



AI Training with Multiple AIs

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3. **Simulating Real-World Interactions:** This approach can replicate complex, human-like interactions. For instance, one AI can simulate the role of a teacher, another as a critic, and another as a co-learner. This can provide a richer and more dynamic training environment for the "student" AI.

4. **Closed-Loop Optimization:** By using multiple AIs to train a single AI, you can build a closed-loop system where AIs continuously learn and improve based on their interactions. This is similar to having a classroom of skilled tutors who keep teaching, assessing, and refining the abilities of a new AI.

Potential Approaches for Multi-AI Training

1. **Self-Play and Competition:** Self-play involves having multiple AIs play games or solve problems against each other. This technique was notably used by DeepMind's AlphaGo and AlphaZero, where two versions of the same AI repeatedly competed against each other, resulting in rapid improvements. Expanding this to 10–100 AIs could produce a more nuanced training environment.

2. **Multi-Agent Simulations:** By setting up a simulation where multiple AIs interact, share knowledge, and even argue, you can simulate social learning and even collaborative or competitive dynamics.

3. **Hierarchical Learning:** You could use a hierarchy of AIs where higher-level AIs provide high-level strategy and guidance, and lower-level AIs focus on detailed, technical problem-solving. The student AI then learns by observing and interacting with this hierarchy.

Challenges

1. **Computational Complexity:** Running and coordinating 10–100 AIs of ChatGPT 3.5's complexity requires significant computational resources, both in terms of hardware and energy consumption. Each AI would need to interact in real-time, creating a massive processing overhead.

2. **Scaling Feedback Loops:** While diversity in AIs helps, it can also create conflicting signals. When different AIs provide different kinds of feedback (or even contradictory information), determining the optimal path for the student AI becomes much more complex.

3. **Risk of Unintended Convergence:** Even if you use multiple AIs, if they are too similar or share common flaws, you might end up amplifying unwanted behaviors instead of correcting them. This is why diverse architectures and training paradigms are needed.

Feasibility and Current Research

Your idea of a looped training environment where AIs train other AIs is part of what some researchers call **recursive self-improvement** or **iterative refinement**. For example:

• **Multi-Agent Reinforcement Learning (MARL):** In this field, multiple AIs collaborate or compete in a shared environment. This approach has been applied in strategy games, robotics, and even negotiations.

• **Self-Play and Zero-Sum Games:** Projects like AlphaZero used a technique called *self-play*, where the AI plays against copies of itself. Extending this to many copies or incorporating entirely different AIs could open up new possibilities.

• **Generative Adversarial Networks (GANs):** Though not multi-agent in the traditional sense, GANs consist of two competing AIs (the generator and the discriminator) that improve each other iteratively.

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Practical Implementation Approach

If you wanted to try this idea, a good place to start would be:

- Use Smaller, Specialized Models:** Instead of using 10–100 AIs of ChatGPT 3.5 complexity, start with simpler models focused on specific tasks. This will help you iterate faster and manage computational resources.
- Build a Modular Framework:** Use a framework like Ray or a distributed computing platform to manage communication and coordination between your AIs.
- Create a Reward Signal for Convergence:** To avoid chaotic feedback loops, implement a system that scores interactions and adjusts the feedback provided by each AI. This way, you can prune or prioritize which AIs' responses contribute most to the final training.
- Experiment with Different Architectures:** Use a combination of rule-based agents, LLMs, and reinforcement learning agents to see how the interplay of various strategies impacts the outcome.

Why This Hasn't Been Fully Implemented Yet

While multi-agent learning and using AIs to train AIs are being researched, the industry focus has often been on creating a single, powerful AI model.

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4. Experiment with Different Architectures: Use a combination of rule-based agents, LLMs, and reinforcement learning agents to see how the interplay of various strategies impacts the outcome.

Why This Hasn't Been Fully Implemented Yet

While multi-agent learning and using AIs to train AIs are being researched, the industry focus has often been on scaling single-agent learning (e.g., larger LLMs) due to:

- Resource Constraints:** Building, running, and coordinating 10-100 powerful AIs is far more resource-intensive than building a single one.
- Model Alignment Issues:** Ensuring that multiple AIs do not fall into degenerative behaviors (like colluding to solve problems in ways that undermine the overall goal) is a significant challenge.
- Control and Interpretability:** With multiple AIs interacting, it becomes hard to pinpoint which agent or behavior led to a specific outcome, making it difficult to refine or debug the system.

