

VERAI

Member Success Case Study | Written By: Audrey Woods

VerAI Discoveries

As economies around the world shift toward more sustainable energy solutions—which heavily depend on batteries and the materials to make them—the need for critical minerals has soared to unprecedented heights. Copper, lithium, nickel, and cobalt are suddenly in huge demand, and will only become more so in the coming years.

Unfortunately, there are several problems slowing down the collection of these minerals. Natural reserves are limited, the easily accessible opportunities have been largely tapped into, and traditional prospecting methods have a famously low success rate. To support the green energy revolution and ensure a stable supply, mining companies need new, efficient ways to locate and access these precious resources.

CSAIL Startup Connect Plus member [VerAI Discoveries](#) offers a solution using machine learning trained with specific geophysical data to identify reservoirs of those critical minerals. By working collaboratively with the mining sector, VerAI aims to improve the current model of mineral discovery by two orders of magnitude, accelerating the global transition to green and sustainable energy.

GETTING THEIR START

The story of VerAI Discoveries started in 2012 when CEO Yair Frastai participated in a Tel Aviv initiative where researchers were tasked with looking into opportunities in the mining industry, especially in exploration. As a result of more than a year of study involving world experts and a series of pilots, the team saw massive potential in using advanced intelligence-driven technology to answer the biggest question in mining exploration: “Where to start drilling?”

This led them to launch Quantum Discoveries in 2014, the precursor to VerAI. Frastai says, “we didn’t start with AI or machine learning,” explaining how they were initially focused on building a “state-of-the-art exploration toolbox” for the exploration team, who prospected for new targets of mineral deposits. But they soon realized the limitations of current prospecting methods, which relied on the educated guess of experts, and wanted to pursue a more strategic method for finding concealed mineral deposits with limited or no evidence on the surface.

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GETTING THEIR START (*continued*)

To tackle this problem in a more systemic and systematic way, Frastai describes how they reached out and collaborated with relevant research centers such as the Imperial College and the Natural Museum in the UK, the Mineral Deposit Research Unit in BC, the Centre for Exploration Targeting in Western Australia, and MIT CSAIL in the United States. As part of their new approach, they moved their R&D and corporate headquarters to Boston in 2017 to be closer to computer science research centers, engaging with CSAIL faculty to test ideas and consult on possible solutions. Quantum Discoveries decided to shut down in early 2020, but Frastai and his co-founder, VerAI COO Amitai Axelrod, stayed together, determined to continue their journey to disrupt mineral discovery. Focusing entirely on the AI and Machine Learning (ML) side of the business, the two co-founders launched VerAI in 2020, combining an established foundation of research with a new vision for effective, efficient, and scalable AI-driven mineral discovery business.

VERAI: THE IMPORTANCE OF MODEL TRAINING

Despite an industry fascination with big data, Frastai makes it clear that VerAI is focused not on the volume of data but the relevance of it. He says, “it’s not about the Big Data, it’s about the Right Data.” To target concealed mineral deposits that cannot be traced by prospecting the surface, VerAI is using geophysics data to “see the unseen” by human eyes. Their “secret sauce” is an extensive library of AI Search Profiles developed and trained on diverse classes of critical mineral deposits with their specific geological setting. This is because a mineral deposit in, for example, Arizona will be very different than the one in Chile, even if the mineral type is the same. This AI Deposit Profile Library constantly grows and improves its predictive power by deploying an in-house iterative model-calibration process which reduces false-positive results.

VerAI is confident enough in its technology that they’ve chosen to buy into the assets they target, paying for the exploration license to claim a given area and then partnering with mining financiers or exploration groups to do the drilling and further development. Frastai explains that in actual drilling operations, “[VerAI’s] technology doesn’t have any advantage,” so it makes sense for them to collaborate with excellent industry players on that stage. By building and funding their portfolio of projects, Frastai explains that they’ve put “skin in the game,” which he believes is essential when engaging with a traditionally minded industry into the world of AI solutions.

CSAIL ALLIANCES: COLLABORATIONS, TRUSTED EXPERTS, AND A GATEWAY INTO MIT

VerAI’s relationship with CSAIL Alliances dates back to their previous iteration as Quantum Discoveries when they consulted CSAIL researchers such as Principal Research Scientist Una-May O’Reilly and previous Associate Professor Cynthia Rudin. Through CSAIL Alliances, Frastai and his team were also able to connect and collaborate with [Composable Analytics](#), a data science startup spun out of MIT. This relationship helped to conceptualize a better data flow for their system, giving them methods to test numerous complex hypotheses quickly and at a large scale. Learning from the experience and collaborating with MIT scientists allowed VerAI to conceptualize a new “pure machine learning” discovery approach and rethink key aspects of the idea that would become VerAI’s Discovery Platform.

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CSAIL ALLIANCES: COLLABORATIONS, TRUSTED EXPERTS, AND A GATEWAY INTO MIT (*continued*)

Now, VerAI is looking to expand upon the work and engage more deeply with MIT CSAIL. Frastai says that he's found CSAIL "very open" and been pleased with how easy it's been to "receive guidance and support." With fundraising in a good place and their portfolios steadily developing, Frastai says the company is looking to create more connections within CSAIL and, hopefully, beyond it. Due to the multidisciplinary nature of the work they do, VerAI would like to use their relationship with CSAIL Alliances as a launchpad for further engagements around MIT, bringing in researchers from, for example, Earth Sciences to support this emerging field of AI applied to geological and geophysical data.

On the business side of things, Frastai says VerAI is also looking for companies who might want to join forces and "develop something that maybe each of us separately cannot do." Considering the importance of sustainability, responsible mining, and exploration, he's generally "looking to bring more of mankind into this," whether that's faculty, students, or other like-minded companies.

LOOKING FORWARD

Even though VerAI is a reasonably new startup, Frastai believes they have a competitive advantage because of their 10+ years of experience in leading research and development in mineral exploration. They've learned what works and what doesn't when it comes to mineral exploration in general and deploying AI technology in this field. As VerAI grows their portfolio of assets, the team is excited to expand into new mining jurisdictions and commodities.

Of course, the technology is never truly complete in situations where machine learning is concerned, and VerAI's Discovery Platform is no exception. While they've built a solid foundation for their AI model, Frastai describes how they're now working on V4.0 of the system, which they aim to test and deploy later this year. As the AI Discovery Platform continues to develop, Frastai says they will look to "CSAIL on how AI and ML are already disrupting multiple industries and creating significant value to our world" and is sure that "AI and ML will transform mineral discoveries."

It might be hard work, but Frastai finds the process energizing, saying, "it's fascinating to see how the AI Platform is tracing the places of existing mineral deposits and suggesting locations for new discoveries." He elaborates: "**If you think like everybody else, you'll never discover something new, so you need to come up with a unique way of thinking and a different angle to the problem,**" an attitude he sees reflected at CSAIL. More generally, he and his team are highly motivated by the pressing nature of the sustainability problem and want "to be part of the acceleration of the energy transition to reduce our carbon footprint."

He concludes, "by cracking the code of concealed critical mineral deposits vital to the green energy transition, which is a great challenge, we feel that we are taking part in shaping our sustainable future."



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