

How to Make AI-Assisted Innovations?

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This post gathers my thoughts on a few loosely related topics as a follow up to the last post on Why Humans Better at Innovations Than AI.

The Key Takeaways:

1. Future AI models can be used to make forecasting a *commoditized*, readily accessible service for the broader society or tailored to the specific needs of niche user groups.
2. Human creativity is unique in two senses: on the “supply side” it is driven by our unique genetic makeup or our Central Nervous System, while on the “demand side” it is prioritized by our unique interests more than anything else.
3. Even AI models of today have proven that human creativity can be *simulated* by mechanical processes, while creating an identical copy of humanity was not in the AI plan. Summarizing and leveraging our collective, domain-specific knowledge/intelligence is the best way AI can help us.
4. Plato’s assertion “Necessity is the mother of invention” is wrong in making necessity the one and only driver for invention. There will be gaps or huge

time delays between the “demand” and “supply” of inventions, where necessities pose strong and often imperative demands for innovation.

5. Necessity often leads to the creation of temporary, makeshift solutions. This connection between need and immediate (often simple and get-by) response is far stronger than the more deliberate process of invention.
6. Both “originality” and “divergent thinking” are crucial for the “ideation” stage, although real invention does not always follow the textbook process.
7. Innovators & entrepreneurs should consult AI at every step of the way.
8. The difference between “generative” and “predictive” AIs may be smaller than they appear. The same training data and parameters may find their way in both AI models. The difference is likely caused by what question humans ask.

1 AI Forecasting May Become Commodity Service

This report from [Fastcompany.com](https://www.fastcompany.com) informs us of a new study by researchers at the London School of Economics, MIT, and the University of Pennsylvania, proving that “forecasting the future is a task that could well be outsourced to generative AI—with surprising results...,” which is not surprising given that “LLMs are trained on vast volumes of data, trawled on the internet, and are designed to produce the most predictable, consensual... response... The scale of the data they pull from, and the range of opinions, also helps supercharge the traditional wisdom of the crowd concept that helps make accurate predictions.”

But in my opinion, not only should we not be surprised but we can proactively make AI or LLM forecasting something of a commodity — done routinely, regularly and is easily accessible. Not doing so is a waste of resources and data training

efforts. No human possesses the capability, nor the will, to predict the future with the same level of detail and scale as Large Language Models (LLMs) utilizing vast datasets and billions of parameters. Why not let it do its work?

2 Human Creativity Is Unique in Two Ways

John Nosta is an innovation theorist and his well written post on whether AI model is more creative than humans raises an interesting question whether creativity is a uniquely of human activity, or more specifically if AI can be as creative as human if not more so.

I see it as two separate questions but both with positive answers. The first issue of uniqueness of human creativity have already been confirmed by research in genetics. This interesting human creativity gene study confirms the existence of genes that “set apart modern humans from chimpanzees and Neanderthals, which could help explain how modern humans overcame now-extinct hominids like the Neanderthals... 267 genes from this larger group are found only in modern humans and not in chimpanzees or Neanderthals.”

This speaks to me that human creativity may not be the only creativity in the world (think of chimpanzees using sticks to fish for termites, stones to crack open nuts), but *is* driven by our distinct genetic makeup. We can put the debate about whether human creativity is unique to rest.

But let us not ignore the other side of the story that has been largely ignored: Not only is human creativity driven by unique human genetics but faces a unique demands by humanity. Our innovations are first and foremost serving our own interests more than anyone else. This holds even for environmental protection: We strive for a healthy planet primarily because we suffer the consequences of a degraded one.

3 Human Creativity Can Be Simulated

The second question of whether AI can be as creative as humans — if not more so — also have a positive answer. Human creativity can be simulated through machines without having humans' central nervous system or CNS. Generative AI models have already made that happen and we expect them to work better in the future.

No, human creativity cannot be “genuinely replicated” as asked by Nosta, not to the extent that it is “deeply intertwined with consciousness and subjective experience.” But having an identical copy of ourselves is never the AI goal, nor is it possible through mechanical process. Instead, summarizing and leveraging our collective, domain specific knowledge and intelligence is the best way AI can help us.

Going back to my metaphor of AI as Antaeus and humans as Gaia, even though Antaeus is the son of Gaia, he is more powerful — He was invincible to anyone until Hercules finally killed him by separating him from Gaia.

Thanks to Gemini, I quickly find the following exact words of Karl Marx in his “Theses on Feuerbach: ”The philosophers have only interpreted the world in various ways; the point is to change it.”

