INTRODUCTION

The past decade has seen a flourishing of on–demand work, largely driven by the reformulation of work as the constituent parts of larger tasks. This framing of work into abstract blocks has allowed people to engage in work despite limited time, little to no awareness of the broader context of the work, and (often) fleeting identities and associations [13, 24, 19]. The realization that complex tasks can be accomplished by directing and managing crowds of workers has spurred the research and and industry communities to flock to sites of labor like Amazon's Mechanical Turk (AMT) to explore the limits of this distributed, fleeting workforce. Researchers in particular have taken to the space in earnest, finding opportunities to enable new forms of work using this population of "Turkers" [1] [1, 34, 27].

This form of work has grown considerably in size, far beyond the domain of "information work" from which it first sprang. While Howe described crowdsourcing as "outsourcing [work] to an undefined, generally large group of people in the form of an open call", for years the instantiation of this work was limited to the utilization of human intelligence to process data and act on information [15, 37, 40, 6, 28]. More recently, crowdsourcing of embodied work — driving, cleaning, for instance — has become a focus of on–demand labor markets [21, 36, 9, 35]. Today, on–demand work promises to become a yuge industry [citation needed].

For all the growth we've observed in this labor market, we have also seen a complicated and conflicted culture emerge among its constituent workers. Researchers have made efforts to understand the people that have gravitated toward crowdsourcing platforms since its emergence and popularization, but as the form of work has grown and changed, so too have the demographics of workers [30, 32]. Some of this research has been motivated by the identification of the sociality of gig work, and the frustration and disenfranchisement that these systems embody [12, 31]. Other work has focused on the *outcomes* of this frustration, reflecting on the resistance workers express against digitally mediated labor markets [21].

The extant body of work has ostensibly sought to answer one underlying question: What does the future hold for work and those that do it? Researchers have offered their input on this open question along three major threads:

1. What are the limits of crowdsourcing [29, 33, 14, 39, 38, 17, 25, 8]? [2]
2. What forms of work design, and worker management and arrangement, are viable? [1, 4, 22, 18, 20, 3, 5, 26]; and
3. What will work and the place of work look like for the workers? [12, 11, 31, 7, 2, 23]

[1] as test subjects in a sort of at–scale laboratory for economic and other behavioral studies

[2] Perhaps to be more precise, we ask two questions here:
(a) how far will crowdsourcing reach into the everyday lives of people, and
(b) how complex can crowdwork become?

Piecework as a lens to understand crowdsourcing

This large and growing body of research has conversed to varying degrees with labor scholarship, but has not offered a persuasive framing for holistically explaining the developments in worker processes that researchers have developer, or the phenomena in social environments we have observed; nor has any research, to our knowledge, gone as far as predict future developments.

We offer a framing for crowd work spanning the aforementioned industries collectively as a contemporary instantiation of "piecework". Piecework as a metaphor for the type of work at hand is not new. Indeed, Kittur et al. in 2013 referenced crowd work as "piecework" briefly as a loose analogy to the form of work emerging at the time [16]. But more than this, the framing of on–demand labor as a re–instantiation of piecework gives us more material to make sense of the broader research on this new form of work by evaluating this work through a much more refined theoretical lens, informed by decades of rigorous, empirically based research.

More concretely, by looking at task–based or "gig" work as an instantiation (or even a continuation) of piecework, and by looking for patterns of behavior that the corresponding literature predicts on this basis, we can 1) make sense of the phenomena so far as part of a much larger series of interrelated events; 2) bring into focus the ongoing work among workers, system–designers, and researchers in this space; and finally, 3) offer predictions of what social computing researchers, and workers themselves, should expect to see on the horizon of on–demand work.

We'll look at a broad range of cases under a number of major themes we propose as broadly describing the types of research being done in crowd work and more generally in what we argue is contemporary piecework. After validating this lens as a way of reasoning about on–demand labor, we'll attempt to use this perspective to suggest areas of research worth anticipating, and developments we should expect to see in the maturation of digitally mediated work. Finally, we will offer design implications based on this research.

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