UP TO Code

Coding can help solve planning challenges—from internal processes to visualizations.
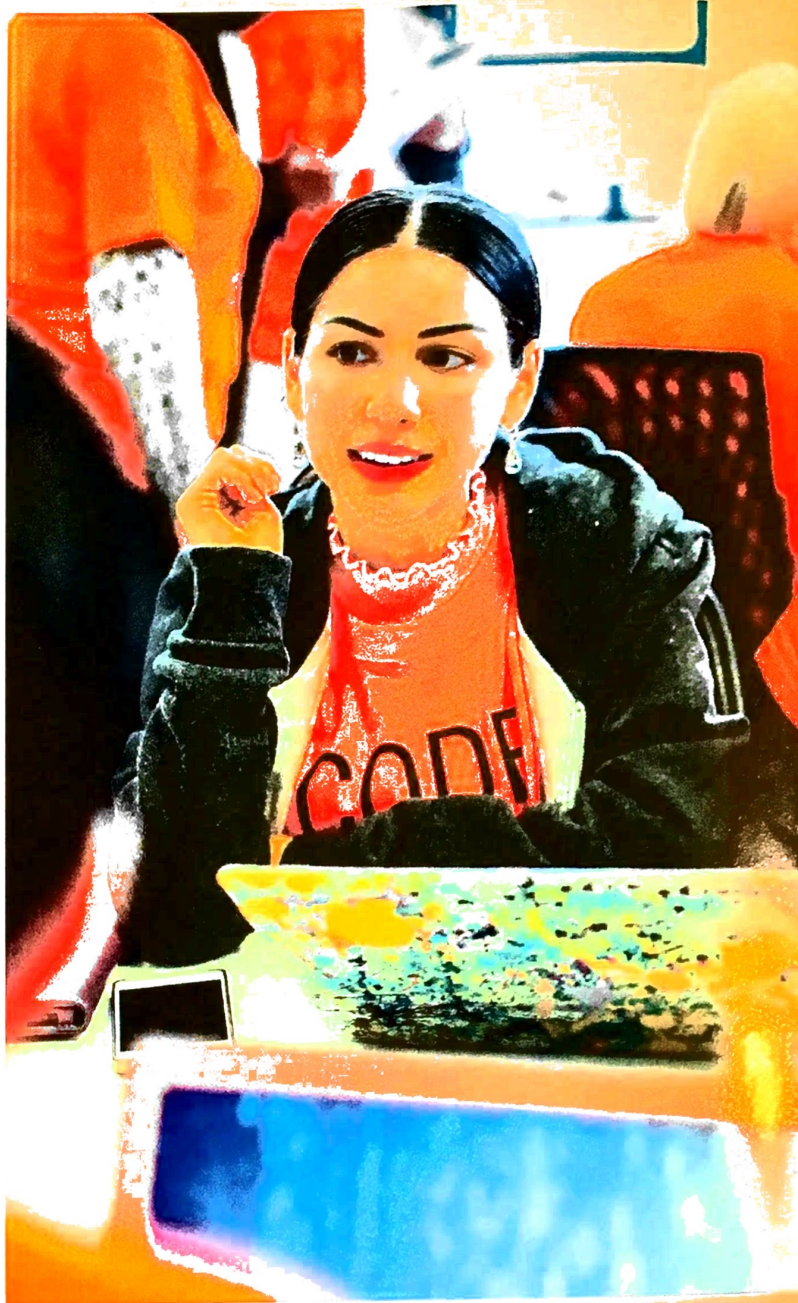
By JAKE BLUMGART

BOSTON, LIKE MANY CITIES THROUGHOUT the U.S., is in the midst of a housing crisis. The city is seeing a continued surge of residents and corresponding spikes in costs. The region has been ranked as one of the most expensive in the country, with median rent higher than in the New York City metro area and home buying costs that make it the fifth most expensive region in the nation.

In this kind of cost-burdened, dense, transit-rich, relatively land-scarce part of the country, every scrap of ground that could host a housing unit will have to be bent to that use if the ambitious construction goals set by local leaders are to be met.

A website created for local developers by the Boston region's Metropolitan Area Planning Council (MAPC) has become a small but meaningful part of working toward connecting parking needs with housing needs. The app, Perfect Fit Parking, was built in-house and uses regional data to help builders determine how much car storage space they actually need.

The idea for the website came about in 2017 after MAPC staff noticed that developers tend to overbuild parking because they overestimate demand, leading to waste of both space and money that could ultimately be used to create more housing units. The idea of "too much parking" is counterintuitive to most developers, who assume that their residents will clamor to have a parking space for each housing unit, and planners didn't have the authority to change parking minimums. How could MAPC show the regional development industry that they were spending big to meet a demand that wasn't as robust as they assumed?

As it turned out, many other regions were facing similar issues. King County, Washington, had created a Parking Calculator to better inform the development industry, and Washington, D.C., had its Parking Right tool. Taking a page from those cities' books, MAPC planners and development team got to work. The agency's transportation department conducted parking utilization studies at residential developments across the Boston region. MAPC then compiled the information into a dataset, coded

professionals more effectively shape policy discussions and community dialogue around even the most niche hyperlocal concerns.

