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ORIGINAL ARTICLE

Automating Essential Work: News Media and Technology Hype in a Critical Sector 2014–2024

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ABSTRACT

The Covid-19 pandemic brought renewed attention to how Artificial Intelligence might be used to address the everyday challenges of low-wage work now deemed "essential." In this paper, we perform an exhaustive analysis of local and national U.S. news reports about automation, robotics, and AI in the recycling sorting industry over the last 10 years (2014–2024). Workers' efforts to sustain operations of this critical sector during the pandemic occurred within a context of media hype that presented AI as a solution to the public health crisis—in addition to the problems of contamination and labor costs that had concerned the industry for years. Our analysis reveals that the discourses around automation and AI are qualitatively different: moving from claims about efficiency to claims about accuracy with a diminished discussion of technology's fallibility. Technology company executives only appear as sources when AI is introduced to the industry. Throughout our dataset, the perspective of workers was almost entirely absent, and no recycling sorters were quoted as sources. In response, we advocate for the practice of solidarity journalism in new stories about workplace automation and call for workers inclusion in public dialogues about the impact and future of AI.

KEYWORDS

News media analysis; technology; labor; artificial intelligence; hype

The center feature of the *Wall Street Journal*'s November 2023 special section on Artificial Intelligence focused on a surprising and seemingly niche topic: recycling sorting (Holger 2023). The spread spanned both interior pages, with a headline that asked "Can AI Rescue Recycling?" It was the most recent in a wave of news articles published in outlets like the *New York Times* and *Forbes* that all reflect on the possibility of AI to address the industry's labor gap (Cai 2020; Corkery and Gelles 2020). Sorting recycling is a quintessentially dirty job with a high turn-over rate. It is a paradigmatic example of the kind of work society seems willing to hand over to AI. Yet, stories like these obscure the estimated one million people who continue to work in an industry that has used mechanical and computer-aided forms of automation for decades (EPA 2001). AI is just the most recent advance. The news stories feature quotes from the executives of robotics companies and sorting facility

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directors—but the people who work to correct, calibrate, and care for these machines are noticeably absent from the media hype.

In the following article, we perform an exhaustive analysis of local and national U.S. news reports about automation, AI and robotics in the recycling sorting industry across a ten-year time span: before, during and after the peak of the Covid-19 pandemic. Business consultancies have termed the pandemic period "the great acceleration" for its driving impact on trends towards digitization (Amankwah-Amoah et al. 2021). Recycling sorting, as a field, represented a "critical sector" during the pandemic. Millions of essential workers performed similar duties amid the public health crisis. This newly visible work occurred alongside automated technologies that were being celebrated as a solution to worker safety and supply concerns, because they would be "laborless." We use Hodgetts and Chamberlain's (2014) method of News Media Analysis to examine how technologies and workers are characterized in U.S. news media—bringing attention to the promise of automation for solving problems and who gives voice to that promise.

By investigating a single industry impacted by AI over time, we seek to discontinue a chain of AI hype (that is, at times, inadvertently perpetuated in academic analyses) by grounding claims about the technology's benefits and limitations as relative to a specific set of problems and existing solutions within a specific use-context. General artificial intelligence—that is, AI that can perform all human skills and behaviors—does not exist and AI is currently designed to perform specific tasks (Goode 2018; Stone et al. 2016). Yet, most often, journalism studies aggregate mentions of AI across news articles that are about various sites of AI application, ultimately interrogating AI as a singular entity.

As Guzman (2018) argues, human-machine communication involves not just people exchanging information with or through machines. It also includes the cultural understandings *around* machines that provide the interpretive frameworks for how people make meaning from human-machine interactions. For AI in particular, these frameworks often come in the form of media reports and academic publications that debate AI's benefits and harms. Suchman (2023) critiques these conversations for passing over more basic questions about a technologies' state of development—whether that be speculative, experimental, prototypical, or established—in such a way that it presents AI as a stable object rather than an emerging cluster of computational capabilities. Accordingly, Broussard et al. (2019) implores writers to dedicate more space to basic explanations of the technology and to carefully distinguish between the systems at work.

This article situates AI as part of lineage of technologies within a single industry, allowing us to identify a qualitative difference in the media coverage about *automation* and *artificial intelligence* in the recycling sorting industry. We find that the introduction of artificial intelligence shifted the prevailing narratives about the benefits of technology from claims about efficiency to claims about accuracy. With this shift, came a diminished attention to the technology's limitations. In the years leading up to the Covid-19 pandemic, these uncritical representations of emerging AI smoothed calls for rapid technology adoption during the crisis that continue unchecked still.

Importantly, technology company executives only begin to appear as sources in our dataset when artificial intelligence is introduced to the industry. These findings

are consistent with recent journalism studies that find an overrepresentation of corporate perspectives in news stories about AI (Barakat 2024; Brennen et al. 2018). Our analysis also indicates that no relevant news article published in the last decade quoted the perspective of on-the-ground workers. This is especially significant because those who work alongside automation are intimately acquainted with the technology's limitations. In response, we advocate for the concept of solidarity journalism (Varma 2025) as capable of including workers who are marginalized by technology hype.

