Proposed Methodology for Crowdsourcing and Agile Development

Himanshu Pandey[1]   Dr. Santosh Kumar[2]   Dr. V.K Singh [3]

1.School of Computer Science & Engineering, Research Scholar, MUIT, Lucknow, U.P, India
2.School of Computer Science & Engineering, Associate Professor, MUIT, Lucknow, U.P, India
3.School of Computer Science & Engineering, Professor, BBDNIIT, Lucknow, U.P, India

Abstract
In this research work, devised a methodology for 'crowdsourcing' focused on incorporating these methods to Agile Development in software engineering. The whole SDLC model for crowdsourcing is developed and tried to be integrated with Agile. This is done in order to speed up the process of Agile Development as Agile is a Rapid Application Development (RAD) based software engineering methodology. The 'workers' of the crowdsourcing process are individually assigned the Roles of the Agile methods that function upon the Agile tasks and produce the deliverables.
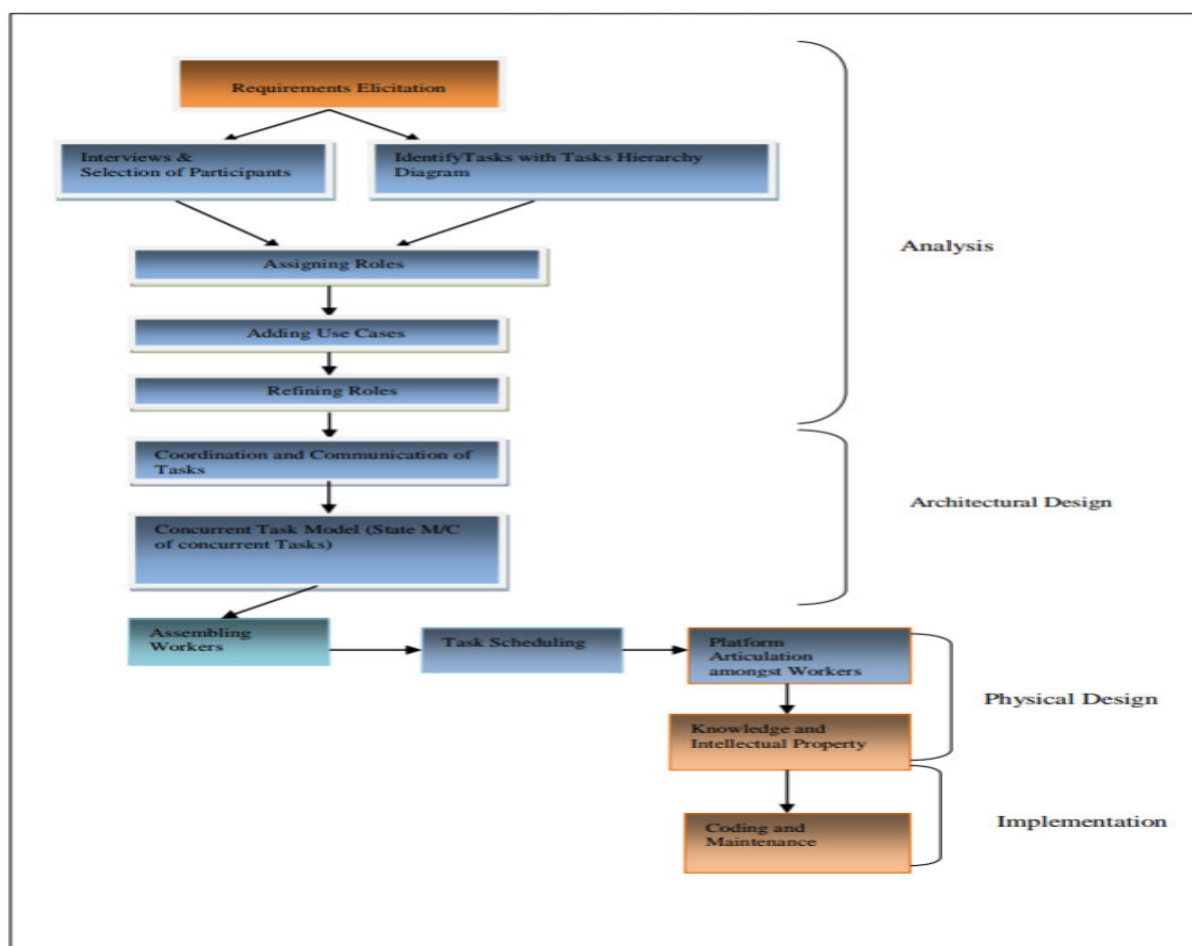**Keywords:** Crowdsourcing, Requirement Elicitation, Tasks Hierarchy Diagram, Concurrent Task Model

