Gauging Receptiveness to Social Microvolunteering

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ABSTRACT

Crowd-powered systems that help people are difficult to scale and sustain because human labor is expensive and worker pools are difficult to grow. To address this problem we introduce the idea of *social microvolunteering*, a type of intermediated friendsourcing in which a person can provide access to their friends as potential workers for microtasks supporting causes that they care about. We explore this idea by creating Visual Answers, an exemplar social microvolunteering application for Facebook that posts visual questions from people who are blind. We present results of a survey of 350 participants on the concept of social microvolunteering, and a deployment of the Visual Answers application with 91 participants, which collected 618 high-quality answers to questions asked over 12 days, illustrating the feasibility of the approach.

Author Keywords
Volunteering; SNS; friendsourcing; crowdsourcing.

ACM Classification Keywords
H.5.m. Information Interfaces and Presentation: Misc.

INTRODUCTION

Crowd-powered systems can be useful in the domain of social good. For instance, VizWiz has answered more than 70,000 visual questions for blind people [7], and Social Accessibility has made thousands of accessibility improvements to the Web [25]. Other efforts advance science [14] or promote human rights issues [27]. Scaling and sustaining these projects can be difficult given that the people powering them are generally either paid crowd workers, *e.g.,* from Amazon Mechanical Turk, or volunteers recruited via app-specific sites with limited audiences.

Two low-cost ways of accessing human resources that seem appropriate for such systems are *friendsourcing*, where users of social networking sites ask their friends to perform a small amount of work (such as answering a question), and *microvolunteering*, where people complete small online tasks for free that can benefit organizations or charities.

Previous work has considered friendsourcing and microvolunteering separately - either using one's social network for personal benefit, *e.g.,* to answer questions of personal interest, or donating one's own time, money, or resources to causes one cares about without directly involving one's social network. We introduce *social microvolunteering*, a hybrid approach that harnesses friendsourcing and microvolunteering to support crowd-powered systems with an altruistic goal.

Social microvolunteering is a type of intermediated friendsourcing in which participants provide access to their friends as a potential work force by installing an app that posts microvolunteering tasks on their social media feed, *e.g.,* answering a VizWiz question or transcribing a few seconds of audio. Friends viewing the feed who choose to perform the task can do so in-place (without leaving the social feed), thus lowering the barrier to participation [11].

Social microvolunteering offers several potential benefits over current microvolunteering paradigms. *Volunteer organizations* may *(i)* broaden their participant base to include people who may be willing to donate small amounts of time, but previously lacked the knowledge or initiative to volunteer directly, and *(ii)* improve response rate and latency for volunteer microtasks, since some of a volunteer's friends are likely to be online and available even if the original volunteer is not. The *volunteer* who installs a social microvolunteering app (and their friends who interact with the posts) can *(i)* directly help a cause either they or their friends care about by completing microtasks that support it, *(ii)* increase awareness among their social network about their chosen cause, *(iii)* strengthen social relationships with others who complete the microtasks, and *(iv)* curate their online persona in a way that may reflect positively on them by publicly engaging in acts of altruism. Finally, the ultimate *beneficiaries of the app* gain *(i)* affordable access to a pool of volunteers who can help power crowd-powered systems that they find useful, *(ii)* scalability and sustainability for apps that people care about and are willing to volunteer for, and *(iii)* higher performance because each volunteer's interest, availability, and capabilities are magnified by their network size.

This paper explores the idea of social microvolunteering. First, 350 participants completed a survey regarding their attitudes toward social microvolunteering; at the end of the survey, participants were offered a chance to install a social microvolunteering application that we built to post VizWiz-style questions to their Facebook account for 12 days. 91

participants installed the application, and we report usage data showing that, when sent to multiple users, the average time for a question to receive a first answer was 1 minute and 45 seconds, and that first answers were generally of high quality. This suggests that social microvolunteering may be capable of supporting a deployed system. We conclude with a discussion of participants' self-reported opinions of social microvolunteering and their use of our application, presenting an end-to-end examination of their reactions to the concept and reflecting on the implications for the design of future social microvolunteering apps.

RELATED WORK
Social microvolunteering is informed by prior work in the areas of social media sites and online volunteering.

Friendsourcing
Social media sites, such as Facebook and Twitter, can be a valuable resource for question asking [19, 22] since they provide a way to broadcast questions to large groups of people with whom the user has a preexisting connection and who the user trusts to provide high-quality responses. Many requests are for help with tasks that do not take much effort to complete and do not require offline action [11]. Friendsourcing can result in answers that are more tailored and trustworthy to the asker than those from traditional search engines [20], and these interactions between question askers and answerers may encourage contact with weak ties and improve bridging social capital between the users [12]. Evidence suggests that people find posts containing questions to be some of the most valuable content on social sites [1]. Mobilization requests (those that ask for an answer to a question or for a friend to do a favor) elicit more comments and faster first response times than general status updates [15].

Despite these benefits, people can be reluctant to participate in friendsourcing. Some users may not post questions on social networking sites, even if there are financial and quality incentives to doing so, believing that the social costs of bothering their friends are not worthwhile; others may rate-limit their friendsourcing activities to balance social costs [24]. Self-censorship of questions is lessened for young and active social media users, and for those highly interested in the responses [24], but it may be enhanced for people in marginalized groups (such as those with disabilities) who have to navigate additional concerns about appearing dependent [8].

