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Abstract

Since Jeff Howe introduced the term "crowdsourcing" in 2006 for the first time, crowdsourcing has be come a growing market in the current Internet. Thousands of workers categorize images, write articles or perform other small tasks on platforms like Amazon Mechanical Turk (MTurk), Microworkers or ShortTask. In this paper, we want to give an inside view of Microworkers and show that there are significant differences to the well studied MTurk. Further, we have a look at Microworkers from the perspective for a worker, an employer and the platform operator, in order to answer their most important questions: What jobs are most paid? How do I get my work done most quickly? When are the users of my platform active?

1 Introduction

In 2006 Jeff Howe introduced the term *crowdsourcing* [1] which refers to "the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call". Besides various non-profit crowdsourcing applications like the Wikipedia [2] and OpenStreetMap [3] projects, commercial usage of crowdsourcing becomes more and more interesting and a large variety of crowdsourcing platformed has developed. These platforms act as mediator between the employers and the crowd.

Some crowdsourcing platforms are specialized on certain tasks, e.g. InnoCentive [4] on research and development, Clickworker [5] on text creation, data categorization, web-search and surveys. Other platforms like MTurk [6], Microworkers [7] or ShortTask [8] offer a framework to access the crowd which enables the employers to submit individually designed tasks. These non-specialized platforms are particularly interesting as they have usually large crowds and are used for a large variety of different task types, like tasks related to search engine optimization, audio transcription of sound data, user surveys for products or recruiting people for scientific on-line tests.

In recent years, several publications dealt with the quality of the workers, the types of the task and about the workers and employers themselves. However, most of theses

studies were based on MTurk which is highly biased in terms of the home country of the workers and employers. In order to place a task on MTurk a US bank account is required, the money earned can only be transfered to an US or Indian bank account or can be used in the amazon.com shop. Thus, most of the employers are from the USA and most of the workers from India and the USA.

Consequently, the question is if these results are generalizable or biased because of the MTurk restrictions. Therefore, we analyze the demographics of Microworkers, a crowdsourcing platform with no limitation regarding the home country of the workers or the employers and compare them to the findings about the MTurk demographics. Further we have a look at platform specific measures to compare the two platforms directly. Hereby, we use three different viewpoints, the worker's, the employer's and the platform's viewpoint. Each of them has different focuses, e.g. the worker is interested how much he can earn, the employer how fast and properly his work is done. As the platform operator charges a fee for each submitted campaign and for each successfully completed task, he is interested at which time the uses are active and how correctly the workers perform the given tasks.

The rest of the paper is structured as follows. Section 2 gives a short background how MTurk and Microworkers work and summarizes the related work. In Section 3 we focus on the home countries of the Microworkers users and compare them to the home countries of the MTurk users. Section 4 characterizes the jobs in both platforms and Section 5 compares platform parameters of MTurk and Microworkers. Section 6 concludes our paper.

2 Background and Related Work

In this section we give a short description of MTurk and Microworkers, their terminology and which information about the platforms were accessible for this paper. Further we review the related work.

2.1 MTurk Platform

Amazon Mechanical Turk (MTurk) was launched at the end of 2005 and 2010 is still in beta phase. MTurk distinguishes between *requesters* and *workers* who are also called *Turkers*. For both roles, a different login account is required. Requesters submit the work as *Human Intelligence Tasks (HITs)* with are completed by the workers.

As soon as a worker chooses to work on a HIT, the HIT is locked for a certain time and no other worker can work on this task. If the worker completes the HIT in the given time it is removed from the system, otherwise it is again available to other workers. The duration of the lock is defined by the requester at the creation of the HIT. This time is often far larger than the time actually required for task.

Each HIT is paid between \$0.01 and a few dollars, depending on the time required to complete the HIT and its difficulty. Similar HITs from the same requester are combined to a HIT group. Each HIT group provides some public information listed in Table 1.

Table 1: Public information about a HIT on MTurk

Field	Description
Requester	Name of the requester
HIT expiration date	Time until all HITs shall be completed
Time allotted	Amount of time a worker has until the HIT is revoked
Reward	Reward per correctly completed HIT
HITs available	Number of HITs still left in this group
Description	Description of the HIT
Keywords	Keywords describing the HIT
Qualification required	Qualifications a worker needs to be able to work on this HIT

2.2 Microworkers Platform

The Microworkers platform was launched in May, 2009 and is similar to MTurk with some slight differences. In contrast to MTurk, every user of Microworkers has only one login and can both, act as *worker* and as *employer*. All payments are performed using online payment services like PayPal [9], i.e. no US back accounts are required. This offers a better support for international users. Similar to MTurk's HIT and HIT groups, tasks on Microworkers are organized in *jobs* and *campaigns*. Unlike MTurk, Microworkers has predefined job categories with different minimum payments depending on the complexity and the time efforts. Jobs which do not fit in any of the categories can be submitted as *other*. The jobs are paid between $0.10 and a few dollars. The public available information about a campaign can be found in Table 2.

In contrast to *time allotted* from MTurk, *time needed* in Microworkers is not a fixed limit for the working time. It is an orientation for the worker how much time he needs to complete the task.

Besides public available information from Table 2, we received several anonymized data from the operator of Microworkers, e.g. the number of completed tasks, the number of submitted campaigns, or the sign up date.

Table 2: Public information about a job on Microworkers

Field	Description
Title	Title of the job
Category	Category the jobs belongs to
Time needed	Average amount of time a worker needs to complete the job
Payment	Reward per correctly completed job
Jobs available	Number of jobs still left in this campaign
Description	Description of the job
Success rate	Percentage of approved jobs in this campaign
Country	Jobs can be limited to workers from certain countries

2.3 Related Work

MTurk and its demographics are already well studied. Between 2008 and 2010 Ipeirotis [10–12] and Ross et. al. [13] conducted several survey among the MTurk workers. The shift of the demographics from 2008 to 2009 is summarized by Ross et. al. in [14]. In 2008 the majority of the MTurk workers were from the United States (reported at 76% of total workers), but their numbers reduced to 47% in 2010. During the same time the percentage of Indian workers increased from 8% to 34%, as MTurk added the option to receive a payout in India. The survey also shows, that most of the workers are well educated with a college or advanced degree, slightly more than half of them are female and most of the workers do not rely on the money earned on MTurk.

Besides the users of MTurk, the market place itself has been subject of scientific research. Ipeirotis [15] presented a detailed analysis of MTurk based on data crawled from the web site. He showed, that 1% of the requesters posts more than 50% of the dollar-weighted tasks and concludes, that only a few participants make extensive use of crowdsourcing. He further analyzed the keywords used to describe the HITs and how long it takes until the workers complete the HITs.

We differ from previous work, as we are the first to study another crowdsourcing platform than MTurk. Further our evaluation is not based on user survey, but on unbiased data from the platform provider.

3 Home Countries of Crowdsourcing Users

The most important part of a crowdsourcing platform is its crowd. Without a qualified and large crowd, the platform is not attractive to employers as the tasks are completed incorrect and slowly. On the other side, the employer are also an important factor for the success of a crowdsourcing platform, as they submit the tasks and the reward which attracts the workers. Thus, we now detail on these two groups and especially on their origin.

The demographics of the platform are interesting for users of crowdsourcing, as tasks may require workers from certain countries or may rely on the diversity of the workers. Furthermore, the distribution of workers and employers over the different time zones has an influence on when new campaigns are launched and finished tasks are submitted.

Our Microworkers data contains approximately 80000 registered users. In the following, a *user* is a person who has a login at Microworkers. We denote to those users, who have completed at least one task as *workers*. Users who have run at least one campaign are refer to as *employers*.