News Media and the Production of Hype

"Innovation-centric" discussions of technology emphasize the design and novelty of new artifacts, instead of how they function in practice or how they are maintained (Shapin 2007). These discussions tend to leave the realm of tangible, measurable technological change and instead take the form of a "sales pitch about a future that does not yet exist" (Vinsel and Russell 2020, p. 13). They become hype. As Schütze (2024) argues, AI is as much an ideology as it is a technical reality. The discourse surrounding AI produces "a complete cultural horizon enriched with narratives and visions that influence the development and use of technologies" (p. 8). For example, in their thematic analysis Johanssen and Wang (2021) observe that technology journalists freely map human characteristics, such as intuition, onto AI. In doing so, the tech press contributes to the (inaccurate) public perception that inscrutable human experiences can be mechanized and charts a path for technology development towards increasing humanness.

News media hype has played a pivotal part in the development of AI technologies since the establishment of digital computing in the 1950s. Hype fuels periods of AI expansion through boosting the confidence of venture funders which are cyclically followed by "AI winters," when both journalists and venture capitalists come to terms with the actual capacities of AI technology (Floridi 2020). Accordingly, journalism scholars have systematically studied the production of AI hype using the disciplinary approach of frame analysis to identify how the topic is contextually presented in news articles as well as the articles' overall tone. Kubler's (2020) qualitative frame analysis of news stories in the business press finds that, in the years following the great recession, discussion of technology's potential effects on employment (e.g., the availability of jobs and the quality of work) were almost all positive or neutral in tone. However, when American newspaper articles *did* frame AI in terms of its risks, they frequently discussed the potential of job loss (Chuan et al. 2019). In the *New York Times,* the anticipated impact of AI on workplaces has been a persistent theme of reporting over the last three decades and coverages has become more pessimistic overtime (Fast and Horvitz 2016).

Though hype may herald the potential for AI to address inefficiencies or reduce tedium, critical technology scholars have argued automation does not replace workers outright as some pundits insist but instead fragments their labor into more discrete tasks performed by workers who are often obscured (Gray and Suri 2019; Irani 2016). Take, for example, the "fully automated" Amazon Go store where shoppers could buy items by pulling them off the shelves and just walking out the door. The stores reportedly used sensors and AI to determine customers' purchases, though *Wired*

acknowledged descriptions of how the technology operated were steeped in "buzzwords" and that "details were hazy" (Alba 2016). When the pandemic made limiting contact between cashiers and customers a necessity, the Amazon Go stores (which had been in development since 2016) were predicted to be newly "viable" by the *New York Times* (Corkery and Gelles 2020). However, 4 years later, investigative journalists revealed that thousands of remote workers in India manually reviewed about 70% of transactions through video observation of customers in stores (Wayt 2023). It is news stories like these that Neff et al. (2020) identify as revealing the gaps, limitations and failures of AI—including recurrent failures of AI to be *artificial* at all.

Media hype is consequential because it participates in producing the reality it seems to describe. Silicon Valley's tech visionaries push an ideology that Zuboff (2019) calls "inevitabilism." In predictive claims about a technology's impending ubiquity, they "bind past, present, and future together as though fated" (p. 221). Yet, the technologists she interviewed working behind-the-scenes generally held the perspective that inevitability is an economic tool; less a genuine forecast and more intended to drive sales. Scholars who study sociotechnical imaginaries illustrate that these pro-innovation discourses (often presented in media) are reflected and furthered in government policy documents, where implementation of AI is constructed as both *inevitable* and *necessary* (Bareis and Katzenbach 2022; Brevini 2021). Narratives of necessity combine with a lack of explanatory information to produce what Campolo and Crawford (2020) call "enchanted determinism." The machine learning algorithms that power AI are portrayed as beyond human legibility while being deployed in deeply human contexts. Hype-driven discourses of technological magic not only power belief in as-of-yet unrealized technological capabilities but also conceal the actual work of producing these technologies (Elish and Boyd 2018).

Communication scholars have long contended with how the media upholds systems of power through limiting who may "publicly articulate their preferred system of ideas" (Lull, 2000, p. 14). This is especially true of corporate ideologies in the United States, where the media circulation of pro-business ideals such as efficiency and economic growth—so evident in the conversation around AI—are naturalized in American culture (Deetz 1992). Herman and Chomsky's (2002) landmark book, *Manufacturing Consent,* recognized that the legitimacy journalists confer upon corporate experts functions as a "filter" for news content (p. 18). Indeed, the selection of sources is one of the primary ways the news media shapes expectations around emerging technologies (Brennen et al. 2022). Recent research reveals that across a three-month period in 2024, at least 60% of the people quoted or referenced in *New York Times* articles about AI worked in the commercial technology industry (Barakat 2024). Similarly, in their systematic analysis of UK news publications in 2018, Brennen et al. found that 33% of news sources were industry experts, more than twice the number of academic researchers (Brennen et al. 2018).

We approach our research in light of these scholarly conversations, seeking a better understanding of the media narratives about automation that came to the forefront during the Covid-19 pandemic. As Naomi Klein argues in *The Shock Doctrine* (2007), moments of social crisis are often seized upon to further the economic interests of the powerful. We analyze a decade of American news reporting around a critical work sector to identify the degree to which pandemic narratives were a departure from

or a continuation of previous discourses. We take-up Barbour et al.'s (2023) call to advance studies of automation within the field of communication by analyzing automation as a discourse. This research agenda includes empirical questions (e.g., "What are the conversations?") and critical question (e.g., "Who gets to have a voice?") (p. 282). Thus, our research questions are: How are machines and workers characterized in news articles about automation? And whose perspectives on automation are included?

