# The engineer who taught a machine to make otis

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A roti, Pranoti Nagarkar likes to say, is a non-Newtonian fluid—its behaviour shifts with pressure, temperature and time. That scientific itch sits at the heart of Rotimatic, the robot she conceived to automate a task millions consider both quotidian and maddening. "You don't have perfect parameters every time," she says. "Even humans adjust along the way" The machine she imagined had to develop the same instinct: to sense, decide and corript in real time so a single button-press could yield a hot, well-puffed roti, again and again.

Nagarkar traces the idea to her years in Singapore as a mechanical-engineering student and young product designer. "I'm a builder by nature," she says. "I learnt how to take an appliance from concept to a working prototype then the harder leap to a robust, manufacturable product." In 2008 she co-founded Zimplistic with software engineer and husband Rishi Israni, who is the CTO of the firm. "Rotimatic needed a brain after all," she says.

To actually build the product, Pranoti began by deconstructing the ritual of making a roti. "You're automating several major actions—measuring and dispensing flour, water and oil; making a dough ball; transferring; flattening; cooking to flame-like finish; and ejecting," she says. And all of this had to be done within a form factor that would be suitable for your average kitchen. "I set a microwave-ish form factor and refused to grow beyond it and so built a thermocol mock-up to freeze the size, then hand-built rigs to prove pressing and kneading. The commercial machine still matches that early silhouette," she says.

The pivotal design choice, Pranoti says, that helped Rotimatic become a practical machine that works, was the decision to design the machine to make one dough ball at a time. "In homes you batch-knead, then divide. We eliminated that. We micro-knead instead—smaller mass, higher precision." That did raise complexity however. "Any time you go micro, your resolution and tolerances get brutal," she says. "We had to achieve lab-like repeatability with commodity parts."

The sensing philosophy of the machine in a way mirrors human judgement. "We studied flours—for example ragi absorbs water differently to cornmeal—but data tables weren't enough to solve the problem," she says. "Humans feel dough. So we built a tactile-sensing system with off-the-shelf sensors, then taught the machine to adjust flour-water-oil ratios and kneading dynamics on the fly"

While the company has IP that has been published for their tech, Pranoti says the hard part is the internal know-how—how each sensor talks to the algorithm, how decisions happen every second.

Making sure the machine was connected to the net was also a deliberate choice that turned out to be crucial for its long term success. "IoT wasn't fashionable decor for us," she says. "We needed over-the-air recipes, diagnostics and remote fixes because our users were spread worldwide." That telemetry later underpinned support. "The machine knows its own health—motor currents, sensor drift, even cleaning lapses—and we can nudge maintenance or push targeted fixes without a service visit."

**200 million rotis served**

So far, 200 million rotis have been served in more than 100,000 homes across 58 countries, with the United States as the biggest market. "That early diaspora demand gave us the runway to keep improving," she says.

A dedicated user vase has even stretched the machine's repertoire. "People ace wonderfully inventive," Ole says. "They add protein powders, spices, multi-grain mixes. Rotimatic takes a couple of cycles to learn **antt** then remembers. That adaptiveness is magic." The firm publishes official profiles for millets and gluten-free flours, but she's happiest when customers experiment. "As long as it's dry ingredients, go ahead," she says laughing.

Roti is a non-Newtonian fluid-you never have perfect parameters, so the machine must sense and adjust in real time. I built Rotimatic for one-click automation and micro-kneading-one dough ball at a time-using commodity sensors as a tactile-sensing system. We added connectivity for recipe updates and remote diagnostics, and a camera with vision tech so it learns each flour type. The aim is simple: hot rotis on demand, without depending on anyone.

**Pranoti Nagarkar**
FOUNDER & CEO, ZIMPLISTIC (ROTIMATIC)

Manufacturing the actual machine followed a classic scale-up arc. "We tooled in Malaysia to begin with—invested in moulds, set up a line, trained technicians—and shipped to our early adopters," she says. "As we matured, we relocated manufacturing to the Bengaluru-Mysuru region to be closer to engineering, suppliers and our India roadmap." The India move also reflected affordability goals. "Cost matters," she says. "Bringing the supply chain home helps us keep improving the price-to-value equation."

The newest iteration of the product is Rotimatic NEXT. "We've put a camera behind the door and added vision **AI** now," she says. "If a roti puffs and pops a hole, the system can 'see' weak gluten bonds and strengthen kneading on the very next dough ball—for that specific flour." Extra sensors in the kneading assembly sharpen its grasp of flour-water-oil ratios. "It's the same idea taken further: more eyes and ears, better decisions, better food," she says.