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Automatic for the people: the automation of communicative labor

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ABSTRACT

Artificial intelligence is rapidly giving rise to new automated technologies. Among the most important of these innovations is the development of artificially intelligent machines that produce increasingly sophisticated forms of oral and written discourse. As more of our communicative encounters are with artificial agents, our notions of communicative labor, surveillance, and digital rhetoric will have to contend with these extensive shifts. As a step in this direction, the present article evaluates several trends in the automation of oral and written discourse, examining their social and economic impact.

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> It is a commonplace to say that the machine replaces the human being. But it replaces him to a greater degree than has been believed.—Jacques Ellul[1]

Throughout the 2010s, the consumer market has been flooded with new products that promise the thrill of robotic interactivity. An especially interesting case is Mattel's newest Hello Barbie doll, which demonstrates how artificial intelligence is creating new possibilities for robotic care and companionship. These new Hello Barbie dolls record and recall the conversations they have with their child companions, using each detail to increase their emotional intelligence and conversational precision. At a recent toy expo in New York, a Mattel spokeswoman picked up a Hello Barbie doll and asked: "What should I be when I grow up?" Based upon data collected during an earlier conversation with the spokeswoman, the doll responded: "Well, you told me you like being on stage, so maybe a dancer? Or a politician? Or how about a dancing politician? I always say, anything is possible."[2]

Unsurprisingly, privacy advocates have expressed outrage at Mattel's turn to artificially intelligent child play. On the one hand, they are incensed that Mattel is recording and saving the household conversations of millions of American families; on the other, they are concerned that Hello Barbie, whose intelligence is based on this massive cloud of surveillance-based data, will absorb inappropriate vocabulary and conversational habits. While these might be legitimate concerns, widespread automated communication raises much higher political stakes than privacy invasion and naughty child vocabulary. Until

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very recently, traditional forms of communicative production (speaking and writing) have been more or less spared the consequences of automation. Yet as computing technologies have become more sophisticated, we are beginning to see the possible social and political implications of machines' accelerating competence in the production of written and oral discourse. The economic consequences are already being felt by many who work in fields that rely heavily on communication—psychotherapists,[3] personal assistants,[4] college advisers,[5] telemarketers,[6] life coaches,[7] bank tellers,[8] phone sex workers,[9] and even teachers and professors[10] now have to compete with sophisticated digital technologies that will do their jobs at negligible costs.[11] In fact, we are all increasingly faced with automated discourse—whether we're ordering fast food, learning the positions of political candidates (through automated campaign calls), checking our bank balances, signing up for health insurance, making a doctor's appointment, paying our WiFi bills, or simply trying to reach a "customer service representative." Recognizing these trends in digital automation, in 2013 two scholars at Oxford University predicted that forty-seven percent of US occupations will be overtaken by computers in the next two decades.[12] Coming to a similar conclusion, Rice University computer scientist Moshe Verdi recently predicted: "by 2045 machines will be able to do if not any work that humans can do, then a very significant fraction of the work that humans can do."[13] Troubled by the implications of his prediction, Verdi asks: "if machines are capable of doing almost any work humans can do, what will humans do?"[14]

As a step toward answering "what will we do?" in a machine-dominated future, this essay explores the present and potential futures of automated communication. While theorists like Paul Virilio have focused on the computerized automation of surveillance and other kinds of immaterial labor,[15] thus far the complementary tendency of automated communication has largely escaped critical attention.[16] To address this gap, the present essay will examine a number of current trends in the automation of communicative labor—a term I will use, following scholars like Jodi Dean,[17] Ronald Greene,[18] and Michard Hardt and Antonio Negri,[19] to loosely denote the entire field of written and spoken cultural production. Given the growing intensity and prominence of these trends in automation, I contend that some of the most important issues facing critical scholars of new media and digital rhetoric will stem from machines' displacement of the discoursing human subject in increasing arenas of economic and cultural life. This technological development, of course, will not eliminate all forms of human communicative labor; it will surely create new forms of creative work and new modes of human expression. Digital automation, like most other radical socioeconomic innovations, has inconsistent and ambivalent effects. Yet at a time when psychologists are critiquing the emergence of computerized psychotherapy, physicians are hesitant about the rise of robotic surgeons, and consumer advocates are warning against the commercialization of automated vehicles, I suggest that we, as critical scholars of media, rhetoric, and communication, should be concerned about how the automation of oral and written discourse will impact our communicative culture and our society at large.

