MARKET, PLACE, INTERFACE

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PARCELID, TAXYEAR, ADDRESS, ADDRNUMBER, ADDRPREDIR, ADDRSTREET,
ADDRSUFFIX, ADDRPOSDIR, ADDRUNTTYP, ADDRUNIT, OWNER, OWNERADDR1,
OWNERADDR2, TAXDIST, TOTASSESS, LANDASSESS, IMPRASSESS, TOTAPPR,
LANDAPPR, IMPRAPPR, LUCODE, CLASSCODE, LIVUNITS, LANDACRES,
NBRHOOD, SUBDIV, SUBDIVNUM, SUBDIVLOT, SUBDIVBLCK

14 004600061108, 2011, 556 JOHN WESLEY DOBBS AVE SE,556,,
JOHN WESLEY DOBBS, AVE, SE,,, MC LEAN DAVID, 556 JOHN WESLEY
DOBBS AVE NE, ATLANTA GA 30312, 1638, 05W, 97360, 10800, 86560,
243400, 27000, 216400, 102, R3, 2, 0.172107, 14362,,,,
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***Source*: Fulton County Board of Tax Assessors**[1]

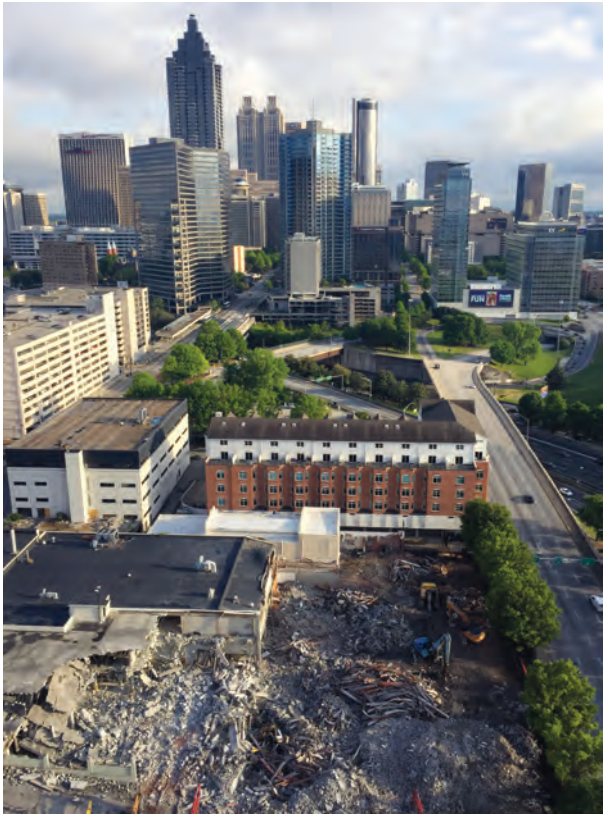
DATA IN THE CULTURE OF REAL ESTATE

I live on the Eastside of Atlanta, Georgia, where I cannot go a single block without seeing a "for sale" sign. Many of the single-family bungalows on the market in this area are gut rehabs, bought on the cheap and flipped for a profit by independent speculators or major investment firms on Wall Street.[2] These homes are practically new—all but for the most foundational elements, a footprint or facade, which are required to preserve generous zoning laws concerning the size and placement of the house. On abundant empty lots or at the site of teardowns, newly constructed houses (often two or more times the size of surrounding dwellings) are springing up, outfitted and priced to sell to a new affluent population flooding the "Intown" neighborhoods of the city.[3]

Frequently, like me, these newcomers hail from outside the state. Meanwhile, traces of former communities linger in view. At the main intersection near my house is an abandoned bodega with a sign that reads "IFFY GROCERY"; the "J" is missing. An *Ailanthus altissima*—the "feral tree" from chapter 2, often characterized as a symbol of a neighborhood in distress—grows at the edge of the store's parking lot.[4] One block away, a yard is spotted with the personal effects of an evicted family that I never met: a laminate wood dresser, box spring, pair of jeans, and grade school activity sheet. But such sights are fleeting; the emptied-out house does not go unoccupied for long.

This latest housing shift, a rebound from the 2007 crisis, is made possible by many things: the changing lifestyles of well-heeled professionals who now put a premium on urban living, increasing economic inequality, subprime lending practices, and as I will focus on here, a "culture of real estate" enabled by the recent widespread availability of data on property values.[5] Communication scholar Joshua Hanan explains this emergent culture as one that combines nostalgic desires for domestic comfort with aspirations for profit and social ascendance.

Like many others purchasing a home in the area, my partner and I used a traditional real estate agent, but also the digital listings of available homes on platforms such as Zillow.com, which offers prices and inviting depictions of interiors, yet little indication as to the history of neighborhoods, or the implications of buying a house in the current cultural and economic climate. As in many urban centers across the United States, home prices within Intown Atlanta have fluctuated wildly over the past few years. In 2011, the median home value in Atlanta was $205,000. It dropped to $152,500 in 2012. By 2016, it had risen again to $250,000. But the cost of homeownership is not the only story. Between 2012 and 2014, 95 percent of rental units constructed in Atlanta were luxury apartments.[6] At the same time, affordable rentals are being demolished systematically to make room for units with a higher return for developers and landlords.[7]



5.1
A view of downtown Atlanta from the Crowne Plaza hotel. Image by the author.

When seen simply as a stream of incoming sales data, Atlanta can look like a city rising up or population left behind, depending on your point of view (figure 5.1). Either way, the future of Atlanta is increasingly viewed through data. Consumers most often encounter these data through what experimental humanities scholar Ed Finn writes about as an "interface layer," formed by tightly curated user experiences meant to shield audiences from the messy sociotechnical conditions of data collection as well as the implications of their use.[8] If data can be considered as texts, as I first suggested in chapter 1, interfaces are contexts: the settings in which data are meant to be fully understood.

This brings me to the fifth principle that supports this book's overarching claim: *interfaces recontextualize data*. Running counter to the lessons of previous chapters, today's interfaces often manifest the aspirations of digital universalism, introduced at the beginning of this book. Universalizing interfaces to data seek to further the ideology of placelessness by integrating data from anywhere and aiming to work equally well everywhere. In order to create and maintain this illusion, such interfaces first delocalize existing data sets, removing all traces of the places in which they are made, managed, and otherwise put to use. Then they present uprooted data within new contexts: unimpeded by the details of data production, unburdened by ethical quandaries that might accompany their use, and free from concerns about their unintended consequences. Such interfaces are known by user experience designers as being "frictionless."[9]

Whether you are looking for somewhere to live, a good meal, information about events in your area, or a ride to work, a new economy of interfaces stands ready to serve you through a series of transactions with data that can be carried out on any networked personal computing device.[10] The data that enable these services are created at the local level, collected by civic institutions or crowdsourced from the users themselves. They are rapidly mobilized by data brokers, who build and maintain national- or international-scale data infrastructures for profit.[11] The boosters of this new "smart" lifestyle are ushering in a new kind of individualism tailored for affluent and tech-savvy urban dwellers.

Consider their tag lines: Yelp, an online directory of restaurants, shopping, and other services, can make sure you "connect with great local businesses."[12] Nextdoor, a place-based social media platform, invites you to "discover your neighborhood."[13] Uber, a networked car service, equates "getting there" with personal freedom: "your day belongs to you."[14] Zillow, the real estate website, will help you "find your way home."[15] These interfaces promise not only access to data but also the operational context to easily act on them.

By operational context, I mean an interface that is procedurally generated from computer code, and composed of visual, discursive, and algorithmic processes that connect existing data to concepts as well as resources that can support their use. Indeed, interfaces are not places per se. Rather, as media theorist Alexander Galloway notes, interfaces are best understood as processes.[16] Visual processes, such as mapping or

graphing, help users see patterns in data. Discursive processes offer ready-made narratives through which to frame those patterns as reality. Algorithmic processes enrich data by generating new value from existing inputs. These interface elements are more than representational because they transform data on the city—for instance, in terms of prices, distances, and rankings—into drivers for local and highly personalized behavior. As in the example of the arboretum in chapter 2, data don't just describe contemporary places; they are a functional part of the way that those places work.

This chapter brings a local perspective to the question, What are interfaces to data? This entails an analysis of the various processes that shape the way we encounter data in applications, such as those described above. The question of the interface is of deep relevance for anyone who wishes to think critically about systems that mediate relationships between people and data. On the face of it, designing an interface is a pragmatic problem of supporting data use. But it is also a problem with important social and even political consequences. Who can use data? How can they use data? And what can they use data for? Interfaces establish the subject positions that users of data are expected to adopt.

In the case of Zillow, which I will focus on here, you can be a prospective home buyer, renter, seller, or real estate professional. No resident, according to Zillow, is outside the market. But Zillow is not the only setting in which we might understand housing data. The potential interfaces for data are always multiple, enabling different forms of engagement and interpretation, with implications for what data appear to say.

The values of homes in the United States and other countries where property is on the market have long been determined in large part by context. The perceived worth of a home is not determined solely based on its age, square footage, or the number of bedrooms and bathrooms it contains. Home values fluctuate based on comparable sales in the area, changes in the neighborhood itself, interest rates, and even the time of year. What counts as context when it comes to pricing a home? The seller and buyer are the ultimate arbiters of that. Yet professionals—realtors, lenders, researchers, developers, and more recently, information technologists and designers—seek to influence perceptions of context by sellers and buyers of housing.

Today, context for home value is increasingly assessed through data. Although the housing crisis of 2007 raised important questions about the way we finance housing in the United States, it has failed to raise parallel and necessary questions about the way we use housing data. I intend to address some of those questions here, asking, How are housing data presented by commercial interfaces, and how do those interfaces shape perception and action in public life? Zillow takes input from public and private sources, such as tax assessments and sales records, in nearly every municipality in the United States. It uses these resources to shape, as much as any other commercial entity, the context in which nonexperts understand housing. Through a combination of visual, discursive, and algorithmic processes, Zillow demonstrates a range of ways for

recontextualizing data. Moreover, I will show that the frames through which we examine such data have serious implications for the future of affordable housing. For this reason, it is necessary to reconsider the settings through which we look at, talk about, and calculate value with housing data.

Before I delve into the specific elements of the Zillow interface, however, I would like to examine what context means in relationship to data. Although the term is widely used in both academic and popular writing, its relationship to data is still being worked out.[17] My use of the term differs substantially from other uses prevalent in the study and design of information systems.

MODELS OF CONTEXT

"Let the data speak for itself": this advice comes from my colleagues in the field of information visualization (often using the term *data* in the singular, to my chagrin). Their suggestion concerning the design of interfaces to data seems responsible and even respectful. It honors and personifies the data. The sentiment is one that I hear everywhere in academia.[18] It is also prevalent in industry and public policy.[19] But I believe that the statement deserves a degree of scrutiny.

What does it mean for data to speak on their own behalf? Like other technological platitudes, the phrase contains several unexamined implications.[20] First, the statement treats data as an autonomous participant in conversation with humans. Second, it indicates that what data say is self-evident, requiring no interpretation. Third and more subtly, it suggests that data are currently marginalized and only need to be given an opportunity to speak.

