Naming Things is Hard: Real Title Following Colon

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ABSTRACT

With growing attention on gig work — ranging from the "sharing economy" to microtasks — scholars have made connections to frameworks like Taylorism, and mechanisms such as worker advocacy and empowerment, to make sense of our observations of on–demand work and the workers that power this movement. We argue that our the underlying trend towards "piecework" — driven in part by the discretization, routinization, and external management of said work — not only suggests, but in fact generates what we have observed: members of this transient workforce increasingly feeling disempowered, marginalized, and frustrated by the systems and platforms on which they work.

After evaluating this framing through a series of case studies in various industries falling broadly under the "gig work" category, we turn our theoretical lens to look to the future, to identify worthwhile questions and points of inquiry that researchers in social computing should consider as we attempt to anticipate and perhaps shape the future of work.

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Author Keywords

Please don't make me pick keywords. This is like asking a teacher to give the bullet points of what a student missed in lecture.

INTRODUCTION

The past decade has seen microtasks, the "sharing economy", and other instantiations of on–demand contract work grow to occupy the fascination of both academic circles and our culture as a whole [22, 14, 24]. The research community has made connections between this emergent form of work and the historically situated "piecework", as well as a number of observations relating to the frustration workers feel stemming from the management of this work [13, 23, 19]. But the

connections between historical piecework and contemporary crowd work haven't been deeply made as yet.

While much of this work appears to gesture toward the parallels between contemporary on–demand work and piecework, it's proven difficult to bring the totality of these observations into focus using one theoretical lens. This paper will attempt to do so by arguing that the topics social computing researchers have investigated are not just parallel to historical piecework and the process of factorization that took place in the early 20th century; indeed, these phenomena precipitate and reinforce each other.

In the reflection on the literature published in the last 5 years since Kittur et al.'s "The Future of Crowd Work", we notice a broader trend describing the change in work that's being done [15]. Following the improvements in breaking down tasks, delegating work, and managing workers more broadly, Crowd–powered has continued to parallel historical piecework's trajectory by outgrowing ad–hoc worker groups and coalescing into more formal working groups; we might call this the beginning of factorization.

Making sense of this by looking at the movements toward distributing work, routinizing and breaking down tasks, and externally managing workers as linked to one another, we give ourselves a framing of contemporary piecework that explains, and arguably predicts, what we have seen thus far — and perhaps what we should expect to see going forward.

This paper will attempt to demonstrate that the familiarity is more than passing; that the phenomena researchers have observed in on–demand digitally mediated labor markets were inevitable milestones in the birth and life of piecework. We will set out to show that this perspective of crowd work as an embodiment of piecework predicts the myriad outcomes of contemporary crowd work, including our developments of work–flows further abstracting work, the troubling effects of those developments on factors such as pay and work quality, and many if not all of the frustrations researchers have discovered among workers in the study of crowd and gig work.

"But", as Scholz points out, "it would be wrong to conclude that in the realm of digital labor there is nothing new under the sun" [24]. For one, information work (e.g. AMT & Upwork) and digitally managed work in general make it substantially easier to keep workers geographically dispersed compared to the factory workers that followed home–based piecework. This aspect of work renders workers virtually invisible to the task solicitors — or "requesters" — despite being significantly more connected than historical pieceworkers were [13]. Sec-

ondly, while factory foremen and other middle–men traditionally mediated the relationships between workers and managers, today the visible agents are *systems*; rather than employing individuals who "personified the functions of management" and can thus negotiate workers' needs, socio–technical systems mediate these interactions [31]. Finally, this characteristic of modern piecework makes worker coordination for collective advocacy and action significantly more difficult, necessitating special consideration to maintain the inertia of collective will while focusing that energy productively [23]. *[al2: I really don't like this paragraph. . .]*

Piecework as a lens to understand gig work

Kittur et al. investigate the future of crowd work by situating and interrogating it through "piecework", which historically described work done in the home, in manageable tasks, often involving clear instructions and payment only for work completed, not work done (the differentiation, here, being that one would be paid for the *output* of the work, not the *duration*) [15]. Given the scope, we can frame piecework and gig work as sharing these important similarities: 1) this form of work began in the home 2) the worker is paid for each discrete piece of work done, regardless of time or effort; and 3) the worker's status (not only socially, but also economically) is ambiguous, or at least the subject of some controversy..