Methods

Empirical Context

A simple definition of Artificial Intelligence is difficult to pin down because it is not a singular general-purpose technology (Stone et al. 2016). Rather, artificial intelligence is a historical label that has been applied to a broad range of technologies that can think or reason like humans (Campolo et al. 2017). In the field of recycling sorting, the term AI is applied to technologies that achieve the task of *recognition*. AI-powered machines such as the Cortex made by AMP robotics are "intelligent systems" that combine cameras, computers, and robotic arms to identify, pick, and sort various materials that enter material recovery facilities on conveyor belts. They are sold on the manufacturers' websites as imbuing machines with the capacity to see like humans while simultaneously reducing the need for human workers (Hsiao and Shorey 2025).

Prior to the introduction of AI, the most advanced technologies in the industry were "optical sorters" which use computers and infrared light to categorize objects but do not use machine learning. Recycling sorting is also enabled by a wide array of complex automated machines, which do not involve computation. Machines like cork-screw shaped screens and magnetic barrels automatically sort materials mechanically, using physical properties like weight and polarity. Despite these technologies, field research makes evident that human workers perform vital labor to prevent, troubleshoot, and compensate for the routine failures of automated systems in this industry (Fox et al. 2023). The reality of recycling today is that waste streams are sorted through a combination of digital technologies, mechanical technologies and coordinated human work.

Data Collection and Analysis

This article is based on a qualitative content analysis of 82 newspaper and magazine articles published about the recycling sorting industry between 1 March 2014 and 28 February 2024. The articles were analyzed using Hodgetts and Chamberlain's (2014) method of News Media Analysis. News Media Analysis is a critical social scientific approach to the study of text, conducted from the perspective that news media shape public understandings of social issues and ultimately societal relations. It pays specific attention to "how controversies surrounding issues of public concern are played out, who are identified as key stakeholders, and how their positions with the controversy are constructed" (p. 3). News Media Analysis is conducted using the practice of "gridding" in which each article is systematically analyzed on an axis of questions—breaking

down text to reveal patterns across stories (p. 8). We performed gridding collaboratively through an iterative process where we independently immersed ourselves in the data, recorded our observations in response to the standardized grid, and discussed what we noticed in weekly meetings. This process was guided by an interpretivist approach: the goal of both researchers was to deepen and complicate emerging patterns to develop our understanding or yield new insight (Soden et al. 2024).

Our data set was constructed through a search-query of the NexisUni[1] database of English language articles. Because recycling policies and procedures vary widely by country, we also limited our search criteria to articles from United States-based publications. Using NexisUni, we performed a search for newspaper and magazine articles that contained the terms for our field (Recycling OR Material Recovery AND Sort) as well as terms for the technologies of interest (Robot OR Artificial Intelligence OR AI[2] OR Automation). These terms were validated using iterative rounds of search refinement, seeking to capture the greatest number of articles that discussed automated technologies within the recycling sorting industry.

A search-query with the outlined criteria returned a total of 716 articles that were then hand-coded for relevance. Articles were excluded that were not topically focused on single-stream recycling (typically about recycling in other industries, such as textiles) or were unrelated (such as film reviews, that referred to derivative storylines as "recycled"). Articles printed in multiple publications were grouped. This resulted in a

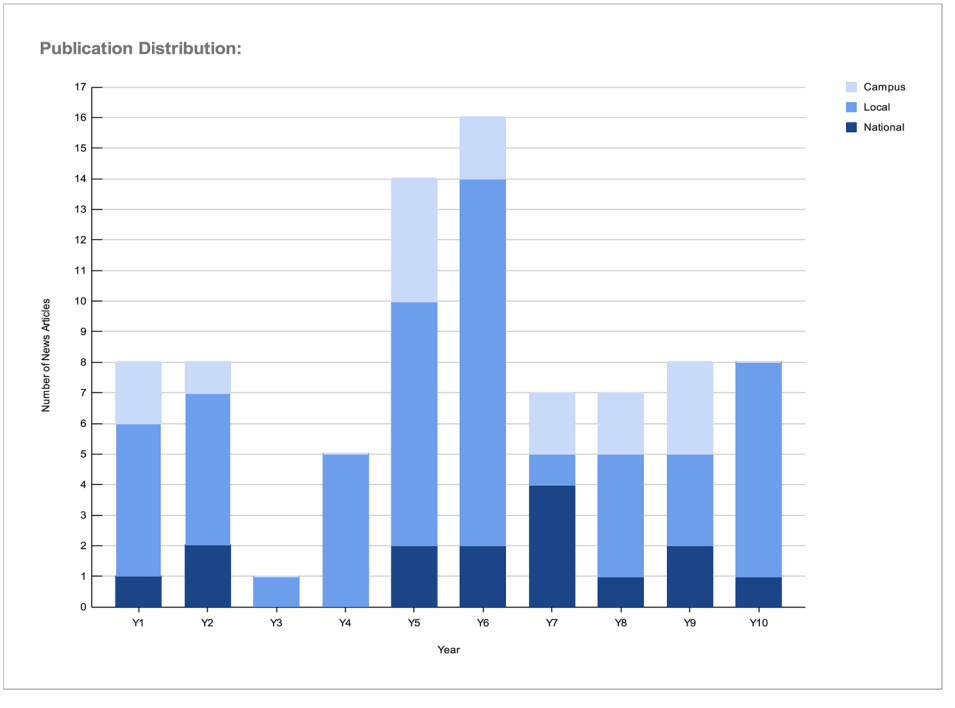

Figure 1. We analyzed articles from national newspapers and magazines, local newspapers (covering regional, state, metropolitan, or city areas), and campus student newspapers. Except for year 7, the majority of the articles we analyzed were from local news sources for each year.

final dataset comprising 82 unique articles (Figure 1). The final data set was purposively separated into three periods: (1) Prior to the pandemic, 1 March 2014–28 February 2020; (2) Peak pandemic, 1 March 2020–28 February 2022; and (3) After the peak pandemic, 1 March 2022–28 February 2024.

