

The Bot Proxy: Designing Automated Self Expression

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Harry, a developer who specializes in the production of social media bots, was one of the first people to give our research team an explanation of the complex relationship between the bot and its builder. Referencing the work of Ian Bogost (2012) he stated, “bots are independent objects that do the work of the philosopher.” This is a concept that requires some unpacking. First, Harry wanted to make it clear that bots are separate from their creators. They are autonomously functioning. Second, he elaborated on the position of the philosopher-builder as someone who builds functions into these digital objects and then relinquishes the majority of control over their activities in the world. Yes, bots do the work of the person that constructs and releases them, but they also have their own identity, they interact with the Internet in ways removed from that builder.

Like Harry, we see the role of the social bot as something that should be complicated rather than simplified. Bots are more than tools, but they are not sentient or independently emotive. They reflect the thoughts and emotions of the builder, while also reacting to the networked computational systems in which they operate. After many discussions with people who build and launch highly automated accounts on social media platforms, we have come to see bots as extensions of their creators. A bot stands in, and often does the will of the person who built it. However, a bot can also challenge the authority of its maker. It functions and interacts with its environment, independently and automatically. The builder is not the bot and the bot is not the builder. Rather, the bot is a separately functioning representative of its creator; the bot is its creator’s proxy.

The Computational Propaganda Project

For the past four years we have been interviewing bot makers. This work has been done in conjunction with two connected projects at the University of Washington and the University of Oxford, concerned with the study of what we have termed “computational propaganda” (Woolley & Howard, 2016). Our goal has been to develop understandings of social automation online. We are specifically concerned with communication-oriented problems surrounding the use of “social bots”—automated software programs on social media built to look and act like real people. In some ways, this work has been a theoretical endeavor aimed at understanding the particular capacities of social bots as social actors. Bots can be used as simple tools on social

media platforms, to automate pre-programmed messages on Twitter or to moderate posts on Reddit. They can also be drivers of sociality in unique ways. They can be constructed to learn communication skills from other users, an unpredictable venture in and of itself, or be deployed and left to interact with their environment with little oversight.

The empirical goal of our research project has been to understand these unique automated tools by talking to the people who build them. We have traveled to several countries and interacted with makers building and deploying bots over social media for all sorts of reasons: to curate news, to manipulate political conversations, to create art, to comment on social problems, and more. These interactions, and the projects in question, have revealed a special relationship between bots and the people who build them. Bots act as a proxy for their makers; they help them to creatively interact with digital systems.

At the outset we had a tendency to personify the social bot. Social media users talk about creations like @OliviaTaters or XiaoIce as if they were thinking automatons: human-like artificial intelligence akin to C3PO or eccentric robot helpers more like R2D2 (Lloyd, 2016). Creators often give their bots human names and creative personalities, they speak about them like friends or pets. Social bots, however, are still built to do tasks specified by developers and even advanced machine-learning bots, such as Microsoft's @Tay, reveal the imperfections and biases of their builders (Neff & Nagy, 2016). Most bots on social media are semi-automated tools that allow the person who launches them to interact with platforms in both an obscured infrastructural and shared interactive capacity. In other words, social bots communicate with servers, applications, and databases on the backend of websites, but they also interact with human users on the frontend of those same sites.

We argue that social bots help users to reveal, exploit and change aspects of digital systems that otherwise go unquestioned. These changes occur through interactions directed from human to computer, but also those initiated from computer to human. However, it is too simplistic to say that automation on sites like Twitter or Facebook is purely functional. Bots are more than lines of code. The reality of social bots' capability exists somewhere in between the poles of bots as wholly autonomous entities or bots as programs or tools. Our interviewees have shown a consistent desire to place themselves as separate but related to, or invested in, the bots they build. They challenge the rigid separation between humans and technologies, makers and mediums.

Thinking of bots as proxies for their creators allows us to treat bots as surrogates, but also to see their function as entities that enact change on a system while they themselves are also changed. As bots interact with complex social systems, they do things beyond the expectations of their builders, they achieve the unexpected.

I'm Not a Bot

In the course of our interviews with bot builders, and in our work revealing the manipulative political uses of bots during elections and security crises, we have regularly discussed the complicated user–bot relationship. During two events in 2016, the “Brexit” referendum in the U.K. and the presidential election in the United States, our team worked to identify automated Twitter accounts working to amplify partisan points of view in attempts to manufacture trends and project consensus. However, we received pushback from the programmers behind accounts we had described as bots.