And yet these conceptions of data do not fit with our everyday experiences. We see data using sophisticated visualization tools (that is, maps, timelines, graphs, and charts). Data are framed by a variety of discourses. And finally, data today hold a privileged place within contemporary scientific, business, and policy deliberations.[21] Indeed, imagining that data need to speak for themselves requires ignoring the various contexts in which we encounter data.

In response, some social researchers encourage us to "put data into context."[22] In particular, social scientists argue that the right context is crucial to understanding big data, which has frequently been uprooted from different places and times.[23] But this advice can be unclear as well. The commonplace definition of *context* in the *Merriam-Webster* dictionary is "the circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood." Yet this does little to illuminate how we might determine the right context for data. I contend that context isn't self-evident or ready-made; it must be assembled through practices grounded in preexisting knowledge systems. Context for data is operationalized in the form of an interface, focused on producing specific interpretations of data.

My operational perspective on context differs from the dominant modes by which context is accounted for in information systems.[24] Paul Dourish, a theorist of human-computer interaction, sums up the prevailing views in his article "What We Talk about When We Talk about Context." Although he writes specifically about definitions of context in ubiquitous computing, an area of research that explores the potential for computers to be distributed throughout the range of human environments, these same uses of the word can be found in discussions of data. Dourish juxtaposes a "representational" model of context, pursued by the majority of researchers in computing, with an "interactional" model, grounded in phenomenological inquiry, an area of philosophical thought centered on understanding individual human experience.

Dourish explains that in the representational model, context is a form of information or data, which is easily delineated, stabilized, and separated from the subject itself. Representational context is "a set of features of the environment surrounding generic activities ... [that] can be encoded and made available to a software system."[25]

Meanwhile, in an interactional model, writes Dourish, "context isn't something that describes a setting. It is something that people do."[26] As such, the context of any event or object can vary enormously depending on whom you talk to and when. Interactional context is relative, dynamic, spontaneous, and arising from activity. This differs from representational context, which is objective, static, and independent of interpretation. In order to avoid further confusion over the term, Dourish suggests that technologists leave aside the notion of context altogether. Instead, why not think about *practices* as the forming the settings for human interactions with computers?

That is exactly what I intend to do. Contextual practices, though, are not something that emerge spontaneously in an unselfconscious moment. Rather, such practices should be understood within culturally embedded knowledge systems, composed of inherited roles, concepts, and technological affordances.[27] In an interface, the practices that give data context are often codified as processes: visual, discursive, or algorithmic. Although an interface does not determine the way that data are used, it provides a procedural setting that shapes the roles and ways of knowing available to users. Clifford Geertz puts the relationship between context and culture as follows: "Culture is not a power, something to which social events, behaviors, institutions, or processes can be causally attributed; it is a context, something within which they can be intelligibly—that is, thickly—described."[28]

As mechanisms that establish the context for data, interfaces might be thought of as what Finn terms *cultural machines*—established and maintained through processes that are consciously designed to secure the value data and benefit particular audiences.[29] A dispute over the context of data is a disagreement over their meaning, but also their use: Who can access the data and to what end? In order to make sense of these three models of context—representational, interactional, and operational—consider a thought experiment used by Geertz.[30]

Three students are engaged in a seemingly identical action: momentarily contracting their eyelids on one side. For the first student, the action is involuntary—a twitch. A second takes an intentional action in response to the first, thinking that they are returning a wink. Finding humor in this exchange, a third student parodies the wink. Now suppose we only know about these events through data that document each eyelid contraction in the same way. Only by identifying the context—the knowledge system in which this series of actions unfolds—can we hope to understand the meaning of the eyelid contraction data: that they represent a twitch, wink, parody of the wink, and even undocumented cases of wink abstention.

Each of the various models of context introduced above would seek to put the data in context differently. A representational approach might take all available data describing the setting, such as geolocation, temperature, arrangement of students, and time, as the context for any single eyelid contraction. In contrast, following an interactional model would mean questioning whether these preexisting details are relevant. More likely, an interactional approach would entail supplementing the eyelid contraction data with accounts of context directly from the students who were there, perhaps from interviews. But looking for the operational context means something more: learning about the encompassing student culture in which various eyelid contractions and noncontractions take on meaning. After all, these students didn't invent the concept of winking.

An inquirer interested in operationalizing the data on winks would investigate structural questions. What kind of body language do students use to communicate? And what sorts of messages does that language privilege? Moreover, how can it be made accessible to outside observers? Indeed, defining the context in operational terms has a goal: it would allow one to not only analyze a series of eyelid contractions but also participate in their exchange and even take appropriate action (that is, suggest that the student with a twitch go to the doctor, and direct the one parodying to student theater). Although Geertz does not use the term *operational* in his assessment of this imagined event, his analysis falls along similar lines. He once again explains what culture means, yet this time in terms of eyelid contractions: "A stratified hierarchy of meaningful structures in terms of which twitches, winks, fake-winks, parodies, rehearsals of parodies are produced, perceived, and interpreted, and without which they would not … in fact exist, no matter what anyone did or didn't do with his eyelids."[31]

In short, an operational context for data is a culturally defined setting in which participants are equipped with the resources and subject roles necessary to access, interpret, and take action on predetermined objects of attention. Although to put it that way is to suggest that cultural context is something settled and uncontested. That is not the case. Contexts that operationalize data are always under construction. Furthermore, disputes over context are common, sometimes with striking significance, as the case of Zillow reveals.

The design of interfaces is more than a means of communicating wink data. In a domain like housing, interfaces can have the highest stakes. Thus we must ask, What does an interface enable? For design is not just an issue of knowledge but of use too. We should consider how interfaces are rooted in normative cultural assumptions about what data can and should do. Data don't speak for themselves, any more than an eyelid contraction does.

In Zillow, data are processed for the user in three distinct ways: visual, discursive, and algorithmic. The visual context of Zillow is defined by the functionality of its map. Placing data on a map enables comparative reasoning, but only about things that have been given a geographic dimension. Zillow's main discursive context is that of "public data." Data in the public realm are increasing accessible, but at what cost? Finally, Zillow uses an automated valuation model, the "Zestimate," to further contextualize data. This algorithmic context offers an interpretation of data, but through a set of opaque and speculative rules. These three dimensions of interface are less about establishing the (capital *T*) truth of data on property values than about creating traction with users.

THE ANATOMY OF A FRICTIONLESS INTERFACE

> Shopping for a home was like being in a dark room where only the agent was holding a flashlight. She'd shine it on two or three homes—listings or "comps" she had chosen for you—but all you wanted to do was grab the flashlight and wield it yourself. Or, better still, just flip on the darned light switch to see it all. That's why we created Zillow: to turn on the lights and bring transparency to one of our country's largest and most opaque industries.[32]

Zillow is a leading online real estate marketplace seeking to redefine the context in which we understand housing by creating access to and avenues for action on data. The name is a portmanteau created by combining the words *zillion* and *pillow* (where you rest your head).[33] Zillow was founded in 2006 by Spencer Rascoff and Stan Humphries with the goal of estimating the value of every home in the United States. It is not a licensed real estate firm, which would require the company to submit to licensing rules and regulations in every state where it practices.[34] It has strategically intervened into the real estate market, however, in a way that has changed the work of many realtors and other professionals in the industry.

Trent, the Intown real estate agent who helped my partner and me find a house, confronts an uncertain outlook for his job. How can he continue to justify the cost of his services (commission in Metro Atlanta is typically 6 percent) at a time when almost anyone can access listings for sale and rent online? "I can't hold data hostage," he jokes. But Trent's situation is serious—one he equates with the circumstance of the travel agent a few decades ago. Orbitz, Travelocity, and Expedia, among others, have all but put an

end to that vocation. "In the past, someone needed my services," Trent recalls of his early days in the business just ten years ago. "Buyers and sellers wouldn't know what houses were on the market without agents." Today Trent must find leverage elsewhere. It is no longer access to data that realtors provide, he argues. Rather, it is context: "the context necessary to understand what it might be like to actually live in a neighborhood or an apartment complex." From Trent's perspective, new points of access to data are not going away. Yet local agents will try to market their own understanding of context for data—one that is intentionally juxtaposed to Zillow's ten-thousand-foot view from above.

Zillow is not the first web company to tread into real estate.[35] Moreover, its way of operationalizing data is not original or unique. It is just one of the many data brokers that seek to produce surplus value from available data on housing.[36] Still, Zillow's recent purchase of Trulia—another major platform for home listings focused more on user experience than analytics—has consolidated its position as a market leader in the United States.

As a representative explained during a routine webinar I attended to learn more about Zillow, the company's unofficial motto is "data wants to be free." This may seem a laudable, emancipatory goal. In addition to echoing the earlier sentiment "Let the data speak for itself," it recalls the famous statement "information wants to be free," expressed by the iconoclast Stewart Brand.[37] But data are never free, only recontextualized. Zillow presents data in a new setting defined by the processes underlying its interface: visual, discursive, and algorithmic. Indeed, Zillow offers important lessons on how to put data in context. Its approach should give us pause, though, for it demonstrates that interfaces are not neutral.

Zillow is invested in furthering the culture of real estate by creating a seemingly rational, economic setting in which individuals are given access to information and encouraged to make choices based on their own self-interests. The effects of this setting are damaging in ways that Zillow obscures. For although users may believe that they are independent actors, the demand they place on the market works to increase the value of all property in their area and limit the availability of affordable options. As I will show, Zillow not only supports a market-based approach to property but also works to increase anxiety among its users by emphasizing instability in the market with its Zestimate algorithm. Let us unpack all three dimensions of Zillow's interface to understand how they are constructed, and their effects on both data and housing.

