

What if Darwin made an AI?

by Philipp Wisgott

The whole world is following the hype of ChatGPT and waits for the next LLM to come. The whole world? No, there is a tiny startup from Vienna going in a completely different direction. Instead of the virtues of language, **danube.ai** with CEO Philipp Wisgott leverages the magic of evolution to create a low-carb AI that has the potential to become more powerful than anything before.

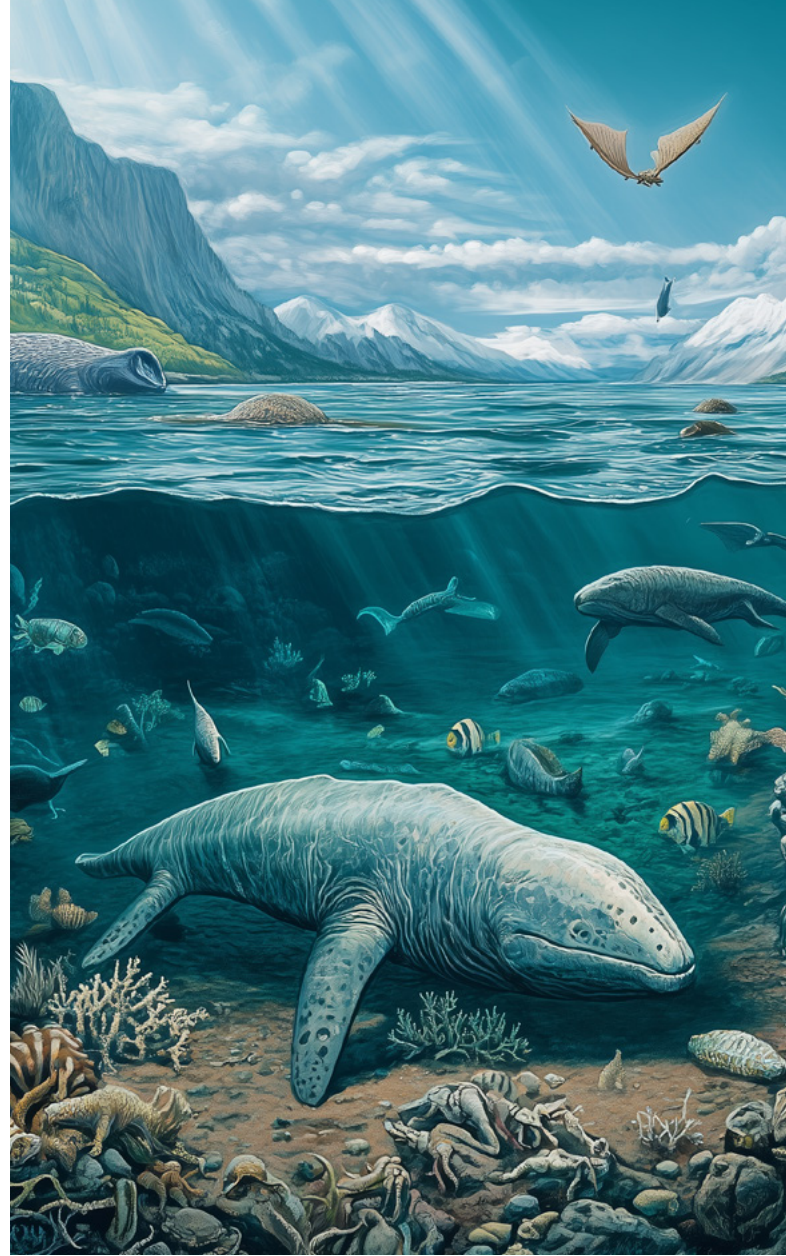
If Darwin was alive today, what would he say about ChatGPT, Co-pilot or any other Generative AI? He would probably be aghast at how much trust we put in a technology that has proven to hallucinate once in a while. He would probably ask if all the money and resources we waste to train AI would not be better used to provide better healthcare for everyone? But in the end he would ask:

“Does the AI make us better humans?”

As LLMs entered the general audience in 2023, the world was stunned: how could something non-human have an answer to anything? Soon the applications were plentiful: coders asked to get ready-made apps within seconds, lawyers wanted to get tips for their current case and even busy parents used ChatGPT to write bedtime stories for their children.

How does an LLM work? It takes written knowledge, from literature like Sherlock Holmes to banal things such as dishwasher manuals, and finds patterns in it. Obviously, the gardener often *is* the murderer in crime novels and most dishwashers have to be connected to a water supply. LLMs draw this conclusion based on the context and usage of a word in a text. LLMs do not know how a dishwasher works but they *expect* to find the words “water supply” in the context of its installation.

Internally, the main quantity an LLM works with is the probability of context, also called “attention”. Maybe the probability of the gardener being the murderer is 55% in crime novels, but only if it is ever mentioned in the text that the crime scene has a garden. Hence, the LLM learns to put things in the context of their average: the average crime novel, the average dishwasher, but also the average employee and the average medical advice.



