


Using Supermind Design and Generative AI to reinvent the Future of Work

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Introduction

Employers today strive to match people to jobs in ways that create economic prosperity, resiliency, and human fulfillment. Achieving this goal can involve reskilling workers in the face of technological change and economic upheaval, crafting jobs to take advantage of people's unique capabilities—especially interpersonal skills—and creating pathways to opportunity for the underrepresented (Daugherty and Wilson 2022). In addition, the rapid recent proliferation of Generative AI systems means that many jobs could be radically reconfigured in the very near future.

To develop innovative ways for employers to address these challenges, the MIT Center for Collective Intelligence (CCI) and Accenture jointly developed a collaborative research project carried out as part of the MIT and Accenture Convergence Initiative for Industry and Technology (MIT and Accenture 2023). This white paper reports on the work undertaken in this effort and outlines potential ways it can be taken forward.

In this collaboration, CCI brought expertise in two primary areas:

– Prior research on how information systems can increase efficiency and equity in labor markets, especially through use of algorithmically driven recommender systems that can point employers and workers toward promising options/courses of action (Horton 2017).

– Supermind Design methodology, based on ideas developed by CCI's director, Thomas W. Malone in his 2018 book, *Superminds* (Malone 2018). Supermind Design is a structured approach for developing innovative combinations of people and computers to solve complex challenges. (MIT CCI 2021).

  The Supermind Design methodology was recently augmented by development of a Generative AI tool, Supermind Ideator (Rick et al. 2023). The tool translates Supermind Design principles into a series of customized prompts and fine tuning, to guide Open AI's large language models (LLMs) on Supermind practices. An API layer has been built to separate the client-facing user interface from the server-side logic that interacts with the LLMs to simplify system complexity and support more rapid iteration of both LLM interactions and user-facing UI and UX design paradigms.

  CCI's larger ambition is to build what it calls "idea generating machines," that is, groups of people and computers using systematic methodologies to create and evaluate innovative ideas to address complex problems. The collaboration with Accenture offered an opportunity for CCI to develop a prototype idea-generating machine to take on the challenge of matching employers and workers.

For its part, Accenture brought to the collaboration a broad range of experience and capabilities:

– Knowledge of the real-life challenges faced by its clients. Accenture works with many large corporations, government agencies, and non-governmental organizations. As a result,

it has a broad view of the range of issues major employers face.

– Solutions to help match employers and workers developed by subject matter experts (SMEs) at Accenture's Data & AI practice and its Talent and Organization (T&O) practice. Accenture also has access to the skills and experience of its entire roster of more than 700,000 people, an asset that could be employed in a prototype idea-generating machine.

A team of MIT researchers and Accenture AI practitioners worked together on the project (see Appendix for the full list of team members).

The effort had two workstreams: first, to develop new algorithms that could better match employers and workers; second, to design organizational structures/processes that could elicit information needed by the algorithm, incentivize stakeholders to contribute it, and use that information effectively once it has been gathered.

This paper describes work done in the organizational design workstream, which had two primary phases: problem definition and solution development.

Problem definition

The research team began with this initial problem statement:

> How can new configurations of people and software algorithms more effectively assess skills, identify opportunities for reskilling, and better match employers' needs with available candidates (including pools of "hidden" workers who exited the labor force during the pandemic).

The team then applied three approaches for exploring potential new perspectives/re-framings:

– discussions at team meetings,
– literature review to identify recent trends in work and employment,
– use of Supermind Ideator.

Discussions at team meetings surfaced several ideas. One was the potential role of labor market intermediaries, such as recruiters, staffing agencies, gig platforms, professional associations/unions, and government. Another was the need to go beyond resumes/job applications and to obtain information about worker's personal qualities, such as initiative or resilience. Yet another was a recognition that the challenge of matching employers' needs with those of workers could well differ significantly by industry, geography, skill level, and for external versus internal hiring. The team also projected that Generative AI would drive significant changes in the composition of many jobs in the future across all industries. In addition, the team noted that employers may want to target previously under-utilized talent pools such as women, members of disadvantaged minority groups, young people, non-residents, transitioners from other careers/fields, and parolees. A related point was that non-college graduates could be considered for many positions that in the past have required a college degree.