The Visual Dimension

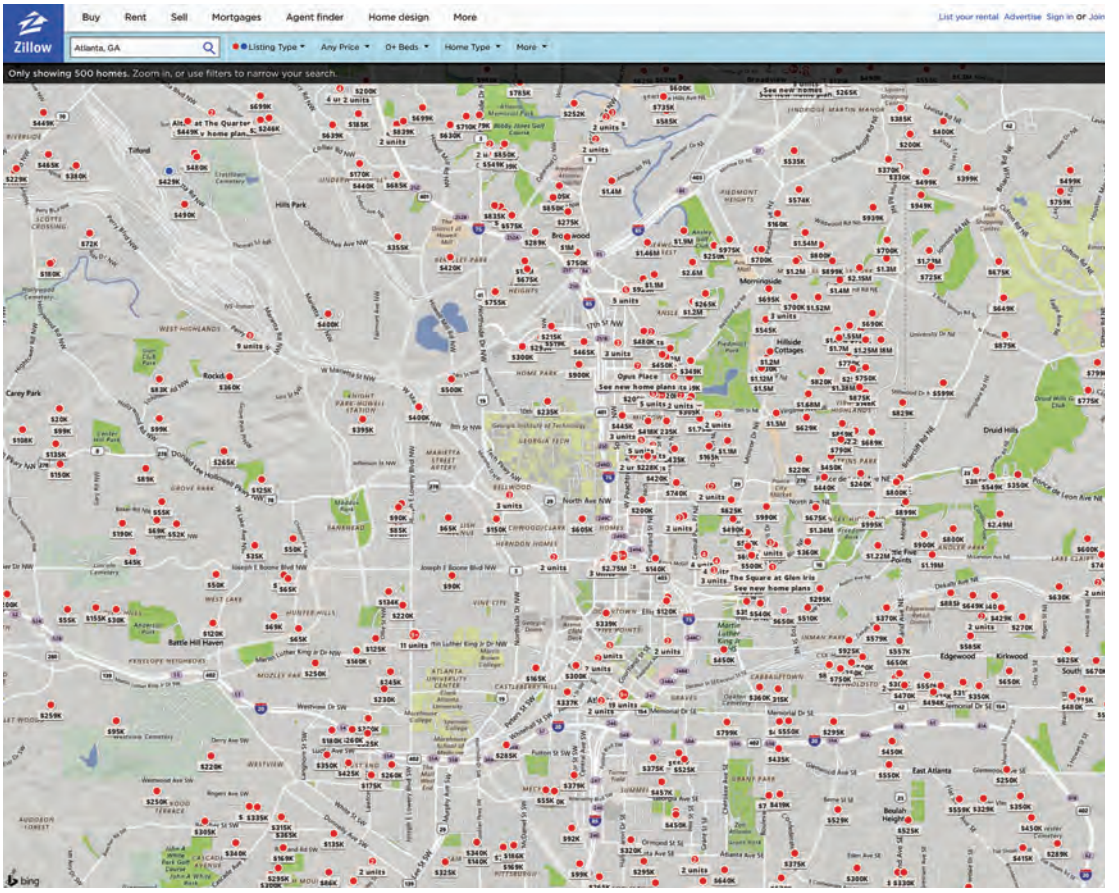
For Zillow, putting data in context starts with positioning them on a uniform map (figure 5.2). Properties for sale, for rent, or otherwise of interest (that is, foreclosure or a category simply labeled "make me sell") appear as colored dots on a faint, gray background showing a network of streets, parks, bodies of water, and place-names.

Hovering over a dot brings up a tag including a small thumbnail image, price, number of bedrooms and bathrooms, and square footage. This intentionally generic setting—the same everywhere across the geography where Zillow lists properties—frames our understanding of housing data not by showing the conditions of their production (representational context) or how they might have been used in the past (interactional context) but by suggesting what can be done with them today. The map is operational.

A venerable technology for visual reasoning, maps are recognizable and accessible to most of Zillow's users.[38] They offer a structure for making sense of data through spatial patterns; they show where the listings are located. This enables comparative readings of listings (that is, "these listings are close to one another") as well as readings of each data point within a matrix of surrounding features (that is, "these listings are close to a park"). These are operational relationships, and as such they can serve as the basis for consumer decisions about real estate—a domain in which it is said that the three most important indicators of value are location, location, and location.[39] The map does not merely register the locations of real estate in the real world.[40] Rather, it produces a reading of location using a narrow set of visible relationships (to, for example, select streets, bucolic parks, and highly ranked schools). In this way, the map participates in the production of reality for real estate by establishing or confirming conceptions about what conditions of location determine value.[41] Thus, putting data in the context of the map is not a retrospective practice. The map does not reunite data with some preexisting setting. Zillow's map is operational because it stimulates actionable interpretations of location and its implications for home value.

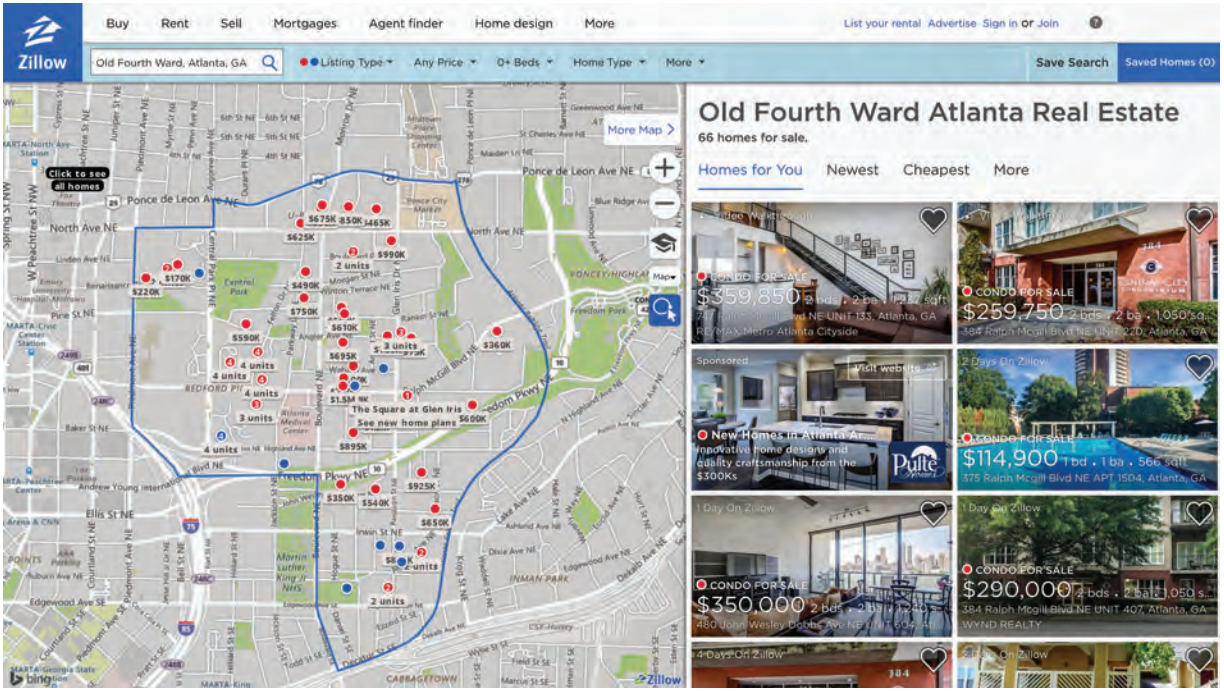
But maps do not "unfold" in isolation.[42] Zillow's map is framed by other media and modes of access to the underlying data (figure 5.3). Above the map is a search bar with filters for listing type, price, number of beds, and more that can be applied to further narrow the number of listings displayed. To the right of the map is a column of property images, mostly facades. Each is annotated with more details about individual listings such as the number of days it has been on Zillow, the name of the listing agent, and the type of sale (house for sale, preforeclosure, or lot/land for sale).[43] These images can act as links to a full-screen view of an individual listing (figure 5.4).

The additional elements of the Zillow interface serve to put the map itself in relief. They help users interpret the map as a collection of commodities: locations valued because of their potential to be bought and sold, not because of their historical significance as places or the circumstances of the people who currently live there. The visual elements of Zillow's interface illuminate a number of things: which data points matter, the relationship between the points, the meaning of the space in between them, and the connection between data and any secondary media.



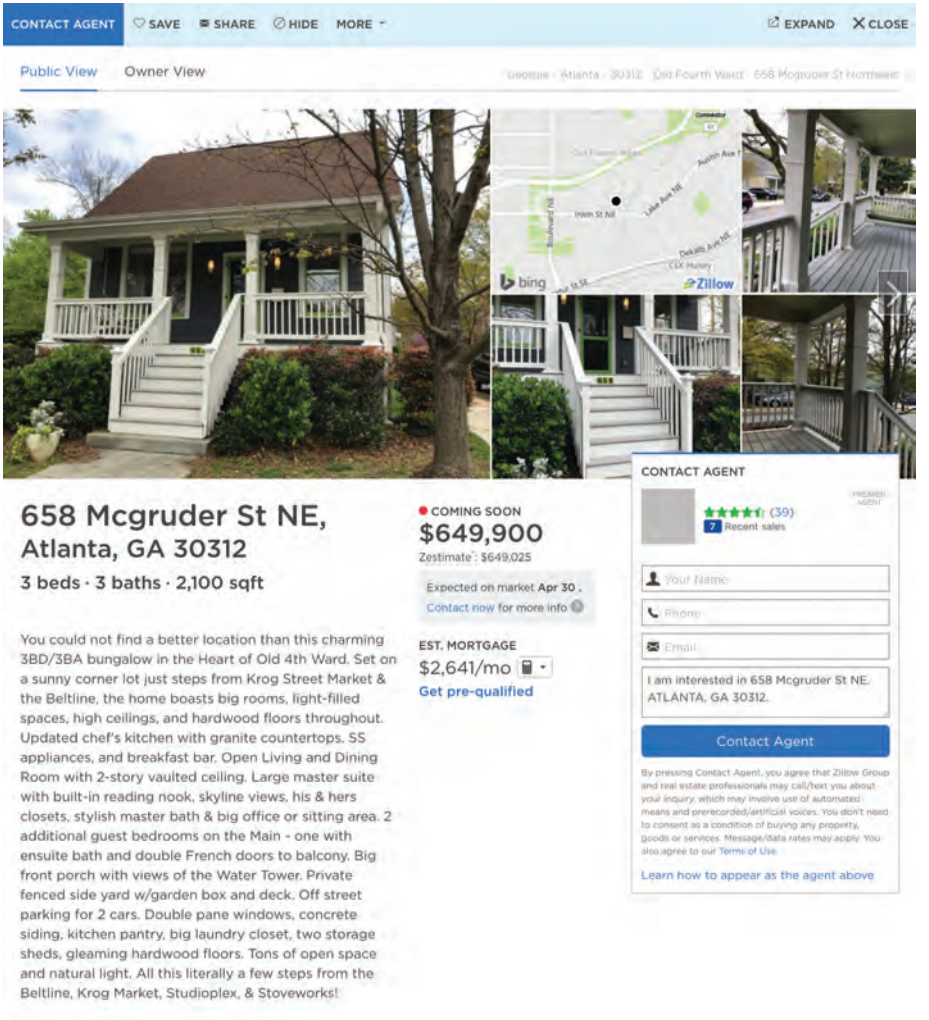
5.2

Intown Atlanta, populated by home listings, as depicted on Zillow's map.



5.3

The Old Fourth Ward neighborhood of Atlanta as depicted on Zillow's map.



5.4

A single home listing from the Old Fourth Ward neighborhood of Atlanta, as seen on Zillow.

