



Can an Algorithm Help Prevent HIV From Spreading Among Homeless Young People?

BY SARAH LASKOW | FEBRUARY 18, 2015

Among homeless young people, across country, HIV rates are 10 times that of the general population. Keeping alive can mean sex work, drug use and other risky behavior. One of the more effective ways of combating the spread of HIV is peer-led education programs. But, says Eric Rice, a professor at University of Southern California's School of Social Work, choosing the right peer to lead can be tricky.

Now, a team of computer scientists who deal in game theory has created a new way of approaching the problem: a mathematical model that's able to consider the uncertainty inherent in this social network and choose which people might be the most effective leaders.

The project began when Milind Tambe, a professor of computer science and systems engineering at USC, saw Rice speak about his work at My Friend's Place, a nonprofit in Los Angeles that serves homeless young people. Tambe deals in uncertainty: He's drawn to problems where someone needs to make decisions about how to deploy resources, without having good information about the people on the other side of the equation. He's worked with the Coast Guard and Federal Air Marshals Service to intelligently randomize patrols for, respectively, the New York Harbor and Los Angeles International Airport.

As Rice spoke about his efforts to understand the network of homeless young people in L.A. and their HIV risk, Tambem saw a parallel to his work on how to best deploy "hearts-and-minds" resources in Afghanistan.

"The problem looked quite similar to the problem we had been working on," Tambe says. "You're visiting different nodes" — people, in this case — "and trying to influence them. Basically the way we look at it is that we are trying to color the nodes. If you put in color in one node, it may seep into other



Inspiring Better Cities.

everyone. You want to be strategic about who you talk to and hope their influence spreads. But while data about military efforts in Afghanistan was hard to come by, Rice had been working on a detailed census of homeless youth in Los Angeles — real-world data that could be used to inform an otherwise theoretical model.

Rice had worked for years to understand HIV risk-taking and improve the spread of information among homeless youth in L.A. “When I was testing out a program ... a few summer ago, I felt like I could have gotten further if I had been smarter about how I picked people,” he says.

Often, participants in these sorts of peer-led programs are chosen because they’re enthusiastic about the idea or because they’re perceived as popular by staff. This problem — how to pick the right people, without knowing much about who they’re actually connected to — was the problem Tambe thought he could make a model to solve.

Tambe and his colleagues started with a mathematical model that’s been in use since the ‘60s and allows for uncertainty in the world. But for homeless young people, there’s so much uncertainty that off-the-shelf programs couldn’t deal with it. The work Tambe and his students did customized the model and generated algorithms tailored to this particular problem.

Like a staff member or social worker organizing a peer-led education program — and using Rice’s detailed census data — the new model “chose” a few people within a network to participate in a program. But it approached the problem in a very different way — and produced a different result.

Unlike a human, the specialized model is able to quickly imagine the many, many different ways that a group of people might be connected. We’re always drawing social maps of people in our minds — A knows B, who knows C. But say you have no idea if A, B and C are connected at all. The model can consider worlds in which A knows B and C, or A knows C but not B, and so on. Tambe’s model can also deal with social networks consisting of hundreds of people.

Get our best reporting, job of the day, and smartest reader. Sign up for our daily newsletter.



SIGN UP



Inspiring Better Cities.

periphery,” Tambe says. Given the uncertainty in the network, the model is aiming to gather information about its structure. By picking someone at the periphery, it creates opportunities not only to spread knowledge to parts of the network that might not be reached otherwise, but to find out that, actually, person C — who might have seemed totally isolated — is connected to A and B.

That, says Rice, offers people like him new strategies for trying to spread information most effectively. “It’s an out of the box way of thinking of that problem,” says Rice.

Putting this into practice, though, is a complicated problem of a different sort. The first step, says Heather Carmichael, executive director of My Friend’s Place, would be to get staff on board. But the real challenge would be figuring out how to communicate the idea to their clients. Homeless young people are a vulnerable population, and they’re not inclined to trust systems — or, really, adults. One of the key principles at My Friend’s Place is to be open with their clients about what they’re doing and how.

