Can AI Predict If Your House Is Going To Burn To The Ground?

Global Circulate

As summer fire season looms in California, Zesty.ai is using machine learning to help insurers and homeowners to make realistic risk assessments—and reduce damage to homes and property.

Standing on the outskirts of Oakland, California, Attila Toth takes in the nearby forested hills. The CEO looks out on what locals call “The Town” and, in the distance, San Francisco, or “The City.” Close by, Toth sees tangles of redwood, eucalyptus and oak trees – and the wildfire risk they pose.

This “wildland-urban interface” isn’t far from the site of the 1991 Oakland Hills Fire, which flared up suddenly in a heavily residential area. Over four days, 3,000 thousand homes were destroyed in one of the city’s wealthiest neighborhoods, causing an estimated $1.5 billion in damages ($3.2 billion in today’s dollars). Twenty-five people were killed. This area, Toth says, will almost certainly burn again.

The uncertainty is when, and what other areas are at risk. “The core is a lack of data-driven understanding that every single homeowner and business owner is facing,” says Toth, 49.

That is where Toth’s seven-year-old startup, Zesty.ai comes in. His company has been gathering data and using it to train machine learning models to better assess risks caused by climate change, like wildfires, on behalf of its clients, mostly insurance companies. “We take satellite imagery, we take building permit data, we take local weather station data, and we are using artificial intelligence in order to explain the impact of climate risk to every single property,” he says.

There’s no shortage of need. In the Golden State alone, eight of the state’s 10-most destructive fires have occurred within the past five years, according to the California Department of Forestry and Fire Protection, or CalFire. These fires have caused over $25 billion in insured wildfire-related losses. But not all properties are insured: CRC Group, an Alabama-based insurance wholesaler, estimates there were $9

billion in uninsured losses from the 2018 Camp Fire alone.

The average cost of insuring a home in California is $1,177 per year, according to the Insurance Information Institute, up 25% over the last decade, despite the state's highly-regulated market. The industry association notes that out of the top 10 wildfires that incurred the highest average insured losses in California, 8 occurred in 2017 or later, and only one occurred in the 20th century. Data from reinsurer Munich Re shows that insured losses from California wildfires in 2017 and 2018 exceeded those of the entire decade prior. The III notes that "much of this loss trend is due to people moving into risk-prone areas," including regions at risk of wildfire. In recent years, hundreds of thousands of California customers annually — many in rural areas — have been dropped by their insurers entirely.

Zesty.ai's pitch to insurance companies is this: don't rely on overly general, out-of-date maps to decide what buildings and homes to insure. With its data, the company generates a single score, much like a credit score, that assesses wildfire risk on a property-by-property basis. This "Z-Fire" score encapsulates all sorts of information about a home — including its age, its materials, roof type, how much vegetation is nearby, the slope of the adjacent land— that isn't always captured when insurers are assessing risk. The company is also working to develop scores that assess risks from hurricanes, flooding and other natural disasters.

Zesty.ai has been running on relatively lean amounts of capital compared to other AI startups. In 2018, the company raised $12.8 million in venture funding at a $47.4 million valuation, according to Pitchbook (Zesty.ai says this valuation estimate is inaccurate but did not provide a figure). Earlier this year, the company took on $10 million in venture debt from fintech firm Brex. The company has a long list of big-name insurance clients including Farmers Insurance, Aon, MetLife and Berkshire Hathaway. Forbes estimates revenues of about $25 million last year (the company declined to comment on its financials, other than to claim revenues "tripled" in 2021).

The business has been helped along by an explosion in the amount of readily available images, thanks to hundreds of new satellites in orbit collecting data as well as the use of drones for aerial photography. Toth's firm takes those images and combines them with more data: property records, building permits, and weather and fire history. Toth says his company's software is even capable of quickly rendering a 3D model of a roof based solely on a 2-dimension image with an accuracy to the tenth of a degree. With all those inputs, Toth says, his company's scores can distill complex questions like: how likely is this property to be within a disaster zone? If it is, how bad will that disaster be?

“AI sounds like voodoo for some of our customers, so I say: ‘Think of me like a chef,”’ he says. “What goes into the stew? We look at vegetation density, we look at the slope, wind patterns are extremely important, and the distance to previous fires — wildfires unfortunately tend to repeat themselves.”