Social microvolunteering is a form of intermediated friendsourcing, where the volunteers who participate ask their networks to perform tasks on behalf of a stranger or organization in need. However, it differs from traditional friendsourcing in several ways: *(i)* the altruistic gains of both the volunteer and their friends who answer, *(ii)* the self-presentation benefits for the volunteer from using the application, and *(iii)* the ability of the volunteer to answer themselves if they are online. Neither the volunteer nor their friends are direct beneficiaries of the work that is done – any benefits they may receive are more intangible.

Using social media to ask questions to strangers, rather than friends, is another active area of research; for instance, TSATracker asks Twitter users to self-report airport security line wait times [21]. However, many people viewed questions from TSATracker as spam. Social microvolunteering posts may be less likely to be perceived as spam because users are told that the posts are being shown because a specific friend is interested in a cause.

Previous research has found that applications that allow the user to post automated updates to social media can have many benefits (in the case of weight loss, accountability and support) [26]. Although there is a general sense that application posts are often perceived as spammy [6], we were unable to find any published reports quantifying user reactions to such posts. Additionally, social microvolunteering posts may differ from traditional application posts since they benefit a charitable cause instead of benefitting the user themselves or a commercial entity. This work contributes a more formal understanding of user reaction to a specific type of charitably-oriented friendsourcing application post.

Micro-activism and Online Volunteering
If someone is involved with a cause, social media sites provide a low-effort way to connect to a large group of people and share information with them. This has led to many social media users partaking in micro-activism, where the extent of their involvement in an activist cause is limited to online behaviors [17]. The impact of these activities, which can include sharing petitions or updating one's status or profile picture for a cause, have been a subject of debate, with the public press and some scholars deriding them as low-effort "slacktivism" [28] while others point to increased awareness and results [16, 27].

One example of micro-activism on social media occurred in March 2013 when the Human Rights Campaign encouraged their Facebook followers to change their profile pictures to a red 'equals' sign in support of marriage equality. Facebook reported that 120% more profile pictures than usual were changed the day after the campaign started, and the HRC reported more than 10 million visits to their web site [27]. Despite successes, micro-activism can still be viewed as low-effort and not as meaningful as traditional donations [28]. The intent of social microvolunteering is to tap into the same motivations that cause people to like and share content on Facebook while making concrete contributions for causes that are amenable to microtasks.

In addition to micro-activism on social networking sites, "microvolunteering" refers to small volunteer tasks that can be completed by a single volunteer and possibly aggregated to complete larger tasks, analogous to paid microtasks found on sites like Mechanical Turk [mturk.com]. While the concept of microvolunteering has been introduced [2],

Figure 1. The Visual Answers social microvolunteering application. When a blind user asks a visual question with VizWiz, the question is posted as the status of multiple volunteers. Comments to the thread are immediately forwarded back to the blind user as responses. Sometimes the volunteer answers the question, sometimes his or her friends answer the question, and sometimes his or her friends may enter comments that do not answer the question.

few efforts have been launched to facilitate it. As with micro-activism, attitudes toward this emerging phenomenon are mixed, with some traditional charitable organizations remaining skeptical of microvolunteering's efficacy [28].

One example of microvolunteering is Help From Home [helpfromhome.org]. Volunteers search for opportunities based on their available time or based on interest. Tasks range from playing games that help research efforts to documenting one's own efforts to save energy at home.

Microvolunteering actions are intended to be individual, rather than social, efforts, and require users to continually visit the coordinating site to look for new tasks and ways to help. As discussed earlier, *social microvolunteering* can harness the power of a user's online social network to provide additional benefits both to volunteer organizations and to individual volunteers. The tasks are also embedded in what participants are already doing (using Facebook).

APPLICATION OF SOCIAL MICROVOLUNTEERING
Technology designed to support people with disabilities often includes humans in the loop because many necessary functionalities are still beyond the reach of automated approaches [5]. Because of the value of human input in technologies for people with disabilities, and its altruistic nature, we used this as our sample domain to illustrate the potential of social microvolunteering. Here, we describe VizWiz, an application that gets microtasks from blind users, and introduce Visual Answers, our social microvolunteering application that connects VizWiz users' questions with sighted volunteers and their friends.

VizWiz
VizWiz [vizwiz.org] is a mobile phone application that allows people with visual impairments to ask questions about their environment, and receive answers quickly from sighted workers or friends [4, 7]. Users take a photograph of something they have a visual question about, record audio of their question, and then send it to crowd workers who answer it quickly. Answers are forwarded back to the

user and read aloud. Other products like TapTapSee [taptapseeapp.com] provide object recognition, but VizWiz's use of human answerers supports complex or subjective questions.

VizWiz is currently free to end users, and the academic team that created the app pays the crowd workers that answer questions for each question they answer. VizWiz uses a worker retainer model, where workers are pre-recruited in order to ensure that answers can be sent back quickly [4]. Crowdworkers do not always provide high-quality answers, and so VizWiz requests redundant answers from three different workers, which further increases costs. These costs reduce sustainability and scalability.