The Discursive Dimension

Beyond the setting established by Zillow's map, the company's interface also suggests the terms by which users should talk about housing data. These discourses serve to establish and stabilize Zillow's use of data as a legitimate representation of the world of real estate. Indeed, discourses define what can and cannot be comprehensibly said about a subject.[44] Among the most important discourses used by Zillow is that of *public data*.[45] In a list of frequently asked questions on its website, Zillow explains *public information* (a related but more expansive term than *public data*) as the way and reason that it knows things about your house: "Zillow receives information about property sales from the municipal office responsible for recording real estate transactions in your area. The information we provide is public information, gathered from county records."[46]

The term *public* tells users that Zillow's map is based on data from an open and authoritative source: the municipal office in their area. This legitimizes both the data and Zillow's use of them. For although Zillow operates outside the boundaries of any particular municipality (remember it is not licensed anywhere), it is making fair use of data created by and for the people. Moreover, invoking the public context of these data protects Zillow from requests by homeowners to have them removed from the site. After all, these are not private data. And though—as the reader might come to expect by now—Zillow acknowledges that municipally created data may contain local contingencies, such as skewing effects or errors, the company takes no responsibility for those. It is up to homeowners to show proof of anomalies that might affect public perceptions of the value of their own house. Ironically, all these assertions about Zillow's rights with respect to the data are wrapped in the language of public empowerment: "Our mission is to empower consumers with information and tools to make smart decisions about homes, real estate, and mortgages. For this reason, we do not remove public record property data from Zillow unless it is shown to be erroneous."[47]

Beyond its discourses on public sources, Zillow also cultivates a perception of its map as a virtual public space and invites contributions of data from private sources to be made broadly accessible. There are two ways that this can happen: realtors can contribute their own listings—and pay a fee to have their profiles promoted in association with those listings—or owners can contribute "house facts" in order to improve the online image of their property. As one real estate technologist remarks, "If you are able to give people a real-time value of their home, they are going to check that value and ask: what can we do to update that value? The Zestimate [Zillow's algorithm for predicting property values] is a powerful consumer engagement instrument."[48] By making its database open to public reading as well as public writing, Zillow fashions itself as the "Wikipedia of housing": a democratic, free, and transparent context for sharing data publicly.[49]

In tension with the discourses on public data and public space is that of a personal journey. "Find your way home" is the welcoming message on the Zillow front page.

"You are in the driver's seat." The implication is that Zillow is a vehicle that can be used in the journey toward homeownership. This second discourse positions the platform as a navigational aid in an individualized search for *home*—a term used as a synecdoche for personal comfort, security, and belonging—through a bewildering landscape of consumer options. While the space of data on Zillow is public, the journey through that space is private and the implication is that it should be guided by individualized interests as opposed to the public good. In this way, the culture of real estate is strengthened.

The result is the creation of a public setting in which—following the flawed logic of digital universalism outlined at the beginning of this book—everyone has access, but no one is equal. Users come to the map with different resources for buying, selling, or renting, and Zillow lets them know right where that places them. Thus, the discursive elements of the interface define the relationships between people and data: who owns them, manages them, or uses them, and who doesn't, and what stories about the nature of the data justify these attachments and exclusions.

The map, its media annotations, and an overarching discursive framing put Zillow's data in context—one that isn't a reconstruction of the origins of data but rather an operational setting that makes the data actionable. Yet the interface marshaled by Zillow extends beyond these visual and discursive elements. Zillow has been successful in large part because of an additional computational layer of context that it brings to the existing set of housing listings.

The Algorithmic Dimension

Zillow's "rules of real estate" establish the final dimension of its interface that I will discuss.[50] The company not only accumulates data from a variety of sources but also extracts a surplus value from those data in the form of computationally generated predictions. Using the data that Zillow has assembled on sales and historic valuations of homes in a particular area, the company produces estimated values for properties, including many that are not currently on the market. This process of triangulating property values is called an automated valuation model. The outputs of Zillow's model, comically dubbed Zestimates, are generated for nearly every home in the United States.[51] More generally, the algorithmic dimension of an interface is any procedure that enriches data by generating new values based on existing inputs.

At the time of this writing, a Zestimate was calculated for about a hundred million homes nationwide using public data as well as information contributed by realtors or homeowners.[52] The physical characteristics of a home (i.e., its location, square footage, and number of bedrooms) and its past sale prices, as well as the prices of comparable homes nearby, are analyzed using proprietary valuation rules. Instead of relying on a single complex model of the entire US market, Zillow depends on simpler, albeit obfuscated, localized models (sometimes at the scale of a single street) to account for different market situations.[53]

And yet the Zestimate still struggles to account for the contingencies of the data on which it is reliant, such as the politics of tax assessments, dated house details, fake sales, and even false sale prices that are a part of many purchasing negotiations. The Zestimate makes up for its limitations by being dynamic. Home values are discarded every night and built again in the morning using fresh data that incorporate changing conditions.

Highlighting the context that the company brings to existing data, Rascoff and Humphries, the founders of Zillow, argue that it is not the data but instead the Zestimates it extracts from those data that differentiates it from other online real estate sites. The founders claim their Zestimate has a pulse on market conditions in local contexts across the country, and furthermore, that it can make accurate predictions on where the market is headed in the near future. For Zillow, the future is just another discursive element to be marshaled in operationalizing housing data.

The Zestimate is an algorithmic system, explained by anthropologist Nick Seaver as an "intricate, dynamic arrangement of people and code."[54] Understanding it means examining both its technical details and the social practices of its creators. This effort is complicated further by the fact that, like most algorithms, the Zesimate is a closely guarded secret and requires local knowledge to be decoded. Fortunately, we can learn much from simply looking at how it is discursively framed.

Like the map, the Zestimate has its own discursive elements. Users are told, for instance, that it is not meant to replace realtors but rather to connect them (as well as a range of other real estate professionals) to potential buyers and sellers. Take as an example an excerpt on how to deal with the Zestimate written by the company on its site.[55] Zillow's literature invites users who are selling their homes to quickly look past the Zestimate if it doesn't "feel" as accurate and up-to-date as possible. Moving along, sellers should first (no surprise) update their Zestimate by making Zillow aware of improvements to the home that aren't reflected in the "home facts." Next, sellers are encouraged to check the "comps" that Zillow provides—comparable recent sales within the neighborhood in the last sixty days. The market can change rapidly, and a sale six months out may be a poor indicator of what a house is currently worth; this is just an indication of the incredible instability and unpredictability of these values. Then sellers are prompted to think "psychologically" about the sale, such as by using findings from consumer research on the way that "magic" numbers like $299,000 instead of $300,000 can stand out from a cluster of other prices in the same neighborhood. Finally, explains the site, a number of other seemingly external factors might affect your home price including the time of year, interest rates, and job market in the area. Sellers who find all this overwhelming are encouraged to get a comparative market analysis from an agent or even a professional appraisal, which can run from $250 to$400.[56] At each step, sellers are encouraged to put the Zestimate itself into context using feelings, facts, comps, pop psychology, and the general economic climate.

Furthermore, the company talks about the need to understand the Zestimate as part of a social process. A recent public exchange between Zillow and a critic of the company exemplifies this. Realtor David Howell, the chief information officer at McEnearney Associates, calls into question the way that Zillow has intervened in the housing market in an article titled "How Accurate Is Zillow's Zestimate?" He notes that "on average, those 'Zestimates' are within 5 percent of the actual value of a home just half of the time." In other words, Zillow's estimates are "about as good as a coin flip."[57]

Responding to this challenge, Humphries, the "architect" of the Zestimate, weighs in on what he believes is absent from Howell's analysis: context. He says that "McEnearney disparages the fact that less than half of Zestimates are more than 5 percent off from sales prices as 'wildly inaccurate and inconsistent,' without much context as to how that level of accuracy compares to other opinions of value."[58]

Humphries goes on to argue that the accuracy of the Zestimate cannot be evaluated on its own terms—which is another way of saying that the data produced by the Zestimate don't speak for themselves. Rather, Humphries implores, we should understand the Zestimate's accuracy in relation to the accuracy of listing prices set by real estate agents.

> In our eyes, a helpful analogy here is WebMD, the large and popular online health resource. We've all searched online to research our ailments—"what are the symptoms of Strep Throat?"—but then we go to a doctor for a proper diagnosis. We need professionals to help us interpret and treat what anyone with an Internet connection can find in twelve seconds on Google. The doctor's role, then, is a little different, but it's definitely not diminished. The same is true of the real estate agent. Home purchases are infrequent, emotional, and expensive. High stakes command high expertise. But that doesn't mean people shouldn't be armed with the best possible information to help them navigate the process.[59]

Consider what Humphries is suggesting about the context of data analysis: the Zestimate, a computational model, should be understood in relation to other sources of data in a market in which no prediction can be trusted completely. Humphries acknowledges that the Zestimate is often incorrect. The prices set by real estate agents are more accurate. But not by as much as you'd expect, he says. There is a place for automated valuation models, suggests Humphries, as a "starting point for a conversation."[60]

The automated valuation model is not meant to replace realtors but, as I have said, connect them to buyers and sellers; this is Zillow's business strategy. It doesn't depend on the accuracy of its automated valuation model to make money. Zillow makes money on subscriptions from realtors and other professionals, who pay to advertise on the site. This ad-based model of revenue is not unlike those used by other web platforms that host social media including Facebook and Twitter.

In this exchange, we get a contextual explanation of the Zestimate. The model is good enough if it catalyzes a certain kind of social relation between real estate professions and potential clients. Again, we see that Zillow cares less about the truth of data than their tractability: the ease with which they can be used. Considering all this, realtors appear to be the real clients of Zillow—albeit not always happy ones.

Zillow has recently begun to err on the side of pricing homes too low. This has some obvious benefits.[61] For one, it may protect Zillow from accusations of further inflating the housing market. More important, though, a low price will induce anxiety on the part of sellers, making them more likely to, first, contribute additional "house facts" that might bring up the Zestimate, or second, turn to one of the options that Zillow offers for increasing home value: ad-laden advice columns, improvement projects (it can introduce you to a good contractor!), or a relationship with a subscription-paying realtor.

Algorithmic elements of Zillow's interface are a form of what Janet Murray and other digital media scholars call *procedurality*, "the computer's defining ability to execute a series of rules."[62] More specifically, the Zestimate might count as a type of what Ian Bogost labels "procedural rhetoric."[63] Bogost writes about how games can persuade through an expressive system rather than an explanation. To adapt this framework, we might say that the Zestimate, like a game, makes claims about how property values operate. It holds that not only square footage or the number of bathrooms and bedrooms but instead a host of other, sometimes specifically local characteristics are intertwined with value. We shouldn't see this as merely a representational system, as in the case of the persuasive games that Bogost studies. Rather, Zillow is an operational part of the way that the housing market works today. Zillow's rules form a system that homeowners can interact with by updating their home facts or simply checking their Zestimate regularly. Zestimates may be wrong. But it may not matter, if they lure users into a conversation with realtors and other professionals who pay Zillow to stay in business.[64]

In summary, the visual, discursive, and algorithmic dimensions of Zillow's interface work to delocalize data by establishing a new, seemingly generic context for their use. But everywhere Zillow is used, it is creating new local effects and subjects. When you peruse the Zestimates and imagine how you might afford your dream home, when you look for a fixer-upper that you can flip for an easy profit, when you click on the handy "make me sell" button, anxiously considering "how much could I get for my home today?" you become a desiring subject in the culture of real estate. These actions may seem minor. Yet they are incremental contributions to market inflation. And in a specific neighborhood, they can easily lead to speculation on local properties, increased prices, and ultimately the displacement of existing residents who cannot afford to stay. Existing low-income homeowners or renters, who fear being priced out of their local markets, are the invisible subjects of Zillow.

HOUSING DATA IN A CIVIC CONTEXT

The elements of Zillow's interface establish a consumer-oriented setting for thinking about housing data aligned with the culture of real estate. It is a setting in which users can compare housing options, contribute data on their own homes, and begin a conversation about what, based on data, can reliably be predicted about the market for housing. This context is enabling for many prospective buyers and sellers, not to mention the realtors and contractors who want to connect with them. But it is an interface rooted in knowledge systems that privilege self-interest and speculation, while not guarding against the accompanying potential for harm in localized places where its data are made or used.