Figure 1. Proposed Methodology

1. Introduction

The proposed CrowdSourcing Methodology is the first step towards devising a process for gradually designing CrowdSourced application. Our first step in developing an understanding of the crowdsourcing phenomenon was the study of some of the seminal works in this area. This established a common vocabulary and understanding among the researchers about the concept of crowdsourcing. Due to the specific intricacies of software development, crowdsourcing in a software context is different from other contexts, as represented by, for instance, AMT. Clearly, this has implications for what aspects of crowdsourcing should be studied in a software development context. To that end, based on a traditional literature review we identified a number of key

concerns in crowdsourcing software development. As this set of concerns represents one dimension of our research framework, we briefly reiterate these in Section 2.1; a more extensive description can be found in ref. [31]. Furthermore, since crowdsourcing involves a number of actors, or stakeholders, it is useful to take different stakeholder perspectives so as to study crowdsourcing software development from different stakeholders' views. We identified three different perspectives, namely that of customers, workers and the platform representing an online 'market'.

1.1 CrowdSourcing Methodology (CRM)

To construct the initial Methods of CRM, the designer takes the list of terms or concepts and organizes them into tasks and solutions and produces an initial where tasks are the goals to achieve and solutions are the bottom up builders for the final product. For example, taking Research Journal Paper Submission Process (RJPSP) as the case study, first the Requirements are elicited. Then the process of Analysis begins that incorporates Interviews and selection of Participants. The participants later are assigned to workers. A Task Hierarchy Diagram involving Minsky's Model of Task Reduction. After Task Reduction is done, Roles are assigned and Use Cases are elaborated. Roles are further refined in that the specific task is allocated to specific Role(s).The process of Design and implementation of CRS then proceeds ultimately converging to the final Crowd Sourced Product.