Context

Importantly, since the reemergence of piecework we've seen substantial frustration and resistance among the workers in this area [19, 13, 23]. This paper attempts to make sense of the broader research on this piecework, or "gig work", by framing this as one of several steps in the marginalization of workers, All of this is to say that these milestones follow sequentially, not coincidentally but necessarily, and that by tracing this path using the corpus of scholarship on labor and workers we can both make sense of past events and perhaps reasonably predict next steps.

We explore each topic — discretization, routinization, & management — by looking at case studies in social computing. Having validated this lens as a way of reasoning about contemporary piecework, or "gig work", we turn to look ahead, envisioning future areas that researchers in social computing — and particularly digitally mediated work — should explore.

CASE STUDIES

The existing body of research has shed light on on–demand from various perspectives, and revealed a number of topics that, through our framing, are clearly situated together. Those topics are, at a high level, as follows:

1. the processes involved in making work into tasks, or **discretization**, in "Making Gig(s) Work";

2. the outcomes of that discretization, both on the work itself as well as the workers, in "The Fallout of Gig Work"; and finally

3. the results of these forces; namely the turning of work toward **factories**, which we will discuss in ". . .".

We will follow these topics, using them as prompts for case studies in the emergence and development of contemporary piecework.

Making Gig(s) Work

This section will largely discuss the processes at work that make distributed, digitally managed work both possible and indeed preferable for "requesters" (in other words, the employers who solicit workers). This body of research spans a broad field within the CSCW and broader HCI community. In this context, we'll look at the body of research through the lens of highlighting contributions which expand what we (as "requesters" of work) can do by managing workers in novel ways. This work broadly consists of three areas: 1) Decomposition, 2) Work Abstraction, and 3) Flexibility.

Decomposition

Scholarship describing and exploring the decomposition of tasks is perhaps the most established of the above areas among HCI researchers; Bernstein et al. made early contributions to this area with *Soylent* (by coining and employing the "find–fix–verify" approach) [1]. Cheng et al. found that microtasks — though not necessarily *faster* than "macrotasks" — yield higher quality work, particularly when that work might be readily interrupted [3]. Teevan, Liebling, and Lasecki further push the boundaries of decomposed work by exploring "selfsourcing", and further this work with Teevan et al. [28, 29].

Work Abstraction

Decomposition allows requesters to assign work tasks without concern for the broader context. Chilton et al. perhaps best illustrates this, demonstrating with *Cascade* that it's possible to break certain classes of tasks apart in such a way that they yield hierarchical categories previously thought to be safely within the domain of expert workers with top–down awareness of the context of the work as a whole [4].

Much of the research in the space of designing crowd work sought to illustrate the potential to take highly creative or skilled work and generate high–quality work. Perhaps the most salient case study here can be found in Retelny et al.'s *Foundry*, which employed "flash teams" to achieve expert–level outcomes via thoughtful decomposition of work as "modular tasks" [21].

Flexibility

Earlier we discussed Cheng et al.'s work identifying the impact that interruption has on worker performance. This work both points to and embodies a broader sentiment in both the study and practice of crowd work that microtasks should be designed flexibly, fully exploiting the abstracted nature of each piece of work [11, 18, 30]. While Cheng et al. identified costs with breaking tasks into smaller components, Lasecki et al. found that some performance can be recouped by stringing similar tasks together. To use an example from "Break it down: A comparison of macro-and microtasks",

This work on decomposition is not strictly new; "decomposition" generally illustrates the same concepts of work that "Taylorism" and scientific management sought to embody —

Silberman, Irani, and Ross in particular foresaw this danger and warned of it in 2010 [15, 26, 20].

In both the historical and contemporary cases, distributed, speculative work has promised to diffuse the costs of capital–intensive resources (whether they were sewing machines or laboratory equipment).

The HCI community is perhaps most familiar with examples such as Innocentive, Uber, Lyft, and Amazon Mechanical Turk (AMT), which all allow requesters in various forms to tap into resources such as cars, computers, and above all "cognitive surplus" with relative ease [10, 5, 12, 25]. This insight, that workers can be geographically distributed and tasks decomposed, has proven remarkably compelling and an effective fulcrum for leveraging the Internet for highly scalable work [2, 16].

