

IdeaGens: A Social Ideation System for Guided Crowd Brainstorming

Joel Chan¹, Steven Dang¹, Peter Kremer², Lucy Guo¹, and Steven Dow¹

¹Human Computer Interaction Institute, Carnegie Mellon University, Pittsburgh, PA 15213, USA

²Brain and Cognitive Sciences, University of Rochester, Rochester, NY 14627, USA

Abstract

Many crowd ideation systems seek to gather scores of ideas from people online. However, this often leads to many bad ideas and duplication. A dedicated facilitator who guides exploration of the solution space is a common and effective strategy for optimizing ideation in face-to-face brainstorming, but has not yet been explored in computer-supported crowd ideation. We introduce IdeaGens, a social ideation system for guided crowd brainstorming. IdeaGens divides the crowd into ideation and synthesis tasks, and enables efficient data-driven facilitation of the crowd's ideation. This work can inform general strategies for shepherding the crowd to produce better results for complex collaborative tasks.

Background

Many crowd ideation systems seek to gather ideas from online groups, such as enterprise employees, customers, or paid crowds (Bailey & Horvitz, 2010). A major motivation for this is the possibility of increased diversity of ideas through engagement of “extreme users” and outsiders to the problem domain. For example, OpenIDEO.com has collected 1000s of ideas from 1000s of people all over the world for 10s of complex social innovation problems (e.g., revitalizing struggling urban communities).

Systems like this yield many ideas, but also a lot of noise (e.g., many bad ideas, repetition). How can crowd ideation be improved? In face-to-face brainstorming, a dedicated facilitator is a common effective strategy for overcoming the challenges of collaborative idea generation (Isaksen & Gaulin 2005). A facilitator strategically maximizes breadth/depth of search through the idea space, encourages “extended effort”, and highlights inspiring ideas and questions when ideation runs “dry”, resulting in less wasted effort, better overall ideas, and more effective exploration of the solution space.

Facilitation is potentially promising for crowd ideation, but is difficult to scale effectively. For instance, how can facilitators efficiently synthesize a large stream (100s to 1000s) of ideas from the crowd? How would they guide a potentially large group (e.g., 10s up to 100s) of independent ideators? Beyond scaling issues, how can we more “op-

timally” employ crowd ideation (e.g., exploring multiple parallel streams of ideation in different ways)?

We present IdeaGens, a social ideation system for guided crowd brainstorming. IdeaGens decomposes the big task of brainstorming creative solutions into smaller, structured tasks (ideation tasks, synthesis tasks, and facilitation tasks) and supports monitoring and adaptive real-time facilitation of the crowd's ideation.

Related Work

Dow and colleagues (2012) explored how to provide feedback to guide crowd work, but with simpler tasks (i.e., writing product reviews). We build on Rzeszotarski & Kit-tur's (2012) idea of using a “dashboard” to monitor and guide crowd work.

Yu and Nickerson (2011) used crowd-generated quality ratings and genetic algorithms to “guide” the crowd's search through the solution space. We take inspiration from their task decomposition approach, but focus more on how to support more “hands-on” guidance.

Little and colleagues (2010) explored different ideation strategies, with parallel group processes producing more “best” ideas, but iterative processes increasing average quality of ideas. Our system supports multiple strategies, including adaptively switching between parallel and iterative processes, showing examples, exploring themes, and changing the ideation prompt.

Description of System

IdeaGens is a social ideation system built using the Meteor framework for real-time browser-based applications. Figure 1 shows the three main interfaces for our system. The crowd is split into *ideators* and *synthesizers*, and is guided by one or more *facilitators* (e.g., a domain expert or group of stakeholders) using the *dashboard* interface.

Ideators use the *ideation* interface (top left) to input new ideas for a given prompt and have structured interactions with other team members. Ideas are fed from here into the *synthesis* interface (top right), which supports identification of 1) “game-changing” ideas (particularly insightful