Through its brainstorming sessions, the team came to several key realizations. In the era of Generative AI, shaping the Future of Work—rather than responding reactively—and investing in talent upskilling and reskilling would be essential for organizations to unlock innovation and to thrive. By leveraging new configurations of people and software algorithms, organizations could revolutionize skill assessment, pinpoint reskilling opportunities, and align employer needs with available candidates. This approach could also help employers tap into pools of "hidden" workers who withdrew during the pandemic, thereby unlocking unrealized potential and fostering inclusive growth.

The next step in the research team's work was a review of recent articles in the business press. This effort surfaced several key trends. One was that rapid and ongoing job creation was creating very tight labor markets in the United States (Donnan 2023). Another trend was labor market demand shifting across industries: layoffs in the tech sector were accompanied by hiring of tech workers by non-tech firms (Coppola 2023); jobs were being lost in the fossil fuel industry but growing in renewable energy (Kraus 2023). Finally, staffing enabled by online

platforms was expanding beyond task-based work like taxi driving and food delivery into sectors like health care and retail (Hilgers 2023).

Finally, the research team used Supermind Ideator to obtain potential new perspectives on the problem at hand. One of Ideator's functionalities is explicitly designed to help users gain a range of fresh viewpoints on the problem they are considering (see Figure 1).

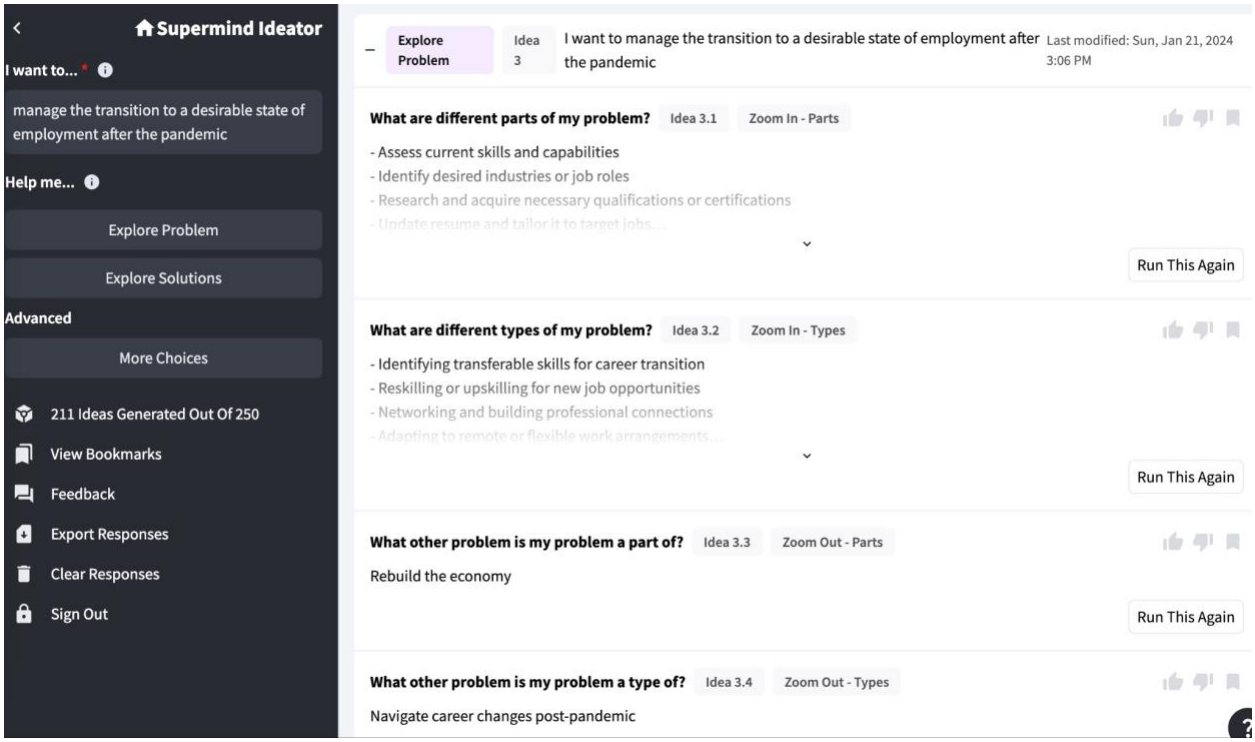

Figure 1: Supermind Ideator User Interface and sample results for "Explore Problem"

A user types a problem statement into the text box at the top left, under "I want to…" and clicks on "Explore problem." Ideator then delivers a set of outputs that help to reframe the problem: Zoom in (which returns parts of the problems and types of problems that are similar), Zoom out (which returns the larger problem of which the problem under consideration is a part and other problems for which the problem under consideration is a type); Analogize (which delivers analogies to the focal problem); and What Am I Missing? (which provides a list of issues to be kept in mind that might be neglected).