At first we focus on the home countries of all users, the workers and the employers. In order to receive a payment from the Microworkers platform, users receive a post card with a verification code. Thus, each worker has to submit his post address to get paid. The worker can add this address to his profile when ever he likes, but he has set his home country during the registration process. As the home country can not be edited at a later point of time, we assume that most of the users submitted their true home country.
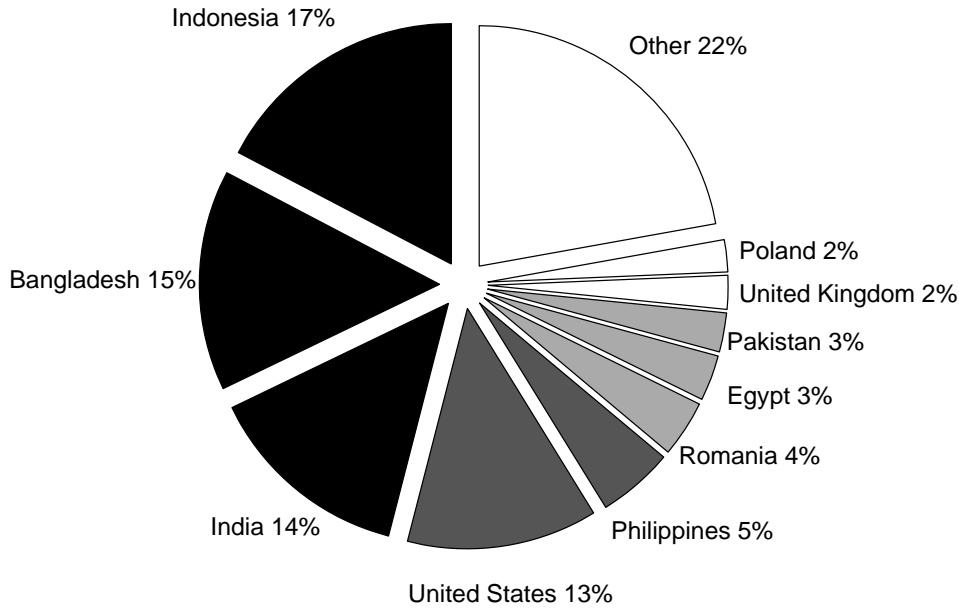
Figure 1: Microworkers users per country

After having a general look at the home country of the user groups of Microworkers, we discuss the correlation between these user groups and the prosperity of the users' home country indicated by the United Nations Development Programme's (UNDP) Human Development Index (HDI) [16]. This will show whether crowdsourcing shows the typical properties of outsourcing, i.e. employers from high-wage countries use the workforce from low-wage countries, or whether crowdsourcing is just a phenomenon for people from high-wage countries to earn some extra money.

3.1 Where do the users come from?

The registered Microworkers users are from 197 different countries, but only a few countries account for the majority of the users. Figure 1 visualizes the distribution of the users among the countries, the 10 countries with the largest number of users are labeled, all other are accumulated in *other*. About 78% of all Microworkers users are from the 10 labeled countries, while all other countries account only for about 22% of the users.

Most of the Microworkers users are located in Asia, only Indonesia, Bangladesh, India, Philippines, Egypt and Pakistan account for 57% of all user, however, there are also large user groups from Europe and America. The users are not only distributed all over the world, they also origin from very different developed countries, from low developed countries like Bangladesh over medium developed countries like India to high developed like Romania and very high developed like the United States, according to the UNDP's HDI in 2010.
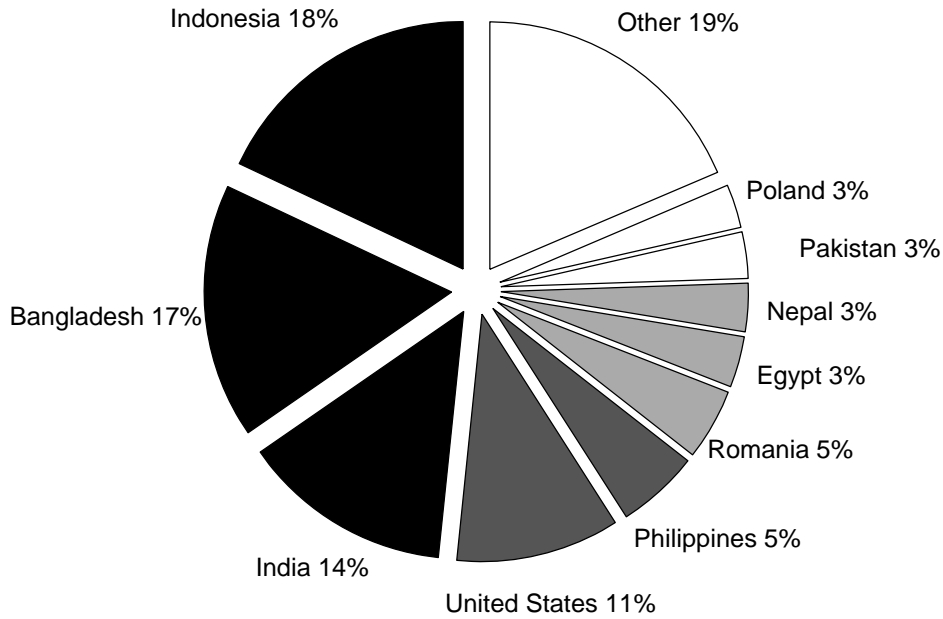
Figure 2: Workers per country

3.2 Home country of workers:

Figure 2 shows the top ten home countries of the workers. We can see, that the ranking of the top seven countries is exactly the same as the ranking of the top seven home countries of the users. The United Kingdom is not among the top ten worker home countries but in the top ten home countries of the users, for Nepal it is the other way round.

Similar to all uses, the workers are mainly located in Asia (63%) and the United States (11%). European workers play only a minor role 8%. However, Microworkers shows a much larger diversity than MTurk which is heavily biases towards workers from the United States (47%) and India (34%). In contrast to MTurk, Microworkers workers tend to be from low-wage countries.

3.3 Home country of employers:

The home countries of the employers are shown in Figure 3. Most of the employers (28%) are from the United States while the United States account only for 13% of all users. Further, other high-wage countries like the United Kingdom and Australia are over represented compared to the distribution of the users' home countries. By contrast, Bangladesh accounts only for 2% of the employers even if it accounts for 15% of all users. However, users from low-wage countries like India and Indonesia still account for a significant number of employers.

