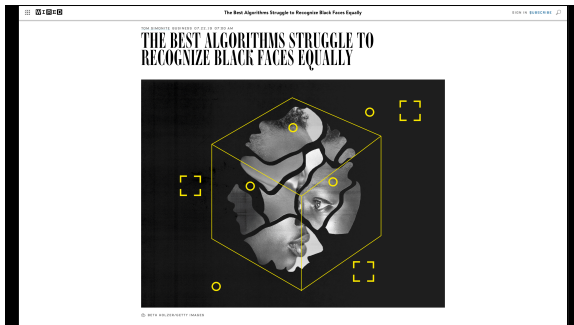
2. Right now, the dominant worldview seems to be one where - utopically or dystopically - we assume AI is in charge.

3. This view was solidified by the triumph of AlphaGo, where publications (who should have known better) promoted a near-magical view of the results.

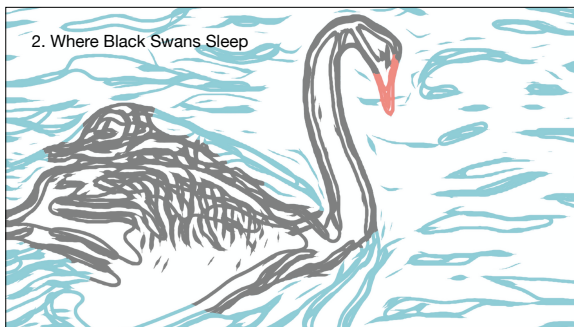
4. Now, in recent years, we've seen superb outcomes in open source projects - but mostly framed as replacing medical professional functions, outside the purview of physician agency.



5. However, things aren't going so well in the black box world, with exaggerated claims about outcomes, and opacity to causes of failures.



6. And problems of biases noted at the beginning of this generation of AI are still with us, but now showing up in black box products on the market, rather than in the lab.



7. This already presents a worrisome panorama - but an additional problem appears: the setup of AI as it exists right now is ideal for creating Black Swan events.

Black Swan Events

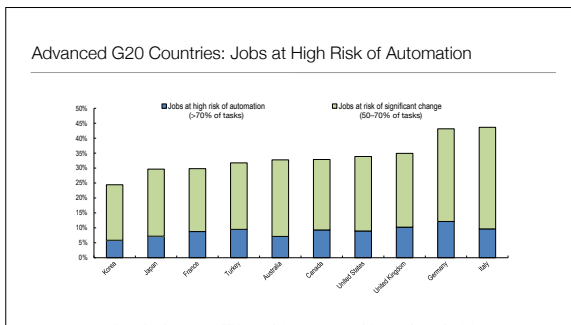
- Cannot be predicted ahead of time
- Have a major effect
- Can be rationalized retrospectively

8. What is a Black Swan event? Well, they cannot be predicted ahead of time, have huge - frequently negative - impact, and in retrospect, you say "oh yeah, that's why that happened".

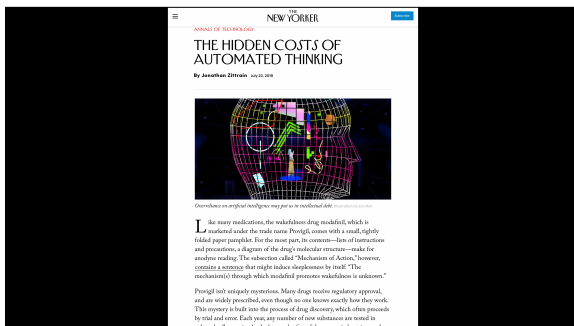




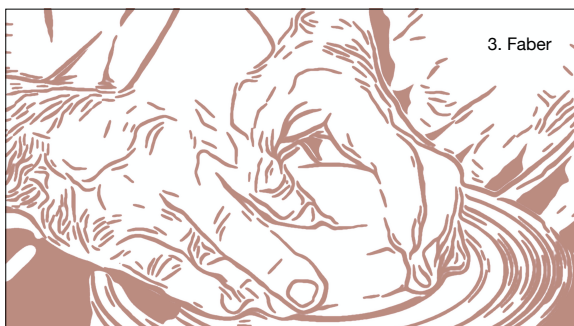
9. A classic example are the major financial crashes of the 20th and 21st centuries. Nobody predicted them - at most, they could see trouble forming - but the exact features, magnitude, and timing remained opaque.



10. All the factors mentioned contribute to likely Black Swan events in the offing for AI, but two additional components make things worse. First, AI generally does not replace jobs wholesale - just parts of them, and modifies the rest in complex ways. This type of change creates complex, opaque structures that are particularly Black Swan-prone - again, think of parallels from the financial markets.

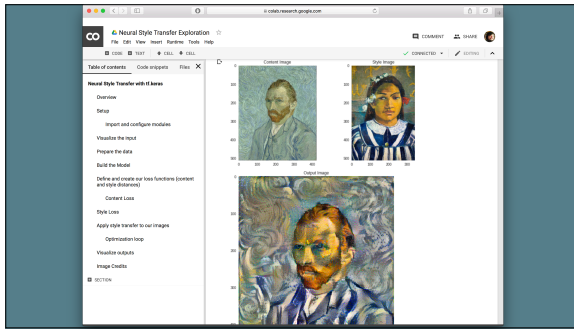


11. Additionally, the attitudes towards lack of agency and opacity are creating what Jonathan Zittrain calls “intellectual debt”, which much like monetary debt can come back to bite you and trigger crashes if not carefully monitored and controlled.



12. So what do we do? Just give up, or ban AI? This would be a terrible idea - the potential for what can be accomplished is too powerful to ignore. Instead, I propose something different. All of us - medical professionals, educators, and most particularly students, need to become makers in the arena of AI.





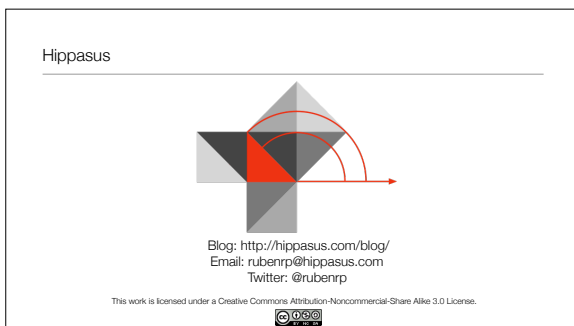
17. Defanging Black Swans requires speculative exploration that is informed both by the humanities, as well as by a playful sense of “what if” creation. So, we want our students to expand their own AI creation beyond the medical, into realms that will inform this exploration.



18. With all of this, we have moved away from that AI-run world, to one where it is a valued partner - but as a thinking sidecar, with all of us squarely at the wheel.



19. I began by mentioning Go - let me close with chess. When the same engine that triumphed in Go took over chess, Garry Kasparov suggested that it was not opaque or magical, but rather a wonderful way to learn new things about chess - and that he rather liked that its style resembled his own.



20. So, let's undertake the next step of this journey in that spirit: one of joyful creation and exploration, in which the partnership with the tools of AI will not lead to intellectual debt, but rather to intellectual wealth.