To provide a historically informed critique of these developments, I begin with a brief overview of how automation has threatened and displaced diverse sectors of labor. I then supplement existing research on immaterial labor by exploring how the automation of communicative production secures digital capitalism's circulation of symbols, ideas, and affects while managing the affirmative biopolitical potential of speaking human subjects.

Through a similar process by which capital mechanized industrial labor in order to replace human workers with machines, human communication is being monitored, analyzed, mechanized, automated, and gradually removed from the work of cultural production. After reviewing several trends in the automation of written and oral discourse, I conclude by further exploring the social and political implications of widespread automated communicative labor. While many of these trends might be intellectually fascinating and socially benevolent—for example, the automated technologies that have allowed Philip Parker, a French economics professor, to "compose" more than 200,000 books[20]—the unfettered advance of automated communication threatens not only our material livelihoods, but also the values of deliberative struggle and social reciprocity that are embodied in our everyday communicative practice.

Automation and immaterial labor

The prospect of automation has long captured the imagination of inventors and intellectuals. In particular, the design of machines that could imitate living beings—"automata"—has served as an ideal for technical achievement in diverse cultural milieus. The father of cybernetics, Norbert Wiener, once observed: "At every stage of technique since Daedalus or Hero of Alexandria, the ability of the artificer to produce a working simulacrum of a living organism has always intrigued people."[21] The Ancient Chinese and Greeks, for example, developed automata of varying complexity, and medieval Muslim inventors—such as al-Jazari—designed a number of extraordinary machines that could imitate animal and human behavior. Indeed, while al-Jazari designed hydropowered peacocks and musicians to entertain royal guests, perhaps his greatest achievement was the design of machine servants that could wash nobles' hands and serve them food.[22]

Al-Jazari's inventions exemplify the two animating tendencies of the automation drive. In the first, inventors designed extraordinary machines to entertain and marvel human audiences. During the Enlightenment, for example, animal automata like Jacques de Vaucanson's *Digesting Duck*, a proto gastrobot that appeared to eat, digest, and defecate, became popular attractions across Europe.[23] Yet Vaucanson and his fellow inventors were not content merely to build entertaining robots: a complementary tendency of the automation drive led to the design of machines that could *serve* humans. Just as al-Jazari built mechanical servants, later in his career Vaucanson began to design automated looms for the French silk industry. But when it became known that Vaucanson's silk loom would replace human laborers with hydropower and beasts of burden, silk weavers destroyed his new machine and chased him out of town.[24] While a defecating duck is all good fun, these eighteenth-century French workers, like the machine-smashing Luddites of the following generation, recognized the social threat posed by automated machine labor.[25]

Like Vauconson's attackers and their Luddite cousins, nineteenth-century intellectuals like Marx also recognized this threat. Although Marx's ambivalent stance on automation is well known,[26] he acknowledged that capital deployed automated machinery as a weapon against labor.[27] "For capital," Marx wrote, "the worker is not a condition of production, only work is. If it can make machines do it, or even water, air, so much the better."[28] Human labor, of course, is messy and expensive—not only is the worker lazy, unpredictable, and imprecise, but also s/he demands a living wage. These problems are inherent in a

human labor force, and they diminish capital's ability to produce profits. According to Marxist critic Ernest Mandel: "For the individual capitalist the struggle to raise the rate of surplus value found empirical expression in the struggle to force down the share of wages. The purpose of automation was to achieve this reduction, and simultaneously to reconstruct the industrial reserve army."[29]

Capital's quest to create surplus value easily leads to the application of technology to the labor process, and the automation of machinery was a major step forward in this development. These machines then tend to displace as many human workers as possible, moving most of the remaining human workforce into supervisory and auxiliary roles.