In contrast to MTurk, the employers at Microworkers are more international as no bank account in the United States is required.
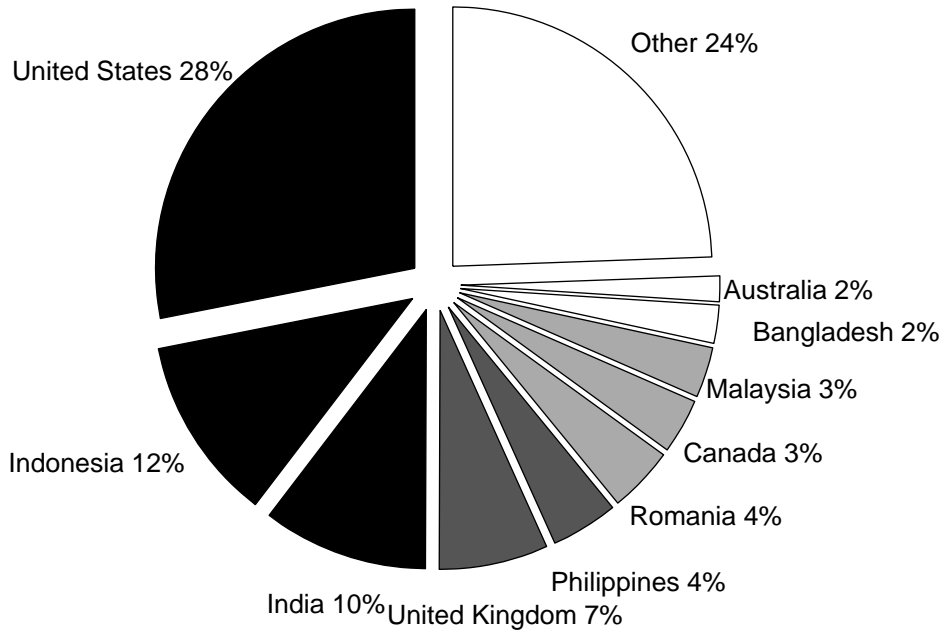
Figure 3: Employers per country

3.4 General observations about the home countries

Table 3 lists the top ten countries which account for the largest number of users, workers, and employers. We see that these countries account for more than ¾ of all users, workers, and employers. Thus, we have a closer look a the distribution of the group members per country.

Table 3: Home countries of user, workers and employers

Rank	Users	Workers	Employers
1	Indonesia 17%	Indonesia 18%	United States 28%
2	Bangladesh 15%	Bangladesh 17%	Indonesia 12%
3	India 14%	India 14%	India 10%
4	United States 13%	United States 11%	United Kingdom 7%
5	Philippines 5%	Philippines 5%	Philippines 4%
6	Romania 4%	Romania 5%	Romania 4%
7	Egypt 3%	Egypt 3%	Canada 3%
8	Pakistan 3%	Nepal 3%	Malaysia 3%
9	United Kingdom 2%	Pakistan 3%	Bangladesh 2%
10	Poland 2%	Poland 3%	Australia 2%
Sum	78% of all users	82% of all workers	75% of all employers

Figure 4 shows a quantile-quantile plot of the percentage of users, workers and employers on the y-axis versus the percentage of countries they came from on the x-axis.
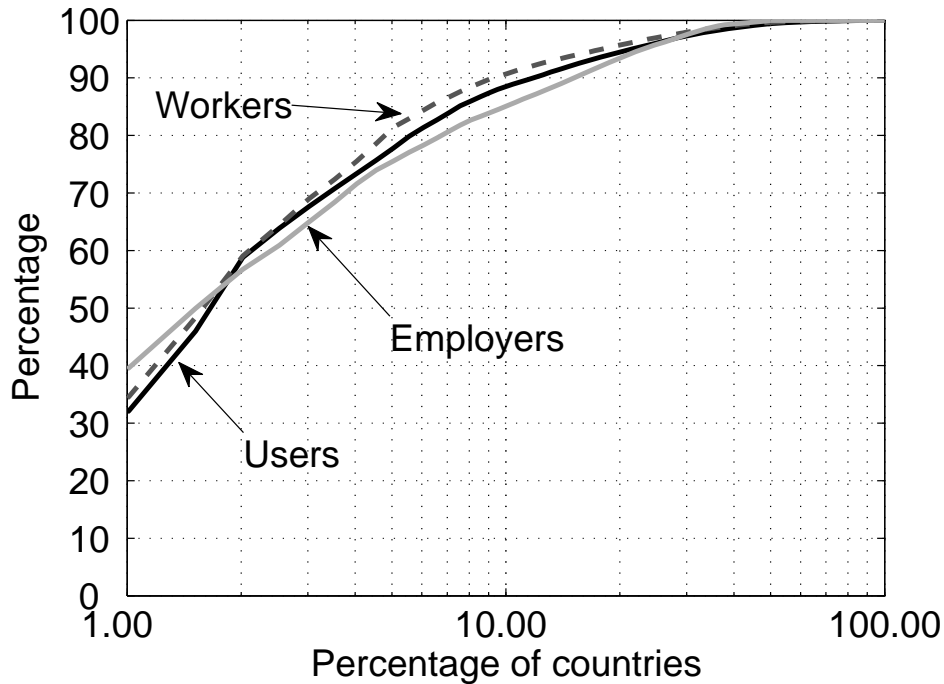
Figure 4: Percentage of users, workers, and employers vs. percentage of countries

Note that the x-axis is in logarithmic scale. All three show a typical Pareto behavior, about 90% of the group member are from only 10% of the countries. Further we can clearly see the high impact of the few very large countries, as 1% of the countries account for 30% of the users, worker and 40% employers.

3.5 Correlation with UN metrics

The United Nations' Human Development Index (HDI) is intended to rank countries by their level of "human development". A country's HDI is based on the life expectancy, literacy education and standards of living in the country. Generally, there are four types of countries, low developed (HDI below 0.470), medium developed (HDI between 0.488 and 0.669), high developed (HDI between 0.677 and 0.784) and very high developed (HDI over 0.788). We now investigate if the home countries of the users, workers and employers are correlated with the HDI. This shows, whether crowdsourcing shows the same tendency as outsourcing, where employers are mainly from high-wage countries and the workforce from low-wage countries.

Figure 5 shows the cumulative distribution function (CDF) of users, workers and employers origin for a country with a HDI $x < X$. The vertical lines mark the borders of low, medium, high and very high developed countries. At first we have a look at the distribution of the workers. About 24% of them are located in low, 45% in medium, 10% in high and 21% in very high developed countries. This reveals two interesting facts.
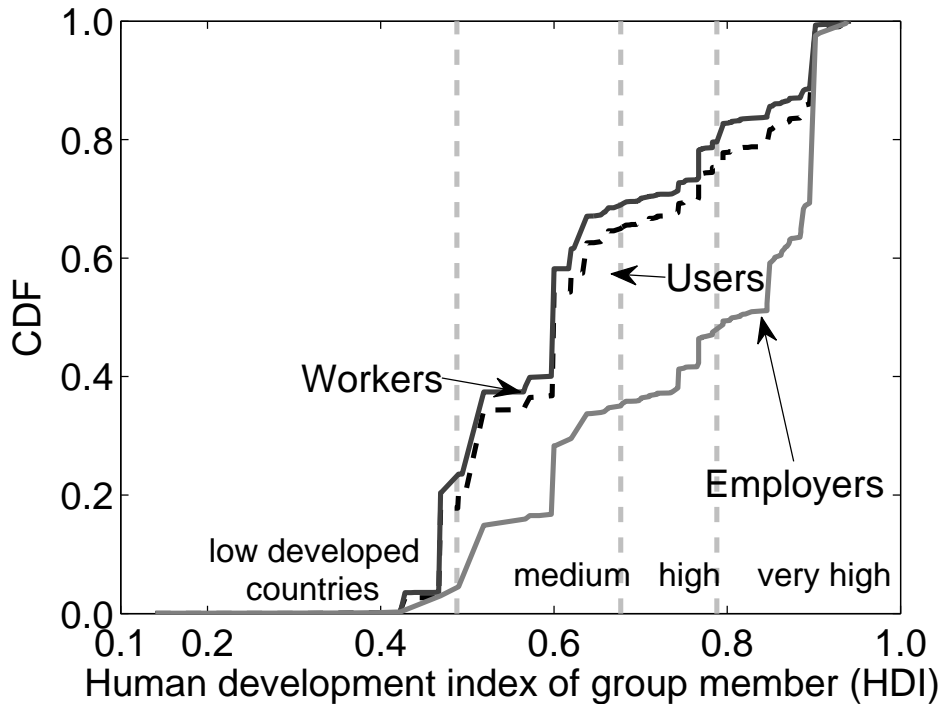
Figure 5: Distribution of Users, Workers, and Employers regarding hid. The for areas mark low, medium, high and very high developed countries

Firstly, low developed counties account for about the same amount of workers as very highly developed countries even if the workers normally work due to very different motivations. While workers from low developed countries are very likely to depend on the money earned from Microworkers, workers from very hight developed countries normally work "for fun" or to earn a little extra money. However, there are two main factors which limit the number of workers from very low developed countries. Internet access is usually only available to a few people and at least basic English knowledge is needed to be active in Microworkers. By contrast, in very high developed countries, Internet access is available to almost all people. But here only a limited number of people is willing to work on microtasks and a lot of the potential workforce does not know that new type of work organization.