The research team input six problem statements into Ideator, based on the project proposal and its prior internal discussions. The most interesting and useful Ideator outputs were in two areas.

First were analogies that offered intriguing perspectives from which to think about challenge of matching employers and workers. That matching challenge was likened to other forms of matching: students and universities; doctors and patients; businesses and investors; and products and customers. In addition, Ideator noted a matching process that relied extensively on a complex algorithm: the system that assigns medical students to post-graduate internships and residencies. One of the team members also noted that Google uses a similar algorithm to assign staff members to project teams (Cowgill et al. 2023).

Another set of analogies also proved interesting. In response to a problem statement concerning how to assist workers who have been most disadvantaged by the pandemic, Ideator suggested a set of potentially parallel situations where disadvantaged groups could be helped by interventions: in the housing market on behalf of low-income families; in education on behalf of children from difficult circumstances; in health care to ensure access for all; and in the criminal justice system to reduce disparities.

The second area where Ideator delivered valuable results was with its "What Am I Missing" outputs. Ideator surfaced several issues that were important but had not yet come to the fore in the research team's deliberations. Among these were potential complementary actions that could augment matching algorithms and processes, such as flexible schedules/job-sharing and enhanced compensation; the need to recognize financial/time constraints and to provide support systems for workers who are reskilling; the prospect of biases creeping into algorithmically based solutions; and the importance of attending to factors like resource constraints, risks, and unintended consequences when considering any proposed solutions.

Based on insights from its internal discussions, the literature review, and its work with Ideator, the research team planned two workshops with leaders of Accenture's Talent and Organization (T&O) practice (see Appendix for list of practice leaders who participated in the workshops). Before the workshops, the research team prepared a reframed problem statement:

How can software algorithms and accompanying organizational processes more effectively match employers' needs with available job candidates?

At the workshops the leaders were invited to comment on the reframed problem statement and to discuss a set of themes that had emerged from the research team's work. The T&O practice leaders provided insightful input that expanded the research team's perspectives significantly.

Several T&O practice leaders noted that data was a critical foundation for matching employers and workers:

- One leader noted that without high quality data, even the best algorithms and matching processes would not perform well. Another pointed out that many employers have solid information about workers' concrete skills but don't know enough about workers' individual preferences, such as preferred work environment or long-term career goals—important factors could shape future performance. Yet another leader went further and suggested that social media feeds and other elements of a person's online presence could be useful sources of data and might even serve as the basis for detailed profiles of prospective candidates. This leader even speculated that profiles of this kind could underlay recommender systems that would suggest new opportunities to workers, in the same way Netflix now suggests a slate of movies and TV shows to its subscribers.

- The practice leaders noted that significant privacy concerns must be addressed when employers seek to expand the data in use beyond traditional resumes/job applications, with privacy issues a particular concern for employers in the European Union. Yet the leaders also noted that there may be ways to address privacy challenges. For example, if contributing personal data to an online profiling system could genuinely lead to valuable new career opportunities for workers, they might well opt in voluntarily.

Other comments from leaders focused on how employers could expand the pool of talent they draw upon.

- One leader noted that connecting with existing communities—locally-based non-profits and civic groups, universities, and company alumni organizations—can help employers broaden the talent pools they tap. Another suggested that career changers could be an interested group to consider. And yet another leader speculated that employers could reach candidates who may be suitable—or even outstanding—in a role but are not currently looking for a new position. There were no specific suggestions about how to do this, but the comment served to open the aperture more widely on the talent pool question.