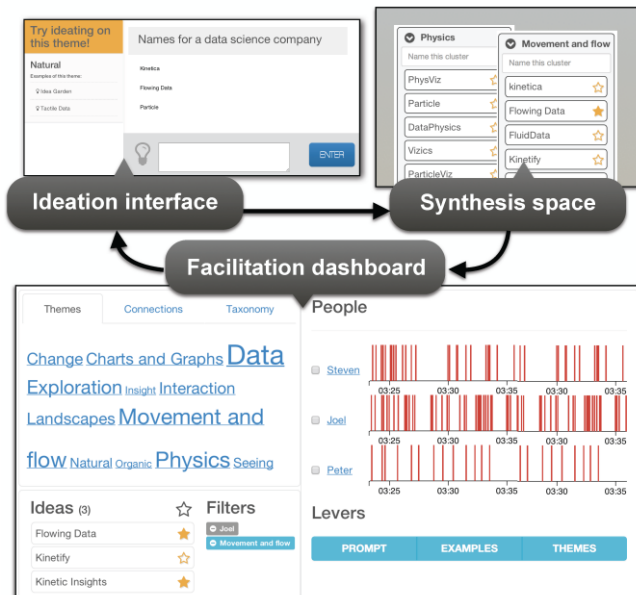


Figure 1: Schematic of IdeaGens system

ideas that expand the design space), and 2) common themes/topics (through clustering of ideas). Following prior efforts with crowd synthesis, we enforce a global constraint on synthesizers through simultaneous viewing of all created clusters (André et al. 2014).

These themes and specially-marked ideas are combined with system-generated analytics (e.g., ideators' ideation rates over time) and fed into the *dashboard* interface (bottom). The left panel provides ways to explore the evolving idea space (e.g., themes, game-changing ["starred"] ideas, filters). The right panel provides a way to monitor ideators' ideation rates and trajectories through the idea space (through combined exploration/filtering with the idea space filters).

Facilitators can use the dashboard to monitor and positively influence the ideation of both individuals (e.g., providing timely stimulation with examples or themes) and the group as a whole (e.g., focusing group attention on promising emerging themes). The facilitators' influence on ideation is embodied in the *levers* functionality (bottom right of dashboard):

- **Prompts** can be altered to either expand (e.g., relaxing a problem constraint) or prune the design space (e.g., requesting variations on particular themes)
- **Examples** can be sent as inspiration when ideators "run dry." Game-changing ideas can also be sent to help expand the design space through constraint relaxation.
- **Themes** can be sent as inspiration at different levels of abstraction (potentially avoiding fixation on features of examples)

IdeaGens also has a communication channel between ideators and facilitators (ideators can request help), and

between facilitators and synthesizers (facilitators requesting particular kinds of thematic organization).

Preliminary Testing and Ongoing Work

Following a design-based research approach, we have conducted two live sessions with 7 people each: in the first session, the group ideated alternative uses for old devices, in the other, names for a startup company. Each session helped us refine our features (e.g., adding filters for the synthesis interface). While these pilots were with relatively small pools of people, they show promise for scaling to much larger ideation sessions. We have also learned that the synthesis task can be overwhelming with large numbers of ideas, and we have implemented interface components to ease this load (e.g., filtering, sorting).

IdeaGens is currently designed to work best with 10-20 ideators. We are currently exploring how to best structure and support the synthesis tasks (e.g., with further task decomposition, visualizations, intelligent management of overlap between multiple synthesizers) for larger scale crowd ideation (e.g., >50 to 100s of ideators). We are also exploring what analytics are most useful for effective facilitation, and how to best represent those analytics at scale. We believe IdeaGens holds much promise for effectively supporting crowd ideation, and also extends knowledge on how to best shepherd the crowd to produce better results for complex collaborative tasks.

References

- André, P., Kittur, A., & Dow, S. P. 2014. Crowd synthesis: Extracting categories and clusters from complex data. In Proc. of the 17th ACM Conf. On Computer Supported Cooperative Work & Social Computing.
- Bailey, B.P. & Horvitz, E. 2010. What's your idea? A case study of a grassroots innovation pipeline within a large software company. In Proc. of the ACM 28th Int'l Conf. on Hum Factors in Computing Systems.
- Dow, S., Kulkarni, A., Klemmer, S., & Hartmann, B. 2012. Shepherding the crowd yields better work. In Proc. of the 15th ACM Conf. on Computer Supported Cooperative Work.
- Isaksen, S. G., & Gaulin, J. P. 2005. A reexamination of brainstorming research: Implications for research and practice. *Gifted Child Quarterly* 49(4): 315-329.
- Little, G., Chilton, L. B., Goldman, M., & Miller, R. C. 2010. Exploring iterative and parallel human computation processes. In Proc. of the ACM SIGKDD Workshop On Human Computation.
- Rzeszotarski, J., & Kittur, A. 2012. CrowdScape: Interactively visualizing user behavior and output. In Proc. of the 25th ACM Symposium On User Interface Software And Technology.
- Yu, L., & Nickerson, J. V. 2011. Cooks or cobblers? Crowd creativity through combination. In Proc. of the SIGCHI Conf. on Human Factors In Computing Systems.