2. Literature Review

Alam, S. L., and Campbell, J. [2], investigates discoveries from an interpretive contextual investigation research of a non-benefit crowdsourcing activity inside the Australian Newspapers Digitization Project (ANDP). In light of administration systems for IT administration and Open Source Software, the administration components actualized inside ANDP are inspected. A mix of proactive and receptive, formal and casual social instruments were found to assume a basic part for effective crowdsourcing administration. The discoveries show the significance of the part of social administration components in crowdsourcing administration and fortify the significance of comprehensive partner interest and correspondence. Amrollahi, A., Ghapanchi, A., and Talaei-Khoei[3], presents an in-advance contextual investigation of utilizing the crowdsourcing model to execute the open methodology idea in an Australian college. We utilize the standards of Design Science Research Methodology (DSRM) for open vital arranging by utilizing the crowdsourcing model and assess the technique by looking at the nature of resultant arrangement in conveying its goal. Amini, S., Lin, J., Hong, J., Lindqvist, J., and Zhang[4], thinking about the expansive and developing number of portable applications, our imagined benefit expands on crowdsourcing, virtualization, and computerization to empower substantial scale examination of applications. AppScanner gives end-clients more reasonable data in regards to what portable applications are truly doing on their gadgets. Anderson, M.[5] outlines the real difficulties that obstruct to successfully consolidate crowd sourcing into existing business condition to develop another type of participation. We lay out research challenges in most vital territories: the procedure plan and check, outline of run of the mill examples to help business portions finished by nonconcurrent swarm contribution through unidentified accomplices, improvement of work processes administration framework usefulness to suit swarm sourcing exercises. The article by Brabham D.C [6,7,8]contends that the crowdsourcing model, an effective, Web-based, disseminated critical thinking and generation display for business, is a fitting model for empowering the subject interest process out in the open arranging ventures. This article starts with an investigation of the difficulties of open cooperation in urban arranging ventures, especially in the tackling of innovative arrangements. Bücheler, T., and Sieg, J. [9] examine the relevance of Crowdsourcing and a few strategies from Open Innovation to the logical strategy and fundamental science in a non-benefit condition. Chen, L., and Liu, D[10], find a U-formed connection between the accommodation time and winning in the two kinds of challenges. Social capital lifts the likelihood of winning a group evaluated challenge just if the social capital is adequately high. Chen, Z., and Luo, B.[11],report a preparatory report on crowdsourcing testing for instructive ventures. We present three business programming items as instructive testing ventures, which are crowdsourced by our showing emotionally supportive network. We call this "Semi Crowdsourcing Test" (QCT) on the grounds that the competitor laborers are understudies, who have certain social relations. The examination comes about are urging and show to be advantageous to both the understudies and industry in QCT ventures. Geiger, D., Seedorf, S., Schulze, T., Nickerson, R. C., and Schader, M[13], centers only around an authoritative point of view and on the systems accessible to these associations. The subsequent measurements are preselection of patrons, availability of companion commitments, accumulation of commitments, and compensation for commitments. By grouping the procedures of 46 crowdsourcing illustrations, we recognize 19 unmistakable process composes. A consequent bunch investigation demonstrates general examples among these sorts and shows a connection to specific utilizations of crowdsourcing. Graber, M. A., and Graber, A[14], will show that the crowdsourcing model of research can possibly make hurt members, controls the member into proceeded with support, and uses members as exploratory subjects. We presume that conventions depending on this model require institutional audit board (IRB) investigation. Hetmank, L.[15], endeavors to pick up a superior comprehension of what crowdsourcing

frameworks are and what regular plan angles are considered in the improvement of such frameworks. In this paper, the creator led a deliberate writing audit in the space of crowdsourcing frameworks. Metropolis Model is Kazman, R., and Chen, H-M [17], endeavor to depict and recommend the standards encompassing how such frameworks may be made and supported. It offers a bound together rationale for thinking about and overseeing framework improvement for the two noteworthy types of crowdsourced frameworks: OSS improvement what's more, group based administration frameworks. Kittur, A., Chi, E.H., and Suh, B [18],explore the utility of a smaller scale undertaking market for gathering client estimations, and talk about outline contemplations for creating remote miniaturized scale client assessment assignments. Albeit small scale undertaking markets have awesome potential for quickly gathering client estimations at low costs, we found that exceptional care is required in planning errands so as to outfit the capacities of the approach. Peng, X., Babar, M.A., and Ebert, C.[23],consolidating best practices from open source improvement furthermore, outsourcing, crowdsourcing influences and animates vitality toward disseminated esteem creation. Its ubiquity as it were keeps on developing: more than 600,000 individuals have enlisted on the TopCoder site up until now, and 15 percent of them have taken part in at any rate one calculation rivalry. Zhao, Y., and Zhu, Q.[24] looks to introduce a basic examination of the substrate of crowdsourcing research by reviewing the scene of existing investigations, including hypothetical establishments, inquire about techniques, and research foci, and distinguishes a few imperative research bearings for IS researchers from three points of view - the member, association, and framework - and which warrant additionally think about. This examination adds to the IS writing and gives experiences to scientists, originators, strategy producers, and chiefs to better comprehend different issues in crowdsourcing frameworks and activities. Zogaj, S., Bretschneider, U., and Leimeister[26], demonstrates that testCloud faces three fundamental difficulties, these are: dealing with the procedure, dealing with the group and dealing with the innovation. For each measurement, we diagram instruments that testCloud applies for confronting the difficulties related with crowdsourcing ventures.

