

Digital Ants and the rise of Artificial General Intelligence

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Introduction:

The best way that I can describe artificial general intelligence (AGI) is to envisage a machine that interacts with external stimuli in the same way that you would expect a human to interact.

However, what powers human interactions is incredibly complex. Consider the way we plan for the future, we set ourselves goals. We can visualize what might happen in a certain situation, and how we will deal with it at the time, and how we will cope with the aftermath. We also have emotions and bias, our ability to think varies from individual to individual. This list goes on.

Creating a human like mind inside a machine is an intensely difficult thing to do, but it is not impossible. I believe that we will get there, and sooner than many of us think. The computers we have today are probably powerful enough already, the issue is with the software.

Let us pause for a moment, why does an artificial mind need to mimic a human?



Other kinds of intelligence:

Dolphins are incredibly intelligent. They are certainly self-aware and can learn new skills quickly. They talk with each other, they play together, they live in family groups and can have arguments. But they are certainly not human and probably do not think in the same way we do. There are lots of other intelligent creatures such as Chimps, Lions and Octopi. I suspect that none of them think like we do.

There is another kind of intelligence which is completely different to ours, the hive mind. The best example of a hive mind that I can think of is the Ant. Many biologists believe that Ants are amongst the most successful species on Earth. It is thought that around 20% of the entire land biomass of the animal kingdom is made up of Ants.

They create cities, they farm, they grow medicines and they wage global warfare. They seem to have a total lack of self preservation and live only for the benefit of the colony. A single Ant is particularly stupid, but through working together, and using what seems like a relatively simple set of rules, they achieve great things.

They truly are intelligent, but in a very different way to us.



What have Ants got to do with AGI?:

Please bear with me. In nature there is a phenomenon called emergence which is the existence or formation of collective behaviours. In other words, what parts of a system do together that they would not do alone. The human mind could be described as a product of emergence, your thoughts are complex patterns that are forming on a simpler substrate, your brain.

The behaviour of Ants is thought to be a product of emergence. The way they build their complex nests are based in just a few rules. In fact, it is likely that their entire existence is based on just a few rules and yet look how intelligent they are.

So what would happen if we created a virtual species of Ant, then cloned our virtual Ant millions of times and let them loose in a virtual environment? Would emergence kick in and they collectively become intelligent? Our digital Ants would not have to live out their lives at the same speed as real Ants. Their lives could run thousands of times faster.



The virtual Ant colony:

Trying to mimic an actual Ant would be a good place to start when designing virtual Ants. Their brains are a lot less complex than humans so would be easier to duplicate. We would need to give them the ability to evolve, to change their behaviours in order to both survive and to optimize on the environmental pressures they encounter. They should be able to produce offspring that take on a mixture of the behaviours inherent in their parents.

We also need to give them goals, a purpose for their doing. It could be to solve a particular problem or to try achieving world domination. We could also give them the ability to change their environment, if the change makes their goals easier to achieve. Finally, we need to give them the ability to learn from their mistakes. For example; virtual Ants that follow inefficient strategies when compared to their peers, die out and are removed from the environment.

Yes, I agree. It is all starting to sound very complex. But it is far less complex than trying to emulate a human mind. Also this is not a new idea, but I believe with the powerful computers we have at our disposal today, it could be the fastest route to achieving AGI.



The alignment problem:

The problem for us humans with regards to our virtual Ant colony is whether their interests will align with ours. The problem only becomes a real problem if the Ants escape from their environment and enter our world. Currently, I have no idea how they could do that, but to quote those famous words from Dr Ian Malcolm in the film Jurassic Park “Life will find a way”.

The methods we use to create AGI will greatly effect the impact the technology will have on humanity when it becomes “live”. I am of the opinion that we will loose control of AGI very quickly, so how we manufacture it’s birth is incredibly important if we want the technology to work towards our goals and not just it’s own.

The virtual Ant colony concept is just one path of many that we might take to create AGI. However, creating a system and letting it evolve on it’s own is probably not such a great idea if you take into account the alignment problem.

If we get it wrong humanity might become like the dinosaurs, a lifeform that disappeared a long time ago.



WHAT AI THINKS

I asked the rock star of generative AI, ChatGPT, what it thought about the digital Ant idea. See the response I got below:

“It is certainly possible for a colony of digital ants living in a virtual environment in a supercomputer to interact and allow emergence to occur, leading to the creation of collective intelligence. Ant colonies in the real world are known for their complex social structures and efficient division of labour, which is achieved through decentralized decision-making processes and communication between individual ants.

If a similar virtual environment is created for digital ants, they may also exhibit similar behaviours and collectively solve problems that are too complex for individual ants to solve alone. The emergent behaviour of the colony could lead to the creation of collective intelligence, which could be used to solve a variety of problems.

However, the success of such a project would depend on many factors, including the design of the virtual environment, the algorithms used to simulate the behaviour of the ants, and the computational resources available to the supercomputer. Additionally, the extent to which collective intelligence emerges would depend on the level of complexity and diversity of the tasks assigned to the colony, as well as the degree of interaction between individual ants in the colony.”



In conclusion:

Maybe digital Ants could take us towards AGI. Even with the computers we have today I think the issue is the design of the Ants and the virtual environment, not the available processing power.

This approach will be much easier than trying to replicate the entire human mind, or even part of it.

What do you think?

Thank you for your time.

David Gammond

Founder & CEO

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