Following in Marx's footsteps, Nick Dyer-Witheford argues that this process is reflected in capital's historic quest to fragment, deskill, and, as much as possible, eliminate labor. For him, the "search for mechanical means to automate labor—both manual and mental—[is] the logical extension of the desire to reduce and eventually eliminate from production a human factor whose presence could only appear . . . as a source of constant indiscipline, error, and menace."[30]

Thus from the perspective of capital, the automation of labor helps eliminate this "human factor"—that is, those apparently constitutive characteristics of the human that lead them to make mistakes and fail to complete their tasks with the utmost haste and precision. This suspicion toward the human, in fact, lies at the very root of the automation drive, as even non-Marxist technology critics like Jacques Ellul have recognized. According to Ellul, in the labor process "every intervention of man, however educated or used to machinery he may be, is a source of error and unpredictability."[31] In the face of high-tech capitalism, the most appropriate role for the human vis-à-vis technology is one of subordination, supervision, and diminished responsibility. Otherwise, Ellul argues, the human "is ceaselessly tempted to make unpredictable choices and is susceptible to emotional motivations that invalidate the mathematical precision of the machinery. He is also susceptible to fatigue and discouragement. . . . Man must have nothing decisive to perform in the course of technical operations; after all, he is the source of error."[32]

In this relationship, therefore, the human is not valued for its ingenuity or creativity. Instead, when confronted with the cold efficiency of the machine, the human appears as just an organic collection of potential errors; as Ellul observed the automatic machine "must attain its result with mathematical precision, it has for its object the elimination of all human variability and elasticity."[33]

Yet, in contrast with industrial automation—which easily replaced repetitive physical human labor with stronger, faster machines—how can human variability and spontaneity be managed in the age of immaterial labor? In recent decades, the circulation of immaterial products—such as ideas, symbols, codes, images, and affects—has surpassed and transformed industrial and agricultural production.[34] During the course of this socioeconomic shift, the prospect of automation has attracted many industries that rely on communicative labor to persuade, transmit, calculate, soothe, sell, and satisfy. As I will discuss in greater detail below, we might consider how the affective labor carried out by advertisers is being revolutionized by algorithmically generated content; the relief, satisfaction, and other affects typically circulated by psychotherapists are now being produced by sophisticated computer software; and domestic affective labor directed toward children, spouses, friends, neighbors, the sick, and the elderly is in many circumstances being handed over to

machines that distribute a sense of well-being, health, security, and emotional warmth. Our traditional critiques of the political and cultural effects of industrial automation, therefore, will have to be revised to contend with the shift toward the automated production and circulation of ideas, codes, and affects. As digital technologies allow for the automation of communication—perhaps the defining activity of human community and of political life—one of the main contradictions facing digital capitalism is coming to the fore. Namely: capital must reconcile its desire to profit from human communicativity with its historic mission to eliminate the variability, contingency, personality, and political volatility of the human worker.

Ultimately, this troubled reconciliation poses a threat to the affirmative "biopolitical" potential that a number of scholars attribute to communicative labor. Describing this unique political potential, Michael Hardt and Antonio Negri identify how immaterial labor differs from its material counterparts: "The difference of immaterial labor . . . is that its products are themselves, in many respects, immediately social and common. Producing communication, affective relationships, and knowledges, in contrast to cars and typewriters, can directly expand the realm of what we share in common. . . . This becoming common . . . is the biopolitical condition of the multitude."[35]

By circulating the conditions of the common, this affirmative biopower makes possible creative human resistance to capital: as Ronald Greene puts it, communicative labor is

> a form of life-affirming constituent power that embodies creativity and cooperation. . . As a form of constituent power . . . [communicative] labor can never be reduced to its capture, command, and control by capital. . . . [T]he cooperative potential of affirmative labor, or more specifically the qualitative significance of communicative and affective labor, generates a productive excess impossible to calculate and control.[36]

According to Greene and his comrades, communicative labor produces the constitutive surplus that places the human subject and its communities beyond the domination of capital.