Findings

Period 1. Prior to the Pandemic: 1 March 2014–28 February 2020

Separating Single-Stream

Within the United States, recycling sorting technologies are typically part of a "single stream" recycling system. Rather than consumers separating paper, plastic, and glass in their homes or businesses, they deposit all the items in a single curbside recycling can that is delivered to a material recovery facility (MRF). As discard studies scholar Liboiron (2013) argues, modern waste is defined by its heterogeneity. The loads of material that arrive at MRFs are jumbled up, varied and inconsistent—filled with paper, aluminum, multiple types of plastic, and items that are not recyclable at all. To be recycled, the items that are commingled in waste streams need to be grouped by material similarity so they can be baled, sold, broken-down, and used as a stock for the manufacturing of new products. All labor and technologies in an MRF are engaged in the shared, central task of separation.

In 2015, communities across the United States were adjusting to recently implemented single stream recycling processes and meeting them with curiosity and, at times, confusion. Single-stream recycling had quickly become the prevailing method of recycling in the decade prior to the first period of our dataset: increasing from 29% in 2005 to 80% by 2014 (Koerth 2019). Yet, once recyclables leave curbside bins, operations are mostly obscured from view in remote facilities. In the spirit of demystification, newspaper articles offered readers an in-depth explanation of recycling sorting facilities which focused on the complexity of operations. In these articles, recycling sorters and sorting machines were depicted as working in tandem in step-by-step tradeoffs for specific tasks. Computationally enabled technologies appeared both by their technical names (i.e., "optic sorter") and in vernacular terms (i.e., "air blaster") and were described in sequence, with other machines like conveyor belts, magnets, and tumbling cogs. Human workers were represented as playing an important part in sorting processes, especially in their role as pre-sorters. Pre-sorters prepare waste streams for processing and protect machines from being damaged by large, non-recyclables items that consumers mistakenly or carelessly place in recycling bins. Indeed, mechanized recycling sorting would not be possible without this preventative, initial step that contends with objects so varied it cannot be automated with current technology.

Though humans and machines were represented as interconnected in these articles, they also offered readers an assurance about the burden of labor—recurrently describing the process as "largely automated" *[3]*[3] with machines that do "most of the work" [38]. For example, when Bowling Green State University implemented single stream recycling, a college sophomore questioned if the switch would require "more work

on the back end." The university's sustainability coordinator assured her it was "very automated," referring to the mechanical technologies that separated materials in the facility [6].

Recyclables Resold

The profit margins of MRFs—and financial viability of recycling, as an industry—are determined by the costs incurred to sort recyclables and their fluctuating resell price. The challenges of this economic model were exemplified in eight articles that traced the automation of an MRF in High Point, North Carolina across a four-year period. The coverage began when the city council debated a bond referendum that would allocate $3.5 million dollars to upgrade a local recycling facility that had "historically operated at a financial loss" [4]. In reporting on potential options, each of the initial articles included the *unattributed* perspective that automation would make the sorting process "less labor intensive" [4, 5, also 7]. The city ultimately decided in favor of the upgrade and the Assistant Public Services director speculated that the new "fully-automated" [17] sorting lines may make it unnecessary to fill the seven vacant full-time positions at the facility—though "some manpower will still be required" [17]. He, and other proponents of the upgrade, pointed to automation as the pathway to profitability. It would increase the amount of waste the facility sorted while simultaneously making the process less expensive through the reduction of labor costs. When the facility opened four years after the referendum, a celebratory article reported that the MRF "passed its first big test with flying colors." Despite the original doubts about the upgrade's value, the machines seemed to fulfill all the goals as it helped put the facility "way ahead of schedule," processed materials "more efficiently" and "already saved" the MRF more than $100,000 that year in labor costs [32].

The business-case for automation came to the forefront of news reporting in 2017, when a change in Chinese policy known as Operation National Sword placed stringent quality standards on recyclable materials entering their country. Prior to 2017, China had been the largest buyer of global recyclables and purchased an estimated 70% of the world's discarded plastic (Joyce 2019). The large-scale shift in the recycling sorting market put sudden and intense pressure on MRFs, and journalists reported upon an industry in "crisis"[4] [30, 33, 42]. MRFs had to comply with global changes in policy at the municipal and regional level where recyclables are typically sorted. In the wake of National Sword, several local newspapers detailed how MRFs had begun to upgrade their operations in hopes that AI and automation could increase efficiency, cut back on labor, and improve accuracy [33, 42]. Because automated technologies could lower costs as revenue fell, they might preserve profit margins.

Almost all discussions of existing technologies in the recycling sorting industry were procedural in nature prior to the enforcement of Operation National Sword—predominantly using generalized references to "automation." The crisis brought greater journalistic attention and specificity to technological aspects of the process. Initially this involved optic sorters, the state-of-the-art in 2017. The technology was explained with esteem by Boulder county's Recycling Sorting Operations Analyst, who described the machine's ability to visualize objects and change priorities through its internal computer [25].