One programmer, a developer from the United States, wrote an email to our project in which he stressed that *he* was not a bot, but a person who used software to automate his presence on Twitter. This particular user had, in his relatively brief tenure on the platform, produced hundreds of thousands of messages. Most were heavily in favor of a particular political perspective or, at times, heavily against oppositional views. The account tweeted nearly every second, with a high degree of topical specificity, both markers of automated activity. It was, however, diverse in the way it interacted with content and other users: it was able to both like and retweet existing posts and also to generate original messages.

It would be true to say that this user was harnessing a bot in order to bolster his online presence. By definition, a bot is a piece of automated software used to do automated tasks that a human would otherwise have to do. But our interaction with him complicates a mutually exclusive division between him and the software automating his profile. He saw his profile as being reflective of his views. For him the software was mostly functional, it allowed him to have some kind of online presence at all hours. The software, however, is not the person. In this case it was the software, and not this user, that was actually generating tweets and interacting with sites. But, the bot did not exist by itself. It was made as an extension of its creator. While people shape the content and trajectory of automation used to streamline interaction on and over social media, they are also separate from that technology and vice versa.

The Bot as a Proxy

Anecdotes like this reveal the usefulness of thinking of bots as proxies. The word “proxy” describes organizations, activities, and people who “act as a substitute for another” (Proxy, 2016). We use this definition when referring to a social bot as a proxy for a human user. The bot is endowed with agency or power, and can exercise that agency on behalf of the builder. Because a person must construct the code that allows the bot to function, they can have a degree of faith—and culpability—in what the bot does or will do. However, the expectations of creators are challenged on social media platforms where the bot interacts with other people or programs.

Here a diverse range of inputs and outputs can affect the actions of a bot. In short, is it hard to predict exactly how any social program will function under different stresses. Tay was an example of this. The case of a bot built by developer Jeff van der Groot (Weaver, 2015), wherein the bot said it wanted to kill people, stands as another. Here, a proxy behaved in a way that its creator did not intend. The bot went beyond the tasks its builder believed he had programmed.

A social bot is, therefore, an automated software program built to stand in for, represent, or extend a human user. We argue that these digital automatons allow users the unique ability to interact with both systems and social spheres in ways that otherwise they could not. Socially, bots allow users the ability to act exhaustively. While a user has to sleep, a bot does not. They allow users to multiply their presence online, as one person can control many bots. They allow users to speed up their actions online, to computationally enhance the ability to complete tasks. They allow users the ability to veil their actions, providing a degree of separation and anonymity between the user, the message sender, and their target, the message receiver. They allow and facilitate communication; they mediate conversations and can be seen as a new medium in their own right (Woolley & Guilbeault, 2017).

Bots are also infrastructural elements of social media systems built on top of existing platforms. The work of deploying a bot over Twitter or Facebook does not require direct collaboration or involvement of platform designers or engineers in order to change or allow for original features that users want to make possible. For example, users can build and deploy bots to translate text from one language into another. This accessibility can be harnessed in very practical ways. Several interviewees argued that they were most generally using bots to add additional functionality on systems already in use. Still others argued that this ability allowed for genuine creativity. Bots have been used to generate art based upon user's profiles and preferences (Katie Rose Pipkin's @mothgenerator), to critique news media (Darius Kazemi's @twoheadlines), even to argue with other users (Sarah Nyberg's @arguetron). All varieties of bots offer new possibilities for interaction on, and with, social networking sites.

In this chapter, we explore bots as a form of networked self-expression. When a person types and sends a tweet, it is clear that they are motivated by a desire to convey a thought or feeling. But, when the text is produced through combination and sent automatically by a computer script, these motivations become less clear. This means that it is exceedingly important to look beyond the content of automated messages to the bot designers, themselves. While it is possible to interpret the desired effects of a bot based on its messages, talking to bot makers helps us understand the design goals—elements that have a meaningful impact on the form and features of bots. Through forty qualitative interviews with bot makers, we discovered that bots both enable and extend the communicative reach of their builders. Our interviewees made it clear that social bots function well beyond the purview of simple automated messaging, that they have

a unique capacity for complex interaction. Because some bots are built to learn from their ecosystem, they often display startling characteristics borne from factors outside of their original code. They are not human, but they are invested with power that can be directed diversely and unpredictably.