Yet as these scholars have recognized, capital can hardly be expected to ignore this potential site of self-fashioning and resistance.[37] Artificial intelligence and automation, in particular, have simply facilitated a more intensive regulation of our communicative culture, its speaking subjects, and the communities in which these subjects realize their biopolitical potential. Because this potential can only be fulfilled in the realm of common human experience, the widespread circulation of automatic communicating machines gradually reduces—in real terms—the opportunity and impulse for cooperative human struggle. For example, consider how Taylorist/Fordist regimes of industrial production alienated workers from their creative labor and from their colleagues by processes of surveillance, fragmentation, and deskilling. Workers were observed and studied, with an eye toward mechanizing their labor and eventually replacing them with machines. Along with this, the introduction of the machinic interface mediated production in such a way that workers depended on the machine rather than on their fellow workers and their own creativity. In the same way, the gradual process of automating communicative labor has required the monitoring of human communication, the analysis and mechanization of communicative interaction, and the ongoing circulation of automated machines into the center of our communicative culture. And the result, of course, is a familiar one: the immaterial products of the communicating machine, such as curiosity and care and

intimacy, are just the latest items that machines are recognized to produce more reliably, precisely, and cheaply than mere humans.

Thus as machines develop competency in interpreting and producing discourse, they are gradually taking over many domains of social life in which communicative labor is paramount. As a result, human subjects increasingly turn to speaking machines for the knowledge and affects that are the traditional products of human relationships. Consider, for example, how these machines are being deployed to soothe the sick and the elderly. Sherry Turkle has made some crucial observations of this growing social phenomenon, reflecting on how the "new normal" of artificial conversation partners threatens to radically disrupt our social obligations and, in the process, "remak[e] human values and human connection."[38] In a 2013 address to the American Association for the Advancement of Science, Turkle discusses a robotic baby seal that is designed to function as a conversational companion for older adults suffering from dementia or depression. While we might be inclined to applaud these therapeutic machines, Turkle reminds us of the great social consequences that accompany the development of human-replacing technologies:

> It's not just that older people are supposed to be talking. Younger people are supposed to be listening . . . . We are showing very little interest in what our elders have to say. We are building the machines that will literally let their stories fall on deaf ears.[39]

This is the first cautionary tale in Turkle's story: that when we automate the communicative labor that provides the very conditions of human sociality, "we are forgetting crucial things about the care and conversation that can only occur between humans."[40]

Yet Turkle also warns us of another social consequence: "In twenty-five years, human fallibility has gone from being an endearment and a tie that binds, to being an unnecessary liability."[41] Turkle, therefore, recognizes the underlying anxiety about human contingency that has fueled (and is fueled by) developments in digital automation. According to a tech journalist who attended Turkle's lecture, Turkle was responding to an emerging cultural consensus that

> robots could be better caretakers for the elderly, because they could be programmed with endless patience and would never be abusive, inept or dishonest. . . . In her interviews with people of many ages and backgrounds, Turkle has found that many now are coming to fantasize about robots that could serve as friends who would always listen to us, who would never become angry, who would never disappoint.[42]

By idealizing the machine, we learn to become impatient with the flaws and contingencies of our human relationships. Yet the affirmative biopolitics of communicative labor relies on the productive, spontaneous surplus of human communication to generate realms of dissent and creativity. In an era of automated communicative labor, however, those are the uniquely human qualities that are destined for management and elimination. Hence Turkle's warning about the unanticipated social effects of robotic companions: when we place robots in nursing homes, we risk losing sight of the inherent benefits of intergenerational rapport, as well as the tremendous social value of service-oriented communicative labor (to say nothing of collaborative political struggle). The automation of communicative labor thus plays an important role in foreclosing the possibilities of local, synergistic passion, decreasing the opportunity and impulse for humans to organize, struggle, collaborate, and sympathize with one another.