3. Analysis
3.1 Requirements Elicitation
It becomes an unavoidable activity to elicit the user requirements before moving to the next steps of the CRM. Interviews, level of participation and platform on which the CRM has to run are brought on Paper. The process consists of
1. Requirement Discovery
2. Requirements Classification and Organization
3. Requirements Prioritization and Negotiation
4. Requirements Specification.
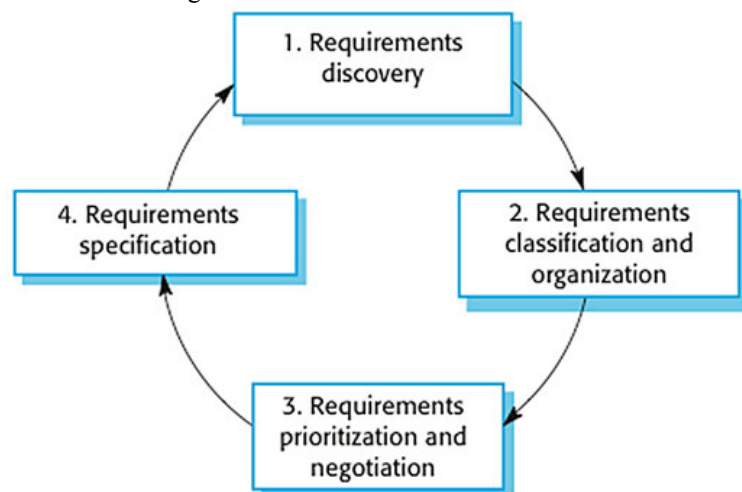
These steps are shown in the figure below:

Figure 2. Requirement Elicitation in CRM

3.2 Identify Tasks with Tasks Hierarchy Diagram

Figure 3. Tasks Hierarchy Diagram

3.3 Assigning Roles

The general case transformation of goals to roles is one-to-one, with each goal mapping to a role. However, there are situations where it is useful to have a single role be responsible for multiple goals, including convenience or efficiency. One mapping of the goals from our previous example to a set of roles is shown below.

- PaperDB
- Partitioner
- Assigner
- Reviewer
- Collector
- DecisionMaker

3.4 Adding Use Cases

Figure 4. Use Case Development

3.5 Refining Roles

Roles are refined in this stage. There are already lots of roles which are application specific and have been assigned to entities. Now in this stage grouping of roles in the order of similarity and action, identified roles are refined in groups.

4 DESIGN

4.1Architectural Design

- Coordination and Communication of Tasks

The tasks allotted to the worker are streamlined and prepared to be distributed to them.
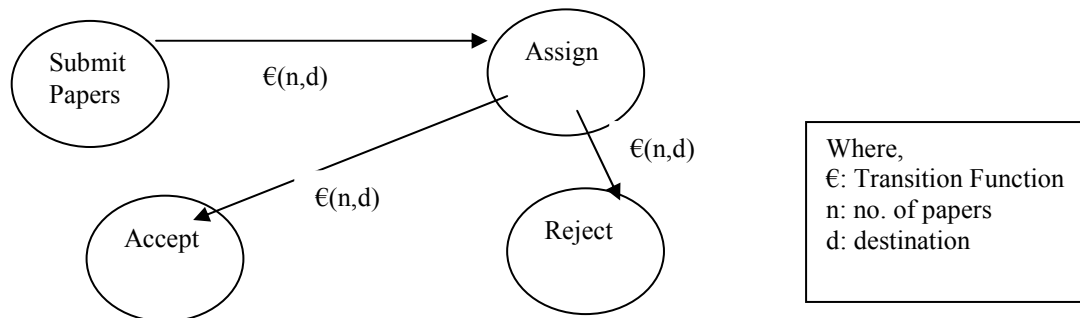
4.2 Concurrent Task Model (State M/C of concurrent Tasks)

Figure 5. Concurrent task model

4.3 Physical Design

- Task Scheduling

Task Scheduling is done by extracting meaning from the state machines. Tasks are assigned to the workers in accordance with the roles.