Friendsourcing is a free way to get answers to questions, and seemed to be an appropriate way to get answers to VizWiz questions without the financial costs of using a crowdsourcing platform [8, 18]. When surveyed about using friendsourcing to get answers to visual questions, however, both visually impaired Facebook users and VizWiz users were reluctant to utilize friendsourcing within their own social networks due to concerns about response speeds and rates (possibly exacerbated by their smaller-than-average network sizes [29]) and concerns about bothering and appearing dependent upon their friends [8].

When weighing these concerns, we considered the possibility of "friendsourcing" questions to a different user's friends on social networking sites. In this way, blind users of VizWiz would still get free, useful answers to questions without incurring the perceived social costs of appearing dependent to their own friends; at the same time, the application installer and their friends who interact with the VizWiz questions may gain a sense of altruism and increased social bonds. In the next section, we describe Visual Answers, the social microvolunteering app we built to realize this concept, which allows third parties to provide access to their Facebook network as a resource for friendsourced answers to incoming VizWiz questions.

Visual Answers

We designed a Facebook application called Visual Answers to explore the potential of social microvolunteering. Visual Answers allows users to donate their Newsfeed as a venue to post visual questions from blind people using the VizWiz app. While these volunteers can (and sometimes did) answer questions themselves, they are able to magnify their contributions by providing access to their friends. Importantly, their friends may be more useful for VizWiz than the individual who installs the app could be alone. The large network of friends connected to a volunteer may help the application answer questions quickly, even when the original volunteer who installed the app is unavailable, and may open up broader pools of potential answerers whose diverse expertise may be valuable in answering questions.

Visual Answers for the Application Installer

Visual Answers takes questions as they are submitted by blind users of the VizWiz app and automatically posts them to the Facebook feed of a volunteer using the volunteer's own name and profile picture. Each post contains an explanation of the application's purpose, the text of the audio question asked by the VizWiz user, and the photo taken by the VizWiz user (Figure 2).

The volunteer's friends will see the post in their news feeds, and can comment on the post to answer the question. While the Facebook algorithm that chooses which posts are displayed on friends' news feed is unpredictable, previous research indicates that any individual post will likely be seen by 35% of a user's friends [3].

Visual Answers for the VizWiz User

In a live system, when a blind VizWiz user submits a visual question, it would be automatically posted to the Facebook feeds of multiple Visual Answers installers. When answers are received from any post, they can be instantly forwarded to the VizWiz user's phone (Figure 1).

For VizWiz users, this design provides a free source of answers that may leverage some of the benefits of traditional friendsourcing (free, high-quality answers) without exposing the user to fear of stigmatization from their own friends. This approach may also afford benefits in speed, since the app could send the same question to several users' social networks, target urgent questions toward users with larger networks or networks with more members currently online or that contain a certain type of expertise.

SURVEY ON SOCIAL MICROVOLUNTEERING

In designing this system, we had many questions about the Facebook users' attitudes toward installing an app of this type. To determine the feasibility of the idea, we conducted an initial survey about social microvolunteering.

Respondents were first asked about their use of social networking sites (in general and to support causes they care about), their current online and offline volunteering behaviors, and obstacles to volunteering more often. Then, they were presented with a description of the Visual

Figure 2. A post from Visual Answers, as seen on Facebook. The question is posted automatically from the volunteer's account, and gathers answers from the volunteer or their friends via Facebook's commenting mechanism.

Answers application, and asked a series of questions to help us understand what users might think about social microvolunteering through their reactions to the description of our exemplar app. The survey had 27 questions, and took about 7 minutes. At the end of the survey, we offered an opportunity to install a pilot version of Visual Answers.

Recruitment and Demographics

Survey respondents were recruited through a series of Facebook advertisements targeted at English-speaking, U.S.-based users who were at least eighteen years old and who were interested in 'charity,' 'charitable donations,' 'volunteering,' or 'visual impairments.' We chose to target advertisements to these specific Facebook users, since we would expect this demographic to be likely early adopters of social microvolunteering in general or Visual Answers

specifically. Respondents were offered a $5 Amazon gift card for completing the survey.

Facebook ads ran for 13 days in May and June 2014 in the sidebar of the Facebook interface on desktop computers. 7337 people clicked through to the survey, and 431 of those began the survey. All of the respondents were directed to the survey from facebook.com, but we could not verify whether some respondents shared the link to friends using the service; we expect that most (and likely all) respondents were directed to the survey by the ads, since we did not notice any bursts of survey activity that would be indicative of viral re-sharing, and no respondents had mutual friends who answered questions. 14 people were disqualified (either for not living in the United States or not completing the consent form properly) and 67 only partially completed the survey. 350 respondents completed the entire survey; the remainder of our survey analysis focuses on these 350.

Respondents were primarily female (63%) and middle-aged (median 44, range 18-83). This matches studies that show that Facebook users are more likely female than male, and that more older adults have joined the social network in recent years [9]. These demographics may also reflect that charitable giving increases with age up to 65 [13] and that women volunteer more frequently than men [10].

Survey Results

Social Networking Site Use
Most respondents were experienced Facebook users, with 76% having used the site for more than 3 years and an additional 19% having used the site for 1 to 3 years. Nearly all were frequent users of Facebook, logging into the site once (15%) or several times (78%) each day. Respondents were most frequently consuming content that was produced by their friends (65% read others' content several times a day) or interacting with others' content (with 45% commenting on and 59% liking others' content several times a day). Posting activity was less frequent; 19% reported posting status updates once a day, and 21% did so several times a day. Only 21% reported having ever installed a Facebook application that posted status messages on their behalf (as our Visual Answers application would).