The second interesting observation based on the distribution of the workers is that the main workforce is located in medium developed countries. This can be explained by the fact that Internet access is available to more users than in very low developed countries and, compared to high and very high developed countries, the wages are rather low. Thus, the micro tasks are an effective way of earning extra money.

The distribution of the employers is rather different to the distribution of the workers. 65% of the employers are from high and very high developed countries and only 5% are from low developed countries. This is a typical phenomenon similar to outsourcing. The employers are located in high developed countries with high-wages and thus outsource
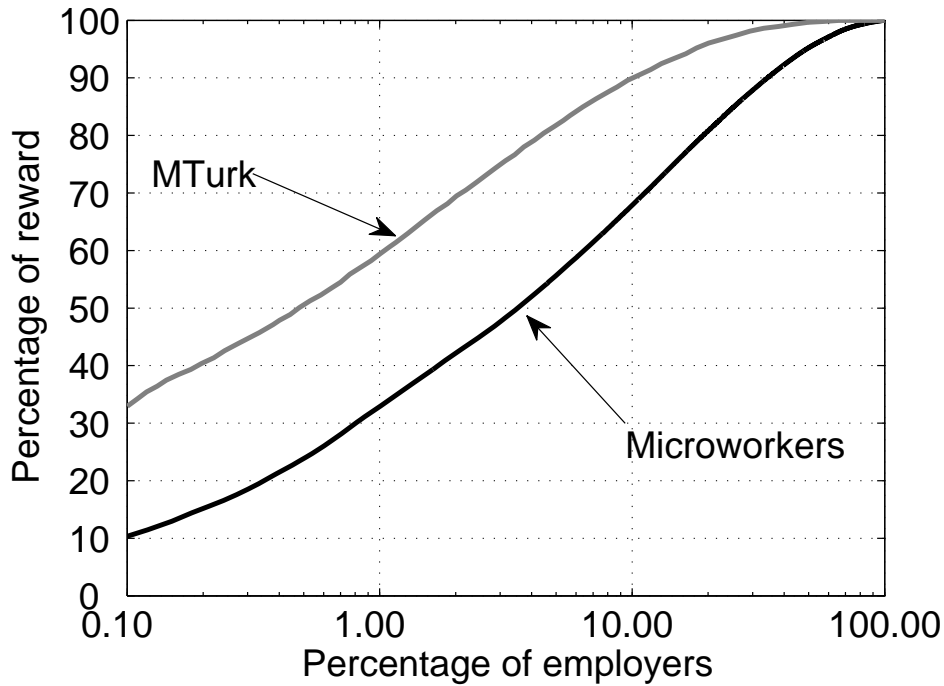
Figure 6: Percentage reward vs percentage requesters

the work to low-wage countries with are typically lower developed. However, this trend is much less present on Microworkers as in normal outsourcing. In a statistical sense, the HDI and the number of workers and the number or employers is uncorrelated, as the correlation coefficient between the number of workers and the HDI is 0.09, respectively 0.04 between the number of employers and the HDI.

The distribution of the users is almost similar to the distribution of the workers as there are about 10 times more worker on Microworkers than employers. Nevertheless, the influence of the employers is clearly visible.

4 Jobs in Crowdsourcing Platforms

In this section we have a close look at the jobs available in the Microworkers platform. This includes an analysis, who submits the jobs, who completes them and which jobs are typical for the platform.

Figure 6 shows the activity of the employers measured by the money they spend on Microworkers and on MTurk. The MTurk values are taken from [15]. The y-axis shows the percentage of all money spent, the x-axis shows the percentage of employers. We clearly see that there is a small number of employers who accounts for most of work on Microworkers. However, MTurk is even more dominated by large employers. At MTurk 10% of the employers spend 90% of the money, while at Microworkers 10% spend 70% of the money.
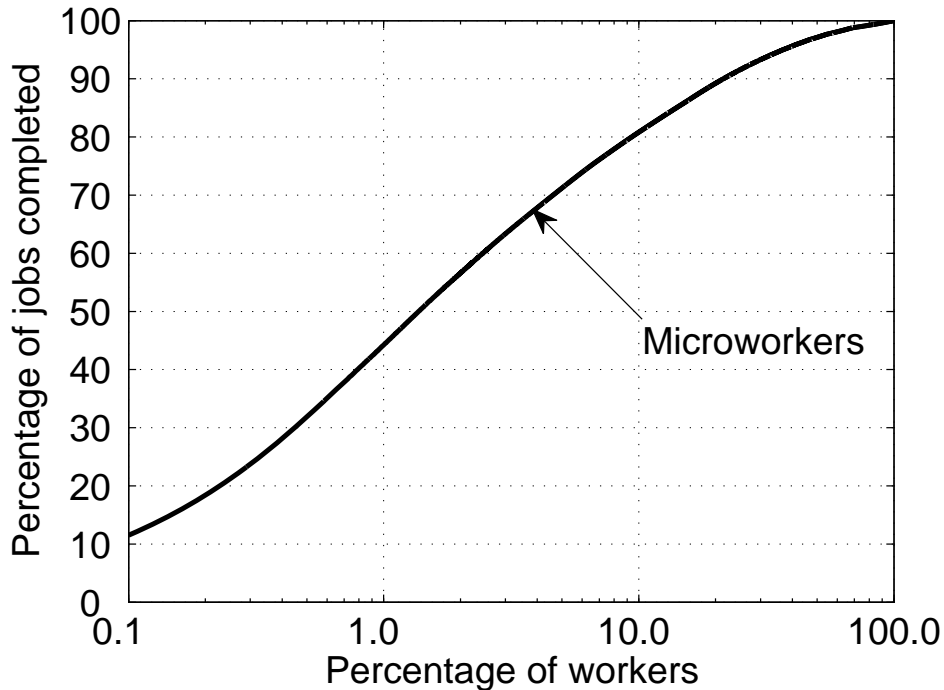
Figure 7: Percentage jobs completed vs percentage worker

This difference in the money distribution is a first indicator that Microworkers is used by different type of employer than MTurk. While MTurk is used by companies which act as mediator for many smaller employers and companies which offer services based on crowdsourcing, employers on Microworkers are more likely to be self-employed or use crowdsourcing only for marketing purposes.

The activity of the workers is measured by their number of completed jobs. Figure 7 shows the percentage of completed jobs versus the percentage of workers. Again the x-axis is in logarithmic scale. Similar to the activity of the employers, a small number of workers account for the majority of the completed jobs. This shows that some workers are very active on Microworkers and theses workers as likely to make their living via crowdsourcing.