With the automation of communicative labor, therefore, the socially essential work of human communication is transformed into yet another domain of life drained of its spontaneity, contingency, and politically creative potential. The automation of our communicative culture thus threatens to siphon the biopolitical surplus from human communication: our political potential as speaking subjects is diminished as our social production is increasingly carried out with, by, and between machines. As we will see, this further delimits the domain of human-produced culture by pushing people out of communication-oriented jobs like journalism, it also (1) replaces unpaid human affective labor with the mimicked creativity and care of machines,[43] and (2) prevents human subjects from recognizing the micropolitical potential inherent in everyday communication, particularly as they pass through a growing number of mundane social and professional situations without interacting with their flesh-and-blood peers. Thus the inseparable ties between communication and care, sympathy, rebellion, and political creativity make the automation of communicative labor an especially urgent technocultural development, especially for those of us who hold out hope for the affirmative biopolitical potential of human communication.

The automation of written discourse

Blue-collar workers, of course, continue to bear the socioeconomic brunt of innovations in automated technology. Just as industrial automation displaced skilled machinists, weavers, and countless other professionals in the nineteenth and twentieth centuries, today automated trucks are putting big-rig operators out of work,[44] burger-flipping robots are displacing minimum-wage fast food workers,[45] and butlers and maintenance crews[46] are seeing many of their tasks relegated to obedient robots. Yet because of its interrelationship with immaterial labor, computerized automation poses a threat not only to the traditional blue-collar workforce but also to many pink- and white-collar professionals. Reflecting on this potentially radical socioeconomic shift, Justin Reich, a fellow at Harvard University's Berkman Center for Internet and Society, warns:

> Robots and AI will increasingly replace routine kinds of work—even the complex routines performed by artisans, factory workers, lawyers, and accountants. There will be a labor market in the service sector for nonroutine tasks that can be performed interchangeably by just about anyone—and these will not pay a living wage—and there will be some new opportunities created for complex nonroutine work, but the gains at this top of the labor market will not be offset by losses in the middle and gains of terrible jobs at the bottom.[47]

For Reich, therefore, "the middle is moving to the bottom"[48]—and the "middle" to which he refers, of course, is inhabited by millions of communication workers, and their fate in a rapidly shifting economy should concern those interested in the role of new media and rhetoric in the digital future.

"Robo-journalism" is perhaps the most interesting case in point. In March 2014, when an earthquake hit southern California at 6:25 a.m., the *Los Angeles Times* generated an account of the quake by 6:30 a.m. The *Times* was the world's first news organization to report on the quake not because its journalists are faster writers, but because it had invested in an algorithmic discourse generator called Quakebot. When a nearby earthquake meets a certain size threshold, the US Geological Survey feeds those data to the

L.A. Times' Quakebot, which then automatically composes a standardized news account on the quake. When the story is finished, it follows the same process as articles written by human journalists: it goes to an editor's desk for approval. Appearing under the byline of *Times* journalist and programmer Ken Schwencke, Quakebot's remarkable story appeared in this form: "A shallow magnitude 4.7 earthquake was reported Monday morning five miles from Westwood, California, according to the US Geological Survey. The temblor occurred at 6:25 a.m. Pacific time at a depth of 5.0 miles. According to the USGS, the epicenter was six miles from Beverly Hills, California, seven miles from Universal City, California, seven miles from Santa Monica, California and 348 miles from Sacramento, California. In the past ten days, there have been no earthquakes magnitude 3.0 and greater centered nearby."[49] Acknowledging that Quakebot's story was not especially complex or insightful, *Slate* journalist Will Oremus described the relative advantages of automated communicative labor: "The algorithm's goal, Schwencke says, is not to write a compelling or insightful story. That's up to the *LAT*'s human staff. Rather, it's to 'get the basic information out' as quickly and accurately as possible."[50] Although human journalists might develop a more rhetorically appealing product, they simply cannot produce a news story in three minutes.