Volunteering, Charity, and Activism
Most respondents had been involved in online activism before. 77% had participated in online activism outside of social media (online petitions, emailing politicians, etc.), and 81% had participated in activism on social media sites (*e.g.,* sharing petitions, changing profile pictures, posting statuses to draw attention to causes). Most respondents were not currently volunteering much – either never volunteering in the real world (34%) or online (59%), or doing so once a month or less in the real world (20%) or online (16%).

Many respondents explained their low levels of volunteering as being due to a lack of free time (52%) or money (42%). Others mentioned feasibility issues, such as

not knowing how to find a group to match their needs (42%) or not having a group to work with nearby (15%). 11 repsondents (3%) self-identified in free-form answers that they were unable to participate in volunteering due to having a disability.

Opinions on Visual Answers
In the next section of the survey, we introduced the respondents to the concept of social microvolunteering via the concrete example of the Visual Answers application. We presented a description of how the application would work, and asked users for their opinions.

Respondents were generally receptive to the idea of installing the application (55%). Respondents were asked to indicate why they responded positively or negatively to the proposed application by selecting from a list of reasons or writing in their own. The 192 respondents who answered positively said that primary motivations would be helping people with disabilities (88%), raising awareness of disability issues to friends (69%), and feeling good about volunteering (48%). Free-form responses included both internal and external motivations such as, "*To be part of something that incredible and being disabled myself just adds to the excitement and joy*" and "*Demonstrate public service commitment.*"

For those who responded positively to installing the application, we asked about the application's potential impact on their Facebook friends. Most thought their friends would be somewhat (61%) or very (27%) happy to see the application's questions, and that friends would not be too bothered (48%) or not bothered at all (14%). When asked what posting frequencies would be acceptable, most indicated once a week (41%) or less (26%).

No clear majority appeared among reasons not to install for the 158 respondents who responded negatively, but many cited privacy concerns (40%), thinking the application would be ineffective (27%), thinking that these kind of questions are not what Facebook should be used for (14%), or concerns about annoying their friends (30%). Privacy concerns were expected, as applications that post on a user's behalf are often viewed as malicious or spam [23].

Respondents were also asked if compensation or rewards would encourage installation. Most (51%) did not think that any compensation would motivate installations, while others indicated that possibly receiving thanks from the VizWiz users (23%) or financial compensation per question posted (28%) would be a valuable reward for participation.

Discussion
Survey respondents were active users of social networking sites, and appeared to participate more in low-intensity online activism (signing petitions, changing their Facebook status or profile pictures) than real world or online volunteering. The survey results indicated that users may find social microvolunteering appealing, both because Facebook and other social networks are already being used

for activism, and because they lack the time, money, or ability to participate in traditional volunteering.

While some respondents were negative about the general concept of social microvolunteering, many gave reasons why they would be wary to use Visual Answers in particular, such as, "I worry that some of my facebook friends might be jerks and misdirect a blind person."

Many respondents (53%) said that they had a family member or close friend with a disability. A few people self-indicated having a disability in their free-form responses. These personal connections to disability might have been part of the reason for the positive response to the application's description.

APPLICATION PILOT
After completing the survey, all survey respondents were offered an opportunity to install a pilot version of Visual Answers for 12 days. In this version of the application, rather than using live, unscreened VizWiz questions, we hand-selected a sample of questions from the VizWiz archive to be posted to volunteers' feeds with transcribed questions. We did not actually forward these answers to the blind users (whose questions had already been answered). This eliminated the possibility of volunteers receiving questions that might contain personal or inappropriate material and also eliminated the possibility of us sending blind users answers that might be low-quality or inappropriate – the purpose of this application pilot was to explore our hypotheses that social microvolunteering could be fast, trustworthy, and high-quality, and explore how we might design such apps to better achieve these goals.

To explore how task difficulty would impact social microvolunteering, posted questions alternated between being answerable from the photograph provided and being difficult or impossible to answer due to issues such as lighting, blur, composition, or framing, which are all common problems in blind users' photos [7].

We also varied (i) the frequency with which questions were posted (every other day, once a day, or twice a day), (ii) the explanation of the study included in the post (providing a motivation for answering, "*Answers will be forwarded directly to the blind user who asked the question,*" for research, "*Answers will be used by our research team to help develop automatic question-answering tools for blind people,*" or no motivation at all), and (iii) how we indicated to participants that questions were closed to new answers (by commenting on the post to thank people for answering, deleting the post, or doing nothing), in order to gain insight into how to post questions in the most user-friendly way.

Users
All 350 survey participants reached the page prompting them to learn more about installing Visual Answers. 188 proceeded to the next page, which described the study, and showed examples of the posts the application would make. Of these, 91 installed the application. When given the

opportunity to install the application, participants were either offered a $20 Amazon gift card as additional compensation for their participation, or were offered no additional compensation. To balance the number of participants who were paid and unpaid, each survey participant who visited the page was offered the payment condition with the lowest number of active pilot users thus far. We varied the payment condition to see how it impacted potential participants' installation rates.