Next, we have a look which types of jobs are offered on the Microworkers platform. In MTurk, jobs can only be classified by the given keywords or by a manual classification based on the job description. In Microworkers, a category has to be assigned to every new campaign upon creation. As each campaign is rechecked and approved by an employee of Microworkers, we can assume that the jobs are filed in the correct category. Table 4 lists the currently available categories, how many jobs belong to each category, the amount of reward they account for, and when the first campaign in the category was launched.

Most of the categories are related to search engine optimization (SEO) by creating more back-links. But additionally, there are also categories for *Leads* [17], content creation (*Write an Article*) and *Surveys*. At first sight, the mostly used category is *Other*, however this is caused by the fact that the categorization of jobs was not available

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Table 4: Campaigns and Jobs per category

Category	Percentage of all jobs	Percentage of reward	Launch of first campaign in this category
Sign up	6.59	6.06	December 2009
Click or Search	2.69	1.73	June 2010
Bookmark a page (digg, Delicious, Buzz,...)	5.67	4.21	July 2010
Youtube	1.04	0.64	August 2010
Facebook	1.74	1.78	January 2010
Twitter	0.25	0.31	March 2010
Voting & Rating (photo, video, article)	1.84	1.11	August 2010
Yahoo Answers	0.10	0.11	September 2010
Surveys	0.00	0.00	No campaign so far
Forums	0.63	0.62	September 2009
Download, Install	0.13	0.41	March 2010
Comment on Other Blogs	0.63	0.61	April 2010
Write a review online (Service, Product)	0.07	0.21	February 2010
Write an Article	0.07	0.32	October 2009
Classifieds posting (Craigslist, Kijiji, etc.)	0.12	0.29	July 2010
Blog/Website Owners	0.95	3.38	September 2009
Leads	0.33	2.47	April 2010
Other	77.17	75.75	May 2009

at the start of the Microworkers platform. The categories were added one after another according to the types of jobs the employers submitted. Thus, all uncategorized jobs have be submitted in the category *Other*. But with the growing numbers of categories, the percentage of jobs in *Other* decreased from almost 100% in January 2010 to less than 5% in September 2010.

Even if the category information is not available for all the jobs in our data set, we can make two interesting observations for categorized jobs. First, the Microworkers platform is mostly used for SEO tasks at the moment, even though this is slowly changing towards more complex tasks like text creation. Secondly, the reward is highly dependent on the type of job. While 1.84% of all jobs belong the to category *Voting & Rating (photo, video, article)* these jobs account only for 1.11% of the reward. In contrast, jobs for *Blog/Website Owners* account only for 0.95% of the jobs but for 3.38% of the reward.

5 Usage of Crowdsourcing Platforms

In this section we want to analyze the usage of the Microworkers platform from thee different points of view, the worker, the employer and the platform operator. The worker is interested in earning as much money in the least amount of time, the employer in getting his jobs done correctly, as fast as possible and at the lowest costs. The platform operator wants to earn money, similar to the worker, but in order to achieve this he has to make sure that the crowd as well as the number of employers is constantly growing.

5.1 A user's point of view

Obviously, each worker wants to earn as much money in the shortest possible amount of time. Thus, we have a look how a worker can maximize his income while still submitting valid work. Figure 8 shows the income of the workers in dependency of the number of tasks they submitted. Both, the number of finished tasks and the earned reward are normalized to 1.

Not surprisingly the earned reward is correlated to the number of completed tasks with a correlation coefficient of 0.95. However, there are some workers who submit only a few tasks compared to the top workers, but also earn a significant amount of money. This indicates, that there are different types of jobs which are differently paid, as already mentioned in the previous section. Thus, we have a closer look what influences the payment per job.

The payment for a job is normally dependent of its duration and complexity. On Microworkers the payment and the duration of the jobs is uncorrelated, with a correlation coefficient of 0.11. Usually, jobs on Microworkers are very short but differ in their complexity or in their prerequisites, e.g. you have to be a blog owner or willing to submit some private data. This can be seen in Table 5, which lists the mean reward for each category. Note that the category *Survey* is missing. In our dataset, this category was already introduced, but no campaigns in this category were performed yet.
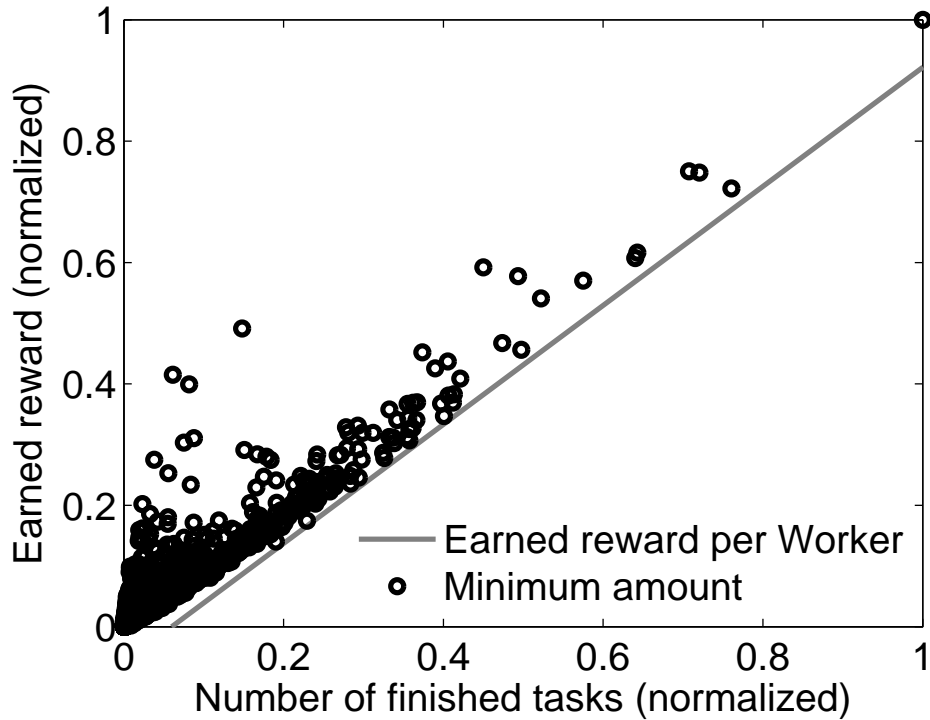
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Figure 8: Reward in dependency of the number of completed tasks

The lowest paid tasks are simple ones like clicking an add or a vote button. Creative tasks like writing an article are paid significantly better, as well as tasks where the worker need an own blog with a certain pagerank. Interestingly, leads with do not require a certain qualification but the will to sell some private data are the highest paid jobs. As all jobs take about the same amount of time, a worker should head for qualified tasks in order to maximize his income.

5.2 An employer's point of view

An employer wants to get his work done correctly, as fast as possible and as cheap as possible. In our dataset only 8% of all jobs are rated *unsatisfied* by the employer. Thus, we do not address the aspect of incorrect work here. For more information about cheat detection and avoidance see [18]. The Microworkers platform offers two features which can influence the completion time of a campaign. First, the employer can define a *campaign speed* which regulates the percentage of workers who can see the jobs from the campaign. Second, the employer can specify that only workers from certain countries can work on the jobs. However, 80% percent of the campaigns are run at the maximum campaign speed and 85% are not restricted to a certain country. Thus, we neglect the effects of these two features. In order to measure the speed of the worker, the employer can use two measure, (1) when was the first job submitted and (2) when was the last job submitted, i.e. when was the campaign finished.