Although journalists like Schwenke doubt that robo-journalism will come to dominate the profession, others disagree. Northwestern University computer scientist Kristian Hammond, for example, whose company Narrative Science develops algorithms for automatic news production, estimates that by 2030, 90 percent of news stories will be bot-generated.[51] While Hammond's prediction might contain a hint of professional bluster, the automated writing industry is reaching an astonishing degree of productivity. In 2013, Durham, North Carolina's Automated Insights used algorithms to automatically generate 3.5 million prose reports from its clients' data, and this year it estimates it will produce more than one billion.[52] Automated Insights boasts that its Wordsmith program "transforms Big Data into narrative reports by spotting patterns, correlations and key insights in the data and then describing them in plain English, just like a human would."[53] This is carried out by Wordsmith's algorithmic "natural language processing," a type of artificial intelligence that domesticates large data sets into "natural" human prose. This process has proven so successful that on June 30, 2014, the Associated Press announced that soon "the majority" of its corporate earnings stories would be produced by automatic prose generators.[54] The extreme rise of productivity that accompanies automated communicative labor —with Wordsmith, AP expects to boost its corporate earnings analysis by more than a factor of ten—undoubtedly threatens the jobs of countless journalists and other writers. Unlike human journalists, computers do not get sick, they do not need to be paid a living wage, and they do not clamor for things like air conditioning, maternity leave, or health benefits. Just as important, of course, is that robo-journalists can research and produce much more content—and can do so infinitely faster—than their flesh-and-blood competitors.

Part and parcel of this displacement is the rise of a radically customized and privatized textual experience. The emergence of Web 2.0 and its successor technologies, of course, has led to the proliferation of personalized online content. Instead of accessing database-linked HTML hypertexts that are the same for every web browser, users now encounter content that is highly customized based upon their complexly generated algorithmic identities.[55] In fact, one of the most interesting innovations facing digital journalism is

the automated production of personalized written discourse. Concerned about these trends in widespread text customization, technology critic Evgeny Morozov asks:

> What if we click on the same link that, in theory, leads to the same article but end up reading very different texts? . . . Imagine that my online history suggests that I hold an advanced degree and that I spend a lot of time on the websites of the Economist or the *New York Review of Books*; as a result, I get to see a more sophisticated, challenging, and informative version of the same story than my *USA Today*-reading neighbor. If one can infer that I'm also interested in international news and global justice, a computer-generated news article about Angelina Jolie might end by mentioning her new film about the war in Bosnia. My celebrity-obsessed neighbor, on the other hand, would see the same story end with some useless gossipy tidbit about Brad Pitt.[56]

Morozov sees the shadow of a digital future in which we have surrendered our public culture to machines. There is simply no way that human journalists can mimic the customization promised by robo-journalism, as each reader will be greeted with a unique textual product. The age of digital automation is thus giving birth to communicative norms that cannot possibly be filled by human subjects, as customized discourse production far surpasses the physical and cognitive capacities of human agents. By consequence, human subjects will unwittingly find themselves consuming texts written not by their flesh-and-blood peers, but by automated machines. This atomization and privatization of the communicative experience illustrates one way in which digital capitalism is likely to navigate the tensions between the necessity of communicative circulation and the control of discoursing subjects: public discourse will be increasingly privatized under the logics of automatic customization, while the costly, unpredictable biopower of the discoursing subject will find itself confined to domains of heightened supervision, control, and inconsequence. Therefore, one of the most obvious social cognates of this automation is the emergence of new general norms of cultural production and consumption: the same values of efficiency, speed, and privacy that drive robo-journalism infect our social practices and worldviews, as artificial intelligence generates a new way of being-with-technology that remakes our expectations of ourselves and of one another.[57] In a similar warning that harkens back to the Jacques Ellul epigraph with which I began this article, Nick Dyer-Witheford begs us to recognize: "Capital is automating not just the factory, but the entire social factory."[58] It is, indeed, replacing us to a greater degree than we realize.

The automation of oral discourse

In spoken discourse, trends in automation can be broken down into two general areas: simple interactive voice response systems and more complex agents such as natural language chatbots (some of which are complemented by robotic bodies or screen-based representations of speaking faces). The former, interactive voice response systems, are already prominent in American interactive culture. Take for example the rise of the automated attendant. The most popular example of this is Siri, the interactive "voice assistant" that Apple introduced in 2011, although competitors like Microsoft's Cortana, Amazon Echo, and Google Now are also growing in popularity. While it is obvious that computerized voice assistants are much cheaper to employ than their flesh-and-blood competitors, they are also recognized to be smarter, have better memories, and be available twenty-four hours a day. As *Forbes* Magazine reports, "In a few years, the roles and abilities of virtual

assistants will be very different than today's. For starters, they'll be able to learn and adapt. Much of that change will be applied to analyzing the big-data details of you and your context. They'll come to know you better than a *human* assistant might."[59] While it is difficult to say whether a computerized assistant can "know you better" than one of its human counterparts, computerized assistants *can* create an extraordinarily complex algorithmic understanding of your habits, inclinations, flaws, and possible vulnerabilities. Fine-tuned with big-data-driven artificial intelligence, the wager is that automated voice assistants will be able to address their clients' needs and desires in ways that human kairotic intuitions could never grasp.[60]