142 participants were offered compensation for participating, and 47 installed; the other 207 participants were not offered compensation, and 44 installed. The offer of payment was a significant factor in installations, $\chi2(1, N=350) = 6.258, p = 0.012$.

We associated the installations and the responses participants gave to the survey. Of the 91 who installed the application, 74 had responded positively to the application's description in the survey, while the other 17 had responded negatively. Most participants who responded positively about installing the application thought their friends or Facebook users' friends would be very (34%) or somewhat (59%) happy to answer questions from the application. Of participants who responded negatively to the application, many (35%) were opposed to the application for privacy-related reasons, such as not wanting to allow access to their information or posting permissions. However, many others cited application-related reasons – either not thinking this was an effective way to help blind people (41%), or fear that the posts would annoy their friends (35%). 8 of the 17 participants who responded negatively mentioned that financial incentives could motivate users to install.

58 of the participants who installed the application said they had a family member or close friend with a disability, and 23 said they were already involved with a charitable organizations or volunteer efforts that focused on disability.

These participants had an average of 447 friends (median 269). In the next sections, we analyze data from these 91 participants, with all names replaced with pseudonyms.

Over the duration of the pilot, 14 of the 91 participants uninstalling the application (8 in the paid condition), after an average of 4.3 days. For these participants, we used only data collected before they uninstalled.

Responses to Visual Answers Questions
24 questions were available to be posted to participants' feeds (12 easy to answer, 12 difficult to answer). Each volunteer and their friends saw any particular question only once, but across all participants each question was posted an average of 47.1 times during the 12 day study period. The average time until a first answer was received to each of the 24 questions across all users was 1 minute and 45 seconds (median of 1 minute and 28 seconds). While this confirms that near real-time speeds can be achieved by posting the same question to several volunteers' feeds simultaneously, this result was achieved when analyzing
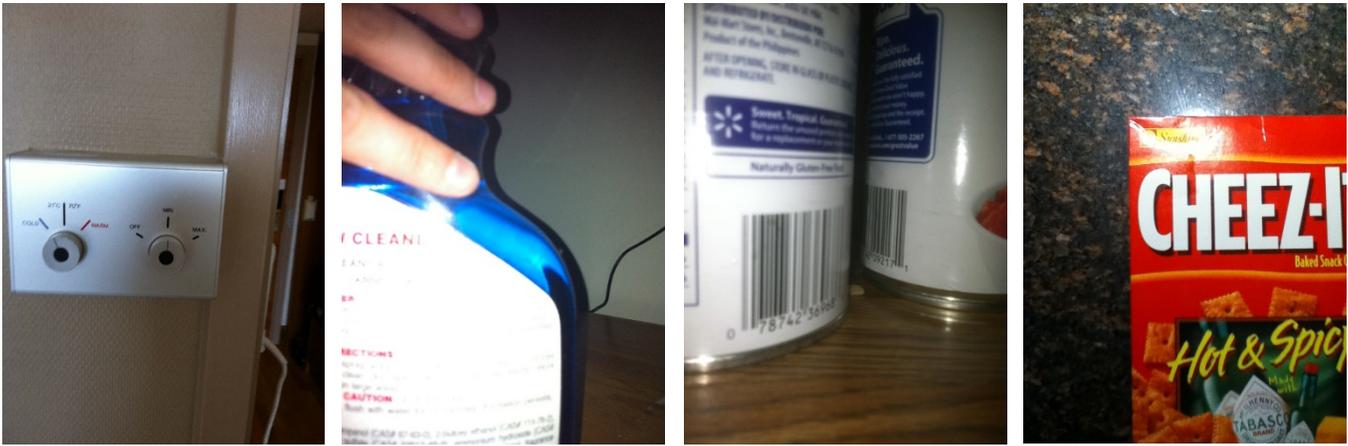
Figure 3. Four of the questions posted by Visual Answers. (a) "Which knob, is it the left or the right, is for temperature control?", (b) "What does this bottle say?", (c) "What is in this can, please?", (d) "What's in the box?"

answers from every post during the study period – as shown in Figure 4, all 24 questions did not all have answers until posted 6 times each, and average first answer speeds decreased sharply until questions had been posted to 9 volunteers' feeds (average time of 6:27), then evened out.

Visual Answers posted 1,130 questions during the study. 479 of these questions received at least 1 comment, either from the volunteer, their Facebook friends, or both. Of 756 total comments, 618 were good-faith answers (as defined below). We break down our analysis of the answers into those from the volunteer's Facebook friends, or from the volunteers themselves.

Comments from Facebook Friends
292 of the questions posted (26%) received at least one comment from a friend, and 67 of the 91 participants received at least one comment from a friend on a question that Visual Answers had posted on their feed.
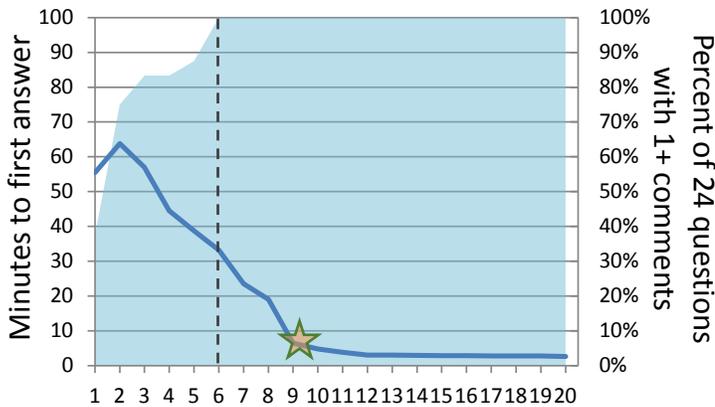
 # Volunteer feeds each question was posted to