It is the instant and easy access to a large part of the knowledge of mankind that makes LLMs so incredibly powerful. It is like a “fast-forward” button in your preparation or investigation, where the most tedious steps have been done for you. Hence, as we can observe every day, Generative AI gives us new business models, new prototypes, and new automatic agents to solve problems in any field.

What do you miss when you press the fast-forward button and learn from average behavior? You will miss things that are diverse and exceptional. You will miss that the AI has a huge bias in the background. And that every vendor of AI services has a hidden agenda — and sometimes they cannot even be sure themselves how strong it is.

A recent study showed that at least one third of all answers of LLM-Chatbots contain Russian propaganda¹. It seems frightening that secret services can exploit the dependence of LLM on their training data. And the amount of training data an LLM like ChatGPT needs is gigantic indeed: e.g. 6.8 TB for GPT 4². And it gets worse: the training of GPT 4 took 7200 MWh of energy and cost 100 million dollars.³ Soon the energy needed for training will be comparable to

large cities and the economic costs will go in the billions — and still stay highly vulnerable when it comes to bias and propaganda. Or, as Darwin would phrase it:

“Is it really worth it?”

What Darwin would also say is that knowledge does not mean understanding. Though language is at the heart of every LLM that does not make the technology a good, unbiased problem solver. As Charles Darwin himself pointed out in his “On the Origin of Species”, nature “uses” the best problem solver already for billions of years: evolution. Organisms adapt. Take some species, put them in a habitat and come back after a million years. Naturally, you will find organisms that are perfectly adapted to their environment — these organisms “solved” the problem of thriving in the habitat in an optimal way.

As the famous evolutionary biologist Richard Dawkins wrote in his bestseller “The Selfish Gene”, an organism is nothing else than a replicator machine defined by its genes. While organisms compete with each other right now, right here, genes compete with each other in the long run. It is almost as if genes and organisms would play an evolutionary game against each other — with the habitat setting the game

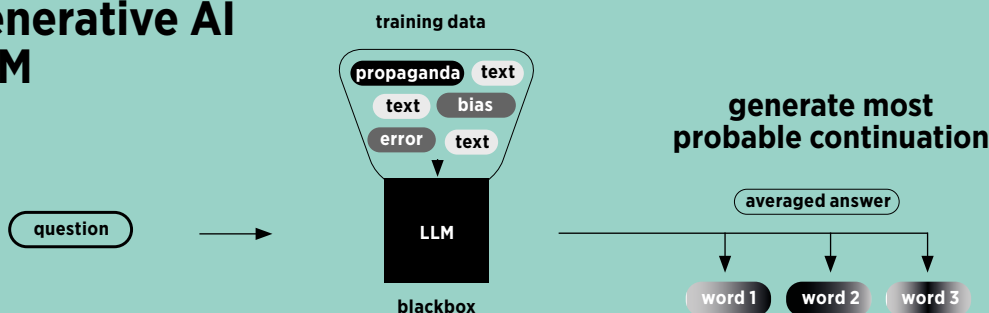
rules. You are bigger? Congratulations, you will often win. But wait, being bigger is actually bad in the current environment (yes, I’m looking at you, dinosaurs).

One of the magical things about life is that it is everywhere: go to Antarctica and take a spoon of ice, put it under the microscope and you will find tiny organisms. It almost seems as if life has found a universal answer to anything: if there is no food, nature develops spores that wait it out; heat up the water, nature assumes Hadean superpowers as the first forms of life, the Archaeans. If only mankind could take advantage of this universal problem solving capability.

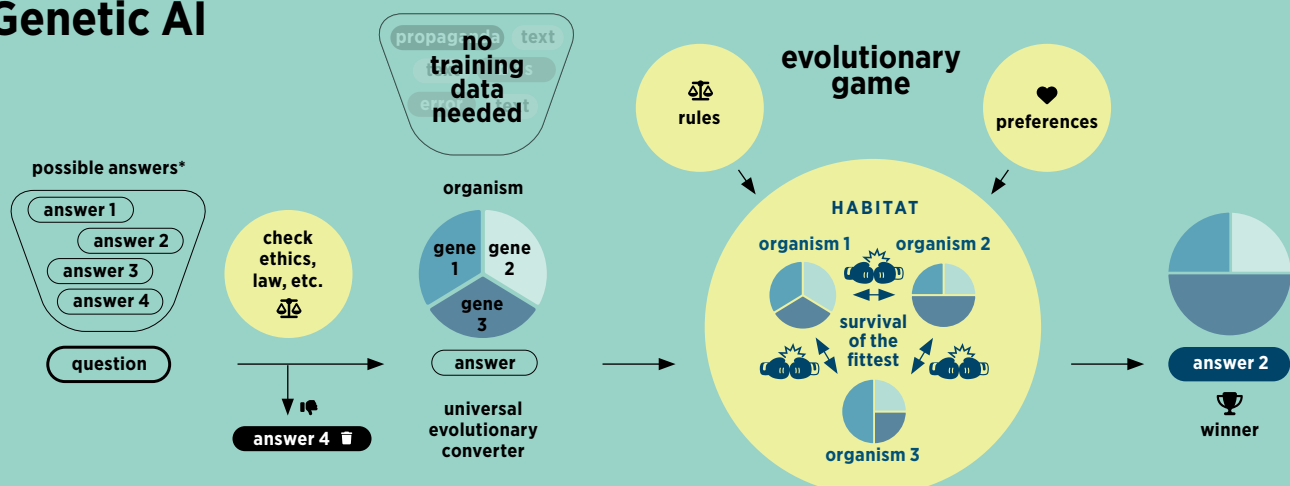
One of the most defining things of mankind is the ability to learn. Asking the same question at a later time, we humans usually get better at analyzing the odds (hey, I did not say *all* humans). How do we do that? First, we break down the question into simpler arguments. Assume you want to buy a new car, then viable arguments next to price could be the range in kilometers or the size of the trunk. After you chose an offer the first time, you gained experience about the process of buying a car. Hence, the next time you will look for a car, you will see the essentials behind the advertisement even better — you simply gained understanding.