With virtual assistants, we see how the intelligence and processing speed of the machine are whittling out larger domains of communicative culture in which flesh-and-blood humans simply cannot participate. In the words of Mark Andrejevic, automated voice assistants and similar technologies are driven by a "logic of customization" that addresses their users at a molecular level.[61] By recording and learning their users' habits and personal characteristics, and then analyzing those data alongside millions of other data points gathered from other users, technologies like automated voice assistants assign users an algorithmic identity that can then be addressed by meticulously customized assistance. The communicative labor offered by personal assistants in the past—appointment reminders, colleague contacts, special requests and inquiries, the preparation of reports, and so forth—can now be performed by computerized agents that function on algorithms and thus have the capacity to learn these processes much more thoroughly than humans. Moreover, few human personal assistants can translate into foreign languages, warn you of traffic jams, and instantly answer questions about pop culture or history. Automated voice assistants like Siri, Google Now, and IBM's Watson can, however.[62] These highly intelligent communicative agents are thus becoming increasingly popular as human assistants are found to be too costly, limited, and inefficient. This comes along with diverse economic and social costs: while hundreds of thousands of women have lost jobs in office and administrative support during the last several years,[63] human subjects of diverse class backgrounds learn to idealize the reliability and precision promised only by machines. Just as with robo-journalism, this fuels cultural momenta that have no patience for the imprecision of human variability or the semiotic confusion of human communication.

In perhaps the most interesting example of automated oral discourse, we are also seeing the rise of highly intelligent—and increasingly realistic—natural language chatbots and talking heads. One of these talking heads, named EHeBby, appears on a screen with a dynamic multidimensional face. To ensure a highly convincing interaction, EHeBby integrates databases of speech fragments, mouth gestures, and emotions. Describing how they use corpuses of "visemes" to link facial and spoken expressions, EHeBby's designers describe: "A set of faces with different poses is generated to represent a 'viseme,' which is related to a phoneme or a groups of phonemes. A phoneme is the elementary speech sound that is the smallest phonetic unit in a language. The viseme is the facial pose obtained by articulatory movements during the phoneme emission."[64] EHeBby's advances in "computational humor,"[65] therefore, can be traced to its sophisticated capacity to link up visemes with spoken discourse, as well as its ability to detect emotion in its interlocutors' speech. To simulate everyday conversation, EHeBby is outfitted with a "reasoner" that has two main components: a humoristic *recognition* area, which allows EHeBby to

search for and recognize funniness in its interactions with human interlocutors, and a humoristic *evocation* area, which allows EHeBby to respond with an appropriate degree of humor.[66] These two components are integrated with what the designers call an "emotional area," which "allows the chatbot to elaborate information related to the produced answer and a correspondent humor level in order to produce the correct information needed for the talking head animation."[67] While EHeBby is certainly an impressive specimen, it is hardly the only talking head that functions on computational humor—research in this area is growing, and wittier, more intuitive, and more sympathetic bots are on the horizon.[68]