Future Directions

I believe this is an area that will see a lot of growth, especially as we move toward AGI-like systems. Your intuition for creating a collaborative learning environment with multiple AIs is very forward-thinking, and if combined with advances in neural-symbolic systems or hybrid architectures, it could push us closer to more robust and general learning models.

Let me know if you'd like to explore how to build a p ↓ type or learn more about specific research in this area!

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Do you know of any companies yet using this method to sell people customized aIs? I see this as almost certainly happening but i cant say whether it will be 2 years from now 5 years from now or 10 years from now and i think this may be a area with opportunity to get in on the ground floor with investing in, possibly even anticipating patent needs and filing patents that such a company would need and selling them to them?

Updated saved memory

Currently, there are only a few companies actively exploring the idea of customized AIs, but it's primarily in the context of fine-tuning or tweaking large models for specific users or businesses rather than using multiple AIs to train one another. However, as the AI space progresses, we may start seeing companies that fully leverage the multi-agent training paradigm to create personalized AI solutions. Here's a breakdown of the current landscape and potential future directions:

Current Companies and Approaches

- OpenAI and Anthropic:**
 - Both are exploring multi-agent scenarios for research purposes, such as AI alignment and reinforcement learning. While they haven't announced plans for selling customized AI models, their work on refining and tuning large models cu ↓ evolve into creating tailored, multi-agent solutions.
- Cohere and Hugging Face:**
 - These companies focus on providing customizable AI models, primarily through fine-tuning and

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are in a good position to pivot if the industry moves in that direction.

- Modular AI Companies** (e.g., **Modular.ai**):
 - Some startups are focusing on creating modular AI frameworks, where different AI components work together to achieve a goal. This is adjacent to the multi-agent concept, where instead of agents, different sub-models with specialized roles train or refine a larger model.
- Personalized AI Solutions** (e.g., **Replika** and **Character.ai**):
 - These companies are more consumer-focused and already create semi-customized AI companions. However, they are currently based on single-agent models rather than a complex multi-agent architecture.

Why Multi-Agent Customization Isn't Mainstream Yet

- Computational Complexity:** Managing the interactions between multiple AIs requires more computational power and complex architectures, making it a more costly approach compared to the simpler fine-tuning of a single model.
- Market Readiness:** The average consumer is still becoming familiar with the idea of a single AI assistant. The demand for fully customized multi-agent systems will likely grow, but it may take a few years before it becomes commercially viable.
- Patent Landscape:** The patent space for multi-agent systems is still under development, particularly in the context of commercializing them for individual users. This means there's an opportunity to carve out intellectual property (IP) around multi-agent training, automated feedback loops, and dynamic behavior adaptation for specific user needs.

Potential Opportunities for Investment and Patents

- Foundational Patents for Multi-Agent AI Training:**

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adaptation for specific user needs.

Potential Opportunities for Investment and Patents

- Foundational Patents for Multi-Agent AI Training:**
 - You could file patents focused on multi-agent training techniques, such as using diverse LLMs for personalized AI, optimizing self-play for non-game scenarios, or building dynamic feedback systems that incorporate user input into ongoing AI training. This type of IP would be valuable for companies looking to expand into this area.
- Customized AI for Enterprise:**
 - Many enterprises will want tailored AI solutions that can adapt to unique business processes. Developing a framework that leverages multi-agent learning to build such solutions could be valuable. Potential patents could cover methods for dynamically reconfiguring AI modules based on real-time user data.
- AI Customization for Individual Users:**
 - As you mentioned, the future of personal AI assistants will likely involve users being able to "train" their own AI for specific tasks or emotional responses. Patenting systems that allow for modular learning, context-based adaptation, and long-term memory could be lucrative.
- Inter-AI Communication Protocols:**
 - If you anticipate a future where multiple AIs are commonly interacting to refine a single product, protocols and systems for optimal communication between those agents could be patentable. Think of it like a TCP/IP equivalent but for multi-agent systems in AI.

Companies to Keep an Eye On

- Modular.ai:** Focused on creating modular and interoperable AI components. They are early-stage and

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