Bring Something to the Potluck: A System for Inclusive and Reciprocal Online Discussion

Emma Lieu
Royal Holloway, University of London
Egham Hill, Egham
Surrey, TW20 0EX UK
emma.lieu.2011@live.rhul.ac.uk

Jennifer Cole
Royal Holloway, University of London
Egham Hill, Egham
Surrey, TW20 0EX UK
jennifer.cole@rhul.ac.uk

Chris Watkins
Royal Holloway, University of London
Egham Hill, Egham
Surrey, TW20 0EX UK
cj.watkins@rhul.ac.uk

We present Potluck, a structured online commenting system that aims to promote the inclusion and reflection of differing views. It features a discussion flow that (1) elicits independent viewpoints through shielded discussion (2) collates and displays divergent viewpoints using automatic summarisation-aggregation and (3) encourages reflection through recursive question-and-answer. This paper describes work in progress, outlining the design motivations, features and user flow of a working prototype. A preliminary user study has shown encouraging results on the usability of the proposed system.

Online discussion systems, asynchronous communication, active participation, reciprocity, summarisation

Figure 1: Overview of the discussion flow through Potluck. The user answers a discussion prompt; gains access to the discussion area, which contains summaries of the full answers; and selects a summary to read the full answers. On full answers, the user can vote or ask a question. Asking a question creates a new discussion prompt.

1. INTRODUCTION

Online commenting systems – from standalone web forums, to embedded tools under media and blogs – enable public discussions with an unprecedented number of participants. These platforms have the potential to present multiple viewpoints on the same topic, and to lead to complex forms of group-undertaking such as large-scale deliberation (Wright and Street 2007).

However, their potential is undermined by longstanding design issues. These systems have users interact with what is typically an unstructured list of disjointed comments. As the list grows, the format suffers from “information overload” in which users are unable to consider all of the comments (Jones et al. 2004). To help make sense of the comments, platforms enable comment re-ordering by time and rating – but this gives less exposure to (and effectively excludes) the comments in the middle of the list. These design issues provide little incentive to write well or courteously. As a consequence, online commenting systems are often subject to low-quality and uncivil comments (Chen 2017).

Related work have gone beyond the list format to better display online comments, using techniques such as dimensionality reduction to visualise opinions as points in a vector space (Faridani et al. 2010; Kim et al. 2021), and topic modelling to identify and group related comments (Dave et al. 2004; Hoque and Carenini 2016). However, these systems are mainly concerned with the visualisation and exploration of comments, rather than the discussion. To enable more constructive discussion, systems such as the Deliberatorium (Klein 2007) have scaffolded the discussion flow, but these solutions are focused on argumentation more so than general discussion.

We sought to design an online commenting system that enables more constructive and inclusive discussion. We propose the discussion flow for online commenting systems shown in figure 1, designed to (1) elicit independent viewpoints through shielded discussion (2) collate and display differing viewpoints using automatic summarisation-aggregation and (3) encourage reflection through recursive question-and-answer.
This discussion flow is demonstrated in a working prototype of Potluck\(^1\), a novel online commenting system. It is named after potluck-style gatherings where each participant must contribute something to be shared by everyone. In other words, Potluck requires users to actively participate in discussion. We describe a user study of Potluck to assess the usability of the proposed discussion flow.

2. DESIGN RATIONALE

Before describing the system, we explain the motivations behind Potluck’s key design features.

2.1. Pseudonymity and active participation

The distribution of participation on social platforms reveals that a small fraction of users make up most of the contributions (Shirky 2008). To include more voices in the discussion, users will need to be encouraged to participate. Pseudonymity provides a middle-ground between the civility associated with real-name identities and the self-disclosure afforded by anonymity (Rowe 2015; Graf et al. 2017; Moore et al. 2021). Potluck has users register with a system-generated username before they can start to engage with the system. To maintain the privacy of anonymous participation, the system does not ask for any identifying information.