Automation and Social Life

There is persistent concern within both media studies and science and technology studies regarding the relationship of algorithms and, often proprietary, software upon various aspects of social life. Today, algorithms and other computational tools play an important political role in arenas such as news consumption, issue awareness, and cultural understanding (Gillespie, 2012; Sandvig et al., 2014). Research on bots, in particular, has largely focused on their potential for political effects. Building upon prior work in the computer sciences (Ferrara et al., 2016; Metaxas & Mustafaraj, 2012; Wagner et al., 2012), communication and media-oriented work has shown that political actors around the globe make social media bots in efforts to both facilitate and control communication (Woolley, 2016). Bots have been used by political campaigns and candidates in attempts to manipulate public opinion by thwarting activist attempts to organize or to create the illusion of popularity. This work suggests that modern social bots are increasingly sophisticated and that pernicious use of them threatens social spheres on and offline. Moreover, it suggests these tools in the hands of powerful political actors are now being widely used in attempts to manipulate public opinion.

Alternately, building and using bots has also been discussed as a kind of agnostic commercialism. Bot builders act as “hired guns,” selling bots on sites like Fiverr, with little concern for how they are used and by whom. Using bots to spread advertisements or attack online adversaries has a long history and has existed over email and other chat mediums before it spread to platforms like Twitter and Facebook (Holz, 2005). Newer forms gather information on other users or push a particular argument, agenda, or hashtag (Hwang et al., 2012). Experiments on the efficacy of such bots reveals that they can infiltrate networks on sites like Facebook with a large degree of success and that they are successful in bypassing extant security systems meant to protect from just such attacks (Boshmaf et al., 2011). Those who build and deploy such programs have told us in no uncertain terms that their work is mercenary, apolitical in their view and driven by a desire to make money online.

Less scholarly attention has been paid to the sense-making of bot builders: how bot makers give meaning to their work, frame their activities within technological systems, and evaluate the effectiveness of their creations. Yet, the creative practices of makers—and the social practices of individuals writ large—are constitutive of the practices of large-scale institutions and

organizations (Neff, 2012). The unique ways that bots are harnessed by non-commercial makers are often taken up by companies and normalized by powerful political actors. Scholars such as Castells (1996) and Howard (2011) have called for media research that studies media infrastructure, media content, and the “individuals who produce and consume content over media” (p. 2).

In this chapter, we interview bot makers to better understand the processes and relationships that determine the shape of automated technologies. From this perspective, bots can be analyzed as part of the “expressive equipment” available to social network users (Papacharissi, 2011, p. 307). Bots, like other forms of text and images, are tools for the strategic sharing of information. They enable users to make statements about current political issues, illuminate crucial details in mountains of information, and reveal biases in computational systems. Rather than doing so using personally crafted messages, they can rely on automated processes (known as “algorithms”) that draw on existing data (known as a “corpus”) to produce messages. Bots are a constituent part of the networked publics in which social media users operate; they “reorganize how information flows and how people interact with information and each other” (boyd, 2011, p. 3). The application programming interface (API) of platforms like Twitter is the bridge that affords publics this exchange. It is through the API that users build and launch software applications, including social bots. These creations play important ecological roles in both the backend and the frontend of social media sites.

Bots have the power to “extend and modify” the functionality of online platforms (Geiger, 2014). Moreover, bots can extend and modify the capabilities of humans who use those systems. We agree with Tsvetkova and colleagues’ assertion (2017) that the curatorial roles given to bots on sites like Wikipedia allow “even relatively ‘dumb’ bots to give rise to complex interactions” (p. 1). However, in this context bots are not “predictable automatons that do not have the capacity for emotions, meaning-making, creativity, and sociality” (p. 1). While we do not, by any means, argue that bots have emotions or the ability to make meaning, we do argue that they have a capacity for effecting sociality in ways beyond those envisioned by their creators. This effect is not a conscious decision on the part of the bot. Rather, is it a motion set in action via the bot through a diverse ecological social system that prioritizes not only the intent of the developer but also that of a broad, and networked, public comprising people, software, and machines. As Guilbeault (2016) argues, social media platforms and a diverse range of inputs and outputs “propel bots into agency” (p. 5004).