While EHeBby is not employed for commercial purposes, its brand of automated communicative labor has certainly drawn the attention of the psychotherapy industry. Virtual therapists, for example, are now used to interview US military veterans to establish preliminary diagnoses of posttraumatic stress disorder (PTSD). With the help of "Sim Sensei" and similar software, veterans sit before a screen while a three-dimensional agent—who is equipped with remote control and fully autonomous modes—asks them standard questions while analyzing their movements, facial expressions, and speech.[69] These virtual therapists' "multimodal corpora"—which are informed by a software suite that interprets the veterans' speech and movements—allow them to fine-tune their communicative strategies while also making preliminary diagnoses that can be passed along to a certified flesh-and-blood therapist. As military personnel return from the wars in Iraq and Afghanistan, many of them are beset by PTSD and similar maladies: in December 2012, the Department of Veterans Affairs released a stark report revealing that veterans returning from Operation Enduring Freedom, Operation Iraqi Freedom, and Operation New Dawn are suffering from PTSD at a rate of almost thirty percent (or nearly a million veterans).[70] Amid Obama administration promises to improve care and benefits for returning veterans, to save costs and boost efficiency DARPA is funneling substantial financial resources into the research and development of "cost-effective"[71] virtual therapy. Thus as scandals, budget woes, and understaffing plague the Department of Veterans Affairs like never before, automated therapy has become an increasingly attractive option. The injured soldiers that have been fobbed off onto these therapeutic communication machines, however, are less enthusiastic. For many of them, virtual therapy is hopelessly "impersonal."[72] Indeed, this response to automated psychotherapy displays a remarkable level of insight: like other forms of automated communicative labor, automated psychotherapy provides an impersonal whiff of human communicativity while allowing capital to eliminate the unpredictability, contingency, and expense of the speaking human subject.

Conclusion

There are a number of ways to engage these socially destructive developments in the automation of communicative labor. A good first step is confronting the tradition of passionate digital optimism that James Carey dismissively called "the technological sublime."[73] Enthusiasm for automated technologies is hardly new, of course. Nearly 2000 years before the emergence of industrial automation, Aristotle predicted that automated technologies would liberate humankind from the toil of work: "if. . . the shuttle would weave and the plectrum touch the lyre without a hand to guide them, chief workmen would not want servants, nor masters slaves."[74] Even Marx, who foresaw the dangers

posed by automated labor, ultimately dreamed that automation could give rise to the "social individual" and the decline of capitalist exploitation.[75] Even if we agree with Aristotle and Marx that in some circumstances these technologies could have tremendous social and political potential, the present convergence of high-tech capitalism and digital automation calls for a cautious, critical assessment of emerging technologies that automate the work of writing and speaking. In the words of Norbert Wiener, we

> cannot always justify the naïve assumption that the faster we rush ahead to employ the new powers for action which are opened up to us, the better it will be. We must always exert the full strength of our imagination to examine where the full use of our new modalities may lead us.[76]

Following Wiener's insightful advice, we will have to develop a more robust understanding of the challenges facing our colleagues and comrades in diverse fields of communicative production. Perhaps the more optimistic among us will conclude that automated communicative technologies will open the door for new forms of creative work; that was the sentiment, indeed, of fifty-two percent of technology experts questioned in a 2014 Pew research survey.[77] The rest of us, however, will side with the forty-eight percent of those experts who foresaw tremendous potential for social alienation and labor displacement (not to mention the poisonous implications of an increasingly dehumanized communicative culture). In the face of these exciting threats and challenges, some of the less hopeful among us might be inclined to follow Jeremy Packer's provocative invitation to "turn off all media."[78] Yet as more scholars are displaced and impinged on by technological innovations—contributing, no doubt, to a collective sense of insecurity within the digital university—some of us might be more inclined to follow the weavers who, facing Vaucanson's automated loom, organized against the social machinery that was designed to make them politically irrelevant.[79] While that might mean pranks, hacking, withdrawal from certain sectors of the economy, or other intelligent means of cooperation and rebellion, it will certainly entail diverse forms of activism against the forward march of automated technologies—for example, the kind recently exhibited by Lester Perelman, a writing professor at MIT who recently ignited a national controversy about the automated professoriate. With an act of creative defiance, Perelman exposed the idiocy of computerized essay grading by developing a computer program that randomly produced nonsense essays that received perfect scores from automated grading systems.[80] Regardless, while the automation drive will undoubtedly survive such small blows, we would do well to recall Wiener's assertion that we cannot remain "naively" agnostic on the question of automated technology. It is a matter that will have to be dealt with, or it will certainly deal with us.

Notes

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