To increase inclusion and diversity of contribution, a first-time user of Potluck is only shown a discussion prompt: a question or topic. To advance through to the discussion area, the user must actively participate by contributing a written answer to the prompt. Further answers are required in the same way for the user to advance through the discussions.

2.2. Shielded discussion

Reading the existing comments before posting can influence how users proceed. Incivility or lack of representation in the comments could potentially inhibit participation, causing users to self-censor and fragment off to other systems (Walther and Jang 2012; Springer et al. 2015). To retain users, the user must post before they can read the answers already submitted to Potluck. This design ensures that a user’s answer is not influenced by the answers submitted by others. This complements the feature of active participation in section 2.1 by giving the user another incentive to participate.

2.3. Summarisation and aggregation

Users cannot see what answers have already been submitted to a discussion prompt. Since each answer is submitted without knowing what has already been said, the same information may be repeated. Without a way to organise the answers, the discussion area would suffer from the problem of redundant and disjointed comments found in existing systems. Potluck synthesises the information by automatically summarising and grouping similar answers as depicted in figure 2. Each summary is displayed in the discussion area, thus presenting the user with a quick overview of unique viewpoints.

2.4. Recursive question-and-answer

Question-asking is a listening tool that can be used to deepen understanding and solve problems (Murphy 2020). It can also be employed as a communication tool for argumentation and rhetoric (Gowdy 2020). Potluck allows users to interact with each other by recursively asking and answering questions – users cannot advance through the system without doing so. By asking a question, users create a new lower-level discussion area within the system. This was implemented with the goal of adding structure to the system, while encouraging deliberative norms such as reflection, ideal turn-taking and reciprocity between users.

2.5. Question trail

After several rounds of recursive question-and-answer, the user may get lost within the system. To address this concern, we implemented a “question trail” (figure 3c) stickied to the top of each page: a navigation feature that displays the prompt for the current top-level discussion area and the prompts for lower-level discussion areas (if any) in a tree. The links indicate whether the user has previously answered the discussion prompt. From the question trail, the user can jump back into the discussion area where they already have access, or contribute an answer to a locked discussion prompt to gain access to a new area. The user can also contribute a new answer to a question they have already answered before.

\(^1\)potluck.cim.rhul.ac.uk
3. SYSTEM

3.1. Usage

Potluck has two types of users: Hosts and Guests. Both Hosts and Guests can partake in the system as outlined in section 3.1.1 but Hosts have additional capabilities as described in section 3.1.2.

3.1.1. Guest user

View top-level questions. When a user registers or logs in, they are directed to the home page (figure 3a) where links to top-level discussion prompts are displayed in descending chronological order.

Answer questions. Selecting a discussion prompt from the home page directs the user to the answer input page (figure 3b) where they must pseudonymously contribute an answer to access the discussion. When the user submits their answer to the discussion prompt, the system processes it with summarisation-aggregation as per figure 2. The answer is automatically screened for toxicity – “rude, disrespectful, or unreasonable comment that is likely to make someone leave the discussion (Perspective API n.d.)” – as described in section 3.2. If the answer's toxicity is above a certain threshold, the answer is posted but hidden behind a “mask”: an opaque layer that requires users to tap to reveal the answer (figure 4).

View summaries. After the system assigns a summary to the submitted answer, the user is directed to the summaries page (figure 4). This page displays cards for each of the summaries associated with the discussion prompt. Each summary has two buttons: an answer count button and a question count button. The answer count button indicates how many answers are under that summary. Tapping the answer count button takes the user to the full answers page (figure 5) where the user can read and interact with a grid of answers. Each answer has four buttons, labelled by a handshake, a thumbs-up, a flag and a question mark.

If the user finds an answer constructive to discussion, they can “respect” it by tapping the handshake button, as implemented in previous work (Faridani et al. 2010). Only the representative answer (the first answer in the grid of cards) is used to create the summary but this is subject to change to reflect the most respected answer. For example, if answer A receives more respect votes than the current representative answer B, then A swaps places with B to become the representative answer. The summary is regenerated using A and a
notification is sent out to the author of A to commend
them.