Wise (1998) argues that software programs like bots serve programmers as “intelligent agents” or “digital butlers,” that they are the digital embodiment of their creator. Our research suggests, however, that bots as proxies exist somewhere between conceptions of bots as pure extensions of their builders and arguments that see bots as only rigid tools. There is a strong

current of humanity encoded into the social bot; indeed, many successfully and duplicitously mimic human users. Though, within humanistic definitions of feeling, the bot is not truly sentient. Sentience is best defined as the ability to “perceive or feel things” (Oxford Living Dictionaries, 2017). While the bot can parse information and use this data to react to its environment, the builder constructs the bot to respond to data according to her wishes. The bot, however, can respond in surprising ways when unforeseen intake results in similarly unexpected output. The bot is neither its builder nor only its builder’s tool, but something in between.

Steyerl (2014) discusses the politics of using media and technology systems in a proxy capacity, and is the first to refer to bots as an example of this representation. This work uses theorizes that bots are an example of “post representation,” like a mask or persona that functions as a generic placeholder. Our own evidence and analysis pushes perspectives of representation further, with more specificity placed upon the meaningful relationship between the bot and maker.

Networked Field Work

There is a short, but rich, history of using ethnographic methods, including interviews, to study technology-oriented communities. The proliferation of digital qualitative methods has grown out of the work done by the social scientists and humanistic scholars throughout academic history. Scholars have struggled with both the proper terminology for studying culture online, vacillating between methods that are digital, virtual, net-based, “netnographic,” and data-centric, but also with how to represent culture online (Howard, 2002; Bowler, 2010). Those interested in internet methods early on were particularly concerned with the separation between the “real” world offline and the artificial one online. This separation itself has since been criticized as artificial, especially in light of the ever-increasing “wired” nature of society.

Markham and Baym (2009) strike down the notion of online/offline separation by arguing that sectioning off certain aspects of social life as real or digital is a colloquial endeavor, one that has no place in empirical research. They argue, moreover, that “qualitative research requires a tolerance for chaos, ambiguity and inductive thinking” (p. ix). By being open to the potential for multiple, and concurrent, meanings—to subjectivity—qualitative researchers are able to work toward contextual understandings of new phenomena as well as new ways of thinking about existing phenomena. This perspective is crucial when theorizing about the social capabilities of technology.

Schools of thought from actor network theory to activity theory seek to answer the complex questions associated with the ability of technology to affect change. Social bots are an obvious object of analysis within the category of technology with a social function. Our concept

of the bot as a proxy allows the simple polarization of the technical and the social to be complicated. Our conversations with bot builders made it impossible to simply classify bots as the technical outcomes of social creators. Bot builders regularly negotiated their relationships to the bots they built. Their expressions of reflexive identification and moments of comparison between themselves and these automated social programs illuminated the proxy nature of bots.

Interviews, and other ethnographic methods, allow STS researchers to get to the heart of intentionality. They ask technology makers why they built what they did, how they built it, and what they believe it does. This strain of research is in contrast to user-based studies, which seek user reactions and interpretations of media. This is not to say that the two cannot be complementary. Here, however, we are concerned with the relationship between builders and their bots, so we have conducted over forty interviews with the bot-building community. In this chapter we focus mostly on builders who make Twitter bots, but this research has implications for other social platforms where bots are being used: Facebook, Reddit, Instagram, Snapchat, Kik, Periscope, Firechat, Wechat, Telegram, Slack, Weibo, and many others.

Our interviewees come from a diverse range of professional, demographic, and cultural backgrounds. Some of them work as professional software developers; others are digital artists, educators, lawyers, journalists, political consultants, entrepreneurs, or writers. Many have day jobs with no connection to bot development or the digital sphere but engage in bot building as a hobby or activist practice. We spoke to men, women, and those who self-identified as non-binary. Some were in their late teens or early twenties, others were in their thirties, forties, or fifties. Politically, interviewees spanned the range from conservative to liberal. Some have worked for political campaigns, others consider themselves anarchists. One thing brings this otherwise heterogeneous group together, they all build bots. The ideas in this chapter, therefore, come from technology makers.

