Croudsourcing and Programming Languages

Crowdsourcing is changing how software is being developed, through several leading models of organizing work. This article surveys the landscape of crowdsourcing in software development, discusses key motivations for engaging, and highlights several key challenges ahead.

Introduction*:Crowdsourcing, a modern business term coined in 2006, is defined by Merriam-Webster as the process of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, especially an online community, rather than from employees or suppliers.By definition, crowdsourcing combines the efforts of numerous self-selected volunteers or part-time workers; each person's contribution combines with those of others to achieve a cumulative result. Crowdsourcing is distinguished from outsourcing in that the work can come from an undefined public (instead of being commissioned from a specific, named group) and in that crowdsourcing includes a mix of bottom-up and top-down processes.*

Crowdsourcing is the process of getting work or funding,contributing, usually online, from a crowd of people. The word is a combination of the words 'crowd' and 'outsourcing'. The idea is to take work and outsource it to a crowd of workers. Famous Example: Wikipedia.

Crowdsourced Software Engineering derives from crowdsourcing more generally. It utilises an open call format to recruit global online software engineers, to work on various types of software engineering tasks, such as requirements extraction, design, coding and testing

This article is about software engineering,the crowd, and whether advances like these can be had in software. Although our introductory examples are pure fiction today, crowdsourcing clearly is already penetrating software development practice. Topcoder (www.topcoder.com) has hosted more than 427,500 software design, development, and data science competitions, awarding more than US$25,000 a day to competitors. More than 100,000 testers freelance on uTest , testing new apps for compatibility with devices, performing functionality testing, and conducting usability inspections and studies. In addition, more than 16,000,000 answers to programming questions have been provided on StackOverflow (stackoverflow.com), now the 69th-most-trafficked website in the US (as determined through www.alexa.com). Major software companies such as Netflix, Microsoft, Facebook, and Google regularly offer bug bounties, particularly concerning security vulnerabilities.4 New platforms for crowdsourcing software engineering are emerging regularly, offering different specialized services—for example, Bountify (bountify.co),AppStori (appstori.com), and Pay4Bugs (www.pay4bugs.com).

Croudsourcing vs Programming languages:

Programming tutorials have been around on the web from the very early days of the internet. New ones keep coming out all the time because the technology evolves so fast and creates new possibilities. The real challenge is to find the good ones, or those most suitable to you. There are many curated lists of resources for programmers, but most aren't updated regularly.

One can solve this problem through crowdsourcing.Users submit tutorials, which are listed category-wise. They get voted up and down by visitors to the site, so that you can find the most liked tutorials on top in any list. There's something for everyone, from Ruby on Rails and Google Analytics to popular ones like Python and Android Development.These croudsourcing is very well usefull in the web in order to deal with the errors in the programming languages.

Crowdsourcing software development or software crowdsourcing :

It is an emerging area in software engineering. It is an open invitation for participation in any task of software development, including documentation, design, coding and testing.Generally all these tasks are done by either members of a software enterprise of people contracted by the enterprise. But in software crowdsourcing, all the tasks can be assigned to anyone in the general public.Software crowdsourcing involves various types of tasks to be performed in different phases of software development; these tasks can be generalized in three broad categories these categories are routine tasks ,creative or innovative tasks,complex tasks.For these different types of tasks software crowdsourcing implements different models and approach to solve these tasks.

Issues in crowdsourcing software development:

1.Task Decomposition

A key issue in crowdsourcing is that work is decomposed into a set of smaller tasks. Some crowdsourcing tasks are very easy because tasks are small and independent where as software development is a tuff task to do so decomposition of task it self very difficult to do. But the projects which can be decomposed into small modules with clear requirements and limited interdependencies are more likely to succeed.

2.Coordination and Communication

Coordination and communication is important while we develop software using crowdsourcing some one has to coordinate all the things other wise it is difficult to manage the software beeing constructed. Communication is needed between crowd in order to properly planed for the software development and changes to the software. Coordination is concerned with directing efforts of individuals toward a common and explicitly recognized goal, and linking different parts of an organization together to achieve a set of tasks.