While yellow–cab organizations often manage drivers in similar ways to platforms such as Uber and Lyft (inasmuch as drivers are often considered contractors, or otherwise exempt from the formal status of "employee"), these new systems go further by framing ownership and responsibility for costs (e.g. automotive maintenance) on drivers. In our fieldwork, we discovered many longtime "on–demand" drivers (affiliated with platforms such as Uber and Lyft) who readily voiced frustration with the costs of frequent oil changes and the unexpected replacement of expensive parts. Distributing labor had similar effects on pieceworkers at the turn of the 20th century; textile workers were given the source material with which to work, but were generally expected to use their own sewing materials and work in their own homes [9].

Distributing work in method described above may be thought of as vertically slicing work such that each person is responsible for the whole task — making a whole garment or being responsible for driving in a single neighborhood. Broken down in this way, work could grow to unprecedented scales, but the quality of the work would remain relatively variable. Textile work being a salient example, some seamstresses might be better than others at the same task, making this framing of the work initially problematic.

A compelling solution emerged in the early 20th century to break tasks down into discrete, manageable routines that could be taught relatively easily, and whose work output could be evaluated in abstraction from the rest of the work. In Ford's assembly line, this meant that workers were not responsible for building a whole car, but a single very narrowly defined action that needed to be done on every car.

This approach paralleled what would be known as "Taylorism", and its influences can be seen today in crowd work and micro–tasks. *talk about breaking tasks down both in general (Cheng) and even for the self (Teevan); horizontal cuts instead of vertical* [3, 27]. By decomposing and recomposing tasks, and in particular by assigning similarly natured work to the same workers, workers could become "experts" in a small aspect of the work that they did, speeding their work dramatically [18]. Perhaps more important, however, was that the breaking down of work into tasks has made it more practical to evaluate work at each stage [*citation needed*].

Opening the door to more discrete modules of work known as tasks Contributions such as "find–fix–verify" and "Cascade" make it easier to assign smaller components of work to myriad workers and recompose the constituent parts into something more complex [1, 4]. Some work has taken special interest in the process of breaking tasks down into more manageable parts inasmuch as decomposing what we might call "macro" tasks into microtasks, both for the purposes of crowd–sourcing in the sense of out–sourcing work as well as "selfsourcing" [**teevan2014selfsourcing**, 3].

The parallels between this kind of work and historical piece-work of the turn of the 20th century is by no means new.

The **discretization** and decomposition of work certainly facilitates breaking tasks down, parallelizing work, and getting more done across a broader array of people; but the key advantage in turning macro tasks into many micro tasks is that we can make that work *routine*.

By making larger bodies of work less contextually situated, we can define processes that make that work and the instructions thereof useful for virtually anyone with shared cultural or intellectual background.

routinization can be seen in the contemporary in work–flows [21, 1].

The Fallout of Gig Work
If the research exploring and documenting how we can exploit crowd *work* can be described as wide–ranging, the scholarship discussing the ways crowd *workers* have been exploited is more focused; Irani and Silberman point out the disillusion that companies such as Amazon foster on platforms for work like AMT (see also Salehi et al.'s work continuing in the spirit of this observation to generate collective action to improve worker conditions) [13, 23]. Lee et al. find similarly that workers on gig work platforms are frustrated by the systems on which they work, to say little of the policies which these systems enforce [19].

sections here should include:

1. "flexibility" [6, 8]

2. leads to "low pay" [13, 23]

3. leads to "variable quality work" [7, 17].

Factories

Looking forward
If we agree that discretization, routinization, management, and even resistance necessarily follow one another according to this theoretical lens, then we have to use it to attempt to envision what comes next.

I've been going back and forth regarding how to frame this paper; the approach that tries to look at things that are similar vs things that are different doesn't seem to work, but I've left the thoughts here because it's not all completely bad.

THINGS STAY THE SAME
How is gig work the same as it's been historically?

I think this section would be compelling to draw parallels between the narratives drivers gave about the flexibility, autonomy, etc... and that which we might have seen among pieceworkers (predominantly women, who benefited from being able to work from home).

Flexibility
Are there cultural differences between the people that did piecework and the people that do gig work now? I'm not sure there are significant differences that have affected the outcomes so far.

Many of the workers to whom piecework appealed were mothers, wives, etc... who mostly stayed at home for various reasons (certainly largely it was cultural — women weren't afforded equal access to labor opportunities, making in–home job opportunities not only compelling, but also one of few available options).