Zillow's interface isn't the only possible way to recontextualize housing data. One way of discovering alternative contexts is by considering the existing cultures of housing to which Zillow does not connect.[65] As an interface focused on individual choice, it is not a setting in which to think about our collective responsibility to treat housing as a human right. Indeed, Zillow draws attention away from the broader impacts of the housing market.

I would characterize the agenda of Zillow's interface as *consumerist*. An alternative interface might use visual, discursive, or algorithmic elements in order to counter consumerist trends by questioning the property values as well as the social impacts generated by the market. I would call this a *civic* context, revolving around "the use of digital technologies to shape public life for the common good."[66]

Rather than positioning us as individuals empowered to act in a public market, a civic approach to housing data turns away from narrowly consumerist goals. As I will show, it can introduce the timeline as a visual element, gentrification as a discursive setting, and housing policy as an algorithmic frame. Such dimensions of context highlight the public impact of individual action and encourage us to care about the broader community in which we live. This civic context is not a better, more socially conscious version of Zillow. It is a corrective to Zillow; it is a countercontext that can help reshape how we think about and handle property value in the United States.

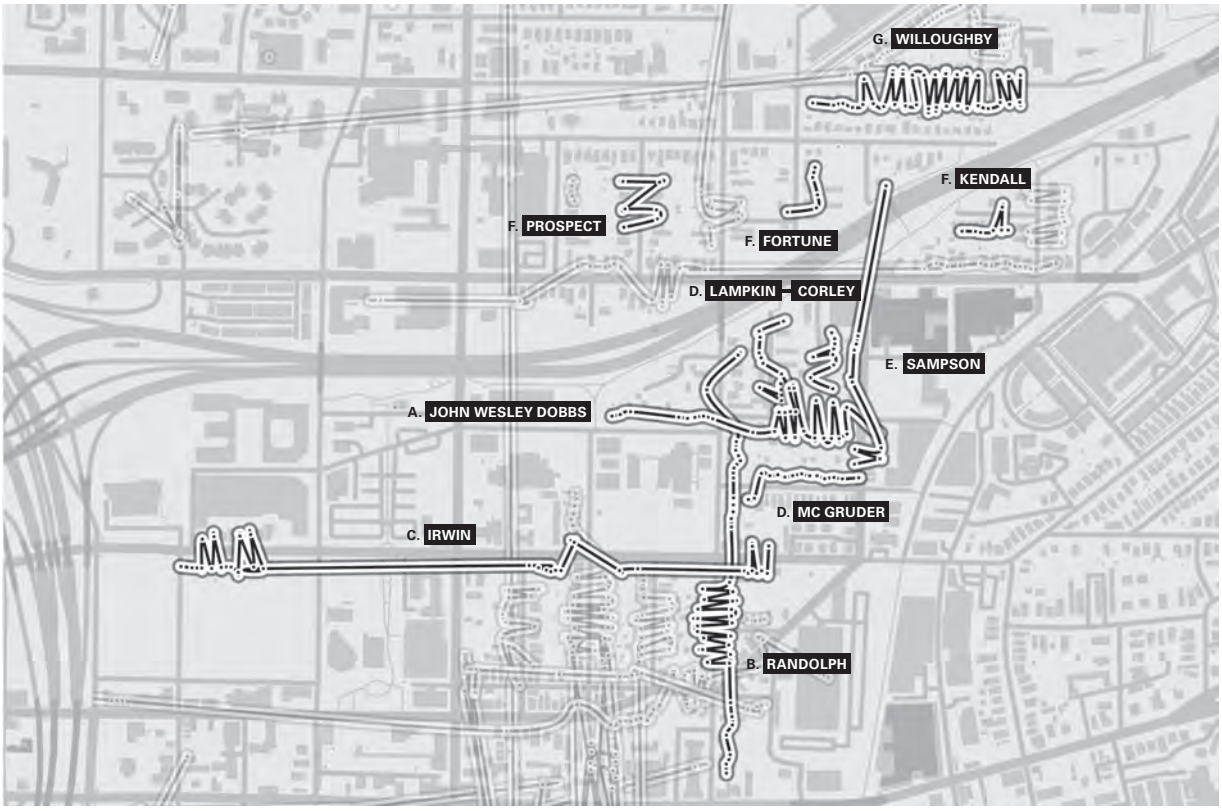
To illustrate the local implications of a civic context for housing data, I will focus on data from neighborhoods on the Eastside of Atlanta, where I live and also work with organizers and researchers who are fighting to preserve as well as expand low-income housing opportunities in Intown Atlanta. These housing advocates seek to understand how new forms of consciousness and new policies might mitigate the negative consequences of the rapid changes that we have witnessed—principally the displacement of low-income and predominantly black communities that have been living here for decades.[67] Atlanta's legacy as a "Black Mecca" is increasingly under threat.[68]

The dimensions of context introduced below frame housing as an issue that transcends its depiction in the market. Housing shapes the composition of our communities—racially, culturally, and economically—as well as access to resources, such as

education, jobs, and transportation, not to mention a healthy living environment. Housing has a long and painful social history in Atlanta: from whites-only "park" neighborhoods built during Reconstruction, to civil rights era redlining policies that prevented people of color from acquiring mortgages, to the recent demolition of historically black neighborhoods on Atlanta's Westside so as to make way for hedonistic sports stadia.[69] Even today, the city is one of the most segregated and economically unequal in the United States.[70] Could an alternative interface, composed of visual, discursive, and algorithmic elements that enable civic operations on data, help reveal the downsides of the current trajectory of development in Atlanta?

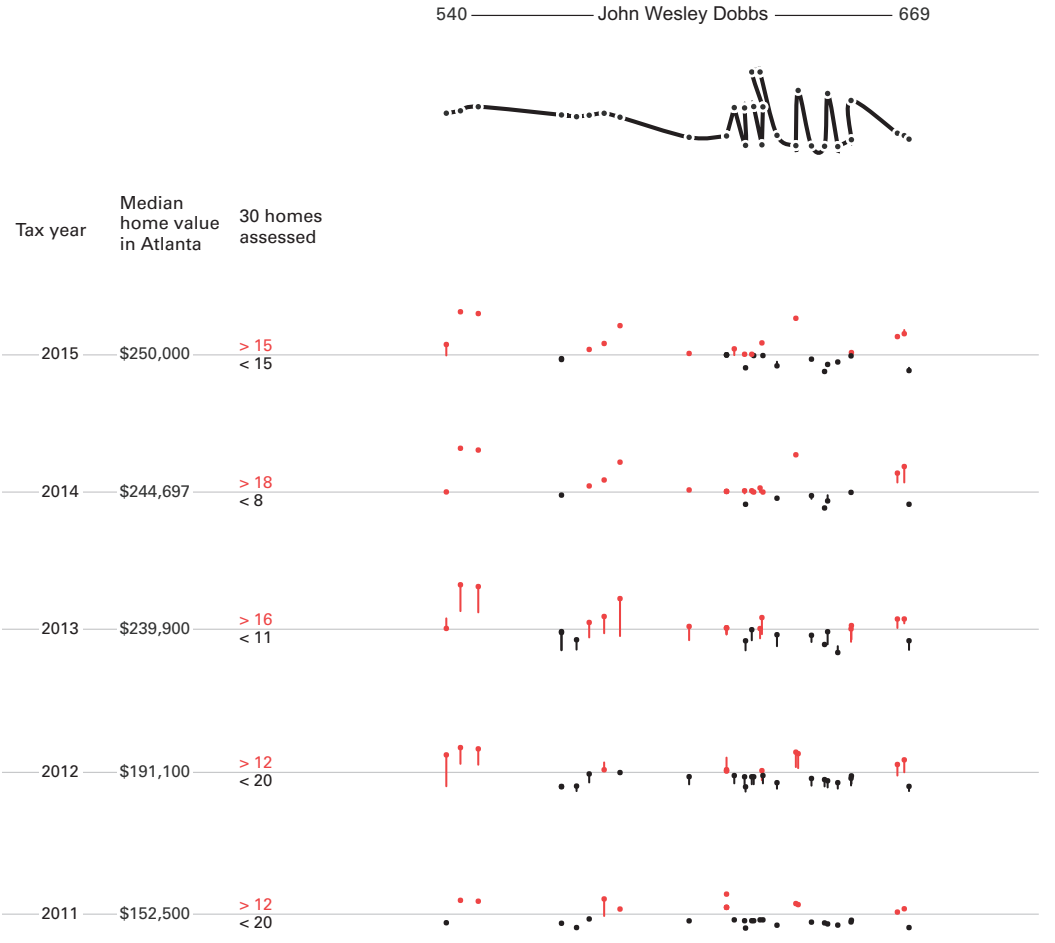
Let us start with a different approach to visualizing housing data. Zillow offers the map as an accumulation of currently available purchasing options. In doing so, it overshadows the question of how that map came to look the way that it does. Visual settings need not be limited to geography, though. A simple timeline can reveal urban change quite dramatically. The images that follow demonstrate how housing data might be put into a visual context defined by temporal relationships.[71] Similar to Zillow's approach, these visualizations rely on publicly available data from the Fulton County tax assessor's office on the total appraisal value for single-family homes in the Old Fourth Ward, a historically black area of Atlanta where Dr. Martin Luther King Jr. lived and is now memorialized.[72] In contrast to Zillow's map, which is addressed to buyers and sellers, this image is for a different audience: a group of organizers in Atlanta collectively known as the Housing Justice League, working to put pressure on policy makers and raise awareness among the broader public. A grassroots, member-led organization, its mission is to "empower renters and homeowners to self-organize and defend their right to remain ... [and] fight to preserve affordable housing, prevent gentrification, and build neighborhood power for an Atlanta-wide housing justice movement.[73]

On Zillow's map, visual space represents geographic relationships. Properties are meant to be understood in terms of their location relative to one another as well as features of the surrounding area considered important for sale value, such as significant roads, parks, and bodies of water. In the images below, visual space is temporal. Thus, I use some of the same data harnessed by Zillow to tell the story of how the Old Fourth Ward has changed over six years from 2011 to 2015.