Our interview process involved establishing contact with potential interview subjects, disclosing the nature of the study, and asking for consent. Second, we conducted the interview, taking notes and recording as appropriate. Finally, we prepared a thematic memo for each interview. We audio recorded all interviews, unless asked not to by interviewees. We completed an interviewee information statement for every interview. This sheet included demographic information and also general questions about the person's level of coding experience and professional background. We gave all informants pseudonyms. This was a considered choice made in the beginning stages of our project and continues for two main reasons: first, to protect informants' identity, especially when confidential or politically sensitive information is being shared; and second, to allow for open conversation, so that thoughts and feelings can be shared without hesitation. In order to protect our data, we followed ethics guidelines established by both

the University of Washington and the University of Oxford, but also those of funders including the U.S. National Science Foundation and European Research Council.

Bot Success

Bot makers defined the success of their bots in two ways: intention and attention. Does the bot do what it is designed to do? And does the bot have followers, does it have viewers and does it garner engagement? For some bot makers, the intention of their bots was practical. Bots extend people's abilities to rally volunteers, gather signatures for political petitions, or translate across language barriers on social networks. For others, the intention was more artistic. Bots are tools for commentary, creating imagery, and making rhetorical points.

In terms of attention, bots extend people's ability to reach audiences, circulate content, and bait political adversaries into arguments. The capacity of bots to increase attention is complementary to the intentions of designers; making their practical goals more achievable and the audience for their expressive goals larger. Bots automate familiar forms of interpersonal interaction, such as tweets and @replies. Importantly, bots are also uniquely equipped to interact with trending algorithms to heighten awareness and visibility around a particular topic.

Intention and attention are not disparate goals. They do not divide bot makers into two groups motivated by two different aims. Rather, almost all the bot makers we talked to referenced *both* intention and attention as the primary criteria for evaluating the success of their creations. Bots are made with both expressive motivations and functional outcomes in mind. These coexisting, though sometimes competing, aims have to be balanced by makers in the process of designing bots.

Intention

Intentionality gives power to designers. Here, success is based on what a bot achieves, relative to what its creator wanted it to do. Bot makers often spoke of bots as a “tool” and compared them to “paintbrushes” or “instruments.” This overarching focus on the intention of designers may appear to imply a view of technology as neutral or impartial, as a conduit for the visions of the humans who build them. However, bot makers often spoke directly about the powerful ideologies that are present in computers and computer-based tools. For these bot makers, intention is seen as a *corrective* to systems that are either inherently biased or easily take on the bias of the communities they interact with. Bot makers who neglect ethical directives were seen as careless and irresponsible.

Rather than mitigating culpability—as one might say with “the best of intentions”—intention is essential for building ethical systems. Quinn, a bot-making artist, stated this directly:

“Bot making itself is political. Sometimes quite explicitly, but in general too.” Bot makers have to consider what they want their bots to express, “to take special care to ensure that they aren’t going express things that we don’t mean for them to express, like they don’t use oppressive language for instance.” Bot making, as a form of technology design, means encoding the values of the designer into what is being built. In writing the scripts with care and intention, they are attempting to ensure that the bots they build reflect their own values as a human.

Modeling

Hannah is poet and teacher, who uses bots as part of her creative practice. She has been making bots since 2007, when the earliest adopters of Twitter were considering what the nature of computers— automation, randomness, combination, repetition—could contribute to the arts. Hannah’s work is wildly popular, with tens of thousands of twitter followers, and inspired many of the people making bots today.

At the most basic level, bots are a rule-based. Like any algorithm, bots on twitter require instructions: conditionals, if this/then that. But, bots that function on twitter also operate on a platform where information is experienced synchronously. “Bots are a response to the fact that twitter is real time.” She explains, “any effect that you want, has to keep happening. It has to happen over and over.” Automation is ideal for repetitive tasks. Once the initial commands are written, reproducing an action takes no additional energy. If you can determine the formula, the basic structure of a statement or pattern of an interaction, it can be automated.

Repetition, as an artistic feature, has a revelatory capacity. Take for example the knock-knock joke, the most unoriginal of all joke formats. Knock-knock jokes work through using a formula: the first two interactions (knock-knock / who’s there?) are always the same. The third introduces the punch line. The fourth is just the third + the word “who.” And the fifth, the punch line, plays on the third. If you have never experienced a knock-knock joke before, each aspect of the script might seem novel. It is only through repetition—through hearing it over and over—that the underlying system becomes clear.

For Hannah, formula and repetition are central to the communicative capacity of bots. In the same way that tweets generated by people have the power to express the writer’s perspective, tweets generated by bots have the power to express the perspective of computers: “I’m trying to expose the guts of these techniques, so it becomes more clear how they work internally.” One of the best ways to do this is to show the procedure, the rules of the system, and how the outputs come about.