Platform Articulation amongst Workers is what the basic need of an AGILE Project.

In crowd sourcing an agile project mainly involves:

1. Requester
2. Platform
3. Crowd

The requester is itself the SCRUM entity that manages the Agile Process Development.

Here the iterations, like a chronograph are periodically assigned to variable and fluctuating crowds. Crowds are sources to some kind of computational resources that can be CPU Cycles, Memory, battery power or something else that in any way can be pulled from the crowds. The idea is to meet few or many of the requirements to be met by the SCRUM because 'Sprinting' in Agile software development requires many iterations and when the project load exceeds the maximum capacity of the development Servers, it becomes a no choice option else to crowdsource the project.

5. IMPLEMENTATION of SCRUM IN CROWDSOURCING

Scrum belongs to the family of agile software development methods that have attracted significant attention among software practitioners during last five years. Whereas the Extreme Programming method [6] that has been widely accepted as one of the most important agile approaches has a definite programming flavour (pair programming, coding standards, test driven development, refactoring, continuous integration), Scrum concentrates on managing software projects.

Scrum starts with the premise that software development is too complex and unpredictable to be planned exactly in advance. Instead, empirical process control must be applied to ensure visibility, inspection, and adaptation. The different environmental and technical variables (such as time frame, quality, requirements, resources, implementation technologies and tools, and even development methods) must be controlled constantly in order to be able to adapt to changes flexibly. This is achieved through an iterative and incremental development process.
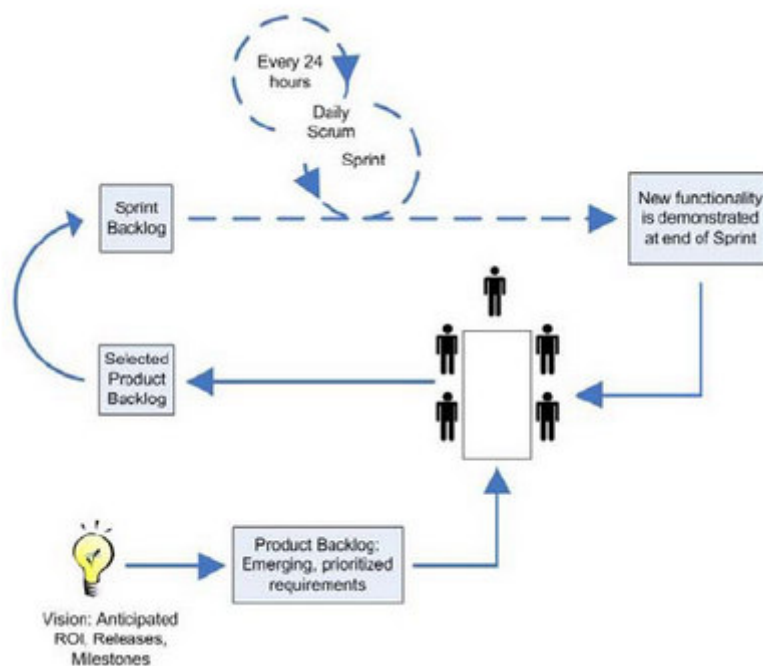
Figure 6. Detailed Scrum flow

6. Coding and Maintenance

OSS (Open Source Software) like Python is used for coding. Python 3.2.3 is preferred with DJANGO as front end and SQLite as backend. Security is provided by user / role basis.

7. Conclusion

In this paper, the authors have devised model for Agile Software Development using Crowd-Sourcing. This is particularly done in order to duct the SDLC phases through workers in crowdsourcing. A methodology has been designed for the same. Agile is based on RAD, so in order to increase the velocity of the development of any Agile product, crowdsourcing is utilized. As future scope efficiency and velocity of Agile Software Development is aimed to be maximized.

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