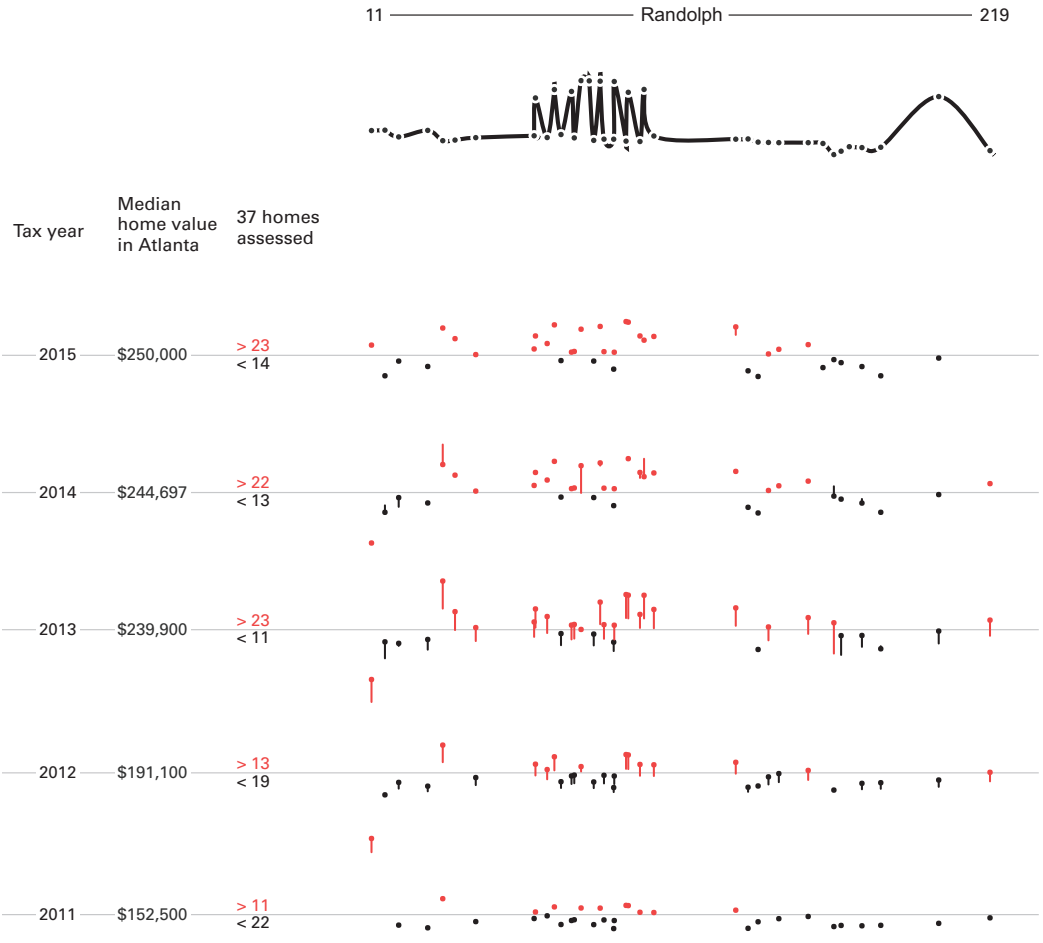
5.5

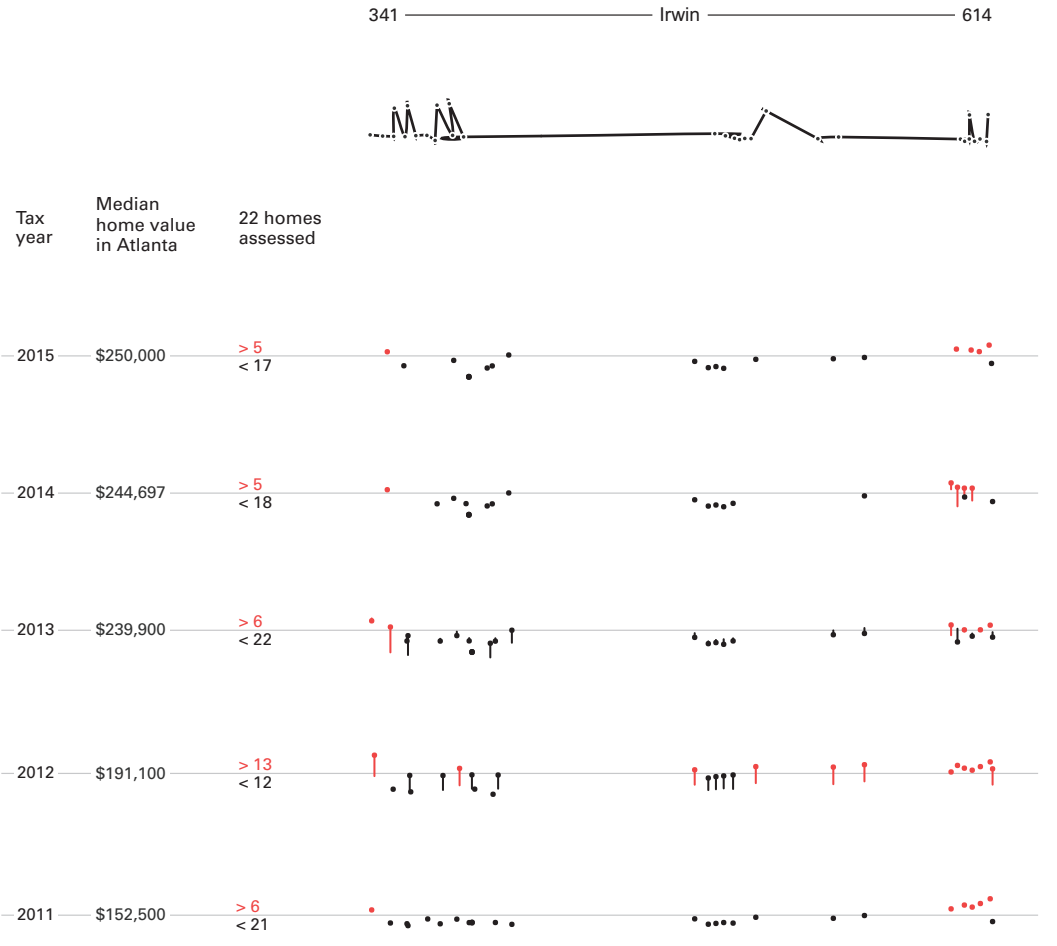
Map of streets in Atlanta's Old Fourth Ward used in property value timelines. Image by the author and Peter Polack.



5.6

Property value timelines. Image by the author and Peter Polack.





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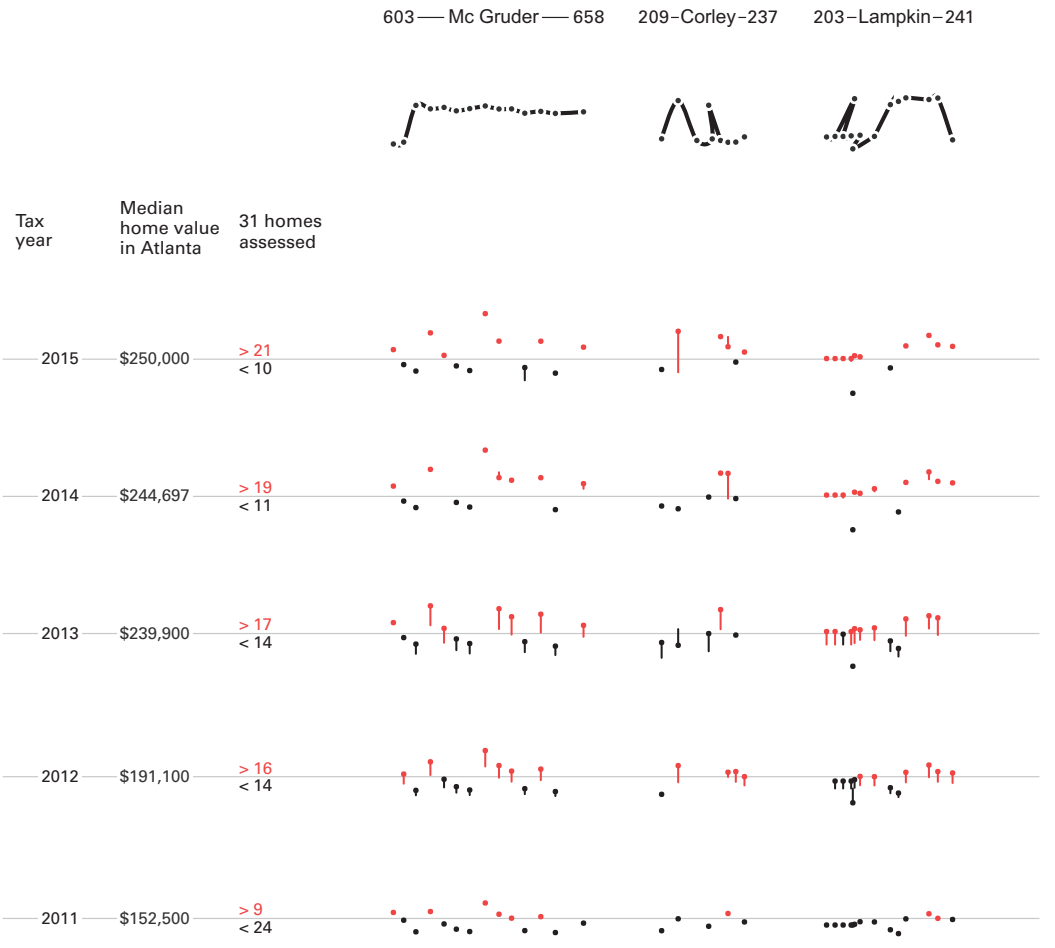
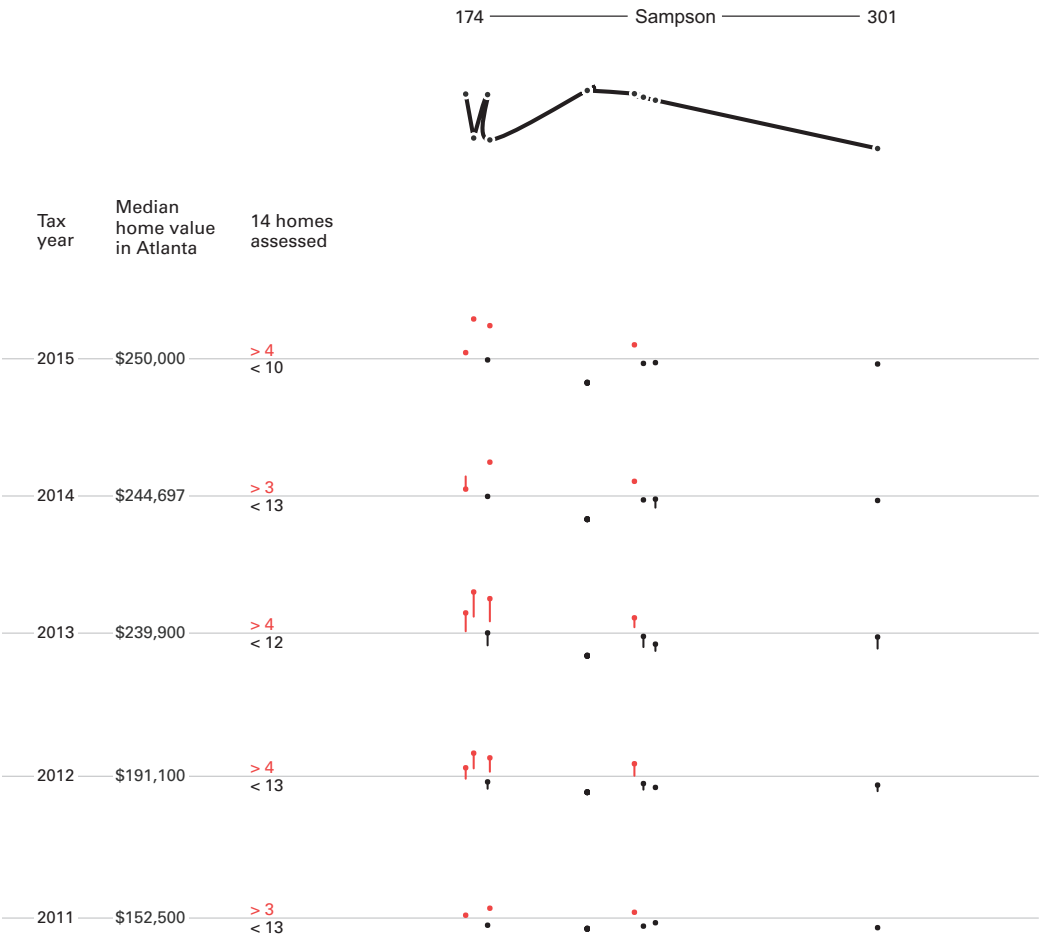
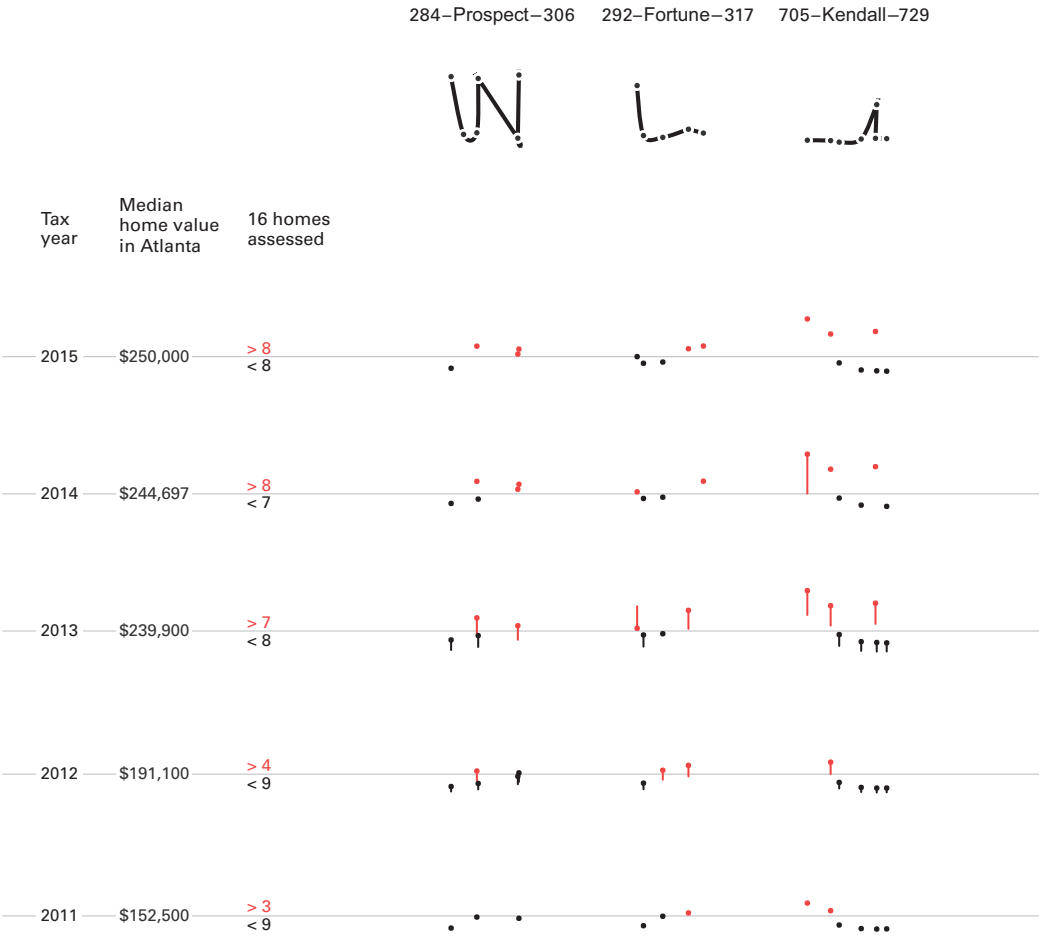