As Hannah explains it, writing the code for bots requires that the maker define a system. This process of definition requires that makers determine the rules of a message, then make a

model of it through code. Beyond highlighting these patterns, modeling also concretizes knowledge that may otherwise remain tacit. This tacit knowledge may be the logic of computer systems or the logics of particular human actions, but in creating bot proxies one can express these logics visibly and legibly to those who may view them.

Concretizing

Charlene is an investigative journalist who uses bots to help with reporting. Her area of expertise, campaign finance, requires sifting through massive databases and monitoring congressional filings. Stories come from finding expenditures which are often deliberately buried in piles of unremarkable information. Bots are an excellent tool for this kind of “boring” and repetitive work, which just requires observing and relaying simple facts. But, automating aspects of the journalist process requires that bot makers write the informal knowledge of seasoned journalists into formal, rule-based code.

Formal knowledge, in this case, are the rules of campaign finance. For example, every political campaign must file with the Federal Elections Commission on an orderly schedule. But this formal knowledge is also accompanied by the informal knowledge that, in any big filing, there will always be small bits of money that are being used for alternate purposes. These cynical-seeming maxims “aren’t written down anywhere” but can be used to inform the bot-making process. “That’s the core,” she says “taking what you know to be true and writing it as rules in a system.”

Building bots makes these tendencies and patterns explicit. The mechanisms become legible to interested parties who can read the code. And, the outcomes of those mechanisms produce information that is relevant and understandable to lay audiences. Charlene sees bots and humans “working together” in the field of journalism—both helping journalists to do their jobs and performing basic journalistic tasks, like sharing information. For other politically driven makers we spoke to, bots served similar purposes. Rather than a person sifting through dense logs in search of pertinent information, bots can watch information as it is produced. They act as monitors or alarms, using the intuition of journalists to overcome the data density that (perhaps deliberately) obstructs understanding.

Exploiting

Aaron is a computer programmer who builds bots as a form of activism. He began building bots in a period of unemployment, which exposed him to the “horrible bureaucracy” of modern unemployment security departments. People receiving unemployment benefits must be actively searching for a job. Rather than assessing qualitatively, the government measures this criterion

by counting the number of jobs a recipient has applied to. The applications are often online, highly impersonal, and repetitive. They require sifting through large amounts of information in job postings and classifieds. As Hannah and Charlene observe, both these qualities make job applications an ideal task for automated tools. But, more than that, Aaron fundamentally disagrees with the idea that benefits are based on “the filling out of forms” and that human experience is not taken into account at any step of the process. So, he wrote a bot to do job applications for him.

While it is easy to frame this activity as a clever work-around, Aaron ascribes significant meaning to the script he created. Automating job applications is exploiting a system through the mechanisms of the system itself. The government essentially automates the process of assessing job seekers through the counting of applications. Yet, unemployment is rife with experiences that do not fit into a quantitative framework. It is a “computational metaphor placed on top of people, and they’re expected to go along with it. I’m fond of disrupting that.” The expressive power of bots is not purely in the content of social media messaging, in the political declarations made over and over again in tweets and postings. They can perform acts of resistance.

The stories of Hannah, Charlene, and Aaron illuminate the ways in which bot making, as a creative practice, allows people to question the quiet functioning of everyday life. Bots achieve instrumental goals: performing repetitive tasks and surfacing relevant content. But, the meaning of bots goes beyond their practicality. They bring to light the computational, political, and societal patterns that govern our everyday activities. They are constructed with a spirit of candor; driven by honest expression. As proxies they mitigate the complexity of algorithms, the magnitude of data and the triviality of bureaucracy.

Attention

One participant put it simply: “Following is the lifeblood of bots.” Bots, as communication technologies, need an audience. This is most true for bots that have a frontend communication focus, a mandate to interact with other users—including humans and other bots—on platforms such as Twitter, Facebook, or Reddit. Without followers, or at the very least, viewers, bots can generate hundreds of messages easily but with limited frontend effects. It is nearly impossible to change a person’s ideas on a social issue, for instance, without that person interacting with the ideas—or, online, even seeing the posts—you are sharing. The importance of followers for user-to-user communication, regardless of whether the user is a bot or person, is due, in large part, to the nature of interaction on Twitter. While moments and hashtags draw from public content produced across the platform, most users experience Twitter through their personalized feed (Java et al., 2009).