I want to paraphrase Marx here, “We are busy debating whether AI is smarter than humans; real progresses will have to be made when more humans use AI tools.”

The biggest lesson is to always keep Antaeus and Gaia together. However, the purpose is not to make Antaeus (AI) but rather Gaia (humans) invincible.

4 Time Gaps Between Necessity & Invention

This article of Scientific American makes a good point rejecting the famous

assertion from Plato that “necessity is the mother of invention” from an evolution point of view: “When food is scarce, orangutans go into energy-saving mode. They minimize movement and focus on unappealing fall-back foods,” which clearly shows that necessity alone does not lead to innovation.

But what about humans, arguably the most creative species on the face of the earth? The bad news is that even for us necessity and invention do not always go together. In general, there will be gaps or huge time delays between the demand and supply of inventions, where necessity is viewed as among the strongest imperative demands.

To take Plato’s metaphor further, the mother of necessity sometimes may take 1,000+ years before finally giving birth to the baby of real invention. Some mothers never had a baby, while others can have twin, triplets or even more at the same time.

Plato is not completely wrong, just wrong in making necessity the one and only driver for invention. Just like anything else that is complicated in the world, invention has to be driven by multiple forces, necessity is one of them and it has to compete with other forces to prevail.

Think of unfortunate soldiers who lost limbs in battlefields, who obviously have a need for some assistance in getting around. Yet they would have to wait for centuries until 3D printed replacement limbs finally became available.

Earth-shattering, game-changing inventions often face competition from existing, temporary solutions. For instance, 3D-printed limbs compete with crutches, while gas-powered automobiles, as Henry Ford famously noted, initially competed with “faster horses.”

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5 The Crux of Creativity May Not Matter

Nosta believes using the open creativity scoring (OCS) tool to automate the scoring of semantic distance sets an even playing field for comparing human sample and AI responses. I would argue that an unequal playing field remains as AI models have been trained by millions of data that will overpower a sample of 151 humans.

Nosta continues by claiming that “the crux of creativity lies in originality and elaboration.” This may be true especially in mental exercises like the academic study he focused on, but originality may not always matter the most in general entrepreneurship.

The same can be said to divergent thinking, which is what the study comparing 151 human subjects with GPT-4 focuses on, with a title that reads, “The current state of artificial intelligence generative language models is more creative than humans on **divergent thinking**.” (Emphasis added). Divergent thinking is evaluated along three dimensions: fluency (number of responses), originality (response novelty), and elaboration (length/detail of response).

If you understand innovations, you should know the processes may be divided into stages. Both “originality” and “divergent thinking” are crucial during the “ideation” stage, where innovators or entrepreneurs focus on generating as many original ideas as they can, in order to pick and choose from a rich pool.

But notice I said “may be,” because entrepreneurs and startups do not have to follow the same textbook stages of *ideation*, *research*, *prototyping*, *development*, *testing*, *implementation* and *evaluation*. Innovations are like LEGO games with endless possibilities where sky is the limit. At later stages entrepreneurs must think convergent more than divergent because nobody has unlimited resources to allow testing all seemingly good or original ideas.

Even the ideation may not always emphasize or prioritize originality. Some-

times entrepreneurs can start from a conviction like “There had to be a better way!” as this interesting post told us. You may call it “unscientific” but from a probabilistic point of view this is more right than wrong, as a “better way” can be anything new from the status quo. When the “better way” involves numerous factors from marketing to technologies to consumers, chances are there *will* be a better way, all one needs is the determination, which is why the conviction matters and is a part of human agency resources.

Bear in mind that throughout the entire entrepreneurial process AI can always be our best friend. Do not think AI is only useful or relevant in ideation. We should always consult AI to avoid mistakes and unnecessary detours along the way:

- If you are not sure if your idea is good, check it out with AI. This is similar to check the domain name for your new website to make sure no one already exists. The difference is that you have to enter more words to describe your idea. The more words you say it, AI will return better and more informative answers.
- If you have problems or questions with research, check AI out also, the same goes to prototyping and development and all the other stages.

Finally, although this post argues that *predictive AI* delivers more value than *generative AI*, as the former begins “with a value proposition by first identifying an important problem and then figuring out how best to solve it.” In reality, I would argue that the two AI models differ less than they appear. The differences arise more from what questions or inquiries humans enter. The answers of predictive AI are likely to be generated from the same training data with similar parameters as we encounter in the generative AI.