5.6 (continued)



5.6 (continued)

The preceding images are meant to be read as a grouping. The first is a map of the Old Fourth Ward. Here, property data from Fulton County tax assessments have been geolocated, then connected and labeled by street. The lines created by connecting each property do not follow the physical path of the streets. Instead, I think of each line as a signature for the street. These may look strange, but I've found them helpful as graphical references that can be easily used to identify and differentiate the streets. In subsequent images, each street is broken down into a set of graphs that track changes in the assessed value of individual properties. Because of their size and the way that they are juxtaposed with one another, such graphs are sometimes referred to as *small multiples*.[74]

Each small multiple displays all the properties on a single street and how they have changed in value from the previous year, according to tax assessment data.[75] An individual mark represents a single-family home, where the number of "living units" on the property is one. There are also multifamily homes and even a few large-scale apartment complexes in the Old Fourth Ward, but these don't appear on the graphs for the sake of simplicity. Instead, the graphs tell a subset of the larger story.

A node at the terminus of each mark indicates the price assessed during that tax year. The length of each mark represents the relative change in price since the previous year. Running horizontally across each graph is a thin gray line representing the median home value in the city of Atlanta during a single year. The median is the middle value in a list of all property sale prices in Atlanta, not just those in the Old Forth Ward (that is, value number fifty out of a hundred values).[76] Marks that surpass the horizontal line are properties valued above the median. Defined simply in terms of their market value, these are within the top half of all properties in the city. The marks are also color coded to reflect this division: red represents property values above the citywide median, and black represents property values below.

For example, there were thirty-seven properties assessed along Randolph Street in 2015 (figure 5.6). On the 2015 graph for Randolph, the distribution of property values is twenty-three above and fourteen below the city median. In this year, Randolph was in line with other markets across the city. But it wasn't always this way. The 2011 graph for the same street depicts a different pattern. There were only thirty-three properties; eleven properties were above the city median, and twenty-two were below. The additional four properties in 2015 are probably a result of parcel subdivision and new construction. These additions further indicate a growing market. Each figure in the overall set presents a different street in the Old Fourth Ward and the changes in assessments it has seen.

One more note about the locality of this data: the earliest assessment in these graphs is from 2011 because in that year housing prices finally began to stabilize after a period of wild fluctuation due to the 2007 housing crisis. In fact, the Fulton County assessor's office had a moratorium on assessments in 2008, 2009, and 2010 intended

to hold values in place during the "great recession." The market value assessment in 2011 was the first in four years. The data set used above is just one example of the numerous county-level records that Zillow draws on in order to assemble its platform. The moratorium underscores a point, made throughout the book, about how data are shaped by local conditions. Only by understanding such data as a composite, created in disparate conditions, can it be leveraged responsibly.

Beyond conveying the local attributes of housing data, this exercise is meant to show that context matters. By taking home values out of a geographic setting and putting them into a temporal context, the images above open up new questions about possible operations that can be done with housing data—questions that start by recognizing that the Old Fourth Ward is a neighborhood in transition. What does it mean to purchase a house in this neighborhood? Who is moving in, and who is moving out?

In order to address these questions, I want to offer an alternative discursive setting for thinking about the rapid change in home values. *Gentrification* can be characterized by a variety of effects: rising home values, the cost and availability of local services, and the overall availability of low-cost housing.[77] Through the discourse of gentrification, rising home values in a neighborhood can be understood in terms of the displacement or marginalization of low-income residents, with consequences on their employment, relationships, and even health.[78] The new affluent members of the neighborhood—the "gentry" in gentrification—might invite high-priced restaurants and stores, inaccessible to the previously existing residents. Finally, a loss of affordable housing overall can be seen as a major cause of declines in social and economic diversity.[79]

Such changes are unfolding across Intown neighborhoods in Atlanta. Affluent home sellers are not unaware of these changes, and indeed stand to benefit from them. Their language, captured in the text of home listings on Zillow, often frames changing prices as an opportunity rather than a danger. Although these listings do not use the term *gentrification*, they gesture to related patterns in the market.[80] Some listings emphasize a newfound stability: "Excellent location in *established* neighborhood but with all the modern conveniences and finishes of a new home" (emphasis added). Others sell the transformation: "This authentic urban loft in *hot* Reynoldstown boasts soaring ceilings, concrete floors, brick walls, skylights & amazing open space!" (emphasis added).[81]

These discourses do not merely reflect market conditions; they are an operational component of how the market acts through data. Actively celebrating or guarding against neighborhood change in online discourses is a well-studied part of gentrification.[82] These discourses have real consequences: welcoming more wealthy residents into the neighborhood, putting pressure on low-income residents to somehow conform to a new normal or leave, and drawing attention from speculators, which can raise the home values in a neighborhood even further.

The discourse of gentrification introduces alternative ways of thinking about the potential impacts of changing home values in a neighborhood. Nevertheless, discourse

alone does not make data actionable at a structural level. Policy depends on algorithm-like rules. For example, tax assessments are a result of algorithms: rule-based procedures that take existing data as inputs. Consider this description from the Georgia Department of Revenue of how property taxes are calculated:

> The assessed value—40 percent of the fair market value—of a house that is worth $100,000 is $40,000. In a county where the millage rate is 25 mills (1 mill = $1,000 of assessed value) the property tax on that house would be $1,000; $25 for every $1,000 of assessed value or $25 multiplied by 40 is $1,000.[83]

This is the language of procedure. It is one of many algorithms involved at the level of policy. At around $300 for a custom "fee" appraisal, the county can't afford to independently assess the value of every home. It instead relies on comparable sales to calculate the "fair market value" of every home as well as the associated tax bill. These "mass appraisals" depend on techniques similar to those employed in Zillow's Zestimate.[84] As home valuations increase in a neighborhood, algorithms dictate that so do taxes, regardless of what the owner originally paid. For homeowners, rising home values often mean a larger tax burden. Thus without intending it, when my partner and I bought a home in a market with rising prices, we increased the cost of living for our neighbors.[85] If they can't pay their new bills, they may have to leave, willingly by selling their homes, or forcibly through eviction or foreclosure.

There are a few ways to reduce the property tax burden of individuals. These are algorithmically determined as well. Rules govern the conditions under which your taxes might be adjusted. For instance, if you live in your home (a rule-based determination), you can apply for a homestead tax exemption:

> The home of each resident of Georgia that is actually occupied and used as the primary residence by the owner may be granted a $2,000 exemption from county and school taxes except for school taxes levied by municipalities and except to pay interest on and to retire bonded indebtedness. The $2,000 is deducted from the 40% assessed value of the homestead.[86]

This only applies to a portion of a home's value. Beyond the initial exemption, homeowners are unprotected from tax increases. There are other exemptions based on age, but nothing at the time of this writing related to income, at least not in the local context of Georgia.[87] Finally, you can contest the county's appraisal of your home's value if you follow a set of predetermined procedures. But learning about and taking advantage of these tax relief measures takes time as well as resources that not everyone has.

All these regulating algorithms contribute to the complex civic context for thinking about and acting on housing data. Understanding the broader impact of these rules is not easy. Some argue that the homestead exemption act—originally instated to support

homeownership—shifts the burden of taxes, necessary for schools and other local services, to those who can't afford to buy. Landlords, who aren't able to claim the exemptions themselves, routinely transfer the rising cost of taxes directly to their tenants.