Operation National Sword co-occurred with the first mention of AI technologies being integrated into recycling sorting facilities in 2017 [19]. A later article by the Mankato, Minnesota *Free Press* gives an account of the "trashed" recycling market and the innovative technologies that two local facilities were using to produce "cleaner recyclables at a more efficient cost:" optic sorters, artificial intelligence arms, and other robotics. "There's more robotics and optics coming," the owner of a recycling collection company forecasted [34]. Though unnamed in this article, the AI arms installed in the facility were profiled by another Minnesota paper a year earlier as "the first of their kind" in the country and were then designated as "still in development." Produced by the company AMP robotics, the robot was characterized in human terms. It had a "craving for cartons" and "it decides what's going to be important" after being trained on images [19].

Overcoming Contamination

Over the next several years, the news media presented two potential solutions to the crisis of National Sword and the problem at the center of this policy: contamination. Contamination refers to the presence of objects that are either soiled or miscategorized in sorted, baled material. These items introduce impurities that inhibit the homogeneity needed to return recyclables back into a single feedstock. In an article published in *USA Today,* the journalist summarized the causal explanations of spokespeople from waste management organizations located throughout the United States. "The problem, in large measure, surrounds how Americans recycle" [33]. Addressing this problem required either improving the recycling practices of citizens in their homes or rectifying these mistakes, after they occurred, in recycling sorting facilities.

Newspapers published at least a dozen articles in the spirit of public education in the first period of our dataset. Many of the articles sought to correct misunderstandings about what is recyclable and spur more responsible behavior by citizens. They explained that attempts to recycle items that were ultimately non-recyclable makes sorting more difficult for MRFs and degrades their product. The term "wish-cycling" or "wishful recycling" was coined during this period to describe well-meaning but incorrect consumer recycling practices (Altman 2021) and appeared in several articles. Attempts to encourage discretion from citizens represented a significant pivot in public messaging around recycling which had, until now, mostly focused on encouraging people to recycle at all. "It's hard to say this—because for years we've been trying to get people to do more recycling—but 'When in doubt, throw it out,'" a recycling facility director explained [37]. It challenged the logic of single-stream recycling programs, which sought to reduce the complexity of separation for consumers in exchange for their widespread participation [52].

Improper disposal by citizens was condemned by various country officials as a burden to recycling workers and machines. For example, plastic bags were a recurrent focus [35, 37, 45, 46]. Described as the "bane" [35] of the recycling sorting industry, plastic bags wrap around sorting machinery and cause downtime when they need to be removed. This, and other forms of wish-cycling, were depicted as requiring additional labor from pre-sorters and sorters on the line. An article published in Salt Lake City's local newspaper described sorters tasked with removing "200+ diapers from the material stream" each 8-h workday [47]. In these accounts, workers were

sometimes invoked directly [e.g., 38] but in others, they were reduced to their cost for organizations—which had to spend "time and money" to clean out machines [45].

Though automated technology was generally depicted in news articles as capable of increasing the volume of materials processed by MRFs and decreasing their operating costs, the machines were also depicted as fallible and fragile. Machines could be jammed and clogged up. The media narratives that circulated in response to National Sword attempted to mobilize social solutions (i.e., changes in consumer recycling behavior) *and* presented technological solutions to the crisis facing the industry. Often, both approaches were included within a single news article.

The exception to this dual approach were articles that discussed the research and development of nascent technologies, which typically explored the potential for technology to provide a single-handed solution to the problem of waste. "Humans, it seems, are not good at dealing with their trash," an article from the Pittsburgh *Post Gazette* began [26]. As a response to this human failure, the story focused on an invention from a local technology incubator called "Trashbot" [also 18]. Trashbot is distinct from other recycling sorting technologies within our dataset, as it is the only one that sorts at the site of disposal (within trash cans) rather than an MRF. The journalist summarizes the perspective of the Vice President of Engineering who promised that, with Trashbot, "people won't need to have that knowledge [about what items are recyclable] when throwing material away" [26].

Within the first period of our dataset, the term "robot" appears primarily in reporting on technology start-ups and technology design competitions. News stories published in the *Chicago Daily Herald* and the student newspaper for Oregon State University covered the "TrashTrek" challenge for high school students to "rethink" the problem of trash by designing robots that can collect, sort, and re-use discarded materials [8, 11, 16]. Taken together these reports constructed recycling sorting as an undeveloped field ready for disruption. It was, as one journalist characterized it, "the last, gross, and untouched frontier" of sustainability [26].

Period 2. Peak Pandemic: 1 March 2020–28 February 2022 and Period 3. 1 March 2022–28 February 2024

The recycling sorting industry—which was "already struggling"—had to contend with a second crisis at the arrival of Covid-19 pandemic in March 2020 [54]. Because of their critical role in city infrastructure, Homeland Security classified waste workers such as garbage collectors as "essential workers." When other aspects of daily life ground to a halt, waste workers were instructed by a national advisory that their activities should continue. However, in the initial days of the pandemic, cities were left to decide individually whether recycling collection and sorting was included in this directive (Kaufman and Chasan 2020). Thanks in part to advocacy by the recycling industry, recycling was later classified as a critical sector for the role it plays in domestic manufacturing during a time of supply chain instability (Waste360 2020).