The dynamics behind cars competing for you to choose them is quite similar to evolution. Analogously to genes in

Generative AI LLM



Genetic AI



*answers can be predefined or generated

organisms, traits like the size of the trunk define a car and give it an advantage or disadvantage over other cars. Do you really care about the trunk? Maybe only if you have a family. Hence, preferences or preconditions act like a specific habitat for our “car evolution” — with the prevailing car being different for individual budgets and lifestyles.

Okay, cars and other consumer choices are one thing, but how about other questions? That is where Genetic AI comes into play. Genetic AI provides a way to “translate” any question or problem into an evolutionary game of organisms and genes. Organisms represent answers to your question or solutions to your problem that compete against each other. Furthermore, organisms are defined by their traits or arguments — and are thus represented as genes in our game.

With Genetic AI you will get more personal results than ever before that are completely unbiased. Why? Because the evolutionary habitat the game runs in is chosen particularly to your needs. And because every game starts from scratch, there is no training data that could bias the organisms — they are simply free to play the game. *Your* game.

Now Darwin steps in: “But evolution takes millions of years, nobody wants to wait that long for an answer”. Again Genetic AI provides a solution: all genes and organisms compete with all others instantly.

And yes, it is like a “fast-forward button” for evolution jumping right to the end.

And it gets better still: removing the training data and bias from the equation, opens up completely new possibilities for AI. You want transparency — every evolutionary step can be traced back to its origin. You want humanism — since answers evolve instead of being generated, ethical and humanistic rules can be easily applied. You do not want one central AI model — since every evolutionary game is independent to all others, you can easily create a de-central AI that is distributed everywhere. And finally: you want control and security — setting up the evolutionary model right, you can be sure that it will never “leave track” and pose a quality or security risk for your application.

Feeling an imaginary pat on the back from Darwin, Genetic AI allows everyone to benefit from the magic of evolution. Think about it: instead of getting the average advice you get exceptional solutions, evolutionary tailored just for you. You get your own evolutionary “playground” which you can take everywhere and which solves problems just for you. Which works only in your interest without any hidden agenda. *That* makes us better humans. And that is magical indeed.

Is all this just a concept and vision? No, Genetic AI is already used in multiple applications — e.g. Austria's biggest price comparison platform Geizhals. And with Cherry Tree, we have a discovery engine based on Genetic AI for restaurants and streaming in open-beta. You want to try it out yourself? It can be used similarly to Midjourney as a [Discord bot](#).

Technically, we live in fascinating times. Digitization, automation and, of course, artificial intelligence changed the world. Still, it seems we are more passengers of innovation than actual drivers. Can we get more into the driver's seat again? Can we get more in control? When Genetic AI can help us with something, then it is this: getting more human control in automation and AI without losing the time-saving benefit to begin with. Still, Genetic AI only just hatched from the egg. Spreading its wings, it has to compete in its own evolutionary game to win as a technology.

1 <https://www.spiegel.de/ausland/chatgpt-und-perplexity-ai-russland-manipuliert-westliche-chatbots-fuer-seine-propaganda-a-7e276236-cac3-4f35-8ad4-40eaba1c8caf>

2 “The most obvious is cost. OpenAI's Sam Altman has said that the company spent more than \$100 million training GPT-4. The CEO of Anthropic, meanwhile, warned that “by 2025 we may have a \$10 billion model.” <https://explodingtopics.com/blog/gpt-parameters>”

3 <https://www.trgdatacenters.com/resource/ai-chatbots-energy-usage-of-2023s-most-popular-chatbots-so-far/>



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About the Author: Philipp studied Mathematics and Physics at the Technical University of Vienna. During his PhD he developed self-learning algorithms to identify new, high-potential solar cells. Founding his first company in 2015, he created the awarded app “Waltzing Atoms”, where students can playfully learn chemistry. Waltzing Atoms was funded by the AWS and brought to all Austrian classrooms by the Austrian Ministry of Education in 2016. Engineering a new non-ML artificial intelligence Genetic AI in 2020, he won Austria's biggest price-comparison platform Geizhals as early partner and customer. Recently, he focuses on making Genetic AI a universal as well as humanistic AI which transparently helps people all over the world.