Figure 4. The x-axis shows the number of volunteers who had a specific question posted to their wall. The solid line represents the average time in minutes for the first answer to the question from all volunteers and their friends. The solid blue represents answer coverage of the 24 possible questions (the percent that had at least 1 comment). After the questions had been posted to 6 walls (dashed line), all questions had been answered at least once. After questions had been posted to 9 people (the star at 6:27), the increases in speed from posting to additional volunteers' walls grow less rapidly.

For the 292 questions that were answered by a friend, most received a small number of comments – the total number of comments from friends was 481. 156 of the questions that received comments were answerable, and the remaining 136 were unanswerable. The first answers from friends to individual posts took an average of 46.9 minutes (median 18.8 minutes), with no significant difference between first response times for answerable and unanswerable questions. In practice, questions would likely be posted as multiple volunteers' status messages, so the times reported in Figure 4 are a better estimate of experienced latency for the blind question asker.

379 of the 481 comments included *good-faith answers* – answers that either directly answered the user's question, made a helpful guess, or told the user the question could not be answered and how to improve their photograph.

198 of the good-faith comments were on answerable questions, and provided the correct answer:

[in answer to "Which knob, is it the left or the right, is for temperature control?" (Figure 3a)]
Left one is for Temperature. It has three settings cold to the left, 21 Celsius/70 Farenheit in the center and warm to the right.

181 of the good-faith comments were on unanswerable questions and provided a useful guess or information on the problem and advice on taking a better photograph:

[in answer to "What does this bottle say?" (Figure 3b)]
The flash on the camera seems to have caused the label to be too bright white to read. Also; the picture is not centered to see the full product. My guess is that it is window/glass cleaner.

In one case, a commenter went above and beyond to correctly answer a question we thought was unanswerable:

[in answer to "What is in this can, please?" (Figure 3c)]
The left one is canned pineapples. The right is petite diced canned tomatoes. (Google the bar codes; then click the WIC pdfs).

102 of the 481 comments were not good-faith answers. Many of these comments were part of normal conversations that occurred in the comments of the application's posts, often after a good-faith answer was received:

> [in answer to: *"What is this product?"*]
> *Jenn: splenda*
> *Jamie: Jenn, go to bed!!!*
> *Jenn: I would if I was at home still out... just waiting for Al to pack his stuff up then we are going home promise xx*

Others discussed the application ("Jess explain this to me. What is viz wiz"), interacted with previous answerers, or were just not useful as answers, such as, "Asv [sic] would a blind person be clueless; son [sic] am I." We did not distinguish between useless answers and conversational comments, since neither benefit the asker. With these few exceptions, the majority of answers from friends (78.8%) were high quality, providing correct answers or feedback.

Comments from Study Participants
In addition to receiving answers from their Facebook friends, some volunteers commented on their own statuses, either to interact with other commenters or to answer the questions themselves. 275 additional comments on the application's posts were from the volunteers themselves. These comments were posted an average of 72.3 minutes after the question was posted (median 35.8), which is significantly longer than the average time to first comments from friends, t(477) = 3.61, *p* = 0.0003.

The majority were again good-faith answers (87%). The other 36 comments were mostly conversational, answering questions about the application or thanking friends:

> [in answer to *"What color is my shoe?"*]
> *Eunice: White!*
> *Danielle [volunteer]:Thanks, this is an experimental disability app, I offered to test drive. I think it's great!*

Nine volunteers received no comments from their own friends on their questions – instead, they answered a number of their own questions (4.9 answers, on average).

POST-STUDY SURVEY
After completing the twelve-day pilot of Visual Answers, all volunteers who had installed the app were invited via email to take a survey about their experiences. 61 of the 91 participants completed this survey.

Opinions of Social Microvolunteering
Nearly all participants liked the application, feeling somewhat (47%) or very (48%) positive about using it. 68% said they planned to leave the application installed after the study ended. When asked about social microvolunteering, 90% said that Facebook was a good place for social microvolunteering, and 83% said that they would want to use Facebook for social microvolunteering in the future.

From free-form answers, participants seemed to have gained the benefits of positive, altruistic feelings we hypothesized would be associated with social microvolunteering, including comments such as "It is nice to be of service," "This is an awesome application and it makes me feel good to use it," and "just that this is a great idea im [sic] glad i took the first survey."

However, there were drawbacks associated with use, too. Many criticisms focused on questions that were unanswerable, including, "Just I felt bad for them when they asked a question I could not answer" and "Why did you allow post that were illegible? Seems to be a waste of time." Other critiques focused on the application itself, such as, "Answering the questions didn't feel like there was much impact; just some random picture that popped up. People just look at pictures, and don't think of volunteering by facebook."

Friends and Impact on Facebook Use
60% of participants said that they had gotten asked questions about the application's posts during the course of the study. Despite this, most participants did not feel that using Visual Answers impacted their typical use of Facebook (65%), and only 7 said the applications' posts disrupted their news feed.