Bots can, however, be used to push particular hashtags in a quantitatively driven attempt to get topics to trend on the platform's sidebar. This type of bot communication is distinguished from user to user, or frontend, communication in that it is between the bot (or botnet) and the platform's "trending" or "newsfeed" algorithm, or backend. In this type of information exchange bots are constructed in attempts to affect these algorithms in order to prioritize hashtags that users see. The trending algorithm on Facebook, for instance, now operates quantitatively without human oversight (Thielman, 2016). It computes trends based around how many times content is shared and various other pieces of predetermined input and output. As recently as a year ago, human moderators had a role in filtering content on Facebook. This has changed, due to allegations that these news "curators" were politically biased. Now the algorithm arbitrates what content shows up in users' newsfeeds, but the algorithm only has the illusion of objectivity. Not only can the algorithm be gamed—by bots amplifying information in order to manufacture false trends, for instance—it is also laden with human judgment. People construct algorithms and encode them with particular values.

Really, most algorithms built to prioritize information based upon social behavior online can be manipulated. The twitter feed chronologically displays content from followed users, and retweets and @-replies from those users. If bots can garner human followers, their content will show up in human users' feeds. If they tweet enough, even without human followers (many bots rely on armies of bot followers to meet expectations of having followers), they can count on causing hashtags to trend or on their tweets to showing up as a "most popular" when they fall into a particular search category. In both of these circumstances, bot-driven information can be consumed and repurposed by other users. Being retweeted by human users gives the information legitimacy, reaching their networks through a trusted relationship. If bots are built to learn from their surroundings, they can be programmed to draw interaction from their followers. However, most social bots are not, at present, built to use machine learning.

The bots that have the most success in gaining human attention via the tactics mentioned above are quite simple. They often either 1) communicate over popular channels, or on/around popular topics, and/or 2) shout—metaphorically speaking—in order to be heard. Hans, a bot builder who has experimented with launching bots on Twitter in attempts to affect people's perception of social issues, explained the former strategy by stating that he builds the bot with an implicit and explicit goal. Explicitly, the bot will tweet using hashtags and content related to a relatively benign issue—football, for instance. Once the bot gets an audience, however, it begins injecting conversations with content related to a particular belief or concept. It garners a following by engaging in chat about sports and once it has built rapport it begins sharing articles on, say, the science behind global warming. This is the implicit goal of this type of bot. The second type of bot makes use of sheer numbers to get a point across. It shouts, or amplifies

information, in order to get the algorithm and/or people to notice content. Three mechanisms allow bots to attract attention: listening, evoking, and shouting.

Listening

The bots created by Hans (the bot maker mentioned above) often observe interaction on social media. These bots “listen” to the hum of a platform, constantly searching Twitter for relevant conversations. Using hashtags, listener bots find and participate in specific topics and engage with specific users. For instance, to engage with supporters of Donald Trump one might build a bot that listens for conversations connected to #MAGA or #Draintheswap. These bots garner attention through tweeting using the same hashtags as human users—making their statements visible to anyone following discussions on that topic. Or, the bot tweets at hashtag-users directly, engaging them in conversation. After a response, a human user may take over. The listener bot effectively automates the laborious process of finding interlocutors. This tactic is especially useful if the builder is working to further the cause of a particular ideology, policy or politician. Like the journalistic bots described by Charlene, these bots can leverage databases of information while also monitoring newly created information online. They then share that information to make a clear political statement or draw attention to an action or issue acting as a proxy relationship for their builder. Other listener bots can monitor sites and databases for manipulation or wrongdoing, then share that information with the public. Wikiedits bots, for instance, are created to track politicians’ edits to Wikipedia pages (Ford et al., 2016).

Alternately, listener bots can work through distraction. Roadblock bots, a type of listener, are built to generate noise. They monitor feeds for a particular topic and then attempt to push users away from it through generating a wealth of nonsensical or off-topic posts. The volume of tweets makes it difficult for users to find the pertinent information needed to organize online—or, they are distracted by misinformation or attacks. Such bots have been used to demobilize activists trying to organize and communicate on Twitter but they can also be used to drive traffic from one cause, product, or idea to another (Woolley, 2016). These bots can do more than drown out activists or drive people to ideas. They can also be used to direct targeted noise in an attempt to harass other users.