“Transparency is trust building,” says Heather Carmichael, the organization’s executive director. “We’d have to get consent. We can’t just walk up to a young person and say our computer has chosen you.”

But, she says, it’s worth trying to figure out how to navigate those questions.

“If we can take this algorithm and figure out how to apply it to this really vulnerable community of young people, to hone in our intervention, that would be spectacular,” she says. “Even just to try it would be spectacular. These young people are so at risk at HIV, it makes sense to take these types of risks if there’s little to no harm done to the people we’re serving.”

The Science of Cities column is made possible with the support of the John D. and Catherine T. MacArthur Foundation.

Get our best reporting, job of the day, and smartest reader. Sign up for our daily newsletter. 

SIGN UP



Inspiring Better Cities.

Equity Factor

L.A. High-Rise Boom Won't Cure a Housing Crisis

BY [JOSH STEPHENS](#) | FEBRUARY 18, 2015

Until the mid-2000s, the South Park neighborhood of downtown Los Angeles had exactly one high-rise tower: the looming, vaguely Stalinist Transamerica Building. It most famously supplied the rooftop where Guns 'N Roses shot the [video](#) for “Don't Cry.” The area — which occupies the southern portion of downtown Los Angeles, between the Financial District and Interstate 10 — was avoided by business people, developers and rock stars alike.

Today, Transamerica is but the tallest tree in a rapidly growing forest. No fewer than 20 high-rise and medium-rise projects are under construction or in development in the roughly 40-square-block area. At least that many projects are in earlier stages of development. These projects represent more than 3,000 units of mostly rental housing that is expected to be available by 2017. The tallest will be 45 stories.

It is the closest thing to a development bonanza that Los Angeles may ever see. And it's not nearly enough. Though South Park will be transformed, almost no one expects that the development there will cure the city's housing ills. A recent UCLA study named Los Angeles the least affordable rental market in the country. By some measures, including those of Mayor Eric Garcetti, the city of Los Angeles needs to add some 100,000 units of housing by 2021 for supply to remotely meet demand. Meeting that goal requires the city to roughly double the current pace of development.

Much of South Park is a blank slate. Jessica Lall, executive director of the [South Park BID](#), says that

Get our best reporting, job of the day, and smartest reader. Sign up for our daily newsletter.

SIGN UP



Inspiring Better Cities.

veritable United Nations of developers. In South Park, out-of-town developers — including entrants from Canada, China, Phoenix and Houston — can put up marquee properties without getting completely mired in unfamiliar politics and regulations as they might in other parts of L.A.

Though building on empty lots minimizes displacement, Lall acknowledges that the area's existing residents shouldn't be ignored: "Our big concern is looking at how to integrate those communities."

The BID has plans to create a neighborhood — not just a cluster of closed-off high-rises — with street life, sidewalks, public murals and trees. But creating a pleasant neighborhood for upscale professionals is not the same thing as helping the city's housing crisis, according to affordable housing advocates.

"I do agree with the characterization that they're net adds," says Beesemyer. "But I think that that's counterbalanced by who's moving into the high-end rentals. These are not folks who would otherwise be in workforce rental situations."

For all of the excitement surrounding South Park, it is still not exactly a Paradise City for developers. Many of them would prefer to build even higher and more dense and, indirectly, to put more of a dent into that 200,000-unit shortfall. But, even South Park is encumbered by what some consider 1970s zoning ordinances that were designed to restrain development downtown. Parts of South Park are limited to 3:1 floor-to-area ratios. Some projects will be forced to top out at seven stories when they could have been economically attractive at two or three times that height.

The Department of City Planning's [Recode:LA](#) initiative is currently overhauling the zoning code in part to promote high-quality development in places like South Park. But it won't be complete until 2017.

Even so, South Park's developers see the market opportunity now — and want to get shovels in the ground before the next economic downturn — so they are dealing with the current system.

Get our best reporting, job of the day, and smartest reader. Sign up for our daily newsletter.



SIGN UP