In response to this regulatory setting, some organizers and researchers are fighting for more renters' rights.[88] Organizers at the Housing Justice League work with renters in Atlanta, mostly people of color, who have been priced out of the communities that they grew up in. They have recently completed a major public report on gentrification and its effects in Intown Atlanta.[89] May Helen Johnson, an elderly low-income resident profiled in the report, expresses concerns about two new large-scale developments near her home: the Mercedes-Benz Stadium, home to the Atlanta Falcons and United FC, and the public-private infrastructure project known as the Atlanta BeltLine.[90] What will they mean for her community?

> With the stadium on one side and the BeltLine on the other, it feels like we're being compressed between these two giants and my thing is what are they gonna bring to the neighborhood, what are they gonna offer us? Are we gonna be able to stay in the neighborhood or are we gonna be able to rent, to buy, to play, to stay, to worship in the neighborhood?

What would it take to enact regulatory policies in Atlanta that protect low-income residents from the inevitable outcomes of a market on the rise? "A crisis is hitting renters. We need data to declare a renter's state of emergency," the organizers explain.[91] Their policy suggestions include procedurally driven tax relief for developers who are willing to build and maintain low-income units.

The same organizers argue that a critical reading of existing data isn't enough to change the tide. They are amassing counterdata to fight gentrification. Organizers contend that "we need data on how many people are being displaced. We need data on their mental, emotional, and physical health. Who's being displaced and what is the consequence of that? We need data to show that there is mass displacement that is causing great suffering."[92] Together, organizers and residents from gentrifying neighborhoods across the city are working to fill in the missing context, which shows that the effects of the 2007 housing crisis have not abated.

As a contribution to the Housing Justice League report, I worked with students from Georgia Tech to create an online interactive map that displays this sort of counterdata (figure 5.7). The map visualizes demographic indicators of gentrification identified in the report—percent change in median income, college education, and "white share" of the population—for neighborhoods (defined by census tracts) along the current and proposed path of the Atlanta BeltLine, which is currently under construction along a loop of disused railroad tracks that circumvent the city, stitching together some of its most historic neighborhoods.[93] The last of these indicators suggests (inversely) how many people of color have been displaced from an area. The squares on the map represent

census tracts along the BeltLine: red denotes an increase in the indicator selected, and blue shows a decrease. The squares in gray represent other tracts in the surrounding county. For individual neighborhoods, of which the Old Fourth Ward is but one of many, the map is a starting point for a different conversation about the future of Atlanta among Housing Justice League members and other marginalized subjects of housing data in the city.

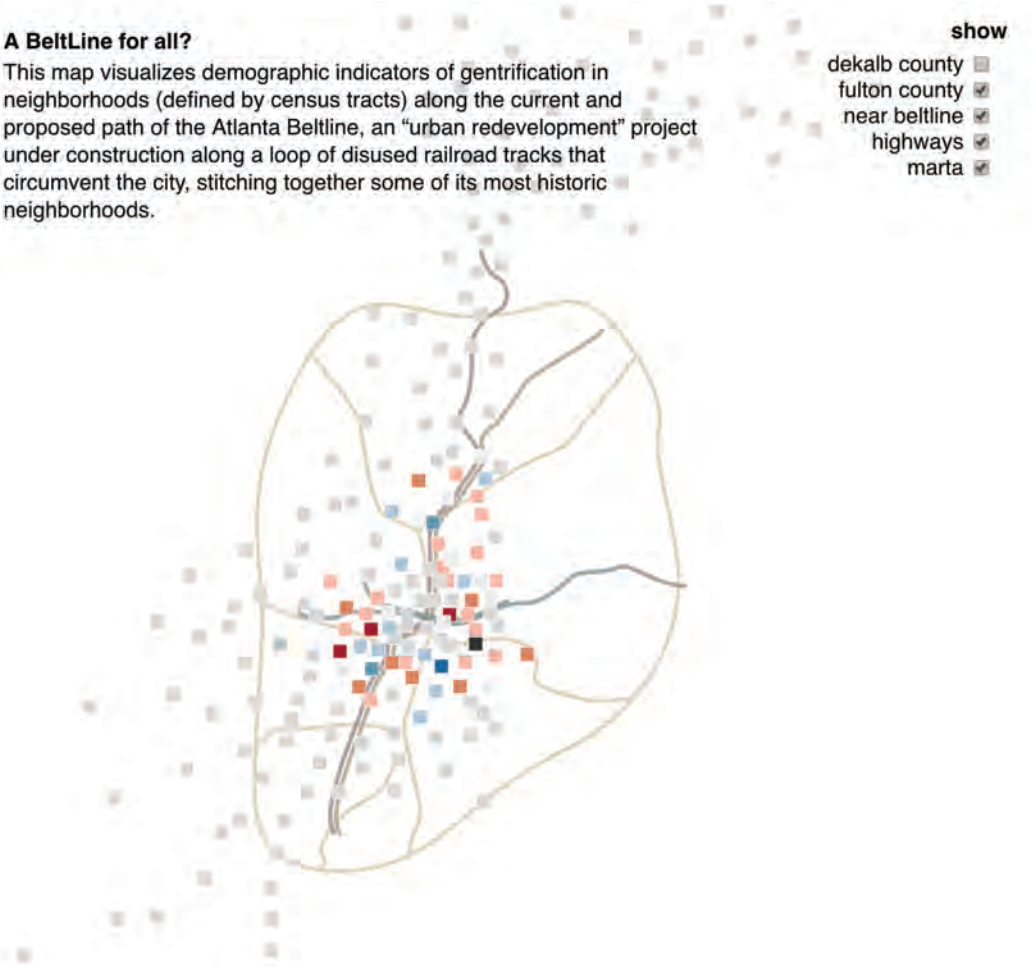
Using visual, discursive, and algorithmic processes, housing data can be critically recontextualized to counter consumeristic desires endemic to the culture of real estate and instead promote a common good. In Atlanta, where low-cost housing is disappearing across Intown neighborhoods, there is an imperative to shift the current context in which we act on housing data. When placed in an operational context, data do not only represent an existing condition in housing; they enable practices that benefit some and harm others. But in order to counter the consumerist uses of data shaping Atlanta's future, organizers must learn how to effectively present data within a civic context, perhaps through interfaces that have yet to be invented.

Can interfaces cause friction in the market rather than kill it? Can they help us critically reflect on how the culture of real estate has evolved? Can they support us in talking more frankly about gentrification? Can they build support for another sort of algorithm: rule-based regulations with the power to restrain market fluctuations along with their effects on low-income homeowners and renters? These are questions that do not have easy answers. Yet I believe that for such interfaces to work—not in some generic sense, but in real places like Atlanta—they must confront the overarching claim of this book: all data are local.

CONCLUSION

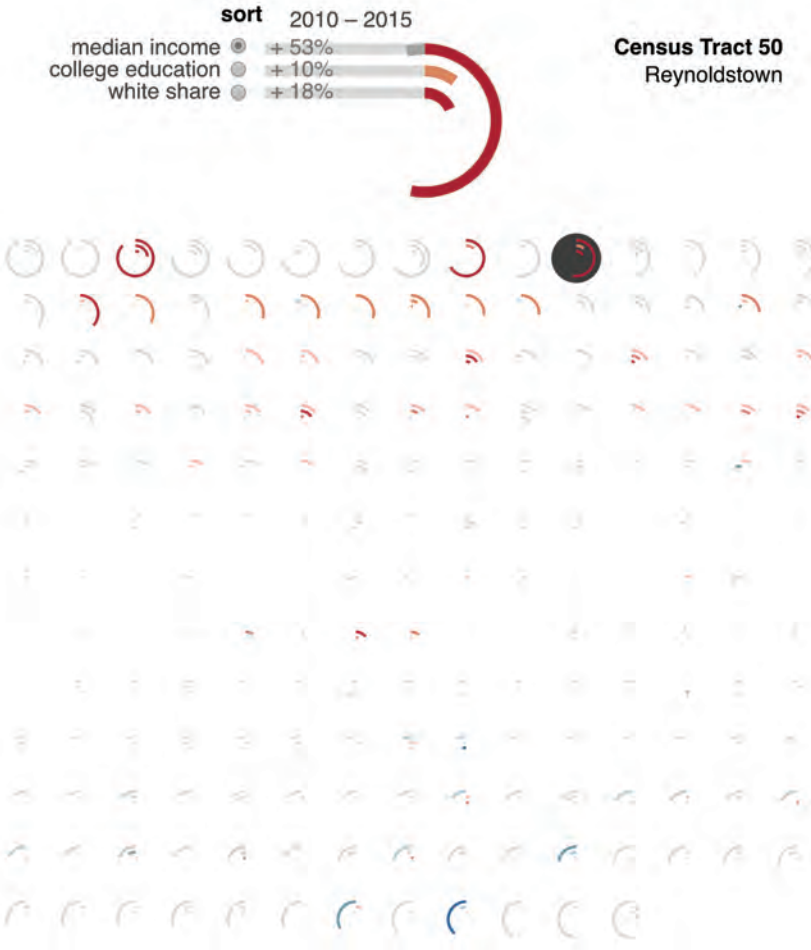
In the rush to make publicly available data more accessible and actionable, companies within the interface economy seek to recontextualize it. As Zillow's interface demonstrates, frequently the context for data is not simply representational: an account of the setting in which the data were made. Nor is context interactional: the spontaneous result of an engagement with data. Rather, putting data in context is often operational: the result of connecting data to an existing knowledge system, defined by a combination of practices, processes, concepts, and affordances brought together in an interface meant to support the data's use. Through visual, discursive, and algorithmic devices, Zillow has constructed an attention-grabbing interface that supports the use of data to buy, rent, or sell housing. The operational context that Zillow has assembled, however, also reifies dominant and deeply problematic relationships inherent to our market-based culture of real estate.

While technologists and designers at Zillow are working to establish frictionless settings in which consumers might make the best personal choices based on housing data, housing organizers seek to construct another context for data—one that calls



5.7

An online interface visualizing demographic indicators of gentrification (percent change in median income, college education, and "white share" of the population) in census tracts along the Atlanta BeltLine. All data are from the US Census Bureau's American Community Survey. Image by the author, Christopher Polack, and Peter Polack.



the market into question. These conflicting contexts—one consumerist, and the other civic—enable different ways of imagining and enacting the future of Atlanta through data. They both implicitly accept that data are now a necessary tool for addressing the problem of housing, which has reached a scale that would be difficult to contemplate otherwise. Indeed, the context of housing data has become a site of contestation, which will determine how the city evolves, and for whose benefit.

In this chapter my explanation of interfaces as recontextualizations of data is illustrated by cases from the domain of housing, where the stakes for accessibility, interpretation, and action are high, particularly in my own corner of the world. But there are many other domains from which important examples might be drawn: health, crime, and climate change, to name a few. In all of these areas, practitioners who design interfaces to data do not act autonomously. Rather, they must connect with cultures of use to support data-driven action. For data are made actionable in culturally rooted knowledge systems: consumerist, civic, or otherwise.

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