For some, the world is dangerous: death by car accident, city removal notices and intense windstorms are just some of the risks that the brave trees lining the streets of San Francisco face every day.

"Life as a street tree is not easy," said Kindra Scharich, a street tree advocate.

Taking care of them is not easy either.

The city is responsible for maintaining over <u>125,000 trees</u> lining the streets of San Francisco. The city keeps track of tree health and maintenance by utilizing data from the street tree census, requests from citizens and a team of urban forestry inspectors who visit the trees, said Director of San Francisco Public Works <u>Carla Short</u>.

To check on the current health of trees, cities and community groups have to organize employees and volunteers to visit every tree physically. Recording basic information about tree health takes about three minutes, according to the <u>Department of Agriculture</u>. If one person were to inspect the basic health of all of San Francisco's street trees, without factoring in transportation time, it would take around 260 days.

"The way (monitoring urban forest health) is done now is literally people walking around with clipboards and measuring tape looking at trees," said Cynthia Wu, co-founder of <u>Taro Al</u>.

Changing something that's been done one way for so many years is hard, but that is what she set out to do.

"I started talking to tree planting groups and they all told me: 'We plant these trees, but no one has time to check them," Wu said. "That's when AI and remote sensing satellite imagery comes in super handy."

Taro AI, a startup based in San Francisco, utilizes satellite imagery and artificial intelligence to track the health of urban forests. The process reduces the time and personnel needed to identify when trees need care.

The company uses AI to compare current satellite imagery with imagery from the same month the previous year to identify trees that may be missing or have declining health. The AI identifies each tree by the unique bands of light the tree gives off. From there, it compares the current image of the tree to the image from the previous year to identify when a tree looks like it may be in decline or is gone completely. The company then alerts its clients on what trees to inspect.

One of the <u>first indicators of a tree in decline</u> is the top of the tree, so using satellite imagery to monitor tree health is definitely a possibility, said Elliot Goliger, president of the <u>Bay Area</u> Arborist Cooperative.

"In general, the urban forest is a high-maintenance environment," he said.

Trees need water – and a lot of it. A new street tree needs <u>15 gallons of water every week</u> for three years. If a tree in San Francisco dies within the first year of planting, the city requires that it be replaced within six months.

Scharich would know about that.

As <u>founding director of Mission Verde</u>, Scharich helped organize volunteers in Mission District to commit to water 150 freshly planted street trees – every week – for three years.

The program is entering its fourth year and it was largely a success, Scharich said. Most of the trees survived past the three-year mark.

Mission Verde started when the city notified residents in her neighborhood that it intended to remove 78 trees from the Latino Cultural District on 24th Street in <u>2019</u>.

"It would have felt like they were cutting down every tree on the block," Scharich said. "The first part of urban forestry is to protect what you have, aggressively."

In response to the plan, residents appealed the resolution and reduced the amount of trees to be removed to 47. The community then negotiated with the city and increased the number of trees to be planted in replacement from 50 to 150 by residents volunteering to water the trees for three years in order for them to become established. This group of volunteers is organized by Mission Verde.

The increase of trees planted was so drastic because it reduced the cost of maintaining the trees. While planting a new tree costs \$550, watering it for three years costs about \$1,650, <u>according</u> to San Francisco's Bureau of Urban Forestry.

Residents committed to the Mission Verde because the tree removals would have completely changed the visuals – and temperature – of the neighborhood, Scharich said.

According to the <u>Environmental Protection Agency</u>, trees can help reduce the temperatures experienced in cities. A healthy urban forest can even <u>help fight</u> against climate change by storing carbon dioxide.

"Climate change is showing us all that we need to do things differently than the way we are used to," Wu said.

She hopes that Taro AI will make data about the health of urban forests more accessible, not just to big cities, but to smaller ones that might lack the funding to send crews to inspect the health of their urban forest.

To Scharich, the importance of preserving trees lies in the legacy they leave for the generations to come.

"Trees are the witnesses of our history, it's in their leaves and in their bark," said Scharich. "It is very deep and profound to think 'How many people's hands have touched this tree that are no more?"