3.Planning and Scheduling

One of the main goal in the software development is to reduce the software development life
cycle.Task will be given to some work force but if they make delay the development then problems will arrise or development will be paused so work has to be given to parallel forces for that schedule and proper planning is essential. The core challenge is to get the sufficent number of workers when needed. Some times we wont get all domain specific workers also one has to make sure that sufficent number of hours are given for the software development.these are all the challenges which need planning and scheduling.

4.Quality assurance

Mantaining quality is very important in the software development. When we give tasks to crowd we are not sure every time we get the quality work.“Crowdsourcing focuses on requirements and relaxes the quality process at the onset of the project, so now all the emphasis on managing the quality comes at the quality assurance cycles later in the project, and that tends to be more expensive.

Goals of software crowdsourcing:

Quality software: Crowdsourcing organizers need to define specific software quality goals and their evaluation criteria. Quality software often comes from competent contestants who can submit good solutions for rigorous evaluation.
Rapid acquisition: Instead of waiting for software to be developed, crowdsourcing organizers may post a competition hoping that something identical or similar has been developed already. This is to reduce software acquisition time.
Talent identification: A crowdsourcing organizer may be mainly interested in identifying talents as demonstrated by their performance in the competition.
Cost reduction: A crowdsourcing organizer may acquire software at a low cost by paying a small fraction of development cost as the price for award may include recognition awards.
Solution diversity: As teams will turn in different solutions for the same problem, the diversity in these solutions will be useful for fault-tolerant computing.
Ideas creation: One goal is to get new ideas from contestants and these ideas may lead to new directions.

Broadening participation: One goal is to recruit as many participants as possible to get best solution or to spread relevant knowledge.
Participant education: Organizers are interested in educating participants new knowledge. One example is nonamesite.com sponsored by DARPA to teach STEM Science, Technology, Engineering, and Mathematics.
Fund leveraging: The goal is to stimulate other organizations to sponsor similar projects to leverage funds.
Marketing: Crowdsourcing projects can be used for brand recognition among participants.

The Pros and The Cons of a crowdsourcing:

Using crowdsourcing brings some genuine advantages to companies and individuals looking to complete defined tasks with affordable price. The main attraction so far has been its fairly lower price, compared to the price for hiring a dedicated professional. Also the best thing with the low price is the high number of people who are ready to work for you anytime.

As with all things, there are disadvantages, and interestingly the main disadvantage mirrors the main advantage: cheap labor results less credible product, compared to professionals. You pay professionals for their expertise, experience and dedicated spirit, but you buy labor for completing simple tasks. Any task considered above simple is risky for crowdsourcing.

With the crowdsourcing also comes the issue of management. In most cases you have to manage a large scale of workers, which pretty much waste more of your time for management instead of solution. Besides, it’s difficult for collaboration between crowd members as they compete with each other in nature. Worst of all, there’s no contract in most crowdsourcing cases. Workers can run anytime they want, and your design might be reused in anytime.

Future directions of software crowdsourcing:

crowdsourcing is far from being estab-lished.There is no theoretical orientation in this area which is a indication of the immatutity of the research area. Although researchers from diverse disciplineshave contributed to the current research on crowdsourcing,different strands of crowdsourcing research and practice donot seem to have converged yet. So it is challenging to captureits essence or to predict its future movement.

Ref Paper:

[1]http://www2013.wwwconference.org/proceedings/p153.pdf

[2]https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjT75m2s9bMAhUPS48KHaMpBREQFggfMAA&url=https%3A%2F%2Fhci.rwth-aachen.de%2Fmaterials%2Fpublications%2Fkallenbach2011b.pdf&usg=AFQjCNEvq4gehRH9mBClcbUEJqc7AVWWrA

[3]*http://www.brian-fitzgerald.com/wp-content/uploads/2014/06/stol_fitzgerald_icse2014_crowdsourcing_preprint.pdf*

[4]http://research.ijcaonline.org/volume101/number12/pxc3898900.pdf

[5]http://www.cs.ucl.ac.uk/fileadmin/UCL-CS/research/Research_Notes/rn_15_01.pdf