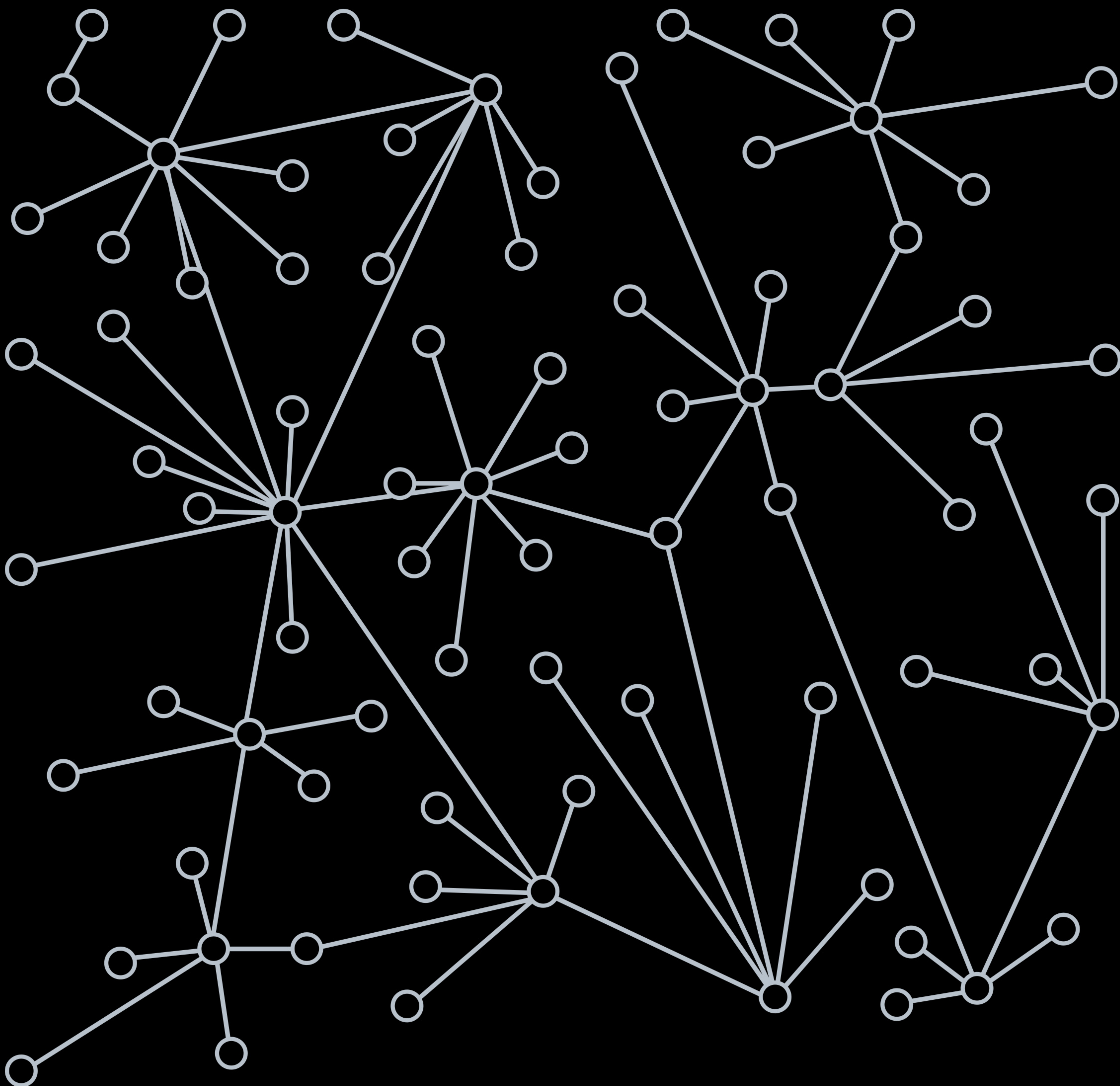


A Perspective on Decentralizing AI



The AI landscape is at a pivotal juncture. With ongoing advancements, worries regarding job displacement and the dominance of data monopolies continue to linger. The centralized models that are now in use are mostly managed by a handful of powerful corporations which are getting close to capacity and need ever-larger amounts of data. To utilize the full potential of AI, the need of the hour is to use decentralized AI as a new strategy.

The Context

For reference, let's look at Sarah from rural Texas, who recovered from COVID-19 but now has excruciating chest discomfort. She brings her former medical records, including a chest X-ray, to her neighborhood clinic, but the doctors are unable to identify the cause of her agony. AI in healthcare seeks to help people like Sarah, with data who don't have access to high-quality care.

Can a doctor use an online service to input her data and obtain the best plan for a mere \$100? Picture compiling medical records from hospitals throughout the globe, developing the most effective model, and giving Sarah options for her course of care. However, patients are hesitant to share data with a central system they don't trust, and medical data is segregated between devices and hospitals. The decentralized reality of dispersed health data and unbalanced incentives conflict with this.

