Powered by A.I., Company Aims to Make Selling Easier for Retailers

Lily AI matches online shoppers to the merchandise they're looking for based on colloquial search terms, a welcome change for companies like Bloomingdale's.

By Teri Agins

Sept. 6, 2023, 5:00 a.m. ET

When Danielle Schmelkin went shopping online for something special to wear to her niece's wedding in 2021, she was looking for "a very specific type of dress based on trends I had seen recently."

To her delight, Bloomingdales.com came through like a personal shopper. The menu filter for "formal dresses" prompted her to choose from 15 criteria like dress length, color, neckline, sleeve length and embellishments. Moments later, she was sorting through 200 desirable options. "It was quick and really focused," she said. "I had no problem going from one page to the next, because there were meaningful results for me." She found "the perfect dress," and bought it.

Months later, Ms. Schmelkin — in her role as the chief information officer at J. Crew Group — was introduced to Lily AI, an artificial intelligence-powered platform that began working with fashion retailers in 2019. Bloomingdale's, she learned, was already a client. Intrigued, Ms. Schmelkin did a test run on its product catalog from the company's Madewell brand.

Madewell provided photos and product descriptions for its garments. Lily AI's artificial intelligence was able to then assign about 13 attributes to each product — from more than 15,000 tags that a team of fashion domain experts started curating in 2016, three years before Lily AI had retail clients. By the time Madewell tried it out, Lily AI had run more than one billion searches, each helping the algorithm become more sophisticated. So it was able to accurately match merchandise to colloquial terms — "quiet luxury," "study hall," "boho chic"— that online shoppers typed in the search bar, rather than just to stock descriptions of the goods.

In less than a month, Madewell saw a 3 percent increase in purchases from online searches, according to Ms. Schmelkin. Lily AI is now used across the J. Crew Group, and each brand continues to see "meaningful increases," she said, adding, "Lily AI is the real deal."

With online shopping accelerating since the pandemic, major retail chains are scrambling to win over consumers — an estimated 70 percent of whom quit their searches without buying. One way is through the kind of machine learning, artificial intelligence and human curation offered by Lily AI. The demand for this kind of technology has made the landscape increasingly competitive, with relatively new start-ups such as Syte.AI and Vue.AI.

However, Lily AI staked its claim long before the recent buzz over A.I. reached a fever pitch. It already counts Macy's, Bloomingdale's, Gap Inc. brands, Abercrombie & Fitch and ThredUp among its customers.

Lily AI, whose platform is powered by machine learning, artificial intelligence and human curation, counts Bloomingdale's and Gap Inc. brands among its customers. Jason Henry for The New York Times

Bloomingdale's began using Lily AI in a four-month test of dresses in October 2019. There was a 3.5 percent increase in online order conversion, according to data provided by Lily AI. The retailer expanded Lily AI across all apparel in 2020. The next year, Lily AI said Bloomingdale's generated about $20 million of additional online revenue. Bloomingdale's said it added Lily AI to all its merchandise in 2022.

Those results have helped Lily AI attract investors. Canaan Partners was the lead partner in Lily AI's $25 million Series B financing in 2022, which brought the company's total raised to $42 million.

Lily is "unique in specifically solving the website discoverability problem," said Sucharita Kodali, a retail analyst at Forrester.

"Lily got early traction with big retail names and is well positioned to maintain and grow," beyond apparel, beauty and home, into sectors such as travel and autos, she said, adding, "The technology is agnostic."

Lily AI was founded by Purva Gupta, 35, the company's chief executive, and Sowmiya Chocka Narayanan, 38, the chief technology officer. Both women immigrated from India to the United States in their 20s, with the ambition of becoming entrepreneurs.

The app's success helped it attract investors. Canaan Partners was the lead partner in Lily AI's $25 million Series B financing in 2022, which brought the company's total raised to $42 million. Jason Henry for The New York Times

The idea for Lily came in 2013 after Ms. Gupta, an economist, moved to the United States with her husband, an M.B.A. student at Yale. She went searching for "a flowy beach dress with sleeves" in stores around New York City and in online searches, only to keep striking out. She considered that language might be the barrier, she said, and wondered, "Was this an immigrant problem I was having?"

So Ms. Gupta shifted into academic research mode, spending the next 18 months canvassing the Yale community, doing one-on-one interviews with random American women of all ages. She asked each the same thing: "Describe the last item of clothing you bought and why that particular one instead of others that were available."

The more than 1,000 women she spoke with used, on average, about 20 terms each to describe new dresses, blouses, bags and shoes they had bought. None of them spoke the way retailers did.

"The retail merchant is saying 'midnight french terry active wear,' and in consumer-speak that's a 'navy blue sweatshirt,'" Ms. Gupta said. She sensed a business opportunity to bridge the gap, "with a product that would have to be deeply technical."

Her husband encouraged her to go to Palo Alto, Calif., to the Founder Institute, an idea-stage business incubator. There, she met Ms. Chocka Narayanan, a software engineer who left India in 2008 to pursue a master's degree at the University of Texas at Austin.

The daughter of a civil engineer (who is also married to an engineer), Ms. Chocka Narayanan had been steeped in the world of tech start-ups since earning her undergraduate degree in information technology. In the United States, she worked at Yahoo, then as the senior software engineer in product development at the gaming start-up Pocket Gems. Later, she was a senior engineer at the cloud-based content manager Box.

With $100,000 in backing from Unshackled Ventures, an early-stage venture capital fund for immigrant-founded start-ups, the two women started Lily as a shopping app. A.I. technology provided personalized recommendations to shoppers; Ms. Gupta's consumer research served as the foundation for Ms. Chocka Narayanan to build Lily's proprietary algorithms.

Ms. Gupta came up with the name Lily, aiming to evoke a friend and shopping buddy for women. The app won a best start-up award at the South by Southwest conference in 2017, which helped it collect $2 million from seed investors that year.

But it became apparent that the trendy phone app wouldn't be scalable, and the partners shut it down, recasting their search-and-shop model for major fashion retailers. Lily AI was born.

Along the way, Lily AI attracted angel investors like Serena Ventures, the Serena Williams-backed venture capital fund, as well as the designer Tory Burch and her husband, the Tory Burch chief executive Pierre-Yves Roussel, who said it was a rare investment for the couple outside their company.

Ms. Chocka Narayanan built a team of 40 engineers, many from Fast.AI, a nonprofit research group. "They are machine learning scientists who are pushing the boundaries on computer vision," she said.

Ms. Gupta assembled the team of 25 fashion domain experts: former image consultants, stylists and retail sales associates, some of whom she found through Craigslist. This group kept adjusting product descriptions and search terms, adding an important human element to Lily's A.I.-powered technology.

"We learned early on that it takes a lot of clean, unbiased training data, labeled by humans who are experts who understand all these minute details about fashion," Ms. Gupta said. "This clean data didn't exist." She added that the experts included "colloquial consumer words, so we could train our machine learning models to know what is the difference between 'boho' and 'boho chic.'"

One of Ms. Gupta's first hires for the domain team was Kathy Lee, a former fashion stylist. She recalled sitting with her colleagues around a conference room in 2016, with fashion books and magazines, staring at garments on computer screens, as they created labels. They bantered over what constituted "festive cocktail" and dissected the nuances of herringbone tweed and chevron stripes. Such was the meticulous slog required to create Lily's initial 15,000 labels. Since then, they have continued to add and tweak.

"You create a recipe with details that improves over time with machine learning," Ms. Lee said.

"We are more than site search," Ms. Gupta said. "This artificial intelligence was built for all of retail."