Evoking

Pan is an educator and software developer, who builds and launches bots that tweet historical data in order to draw parallels to contemporary events. An example of a bot that Pan would build would be one that accesses and publically tweets databased information about the fallout of nuclear arms use in Japan during WWII to critique ongoing proliferation of nuclear arms by both

democracies and countries like North Korea. Pan's bots evoke the past to critique the present. They are stand-alone informational bots that exist with a consistency akin to public art. Once Pan launches a bot she allows it to continue tweeting on its own from a corpus or database. The bot either gains followers or does not, it either spurs conversation or it does not.

Many art bots function in an evoking capacity. They produce statements or images that, far from being political, are built to create a subjective reaction from other users. Pan has built several popular bots that mash together strings of words to create bot poetry or that send out images related to a particular subject over Twitter. Her bots evoke emotions by consistently tweeting images related to, for instance, Americana.

These bots can also be purposefully strange or provocative, a variety that one interviewee called "dancing bear-ware." This type of bot is built to draw attention by saying odd, quasi-human, phrases related to a particular topic—say, affirmative action—in order to get people to engage. Like a dancing bear, they engage in unexpectedly human behavior in order to get other users to communicate with them. Such bots can, and have, then been used to argue with people about politics or distract those who engage in racist behavior (such as @argutron).

Shouting

Shouting bots work to garner attention by messaging in high numbers to get algorithms and/or people to view a particular message. While the actions of listening and evoking bots are topic-centered, shouting bots work mostly through volume. They say something so often—so loudly—it becomes difficult to ignore. Listening and evoking bot are also more targeted than shouters: baiting people into engagement or statically sharing an idea in order to evoke an emotion.

Shouting bots can be built to talk at someone until they listen. They can speak directly to a user through @-ing them or tagging them in images. This means content shows up in mentions, and is potentially displayed to others in their network. The number of people involved in this tactic used to be limited by the twitter character limits, but as this chapter was being written @-replies have been exempted from character counts leading to a potentially infinite number of @s.

An example of this type of bot was given to us by a respondent, who said they had tracked a bot-driven smear campaign. In this instance a builder or group of builders deployed hundreds of bots to tweet rumors about another user. These tweets were feasibly visible to anyone who looked at the embattled user's profile. Though distressful, the respondent felt that the attack was ultimately not very successful in mimicking a crowd of real human attackers because the bots were newly created and had no followers, and thus no audience. "In order for bots to be effective (in spreading a message)" said the respondent, "you have to be able to verify your message is reaching people." This bot did, however, cause emotional distress to the person

who was targeted—regardless of whether it was seen by other people. It also caused them to delete their Twitter account. In this sense, the bot was in part successful in its—decidedly abusive—task of silencing those being attacked. Bots like this can also circumvent the need for reaching users directly by tweeting many times so that the trending algorithm picks up their hashtag or ideas as part of a popular movement. The information the bot maker wants to get to users still reaches them but through an additional layer of obfuscation.

Bots and Networked Self Expression

Whether bots work through means of intention, attention, or—as is often the case—a combination of these two mechanisms, they act as proxies for their creators. They allow their builders to construct additional layers of infrastructure upon a social platform, typically using an API. These layers of infrastructure function beyond the purview of the original platform developers. While bots on social media sites can function as tools for users hoping to alter or stretch their network footprint, they also exist as proxies for those who create them. They are imbued with intentions of their creator, deputized in order to undertake particular communicative actions. As proxies, however, they are separate entities.

Bots are built to do simple and direct functions, but even in these instances they interact with users and systems in ways that are complex and meaningful. Practical goals are accompanied by expressive outcomes—motivated by bot builder’s perspectives on the mediated world in which they live. Beyond amplifying political declarations, bots engage and exploit the nature of social systems. Through writing automated scripts, bot makers write (and re-write) the computational logics, journalistic practices, and public deliberations that organize political participation.

Thinking of bots as proxies means to consider them more than a mask for a user, but less than a fully independent sentient entity. Bots do not think and feel. They can, however, have effects upon the social spheres in which they operate. This effect is driven not only by the bot’s builder, but also by the networked system—all the users, other bots, protocols—with which the bot interacts. Intention and attention make bots more than a tool or set of commands; it makes them exceed their automation.

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