Table 5: Average reward per job

Category	Average reward per job
Sign up	$0.24
Click or Search	$0.15
Bookmark a page (digg, Delicious, Buzz,...)	$0.15
Youtube	$0.12
Facebook	$0.27
Twitter	$0.23
Voting & Rating (photo, video, article)	$0.15
Yahoo Answers	$0.22
Forums	$0.21
Download, Install	$0.63
Comment on Other Blogs	$0.20
Write a review online (Service, Product)	$0.59
Write an Article	$0.95
Classifieds posting (Craigslist, Kijiji, etc.)	$0.47
Blog/Website Owners	$0.80
Leads	$1.49
Other	$0.24

Figure 9 shows the distribution of the time until the first job is submitted, both, x and y-axis are in logarithmic scale. We only consider campaigns, where at least one job was submitted. The distribution shows a typical power-law shape and the values with $x < 25$ can be fitted with $\alpha = -2.59$, shown as line. The distribution shows, that the workers respond to most of the submitted campaigns very quickly and only a few campaigns are adopted very lately. The figure also shows the speed of the employees of the Microworkers platform. Every campaign on the Microworkers platform is review if it corresponds with the platforms terms of use. However, this review process obviously does not introduce a large delay.

The distribution of the completion times of the campaigns is depicted in Figure 10. Again, the x and the y-axis are in logarithmic scale. But this time, we only considered campaigns where all jobs have been completed. Campaigns which are still running, have been stopped by the employer or blocked by the platform are removed. Most of the campaigns are completed very quickly. The same behavior was observed for the HITgroups of MTurk in [15], however, HITgroups may consist of only a single HIT while campaigns in Microworkers have at least 30 jobs. But similar to the completion times of the HITgroups on MTurk, the completion time of the campaigns on Microworkers follows a power-law distribution. The exponent α of the power-law is approximately $\alpha = -1.48$ [15] for MTurk and $\alpha = -1.65$ for Microworkers. This indicates, that campaigns are completed a little faster on Microworkers than on MTurk.

We now have a closer look, when the workers submit their jobs. Figure 11 depicts the distribution of the submission times of the jobs. We use the time zone of the servers,
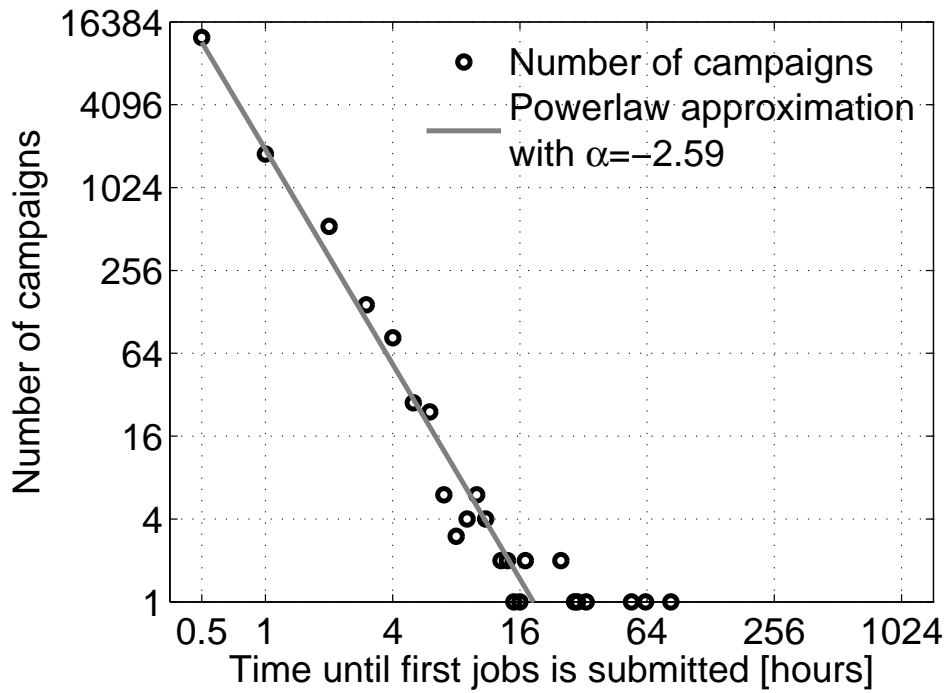
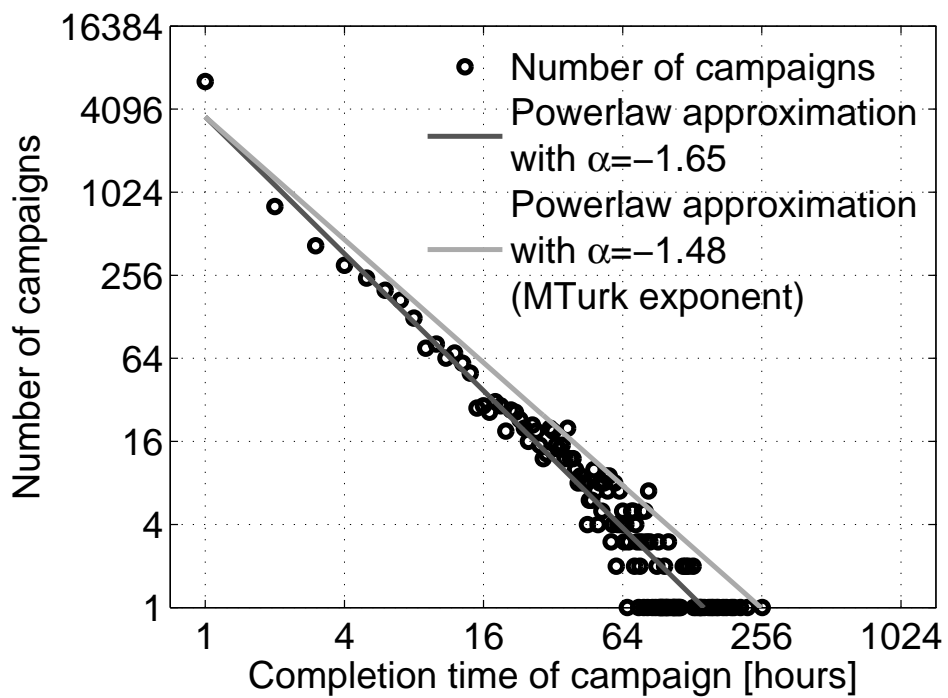Figure 9: Time until first job is submitted