Gig workers are in some senses similarly constrained: workers on Amazon Mechanical Turk — those that use it as a primary source of income, at least — report being homebound for various reasons (e.g. medical, parenting, etc...). Society and circumstance have made it difficult or impossible to join the contemporary, conventional workforce; gig work re–opens that door.

But there are differences; during our research over the summer, we spoke to drivers on Uber and Lyft, cleaners, and other gig workers. Many of them told us about their home lives — about children, spouses, and other commitments — to which they wanted to dedicate more time. One driver (let's call him Raúl) told me about how he drove for Lyft after working as an inventory manager at a hospital for more than nine years.

I asked him why he quit that job and forewent the benefits, predictability, and career growth opportunity that his old job offered. He told me that when his daughter was born, he was overcome with a desire to spend more time with her. No longer satisfied with work where he often left before his daughter would wake up and return after she fell asleep, Raúl decided to start driving for Lyft, because he could drive in the evenings when his daughter was asleep.

Other drivers reported similar benefits; gig work affords its workers flexibility that conventional careers don't allow.

routinization of work
This leads into the next section, but I want to bring up the process of making work about mass–manufacturing, at least inasmuch as the instructions are the same for everyone.

The Internet arguably has made it much easier to broadcast those instructions, but it's had this deeper effect of enabling some amount of back–and–forth between the worker and the (algorithmic) manager.

Taylorism
The routinization of work makes it possible to measure that process, optimize it for certain characteristics, and ultimately lead to Taylorism and scientific management. This is not new; researchers have studied and written about the slow creep of algorithmic management and discretization & routinization of work tasks.

We hope to take a step back from the context in which this work is often applied, and look for its place in the larger trends and theories to make sense of the trends of gig work at large.

Industrialization and the automobile assembly line makes this famous, but piecework functioned on the principle that everyone was making similar or identical garments and other products.

Now, we see Turkers being evaluated on the outcome of their work conforming to norms, sometimes bootstrapped, as in Ranjay's talk on "Embracing Error to Enable Rapid Crowdsourcing", but more conventionally in work flows like "Find–Fix–Verify".

This might be an opportunity to reflect on how pieceworkers internalized the work they were doing, responded to the stress of the uncertainty of potentially rejected work, etc... but I'm not familiar with research in that space.

The emergence of decentralized workplaces
The practice of in–home piecework was consumed by the centralization of factories (the effect of which we'll talk about later, since we can talk about how this made unions more practical), but for a time many pieceworkers at the turn of the 20th century worked out of their homes. Strikingly, many of the gig workers Kittur et al. discussed in 2013, and indeed many more continue to do what we might call "information work" — that is, work that predominantly demands human computation — but increasingly we're seeing the movement toward transient work that largely requires embodied presence [19] (and others).

What was this about?
I was going to check in quickly and take a photo of your whiteboard (hoping that you'd kept our conversation notes around) but your room was *literally* full of people lol.

THINGS ARE CHANGING
The medium on which this work is being done — and to an extent the medium used to manage workers — has dramatically changed things as well, however; workers are distributed around the world, working out of their cars in the cases of livery services (notably, never returning to a base of operations) across and between cities as well as nations, or in their homes (paralleling the trend of piecework even more closely).

Trying to understand how gig work has differed from piecework should at least start with looking at the different characteristics of the work involved. After that, we should think about how the demography and culture of the people engaging in this kind of work have changed versus that of the pieceworkers.

Differences in the work itself
Gig work has all of the above similarities with piecework, but there are key differences.

Piecework emerged at the turn of the 20th century, right at the time that telecommunications began to boom in the United States. *Did telecom enable remote management?*

Gig work in its contemporary formation is largely mediated by ubiquitously accessible digital media (the Internet, telephony, etc...) and importantly has relied on this technology to facilitate the remote management of workers [19].

Has the work fundamentally changed, or are we just being managed remotely in different ways? I'm not entirely sure.

How does this work differ from the experience of being "on–call" that is so familiar to retail employees? How does this work differ from the work in which truckers, taxi drivers, and other independent contractors have been participating for decades? We argue that the substantive difference in these markets is the speed of the market itself, motivated by the technology which mediates it. Because workers can be sourced and dispatched virtually instantly, businesses that engage in this kind of work (e.g. Uber, Amazon Mechanical Turk, etc...) have taken to removing other bottlenecks, like vetting workers upfront

MORE DELIBERATE WORK

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