The relative pay and punishing environment of recycling sorting work meant the industry was plagued with labor shortages and high employee turnover, even prior to the pandemic [58]. A 2017 article in the Minneapolis *Star Tribune* quoted the president of a local recycling sorting facility who disclosed that they were only able

to fill about 15 of the 20 positions at their facility at any given time. "We are looking for automation to help us with the labor shortage" [he] said, adding that there will always be a need for some human workers" [19]. Published in 2017, this article reports on the first installation of an AI-powered sorting robot into an operational recycling sorting facility. The robotics company founder and CEO reflected on the impetus for starting the company in a profile published in *Forbes* three years later. "[He] was struck by how much labor was required to sort through the junk—and how unpleasant it was" the journalist summarized. "That pain … made it an industry waiting to be brought into the modern era with automation" [58]. This perspective is reflective of the virtually axiomatic belief in engineering fields that robots offer a benefit to society through automating labor that is dirty, dangerous, or dull. Known as the "3Ds" of robotics, this impetus shows up directly in a 2019 article about the new AI-system designed by the optic-sorter manufacturer BHS: "The work is dirty, dull, and dangerous, and the positions are difficult to fill and even more difficult to keep filled" [43].

When the Covid-19 pandemic hit, media narratives that presented AI as a potential solution to labor problems gained momentum and gravitas with the additional rationale that AI implementation could also be a prudent health measure. Like other critical sectors, recycling facilities had to implement CDC (2020) guidelines to "minimize the number of workers present at worksites, balancing the need to protect workers with support for continuing critical operations." Any decrease in headcount could curtail person-to-person spread among co-workers and reduce the number of people exposed to contaminated environments. A *New York Times* article published just one month after the pandemic began reported on a "'significant' increase" in orders for recycling sorting robots as companies sought to comply with social distancing directives [54]. It highlighted the dangers faced by frontline workers, who were concerned for their health and often did not have access to personal protective equipment due to shortages at the time.

The potential of automation to improve working conditions appears in our dataset as early 2018; the upgraded High Point facility (detailed in Period 1) was described as "enhancing safety" in comparison to manual sorting [21]. Yet, the Covid-19 pandemic seems to merge the perceived potential of AI with a sense of urgency and an infusion of capital meant to address the new crisis. A *Forbes* list showcasing start-up companies that were pandemic "Survivors and Thrivers" recognized AMP, the manufacturer of the robot featured in the news reports above. With "workers increasingly anxious about contracting Covid-19, some recycling facilities are turning to AMP Robotics" [57] it explained. The company's revenue had increased 50% each quarter in 2020.

From Automation to Artificial Intelligence

Within our data set, the first discussion of an existing AI technology being integrated into a recycling sorting facility occurred in January 2017[5], coinciding with global regulations that were a result of China's Operation National Sword (Year 4, Figure 2). In the following two years, we see a marked increase in news coverage of technology in the recycling sorting industry leading up to the Covid-19 pandemic (Year 7, Figure 2). As attention shifted from general, established forms of "automation" to emerging "artificial intelligence," the way technology was depicted also changed. Discussions of automation in the recycling sorting industry included claims that this broad and often

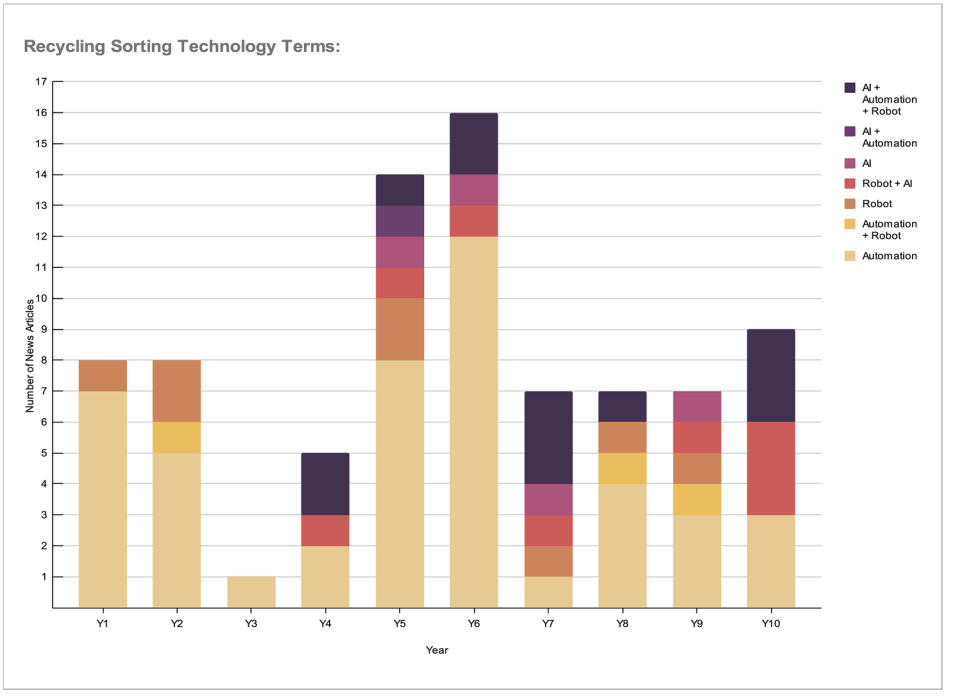

Figure 2. Each of the 82 articles in our dataset were analyzed for the presence of the terms "automation" "robot" and "artificial intelligence/AI." The combination of terms present in each article is represented in the chart above, relative to the total number of articles published that year.

unspecified class of technologies would make recycling sorting processes faster and less costly. Yet, automated technologies were also presented as limited. They required the intervention and efforts of human workers and the careful cooperation of citizens to sustain their functionality.