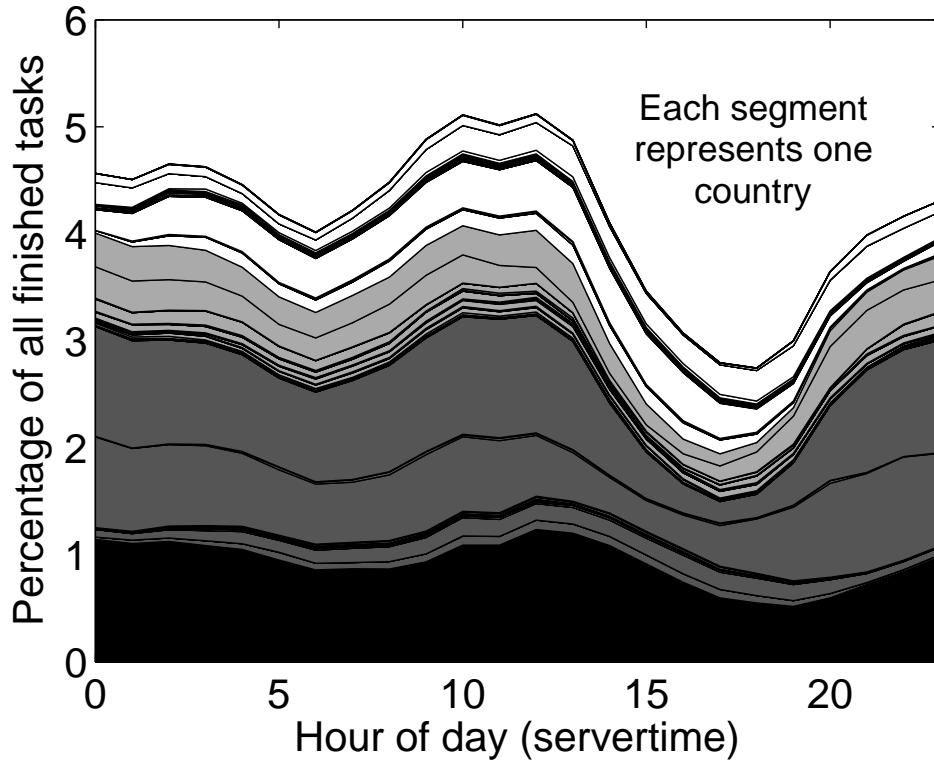

Figure 10: Completion time of campaigns

Figure 11: Submission time of finished tasks

Eastern Standard Time (EST) as these timestamps are also used on the Microworkers webpage. Each area of the curve accounts for a different home country of the submitting worker.

At first, we ignore the stacked colors and just have a look at the overall shape of the curve. We see, that most of the jobs are complete between 10 AM - 12 AM. Afterwards, the submission rate decreases to a minimum at about 5 PM and than increases again during the night. Without the coloring of the different countries, it would be surprising that more people work during the night than in the evening. But if we have a look a the contribution of the different countries, we can identify three main contributors: Indonesia, Bangladesh and India. These countries have a time shift of 10 to 14 hours compared to the EST server time. Thus, the observed minimum at 5 PM EST is between 7 AM and 3 AM local time in the main contributor countries. During this time most of the workers in these countries are asleep what explains the decrease of the job submission rate.

This has two consequences for an employer. Firstly, if he wants a campaign done quickly, he should avoid to submit the campaign between 10 o'clock and 17 o'clock EST. Secondly, the submission time of the campaign can influence which workers work on the campaign. The Microworkers platform offers the possibility to allow only worker from certain countries, however, by scheduling a campaign during night hours of certain countries, the employer can try to avoid workers from there.
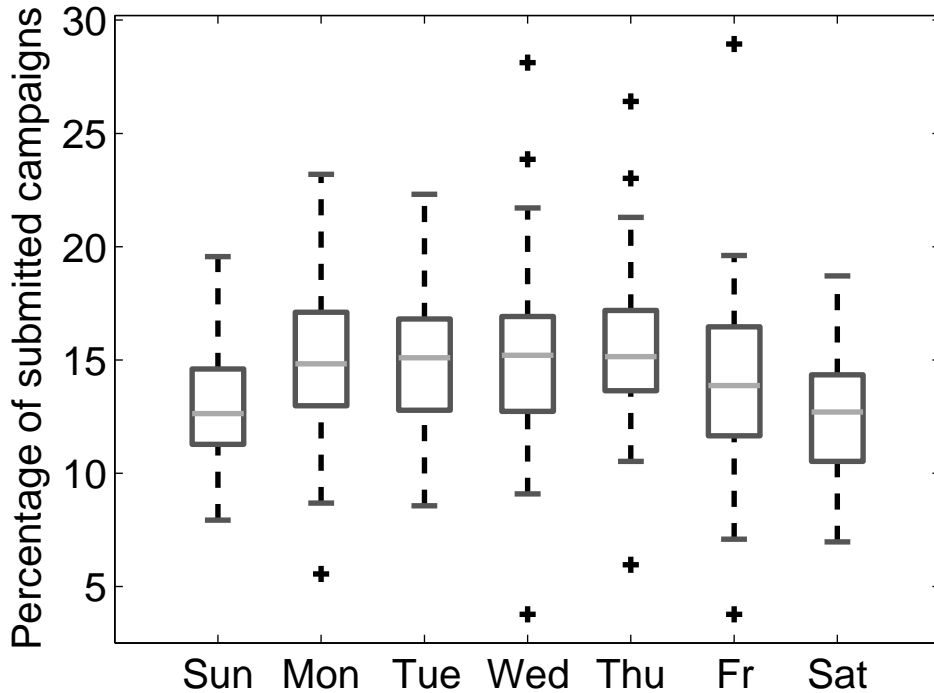
Figure 12: Campaign submissions per weekday

5.3 From platforms point of view

Similar to a worker, the operator of a crowdsourcing platform uses the platform as a business model. On the Microworkers platform, a employer has to pay $0.75 per submitted campaign and 7.5% of the reward for each job he rates satisfied. Consequently, the Microworkers operator is interested (1) when the campaigns are submitted by the employer, (2) when the finished jobs are submitted the worker and (3) how many of them are rated with *satisfied*.

Having in mind the results from the employer's point of view, we already know that 92% of the tasks are rated *satisfied*. We also know that the number of submitted jobs varies during the day. But we do not know how it changed during the week. Figure 12 shows a box plot of the percentage of submitted campaigns per weekday. As shown in [15] the job submission rate on MTurk changes during the week, on Microworkers it remains almost constant. This can be explained by the type of employer using MTurk and Microworkers. MTurk is normally used by firms which do not submit jobs at the weekend, by contrast Microworkers is mainly used by self-employed who tend to work all over the week.

The workers show a behavior similar to the workers. They also submit the jobs almost constantly during the week, as shown in Figure 13. On the one hand, this might be caused by worker, who work just for fun in their free time. But as the main workforce is located in low-wage countries, it is more likely that these worker depend on the earning and are willing to forgo their free time.
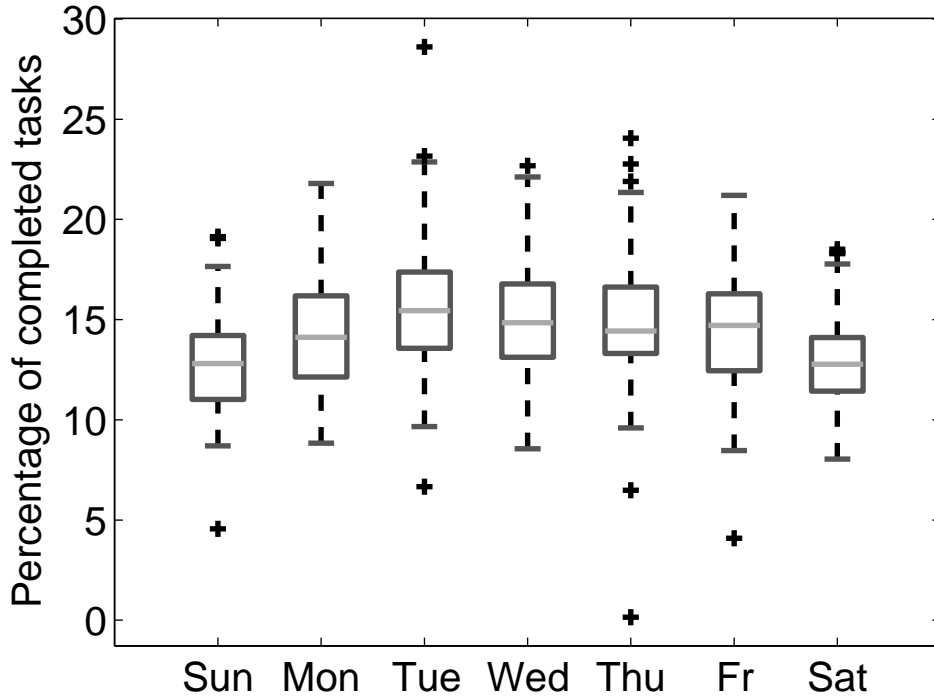
Figure 13: Finished tasks per weekday
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This has two consequences for the platform operator. The constant submission rate of campaigns and jobs all over the week, cause a constant income, a constant demand on the server and the need for workforce to approve the campaigns. With this constant demand it is much easier do dimension the server resources for the webpage than if the submission rate would show a bursty behavior.