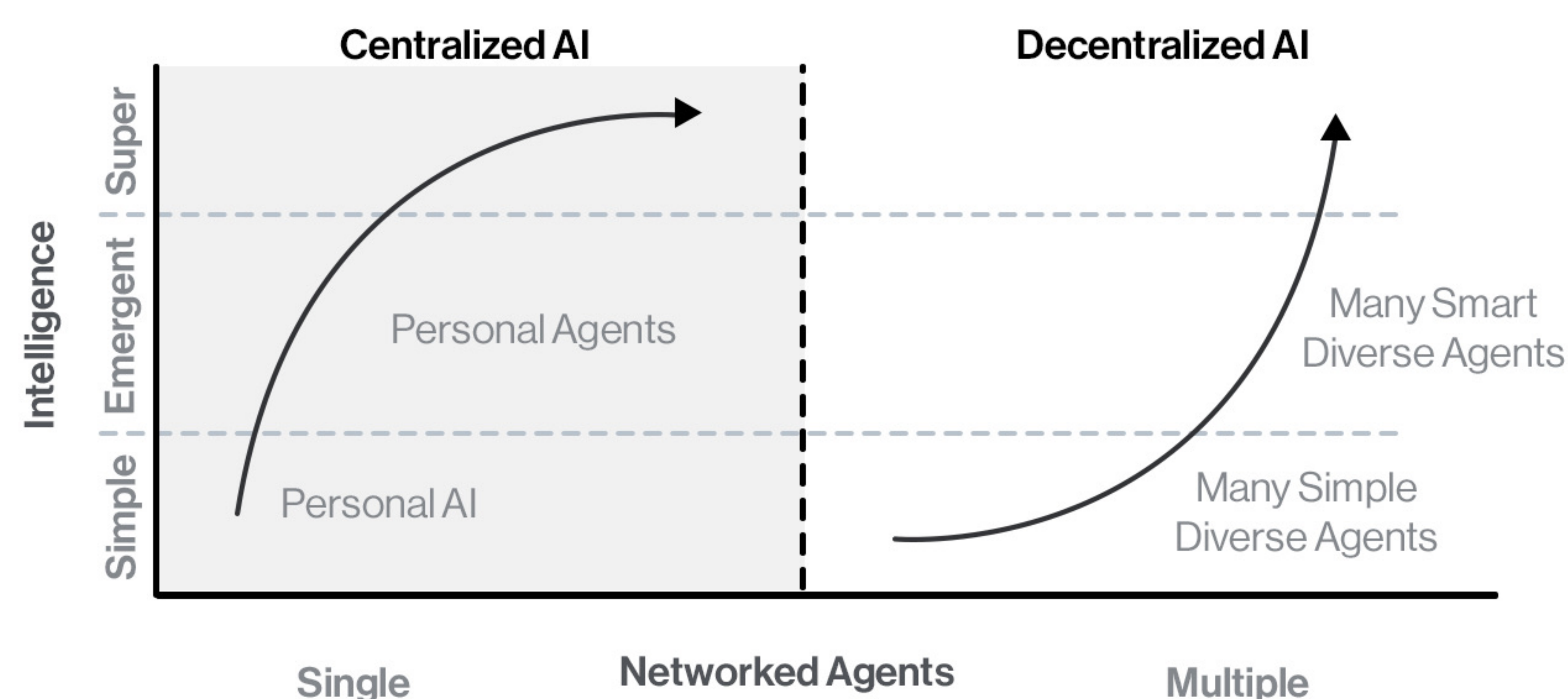


Figure 1: Missed opportunities in today's AI development. By focusing the majority of research and investment on Centralized AI (left half of this figure), we are under-investing in intelligent network based approaches that can lead to smart Decentralized AI

Distributed ecosystems provide comparable issues to the healthcare, banking, supply chain, and climate science industries. These problems result from the decentralized structure of society against the centralized development of AI. While society is decentralized and may marginalize small actors or outliers, such as individuals with uncommon diseases, centralized AI depends on centralized data and computation.

Decentralized AI: A Vision for the Future

We hypothesize that autonomy may make stakeholders more integrated, which will enable more entities to engage and collaborate. Nevertheless, enabling verified computation sharing, providing incentives for data sharing, and compensating organizations appropriately for resource sharing are still the remaining barriers. By tackling these problems, we can improve cooperation and explore new areas of artificial intelligence, which will help human health, environmental sustainability, as well as financial stability.

The essential enablers for a decentralized AI are:

- 1 Data Markets - Secure marketplaces enable data exchange while protecting privacy and ensuring fair compensation.
- 2 Multi-dimensional models: AI that learns from real-world experiences through simulations and agent-based modeling.
- 3 Verifiable AI: Mechanisms like federated learning and blockchain ensure the responsible development and deployment of AI models.
- 4 Exchanges for AI solutions: Platforms where individuals and businesses can access and contribute to AI solutions for diverse needs.

Opportunities in Decentralized AI

The democratization of creativity involving decentralized AI enables people and smaller companies to take part in the AI revolution, by addressing real-world challenges in healthcare, education, and other sectors. By enabling secure data sharing and collaborative learning among stakeholders, Decentralized AI can help:



Accelerating medical research and providing personalized treatments will improve patient outcomes. This can significantly reduce cost of healthcare, while allocating resources in an equitable manner thus creating novel markets for data and models.



Improving credit scoring, detection of frauds, and efficient risk management can promote inclusion of financial services while reducing systemic risks. In turn, it will also create new opportunities for investment and economic growth.



Enhancing real-time inventory management and demand forecasting can significantly reduce supply chain costs, while increasing its efficiency, and enhancing supply chain resilience therefore, benefiting businesses and consumers alike.

Conclusion

In congruence to foundation models, Modern AI is centralized, but highly intelligent. On the other end of the spectrum, systems like Blockchains and volunteer computing are decentralized, but lacks intelligence. Combining the cream of both of these functionalities can be highly impactful. We urge the AI community to, therefore, focus on open issues where decentralized approaches can lead to novel, powerful AI systems equipped with decentralization ideals.

As corporations increasingly adopt decentralized models and citizens interact more frequently with AI systems, there is a growing opportunity for the government to facilitate collaborative frameworks. Supporting such ecosystems could drive rapid innovation, often referred to as an "AI Cambrian Explosion," potentially unlocking trillions in economic value through novel applications and use cases.

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