- At the same time, the leaders were aware that expanding the talent pool could come with costs. One leader talked about an employer that, during the pandemic, relaxed the requirement that candidates for certain positions hold a college degree. Such an approach was based on the goal of becoming a "skills driven" organization, where skills determine the role an individual plays. Companies that have adopted a skills-driven approach generally find that it leads to better employee engagement and team productivity. But some organizations that tried such an approach had more mixed results. They were able to attract many more interested candidates, but the screening burden also increased greatly, and it was not clear that the tradeoff was worthwhile.

Several leaders highlighted that employers needed to combine traditional hiring of full-time employees with more flexible approaches.

- One leader stated that employers should think not just about *buying* talent (through traditional hiring) but also about *building* needed capabilities (through reskilling of current employees and upskilling them on key technologies, Generative AI in particular) and *borrowing* skills (by tapping temps/gig workers). Another leader made a similar point by stating that employers should envision a "total talent equation," which includes regular employees, contingent workers, and relationships with community partners that can provide access to candidates. Moving beyond traditional employment

models allows organizations to increase their agility and nimbleness, which can be especially important in volatile environments.

Finally, several leaders emphasized how important it is for large employers to focus not just on hiring from outside but also on carefully managing their internal talent:

- One leader pointed out large organizations today are increasingly adopting work models that involve use of project teams/agile teams. In the face of that shift, matching the needs of newly formed project/agile teams with talent that already resides inside the organization is a major ongoing challenge employers now face.

- Another leader pointed out that organizations with less attrition reduce their reliance on external hiring. One way to do this is to create new career paths for people to rise within the organization, especially from positions where there is rapid turnover. Workers who have already spent time inside the organization have learned its practices and culture. Providing existing employees with pathways to upward career mobility and helping strong performers move into higher-level roles can benefit workers, teams, and the organization as a whole. Some employers track characteristics of people who have left in the past, which allows them to proactively identify workers who may be on the verge of quitting. In such cases, the employer can intervene, ascertain the reasons an employee is considering leaving, and suggest alternative career pathways that may convince them to stay.

Armed with insights from the workshops, the research team began the next phase: solution development, which involved building a prototype idea-generating machine to develop ideas to address the employer-worker matching challenge and evaluating those ideas to identify the most promising.

Solution development and next steps

In the solution development phase, the MIT research team hopes to engage members of Accenture's staff who possess knowledge about the challenges large employers face and the ways they are currently meeting them.

In addition, the research team seeks to augment the knowledge and creativity of Accenture practice members by giving them access to Generative AI tools. More specifically, the team hopes to undertake a controlled experiment to test idea generation under four conditions: Humans only, Human using ChatGPT, Humans using Ideator, and Ideator only.

Late in 2023, the research team undertook several pilot studies to test the proposed experimental design. One pilot used subjects recruited on Prolific, a platform that provides access to high-quality subjects for online experiments. In the other pilot, approximately 100 members of Accenture's T&O practice were the participants.

In both studies, research subjects played two roles. Some of them contributed solutions in response to a new problem statement, which had been streamlined based on input from the workshops with the T&O practice leaders.

> How can innovative software tools and organizational practices more effectively match employers in need of workers with people who want to work?

After the solutions had been submitted, a different group of participants were invited to rate them on a 5-point scale, from 1 "Not at all innovative" to 5 "Extremely innovative." Innovative solutions were defined as ones that were both *creative* and *useful*.

Because of the small sample size, the pilot results were not statistically significant along all dimensions. But they partially confirmed the research team's intuitions that Generative AI, and Ideator in particular, can enhance the performance of Accenture staff in the task of developing creative solutions to a complex problem. The pilots demonstrated the intriguing potential of augmenting human creativity with Generative AI.

The research team judged that obtaining scientifically rigorous results would require a large-scale controlled experiment, involving participation by hundreds of practice members. The experiment's design would have similar elements to the pilots, but with more participants, plus a focused downstream effort to refine initially generated ideas into grounded, actionable solutions that could be put into practice with Accenture clients and in the internal practices of Accenture's project teams.

It's worth noting that while the research team's work so far has addressed the challenge of employer-worker matching, the large-scale study could address any issue, because CCI's idea-generating machine approach is agnostic.

The large-scale experiment has the promise of providing more comprehensive insights into how Generative AI can complement the talents and experience of Accenture's people.

Research team and study participants

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