Multiple applications

Generally, says Zagaja, coding applications that are being used to advance the work of planning tend to fall into three buckets: First, coding can make day-to-day life within planning agencies easier. Second, it can sharpen tools for policy discussion. And third, it allows planners to create visualizations that make it easier to bring complex topics to lay audiences.

INTERNAL SERVICES AND TOOLS. A touch of coding can enhance the workflow for tasks planners tackle on a regular basis without compromising the integrity of their output. Take, for example, the Housing Production Plans required by Massachusetts law to ensure localities are adequately preparing to accommodate new residents. These five-year plans are meant to help communities tabulate their housing needs, both in terms of demand and in assessing the regulatory and land restraints that might prevent it from being reached. An annual numeric production target is included, giving local leaders a target to aim for in terms of new and renovated units.

But for the individual planners tasked with producing reports for each town and village, the initial process of setting up the research tools for use by policy makers proved time-consuming. Matt Gardner, a software engineer for New York City's Department of Planning who used to work for Boston's MAPC, recalls the tedium of laboriously creating the beginnings of Housing Production Plans on Excel spreadsheets for the hundreds of towns across the state.

"The planners were constantly doing these five-year required plans and eventually it got to the point where I was sick of answering the same questions over and over," says Gardner.

Then in the mid-2010s, MAPC coders created a program that automated the opening stages of the process, allowing planners to plug in datasets to help municipalities set the groundwork for their Housing Production Plans in a less laborious fashion.

The new program allowed planners to input facts about the communities in question, like their

the program, and ensured the interface was user friendly. The end result was an accessible mapping experience that allows developers to play around with the tool themselves, rather than just showing them a static report.

"By just taking a data set and visualizing it on a map, [the website allows developers to] find developments that are similar to their own, look at the data on parking utilization in those places, and figure out exactly how much parking they might need," says Matthew Zagaja, MAPC's lead civic web developer, who spearheaded the project.

The Perfect Fit Parking website is just a small example of how coding technology is shaping the solutions to planning challenges, whether it's creating data-driven planning tools or helping

Coding isn't a prominent part of the curriculum in planning schools; most planners take classes later or learn on their own when their job requires it. See the next page for a list of some of the most useful coding languages for the profession.

current population and its projected growth, income and poverty rates, and the number of current housing units. With these basic inputs, the planners can quickly generate the tables, charts, and data points needed to inform a production plan.

What staffers at MAPC estimate used to take a week to put together (per plan) now takes a day, which means planners have more time to actually analyze the data instead of painstakingly entering it into a spreadsheet. (It's worth noting that the rest of the process is driven by community engagement, which means it can take months to work with the public and local officials to ultimately complete a plan.)

EVIDENCE-BASED POLICIES AND PROGRAMS. At its core, the planning profession is about education and advocacy. You have to try to convince public officials and community leaders that, say, reducing parking minimums or allowing more density won't have the detrimental effects that they fear. Planners can use coding to build a more convincing case for new policies or to question established ways of doing things.

NEW TO CODING? GET STARTED WITH THESE 3 USEFUL PROGRAMMING LANGUAGES

Planners looking to get their feet wet with coding face innumerable options when it comes to which programming language to learn. But three in particular are widely regarded as the most advantageous in planning applications.

R. Known simply as R, this open-source language is used for statistical computing and graphic analysis. It is becoming the primary coding language in planning because it can be used to synthesize the kind of huge datasets that practitioners are increasingly being asked to wrangle. It also has a reputation of being relatively easy to program. Even beginners can start doing simple data analysis right away.

PYTHON. This language is used primarily for data manipulation and data cleaning, and can be used to transform an array of datasets into a consumable product. Python also has a reputation for ease of use, but becoming conversant in it can be more challenging for coding newbies.

JAVASCRIPT. One of the most common coding languages anywhere, Javascript is used to build websites and to place the insights gleaned from R and Python into publicly consumable and accessible locations. Use this language to put your interactive map applications and GIS work in the public eye.

Brittaney Harkness, a trained planner and former data analyst with the Chicago Metropolitan Agency for Planning, says that coding skills helped make the case for Cook County's community solar program. When she began her assignment, there was a question of whether the Chicago area got enough sunlight and had enough space to make it worthwhile to invest in solar technology. In 2016, Harkness used GIS to estimate all the suitable rooftops and vacant land and calculated the anticipated amount of solar electricity that could be produced.

Her program showed that Cook County's needs could, in theory, be fully supported by solar. That finding convinced policy makers to move forward with a community solar program and establish pilots across the county.

Also in Chicago, Steve Vance, a trained planner and founder and CEO of Chicago Cityscape, which tracks development data and makes it publicly available, used coding skills he picked up at Chi Hack Nights—informal mutual education meet-ups—to make the first-ever maps of bike crash locations in Chicago back in 2011.

Cycling enthusiasts and safe streets advocates used his maps to push for more active policy making around non-car road users and for specific interventions at the most dangerous points in the network. As a result, local policy makers were better able to direct limited public resources to develop interventions in areas of the greatest risk.