For the further development of the platform, a growing crowd and more employers are required. Thus, we will have a look at the development of the number of workers and employers, depicted in Figure 14. Both, the number of workers and the size of the crows are normalized, thus the current state equals 100%. We can see, that the number of workers over time, shown by the solid line, forms a convex curve, the number of employers over time, shown by the dashed line, a concave curve. Interestingly, at the launch of Microworkers the growth rate of the employers is larger than the growth rate of the workers. However, this changed over time. Currently, the number of workers is increasing much faster than the number of employers. A detailed modeling of the growing behavior will be part of future work.

6 Conclusion

In this paper, we compared the crowdsourcing platform Microworkers to Amazon's well studied MTurk. We showed that the users of Microworkers are more international than the users of MTurk, which is caused by the different payment systems. Further, our
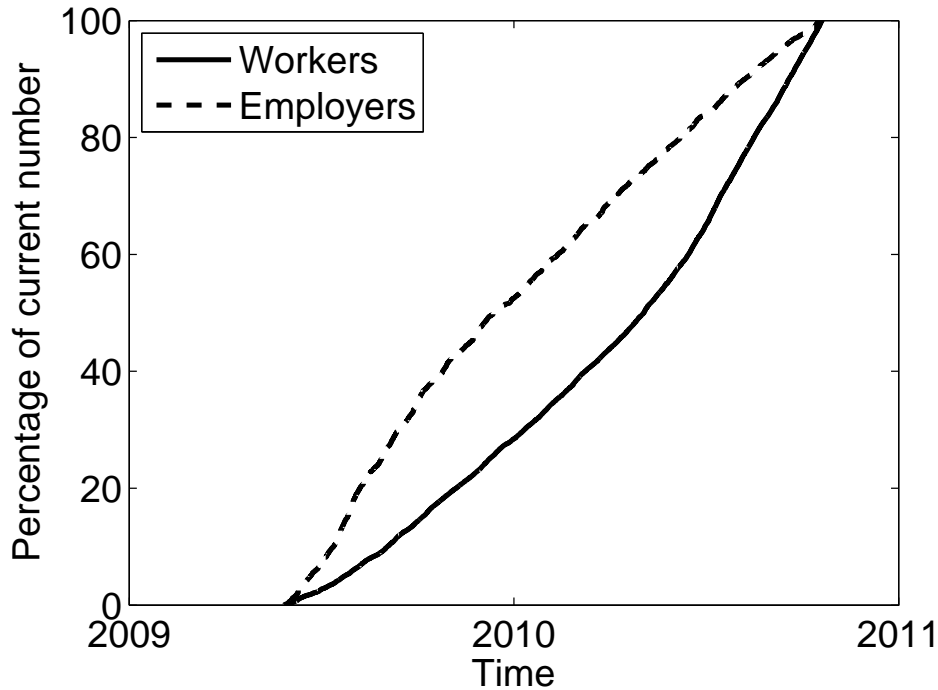
Figure 14: Development of the number of workers and employers

analysis revealed other differences between the two platforms in terms of the jobs they offer, the completion time of the campaigns and the working times of their users. This indicates that crowdsourcing platforms and particular their users sightly differ. Thus we conclude that even if most of the platforms are similar, the findings of MTurk can not be generalized without adaptations.

Our second contribution in this paper are some practical guidelines for the different groups involved in Microworkers, the workers, the employers and the platform operator. We showed that on Microworkers a worker can maximize his income by specialization on complex tasks, as all tasks take approximately the same time. The main goal for a employer is to get the submitted jobs done quickly, thus, we provided a guideline when to submit a job. Besides this we showed that the submission time could also influence the composition of the crowd working on the job. But even if there is a daily fluctuation of the number of active users due to the different time zones, there is an almost constant activity throughout the week. Thus, the platform operator can dimension the servers for the webpage based on our findings.

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References

[1] J. Howe. (2006, June) The rise of crowdsourcing. Online. [Online]. Available: http://www.wired.com/wired/archive/14.06/crowds.html

[2] Wikimedia Foundation, "Wikipedia," www.wikipedia.org [Accessed: Dec. 01, 2010].

[3] OpenStreetMap Foundation, "Openstreetmap," www.openstreetmap.org [Accessed: Dec. 01, 2010].

[4] InnoCentive, Inc., "InnoCentive," www.innocentive.com [Accessed: Dec. 01, 2010].

[5] Clickworker.com, Inc., "Clickworker," www.clickworker.com [Accessed: Dec. 01, 2010].

[6] Amazon.com, Inc., "Mechanical turk,"
www.mturk.com [Accessed: Dec. 01, 2010].

[7] Weblabcenter, Inc., "Microworkers,"
www.microworkers.com [Accessed: Dec. 01, 2010].

[8] EdFed, Inc., "ShortTask,"
www.shorttask.com [Accessed: Dec. 01, 2010].

[9] eBay, Inc., "PayPal,"
www.paypal.com [Accessed: Dec. 01, 2010].

[10] P. Ipeirotis. (2008, March) Mechanical Turk: The demographics. On-line. [Online]. Available: http://behind-the-enemy-lines.blogspot.com/2008/03/mechanical-turk-demographics.html

[11] P. Ipeirotis. (2009, March) Turker demographics vs internet demographics. Online. [Online]. Available: http://behind-the-enemy-lines.blogspot.com/2009/03/turker-demographics-vs-internet.html

[12] P. Ipeirotis. (2010, March) The new demographics of mechanical turk. Online. [Online]. Available: http://behind-the-enemy-lines.blogspot.com/2010/03/new-demographics-of-mechanical-turk.html

[13] J. Ross, A. Zaldivar, L. Irani, and B. Tomlinson, "Who are the turkers? worker demographics in amazon mechanical turk," Department of Informatics, University of California, Irvine, USA, Tech. Rep., January 2009. [Online]. Available: http://www.ics.uci.edu/~jwross/pubs/SocialCode-2009-01.pdf

[14] J. Ross, L. Irani, M. S. Silberman, A. Zaldivar, and B. Tomlinson, "Who are the crowdworkers? shifting demographics in mechanical turk," in *Proceedings of the 28th of the international conference extended abstracts on Human factors in computing systems*, ser. CHI EA '10. New York, NY, USA: ACM, 2010, pp. 2863–2872. [Online]. Available: http://doi.acm.org/10.1145/1753846.1753873

[15] P. Ipeirotis, "Analyzing the amazon mechanical turk marketplace," *CeDER Working Papers*, Sep 2010.

[16] United Nations Development Programme, *Human Development Report 2010*. Palgrave Macmillan, 2010. [Online]. Available: http://hdr.undp.org/en/media/HDR_2010_EN_Complete.pdf

[17] Wikimedia Foundation, "Definition of Lead,"
en.wikipedia.org/wiki/Pay_per_lead [Accessed: Jan. 14, 2010].

[18] M. Hirth, T. Hoßfeld, and P. Tran-Gia, "Cheat-Detection Mechanisms for Crowd-sourcing," University of Würzburg, Tech. Rep. 474, Aug. 2010.