Alternatively, AI-powered technologies were not only described as more efficient but more accurate [42, 58, 76]. Initially, this evaluation was established relative to prevailing technologies at the time. Sorting robots were promoted by AMP's founder for their ability to "achieve better accuracy than existing optical systems, since [a robot] can be trained to correct mistakes" [19]. The ability to "learn" is a central value-proposition for AI systems that utilize computer vision technologies that refine their object-identification capabilities through being presented with and trained upon new data. A facility manager explained it simply. Robots "use artificial intelligence to learn and improve their abilities" [81]. The potential for continuous improvement is reflected in descriptions of the AI-enabled facilities as "unlimited" even before the facilities opened and technologies were tested [43, also 30]. These advances were presented as necessary to produce "higher quality" recycling, partly in response to the changes in the industry that began with National Sword. "The issue is that it's long been too hard for recycling plants to sort material with the level of specificity needed to satisfy manufacturers that could theoretically reuse it" a journalist reflected in an *Atlantic* article on the future of recycling [76]. Here, limitations were anchored in traditional technology that lack fine-grained identification mechanisms.

As time went on, AI was classified as an improvement upon human workers. In 2020, AMP's founder stated that robots were "more accurate at sorting waste than people are" [58]. In a 2023 opinion column meant to encourage proper recycling, a facility manager is quoted as explaining the impact irresponsible behavior from citizens had upon the facility: Workers "have a split second when they make a decision … if trash slips by, it just goes to the screen[6]. It can jam us up. It can break us down. It can cause a lot of issues." Further down the line, where the process was less human, the machines were not characterized as facing the same challenges [81].

Sources

The promise of automation—to solve the problems of commingled materials, contamination and labor costs—was primarily voiced by local government officials and recycling sorting facility administrators. Importantly, these organizations often work in tandem to manage municipal waste. The producers of automated sorting technologies did not appear as sources in any of the articles in our dataset prior to the introduction of AI. Yet, when AI entered the industry, representatives from technology companies also began to be quoted in news articles offering technical explanations and motivations for adoption.

Recycling sorters did not appear as a quoted source in any of the 82 news stories. The only comment that directly reflected on-the-ground worker's perspectives on automation in the recycling sorting industry is sourced from the Vice President of Engineering for a robotics start-up. He spoke for custodians who work alongside smart trash cans, calling them "fans" of the robot's ability to signal when trash bins were full [26]. One custodian[7] (working for a university with traditional trash cans) and one recycling truck driver were also quoted. Although custodians and truck drivers are essential workers, they do not participate directly in the process of sorting waste.

Interestingly, artists who were contending with the impact of generative AI were an exception to the near complete absence of worker perspectives in our dataset. A 2023 article published in the *New York Times* began with a passing mention of recycling sorters, who figured only into the lede:

> "Robots would come for humans' jobs. That was guaranteed. The assumption generally was that they would take over manual labor, lifting heavy pallets in a warehouse and sorting recycling. Now significant advances in generative artificial intelligence mean robots are coming for artists, too." [73]

The article indicates that automation of manual work was widely viewed as inevitable. However, the intellectual, creative workers who were now similarly at risk were granted a level of visibility that was a comparative anomaly. Artists whose creations had been used, without permission, to train generative AI models were represented for their contributions to these technologies—and for their efforts to resist them and reclaim their intellectual property.

Though recycling sorting robots and generative AI tools seem quite different due to their context of use, they similarly rely on machine learning models. As an article in the *Atlantic* explained: "In the same way that ChatGPT is trained by ingesting text that has been published online, [recycling robots] absorb lots of photographs of tossed-out items in various states of degradation and disrepair" [76]. A pilot program

for automated sorting of organic, compostable material in waste streams recounts the similar role workers play in training. "Workers at the facility are teaching the equipment: Everything identified as a food scraps bag—correctly or incorrectly—is fed through the machine again so it can be told whether it guessed correctly or not" [78]. This is in addition to the myriad of workers whose efforts to presort and troubleshoot automated sorting machines are acknowledged throughout the articles in our dataset—including in early articles on AI—but are not included as sources.

The obscurity of recycling sorting workers' perspective on automation raises questions about the experience of working with these technologies and their genuine effectiveness. The chief executives and marketing officers of robotics companies will naturally promote the adoption of their technologies, furthering an uncritical and pro-innovation perspective. Throughout the later periods of our dataset, several articles commented on the financial success of AMP robotics which had received more than a hundred million dollars in successful rounds of venture funding, including an "undisclosed investment from Google's venture capital group" [59]. This had occurred despite there being only a minor recovery in the recycling market after National Sword. Articles in the third period of our dataset depicted an industry that continues to struggle, with cities suspending and limiting recycling services [72] and consumers losing confidence in the recycling process [74, 77].

Discussion

In 2015, an article for *The Atlantic* quoted the president of a waste management research and education foundation who described a future technology that was, at the time, purely speculative: "Eventually, technology akin to facial-recognition software could further automate sorting by helping machines distinguish [between objects]" [10]. It accurately describes the mechanism behind AI-powered sorting robots we see today almost five years before they were available to the market. Though seemingly prophetic, a robotics company founder acknowledged that the idea had occurred to "pretty much everybody" [58]. Even a fifth-grader imagined a recycling machine that could separate trash automatically [65]. What was needed, the robotics founder observed, was an increase in computing power to enable machine learning. Realizing the future of recycling sorting robots required technical and material advances, certainly—but it also required a social readiness for adoption that was, as documented by our research, impelled by hype.