But making an AI stew like this inherently comes with tradeoffs, says Mike Lyons, a managing director at Boston Consulting Group. Although he wouldn’t comment on Zesty’s model specifically, in surveying the industry he told Forbes that “some of it is really hard to scale. Specific recommendations for your company or this building is very hard to do.” That’s because, he explains, the more properties a model covers, the more that model must rely on rules of thumb and general assumptions rather than facts on the ground. “They have to have some sort of heuristics.”

Toth was born in Hungary in 1972, and came to the United States in 1995, after graduating from Budapest Business School. He landed in Chicago, where he got his MBA at Northwestern University in 2003. After graduating, he spent seven years at consulting firms EY and McKinsey, bouncing around various corporate offices across the country.

By 2008, Toth was a general manager for SunEdison, overseeing green energy projects, including a large-scale solar panel installation at Staples Framingham, Massachusetts headquarters that provides nearly 700KW of power for the property. At SunEdison, Toth found himself working again with a former McKinsey colleague, Kumar Dhuvur, with whom he started Zesty.ai in 2015 (Dhuvur is currently Zesty’s head of product).

“When we started this business, it wasn’t an insurance business, but a business to look at rooftops and we modeled 70 million roofs in the US,” Toth says. But then came the Tubbs Fire in 2017, which ravaged sections of both Napa and Sonoma counties, approximately 60 miles northwest of Oakland. By the time the 23-day long fire completed, it had burned over 36,000 acres and destroyed over 5,600 structures, about half of which were homes in the city of Santa Rosa.

The score that Zesty.ai produces for a property isn’t set in stone. Like a credit score it can be improved. Fire experts constantly tell homeowners about “defensible space,” the critical need to create a minimally burnable radius around a home. But there are other steps that can be taken as well, like adding a fire-resistant roof.

William Pitts, a senior assistant vice president at Rhode Island-based Amica Mutual Insurance Company,

says that after the company took on heavy losses in the wake of the Tubbs Fire, it began to re-evaluate its wildfire risk models. Amica, which insures 40,000 houses in California, had been using a competing product from the Irvine, California-based CoreLogic. But as they analyzed their losses, they discovered that CoreLogic had flagged some properties as being low risk to wildfire that actually were not. Amica switched to Zesty.ai and its Z-Fire system.

“If Z-Fire was used to completely re-underwrite Amica’s entire California portfolio, in 2020 Amica would have prevented 95% of its wildlife losses in the state,” Pitts said by email.

Currently, California is considering a state-level insurance rule change that would for the first time require insurers to offer rates “based in part on, the reduced wildfire risk resulting from property-level wildfire risk mitigation efforts undertaken with respect to an individual property being assessed for risk.”

Should California enact this wildfire-specific insurance rule, it would be the first such state to do so – and a huge boon to Zesty. If it passes it would mean insurance companies would be forced to work with Zesty or one of its competitors, or develop its own models in-house.

Zesty.ai’s largest competitor is the Jersey City-based Verisk. Other companies in the space include CoreLogic and Cape Analytics, which is based in Mountain View, California.

Verisk’s primary product, FireLine, has been scrutinized for not having adapted quickly enough. Earlier, in 2018, United Policyholders, a national consumer advocacy group, told the California Department of Insurance that the prevalence of FireLine was “partly responsible” for the state’s “market crisis” for homeowners’ insurance in fire-prone areas. But United Policyholders hasn’t fully embraced Zesty’s approach either.

“My instinct is that Zesty is a favorable development on the horizon, but it’s not any kind of a magic wand by any stretch,” said Amy Bach, executive director of United Policyholders.

Zesty is hoping that its proprietary – and patented – AI tech will give it a leg up in the long run. Plus, partly because it is open about what factors go into its score (in other words, it’s not some sort of “black box”) it has gotten approval from the insurance commissions of six different states: California, Arizona, Montana, Oregon, New Mexico, and Utah. “That’s a very, very big differentiator,” says Toth. For example, in California, its model is one of only two approved wildfire risk models. The other belongs to Verisk. And

by the end of the year, Toth says he expects his company's models to have regulatory approval in 25 states.

The company's also expanding its model to cover more types of natural disasters. Toth says the company already has high confidence in its models for wind damage, hail damage and other types of storm damage. The next big challenge is modeling flood damages, which caused $82 billion in global damages last year according to the Swiss Re Institute, but Toth is confident his company's up to the challenge.

"Insurance used to be a necessary kind of evil, right? I pay for it, I hope I never have to use it," Toth says. "I think there is an opportunity to completely reposition insurance into a data-driven partner that helps you protect the things that are most important to you."