USER-FRIENDLY VISUALIZATIONS. While talk of arcane coding languages might seem alienating to the average person, the products they create—like easily readable maps and graphs—are not. In fact, they are often far more accessible than the traditional jargon-laden planning public presentation.

In Chicago, Harkness says her coding skills were put to use to create strategy maps for guiding regional transportation plans and in helping partner agencies decide where to prioritize investments to ease congestion. She also mapped where zoning restrictions in the region have reinforced segregation and kept out affordable housing. These resources could then be uploaded to websites accessible to the public and can illustrate presentations in community meetings and hearings that help people without backgrounds in planning better grapple with her findings.

In Boston, MAPC created a website (climate-vulnerability.mapc.org) that visualizes climate data to educate and empower residents to analyze their neighborhood's and region's climate vulnerability.

The effort is part of MAPC's long-range MetroCommon 2050 regional planning process.

So you want to code?

As a profession, planning has much to gain from the opportunities created by the lowered barriers to website and app creation in recent years. For planners themselves, knowing how to code opens gateways to higher salaried jobs and improved work efficiency.

Yet, despite the advantages coding presents for both the profession and individual career advancement, many of the planning professionals interviewed for this story largely agreed that coding still isn't a particularly prominent part of urban planning schools.

Harkness says she didn't learn much coding in her schooling in the University of Florida's master of urban and regional planning program. "I primarily learned coding from online courses after grad school," she says. "There were just some responsibilities I had with my current job where I had no choice but to learn a number of scripting languages."

Vance agrees that he doesn't see planners emerging from graduate programs with a firm understanding of the subject.

"I don't know if any urban planning schools have added robust coding to their programs," says Vance, who did not get coding training in the urban planning program at the University of Illinois at Chicago. "Everybody I've talked to who graduated in the last couple years never seems to have any grasp of coding."

He says that many planning schools do touch on coding, they just don't make it a core part of the curriculum. Instead, he says, planning students often pick up on a bit of coding if they work on a project with GIS components, like Python, SQL, or JavaScript. That's how he got started.
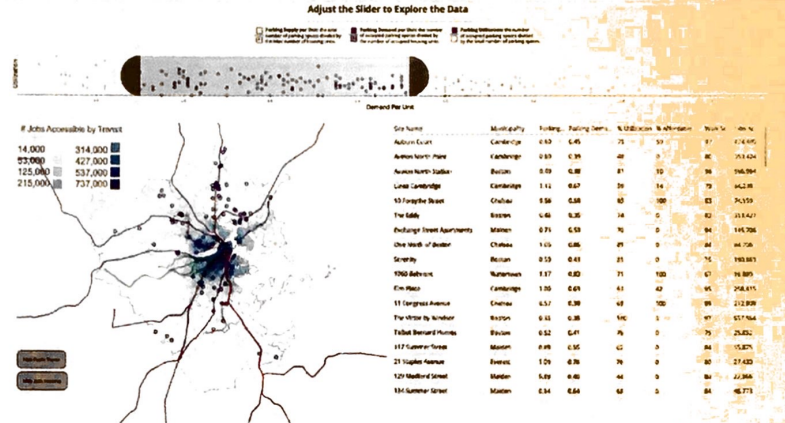
But the lack of a more comprehensive coding curriculum isn't because planning programs don't see the value in it. Dan O'Brien of Northeastern University in Boston says that incorporating a whole new skill set into time-tested, two-year programs can be difficult to enact quickly.

"These are relatively short—one-and-a-half to two-year degrees—and they're pretty programmed," says O'Brien, an associate professor in the School of Public Policy and Urban Affairs. "So there's not a lot of wiggle room. On the academic side, it's also about how quickly institutions can change. It takes a while to get a new program designed and it's only been really five, 10 years since Big Data became a thing."

Boston's Zagaja says that planners don't need to become software developers to get what they need from coding as a skill set. Instead, most practitioners just describe their experience with coding as a process of catch-as-catch-can. Many planning professionals just end up teaching coding to themselves.

It's not as intimidating a process as it sounds.

Discerning users can take an online course to learn the coding languages that would allow them to at least prototype what they want to do. Those who work at large institutions with a digital team in place can then get help from professional developers to flesh out their results and ensure that final products are as user friendly as possible.

Matt Gardner of the New York Planning Department encourages his fellow planners to consider taking academic courses outside their planning programs. But even that level of commitment isn't strictly necessary, depending on what is needed, he says. Many of his colleagues have just trained themselves on the weekends or at night. The lucky ones learn with their peers during a hackathon weekend or with help from friends.

Coding shouldn't be seen as inaccessible or intimidating, he says. In fact, many of his colleagues are learning on the job.

"They sort of use it piecemeal and they just sort of pick it up as needed," says Gardner. "They are getting more interested in the online resources that are just getting so much better, because coding is much more accessible now than it used to be."

Jake Blumgart is a reporter based in Philadelphia.

CRUNCHING THE NUMBERS WITH PERFECT FIT PARKING

The Metropolitan Area Planning Council's app was built in-house to help Boston developers calculate realistic parking needs in their projects.

SOURCE: MAPC

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