Participants said comments on their posts came mostly from personal friends (77.2%) or family members (31.6%), not from their weaker ties. For participants who had received answers from friends, the survey asked about their ties with up to 3 people who had commented on the posts. Most were friends who would usually comment on the participants' content, with only 7 of the 89 friends asked about being people who would not normally comment.

Even when there were low answer rates, participants seemed to value their friends' efforts in responding:

> *I personally did not get a lot of "friends" responding, but those that did were characterized by their own personal involvment [sic] in other volunteer activities and consistently responded throughout the entire study.*

DISCUSSION
The survey results and application pilot demonstrate the potential of social microvolunteering to help sustain and scale crowd-powered systems designed to help people or causes. Participants were optimistic about the idea of providing access to their friends as an answering resource, and many installed the Visual Answers application (both with and without the promise of compensation) to help answer questions for blind people. Their friends engaged with the posts, quickly providing high-quality answers to a significant fraction of the questions that were posed.

Longer deployments with larger user bases will be important for answering research questions about the sustainability and impact of Visual Answers, and social microvolunteering in general. However, this initial study provides insight into the end-to-end design and deployment of a social microvolunteering app, as well as demonstrating the feasibility (in terms of both real-time performance and user attitudes) of the concept of social microvolunteering.

Feasibility

Getting high-quality answers is important for the feasibility of an application like Visual Answers. Most (81.7%) of the answers received during the pilot study were useful, either providing a correct answer or feedback on why an answer could not be obtained from the photograph. However, some had extraneous comments, resulting from users starting conversations in the comments of the applications' posts, either not realizing or not caring that their conversations might be forwarded to the blind person who posted the question. Conversational comments tended to be included after a good faith answer had already been submitted, perhaps indicating that friends felt freer to submit general comments after a real answer had been provided. Overall, 91% of the first comments posted to the 479 questions that got comments from the users or their friends were good-faith responses, significantly higher than the 65.7% of non-first comments that were good-faith ($\chi2(1, N=756) =75.40$, $p < 0.0001$). Future work may look at detecting off-topic comments or simply only forward the first answer.

Though only 42% of individual posts received comments, across all participants all 24 questions that were posted received good-faith answers. This indicates that, while individual users and their friends cannot be guaranteed to answer any one question, distributing questions to multiple volunteers greatly expands the pool of available answerers and the likelihood of getting an answer.

Answers came back quickly when distributed to multiple volunteers, with an average first response to each question across 10 or more posts in 4 minutes, 48 seconds, and a median response time of 18 minutes on individual posts. This approaches the latency necessary for applications like VizWiz – in an analysis of the perceived urgency of VizWiz questions, most required answers within a minute (10%) or up to ten minutes (58%) [7]. In order to further reduce latency, questions could be distributed to more users at once, or targeted to volunteers with many friends currently online. Social microvolunteering could also be useful in systems without real-time demands.

Though rare, some questions from VizWiz may be inappropriate to post on Facebook, either because they contain personal information (such as a letter showing a full name and address) or even malicious content. The system could be used in a pipeline where a combination of computer vision and paid crowd workers first quickly verify that an image is appropriate for Visual Answers before the system passes it along. Alternatively, friends could flag content as inappropriate, by commenting "inappropriate" to indicate that a question should be deleted.

Bootstrapping and Sustainability

A core idea of social microvolunteering is that it may be more sustainable than paid marketplaces, but the long-term appetite for this kind of work is difficult to determine given a 12-day deployment. We have shown that a reasonable fraction of people were willing to install Visual Answers (even without monetary compensation) and that a reasonable fraction of their friends were willing to answer questions for free. This is important because a primary difficulty in sustaining crowd-powered systems is their cost.

Participants need to be recruited to install new social microvolunteering applications. For our study, we recruited survey participants and piloters through targeted advertisements on Facebook. Participants could also be recruited by advertising on mailing lists or websites for people who have an interest in a specific cause. It would be interesting to study whether social microvolunteering applications might spread virally and how app designers or individual volunteers might effectively encourage this.

Our study looked at only 12 days of use, but the long-term success of the approach requires continued interest over time. Longevity could be enhanced by posting questions infrequently (once a week or less); a larger user base would allow less frequent per-user posting. Survey respondents also indicated this would be a desired frequency.

If social microvolunteering were to become popular, it may risk being a victim of its own success, as a large number of mediated friendsourcing requests would compete for users' time and attention. To facilitate this, platform operators could adjust their newsfeed algorithms to condense or eliminate duplicate volunteering requests, or enable that functionality via APIs. Application designers could also consider this factor - if a certain percentage of a users' friends has seen a question recently, the application could defer posting for that user until a new question has come in. The challenges of the attention marketplace [24] in friendsourcing have been noted by others and merit further consideration, but are beyond the scope of our study.

Generalizability

While Visual Answers provides a compelling example of social microvolunteering, organizations could post tasks of different formats, to different social networking sites, or use different techniques to get answers. Visual Answers used image-based tasks, but social microvolunteering could deal with all types of media, ranging from simple, text-based tasks to larger, complex tasks. In traditional microwork, large tasks can be broken down into small components, with responses aggregated into complete solutions. This approach could even work to resolve some of the feasibility issues with Visual Answers – for example, having different types of microvolunteers who donate their feeds to compose an answer pipeline (checking for sensitive info, transcribing audio, answering questions, and verifying answers).

