

MIT Machine Intelligence for Manufacturing Operations (MIMO) Symposium: Key Takeaways

Event Summary, May 9, 2023 | By: Audrey Woods

On May 9th, 2023, the MIT Machine Intelligence for Manufacturing Operations (MIMO) Symposium—a student-led annual event that brings together industry leaders and members of the MIT community to discuss how machine learning is transforming manufacturing and operations—took place, centered around the topic of artificial intelligence (AI) and how business leaders and researchers alike can accelerate the impact of AI. The conference focused on three key AI-related questions: sustainability, workforce enhancement, and generative AI.

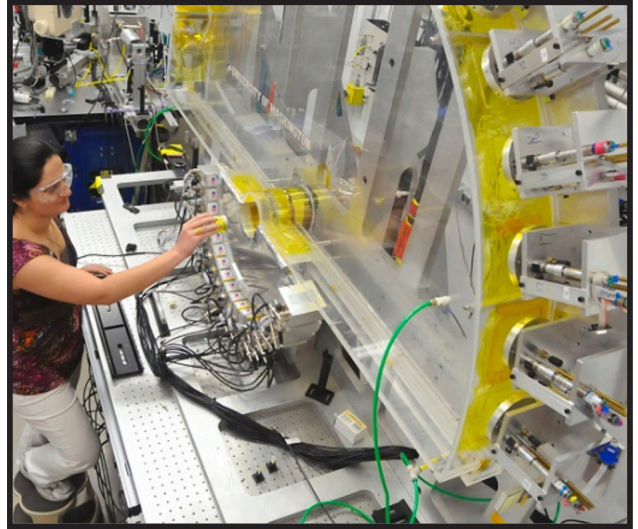
Here are some key takeaways from each theme:

Sustainability:

- In manufacturing, one current concern is **bringing back “full stack” manufacturing** so as not to be dependent on external goods or services, especially overseas. Therefore, when considering AI solutions business leaders might evaluate how such technology could make their pipelines more independent and their processes robust against external disruptions.
- While the explosion of AI-related technology will put a strain on our existing power grid, which isn't built to handle such demand, several speakers highlighted how AI itself is likely to help us solve this problem. Sreedhar Sistu of Schneider Electric spoke about the idea of **using AI to optimize** the charging of electric vehicles, make grids smarter with predictive optimization and distribution, and intelligently manage assets to reduce equipment failures, extend the lifetime of important infrastructure, and improve general performance.

Workforce Enhancement:

- The ability of AI to augment existing workforces was widely explored, but one use case presented by Michael Murphy of Caterpillar was making jobs in industries such as mining—which by nature take place in remote, difficult-to-reach locations—more attractive through **remote management and operation**. He discussed how Caterpillar is solving extreme staffing shortages in rural mining sites by deploying autonomous mining vehicles which can be managed from afar, allowing mine staff to live closer to their families while still accomplishing their necessary work.
- There's been much discussion about the idea of ChatGPT being used to make workers more productive, but some of the MIMO panelists discussed how this emerging tool will be even more exciting when business begin to use **domain-specific knowledge to train LLMs**, which will complement their workforce and distill expert understanding for general use. Using proprietary company knowledge to train in-network models—kept safe behind firewalls—companies can take advantage of AI in a wider range of domains and assist even the most specialized workers.



For more information about CSAIL Alliances industry engagements, please visit:

cap.csail.mit.edu

Generative AI:

- One of the most exciting applications of generative AI in the manufacturing sector is using it to **create better and more diverse designs**. When producing new tools or products, companies want a result that meets specific requirements but is still different from what's currently available. This can be slow and time-consuming when done manually. Generative AI, however, can accelerate this process, offering significant improvements on diversity, functionality, and time-efficiency.
- In discussing the exciting applications of generative AI technology, one theme to emerge was the **importance of change management**. Much of the on-the-ground labor in manufacturing is being done by experts who were trained with specific protocols and might not want, trust, or appreciate such a dramatic alteration of their workflow. Therefore, it's important for those implementing AI in their factories to consider ways to invite the workforce onboard and help their staff transition smoothly to using new tools or algorithms. As several speakers pointed out, these tools will make many jobs easier and compensate for employee shortages that put undue pressure on existing personnel, so when managed thoughtfully, smooth AI rollouts are entirely possible.

A common conclusion during the event was that the AI market is growing and likely to have a huge impact on the economy in the next few years. While big changes need to happen in the infrastructure of legacy factories and old electrical grids to support this transformation, AI is going to affect every business, from optimizing Target's supply pipeline to improving the efficiency of steel plants. More importantly, AI offers exciting potential to help humanity tackle some of the most significant challenges of our time.

As Jeff Wilke of Re:Build Manufacturing said, **"there are giant human problems we are more likely to solve with machines than we are likely to solve alone."**

To get involved with CSAIL research in the AI space, visit CSAIL Alliances at <https://cap.csail.mit.edu/> or reach out to Lori Glover, Managing Director of CSAIL Global Strategic Alliances, at lglover@mit.edu.