Newspaper narratives about AI built upon early representations of automated technologies as increasing volume and lowering labor costs, emphasizing that this new technology was more accurate than existing machines and human sorters. When the Covid-19 pandemic hit, AI bested humans in another way: "they can't get the virus" a robotics company founder explained [54]. AI didn't just improve upon process, it improved upon workers. Robots were not held back by sickness, exhaustion, or disinterest in the way that humans are. Throughout our dataset, AI and automation are consistently presented as *better*. While potentially true in some respects, readers' accurate understanding of technological advances requires clear declarations of what comparative evaluations rest upon. For example: AI-powered machines are better than optic sorters because AI uses machine-learning models that can be updated and

trained on new data, correcting mistakes overtime [19]. This is a limitation of traditional technologies, but not of humans who also learn from their mistakes and improve through training overtime. Without greater contextualization around technical claims, the statements allow for an interpretive slippage between various mechanisms for achieving the goal of separation.

Pre-existing narratives that promote AI as a high-tech tool that replaces human workers may be leading journalists to approach the field with an assumption that workers will not be present at a site—and thus, are not affected or relevant to their stories beyond aspects of displacement. Yet, a close reading of the articles in our dataset reveal human workers everywhere in the margins. At the Highpoint MRF, the assistant public services director was quoted as explaining that the new sorting equipment was "fully automated" [23]. But descriptions of the facility a few lines later indicated that employees still pre-sorted material to prepare it for processing in machines. In another article, a facility president explained that "with [AI] technology, there is no real need to expose people to this work" though a description acknowledged that automated sorting still required "human supervision." [43] To us, these statements are worthy of further inquiry. To what degree can AI system save workers from exposure to difficult working conditions if workers are still overseeing operations? How accurate is it to call a system "fully automated" when it cannot function independently from humans?

The on-the-ground workers who are referenced in articles as extracting jammed material, preparing waste streams, and monitoring machines are stakeholders in the adoption of AI. Yet, their voice is almost entirely absent from the articles in our dataset. Rather AI is framed through the perspective of profit-making entities and presented as beneficial for responding to their concerns: eliminating problems of hiring, improving day-to-day efficiency, and addressing industry crises. Suchman and Whittaker (2021) argue that descriptions of AI as fully realized or imminent are mobilized to obscure an increasing public awareness around AI's potential harms and the choice everyday people have to refuse technology adoption.

A pivot from the statements of official sources to the concerns of on-the-ground communities is central to the perspective of solidarity journalism (Varma 2025). Reporters can practice solidarity journalism by prioritizing "people directly impacted by ongoing issues of marginalization" (p. 1). As sources, workers possess credibility through their first-hand experience and their perspectives can help contextualize institutional data. Further, Varma (2019) implores reporters to go beyond detailing the impact of an issue on individuals to the shared experience of a collective. Though individual stories can inspire empathy from the public, they also suggest individualized solutions that "fall short of infusing optimism about the possibilities for social change" (p. 116). In the context of workplace automation, this might look like shared decision-making power, in which workers have a say about the implementation of new technologies rather than having to respond to these changes through individually acquiring new skills.

Garance Burke, author of the AP Stylebook chapter for reporting on artificial intelligence, encourages journalists to "beware of developers who describe their tools as breakthrough or revolutionary technologies" and to find "the people who are most impacted by them" (Kahn 2023). To aid in this call, we offer a one-sheet of actionable

tips for reporting on AI technologies in essential work sectors: *Don't Be a Drone*. The one sheet is informed by the findings of this research project and our visual analysis of press photographs, published in the proceedings of Designing Interactive Systems (Spektor et al. 2021). It can be accessed at www.bit.ly/ReportingOnAI

Notes

1. Although LexisNexis is a widely used database for the collection of news and magazine articles, a limitation is the indexing of wire stories (Weaver and Bimber 2008). NexisUni's search features group wire stories with press releases. Press releases were not relevant to our analysis, as our research questions were centered on how AI and automated technologies are communicated to the public. However, this also meant that articles from trusted wire sources such as the *Associated Press* are absent from our dataset. Additionally, LexisNexis does not index *The Wall Street Journal*.
2. LexisNexis search results return related variations of input keywords (for example, "sort" includes sorting, sorts, sorted, sorter, etc.). However, the search term "Artificial Intelligence" does not return the common initialism "AI," so this was included as a specific term.
3. Data are cited using a numerical key that is associated with an appendix that can be accessed in the supplemental data file.
4. News articles did represent some debate over the role of AI in the crisis. For example, an article in *The Colorado Daily*, one recycling analyst claimed the technology helped them to "withstand the crash in the market." The county's resource conservation manager was also quoted as saying that the technology "was not crucial in weathering the China storm" and instead was just helpful in increasing efficiencies [25].
5. Prior news stories that included the terms "AI" and "robots" were about speculative technologies or start-ups that were part of design competitions.
6. A "screen" is a non-computational type of machine that uses quick movements to mechanically separate materials through differences in weight.
7. The custodian emphasized that "it's not up to me to separate any of the trash from the recyclables" [14].

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