Different applications could use different strategies to get the answers they want based on their metrics of quality – speed, correctness, thoroughness, originality, or some combination of these. Tasks could be optimally routed to people with large networks for fast answers, or to networks composed of people who are likely to have correct answers

(*e.g.,* health questions posted to a doctor's feed, who may have many other friends in the medical field).

Social microvolunteering could be done on various social networking sites, taking advantage of different sites' affordances and network compositions. Facebook is well-suited to multimedia tasks due to generous length limits for question text, support for embedded images/videos, user familiarity with app posts from other applications, and the network of friends and family members who can be trusted to provide quality answers. Other tasks might be better suited for platforms like Twitter, where users have a broader range of people following them, or LinkedIn, where followers might be likely to share common areas of professional expertise.

CONCLUSION

In this paper, we introduced *social microvolunteering,* where people provide access to their friends as a resource for completing microwork for causes they care about. We presented Visual Answers, a social microvolunteering application that helps blind people answer visual questions. Facebook users responded positively to the suggested application in a survey, and many went on to install the application. Overall, the questions posted to volunteer's Facebook accounts were answered correctly and quickly, and volunteers reported positive attitudes toward the application after the pilot period was complete, demonstrating the real-world feasibility of our approach.

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REFERENCES

1. André, P. et al. Who Gives A Tweet? Evaluating Microblog Content Value. *Proc. CSCW 2012*.

2. Bernstein, M. et al. Micro-volunteering: helping the helpers in development. *Proc. CSCW 2013*.

3. Bernstein, M.S. et al. Quantifying the Invisible Audience in Social Networks. *Proc. CHI 2013*.

4. Bigham, J.P. et al. VizWiz: Nearly Real-time Answers to Visual Questions. *Proc. UIST 2010*.

5. Bigham, J.P. et al. The Design of Human-Powered Access Technology. *Proc. ASSETS 2011*.

6. Blog, F.O. 2014. News Feed FYI: Giving People More Control Over When They Share from Apps.

7. Brady, E. et al. Visual Challenges in the Everyday Lives of Blind People. *Proc. CHI 2013*.

8. Brady, E. et al. Investigating the appropriateness of social network question asking as a resource for blind users. *Proc. CSCW 2013*.

9. Demographics of key social networking platforms: *PewResearch Internet Project,* Dec. 30, 2013.

10. Economic News Release - Volunteering in the United States, 2013: *www.bls.gov/news.release/volun.nr0.htm*.

11. Ellison, N.B. et al. Calling All Facebook Friends: Exploring Requests for Help on Facebook. *Proc. ICWSM 2013*.

12. Gray, R. et al. Who Wants to Know? Question-asking and Answering Practices among Facebook Users. *Communication Arts*. (2013).

13. Havens, J. et al. 2006. Charitable Giving: How Much, by Whom, to What, and How? *The Non-Profit Sector: A Research Handbook*. 542-567.

14. Korpela, E. et al. 2001. SETI@HOME — Massively Distributed Computing for SETI. *Computing in Science and Engineering*. (2001), 78-83.

15. Lampe, C. et al. Help is on the Way: Patterns of Responses to Resource Requests on Facebook. *Proc. CSCW 2014*.

16. Lee, Y.-hao and Hsieh, G. Does Slacktivism Hurt Activism?: The Effects of Moral Balancing and Consistency in Online Activism. *Proc. CHI 2013*.

17. Marichal, J. Political Facebook groups: Micro–activism and the digital front stage. *First Monday*. 18, 2013.

18. Martins, J. et al. 2014. Friendsourcing the Unmet Needs of People with Dementia. *W4A 2014*.

19. Morris, M.R. et al. A Comparison of Information Seeking Using Search Engines and Social Networks. *Proc. ICWSM 2010*.

20. Morris, M.R. et al. What Do People Ask Their Social Networks, and Why? A Survey Study of Status Message Q&A Behavior. *Proc. CHI 2010*.

21. Nichols, J. and Kang, J. Asking questions of targeted strangers on social networks. *Proc. CHI 2012*.

22. Paul, S.A. et al. Is Twitter a Good Place for Asking Questions ? A Characterization Study. *ICWSM 2011*.

23. Rahman, S. et al. FRAppE : Detecting Malicious Facebook Applications. *Proc. CoNEXT 2012*.

24. Rzeszotarski, J.M. and Morris, M.R. Estimating the Social Costs of Friendsourcing. *Proc. CHI 2014*.

25. Takagi, H. et al. Social Accessibility: Achieving Accessibility through Collaborative Metadata Authoring. *Proc. ASSETS 2008*.

26. Teodoro, R. and Naaman, M. Fitter with Twitter : Understanding Personal Health and Fitness Activity in Social Media. *Proc. ICWSM 2013*.

27. Vie, S. 2014. In defense of "slacktivism": The Human Rights Campaign Facebook logo as digital activism. *First Monday*. 19, 2014.

28. Voida, A. et al. Bridging Between Organizations and the Public: Volunteer Coordinators' Uneasy Relationship with Social Computing. *Proc. CHI* 2012.

29. Wu, S. and Adamic, L. Visually Impaired Users on an Online Social Network. *Proc. CHI 2014*.