The thumbs-up button can be used if the user agrees
with a comment. Inappropriate and non-constructive
answers can be acknowledged with the flag button.
If an answer is flagged above a threshold number
of times, it is automatically hidden. The respect,
agreement and flag counts of an answer are not
displayed to the user. In Potluck, they are used as
internal metrics to determine what answers should
be displayed, and in what order.

Ask questions. Tapping the question mark button
under a full answer reveals an input area that
allows the user to enter a question to the author of
the answer (figure 5). Once the user submits their
question, the system semantically compares it to the
other questions asked on the answer, as explained in
section 3.2. If it is too similar to an already-submitted
question, the question is not added and the user
is shown a link to the existing question. If a similar
question has not been asked on the answer, the
question is appended to the bottom of the answer
(figure 5) and the author of the answer is notified
that a new question has been asked. The system
then creates a lower-level discussion area from the
new question. Tapping a question under an answer
directs the user to the answer input page (figure 3b).

3.1.2. Host user
Set top-level discussions. The user can create top-
level discussion prompts which are displayed on the
home page (figure 3a). The user can pin prompts
that they wish to prioritise or archive prompts that
are no longer relevant.

Override moderation. The user can hide Guest
user-submitted questions and mask answers that
are not conducive to discussion. The user can also
override the decisions of the auto- or crowd-sourced
moderation and reveal answers that were hidden.

3.2. Implementation
To build a reproducible prototype of Potluck, we
chose technologies that are freely available and
require minimal set up. Potluck is a Python with
Flask web application. The Transformers library2
is used with a pre-trained DistilBART model3 to
generate abstractive summaries. To compare the
semantic similarity between new and existing user
input (such as summaries and questions), Potluck
converts the input into sentence embeddings using
the SentenceTransformers library (Reimers and
Gurevych 2019) with the pre-trained all-MiniLM-L6-
v2 model4 and then measures the cosine similarity
between the embeddings to determine whether
aggregation is needed. The auto-moderation of user
input is powered by Perspective5, a machine learning
API that returns an estimated toxicity score for
textual inputs.

4. USER STUDY
We had the opportunity to have alumni of the World
Health Organisation infodemic management training
programme (WHO IMTP) trial Potluck remotely for 10
days. The main aim of this study was to understand
the usability of Potluck in a real-world setting.

4.1. Participants
Nine participants were recruited from a rolling
invitation to alumni of the WHO IMTP through
WhatsApp groups. Two of the participants did not
complete the post-study survey by the deadline so
their survey results have been omitted from analysis.
The remaining seven participants (45-54 median age
group; four men, three women) are labelled P1 to P7
in the findings.

4.2. Procedure and tasks
Before the study, participants were emailed a video
on how to use Potluck. At the start of the study,
all participants were granted Guest roles in a
shared private instance of Potluck, initialised with
four top-level discussion prompts and seed answers.
The second author was assigned the Host role.
Participants were required to spend at least five

\[2\]huggingface.co/docs/transformers
\[3\]huggingface.co/sshleifer/distilbart-cnn-12-3
\[4\]huggingface.co/sentence-transformers/all-MiniLM-L6-v2
\[5\]perspectiveapi.com
5. RESULTS AND DISCUSSION

5.1. Usability

In the post-study survey, participants rated the ease-of-use, usefulness and engagement of Potluck’s features, and the ease-of-use and comprehensibility of the system overall.

The results from feature evaluations suggest that the usage of Potluck is feasible (figure 6). In particular, the summaries screen was rated highly for usefulness and it was perceived as easy to use and engaging (figure 6). Five out of seven participants agreed that the summaries presented on Potluck were relevant (figure 7). These results show that Potluck can provide an overview of small to medium-sized discussions, motivating further studies with larger discussions.

The question trail was the most divisive in perceived usefulness (figure 6). In the future, we should provide clearer instructions on the question trail within the system or update the feature with a more familiar look-and-feel, such as a sitemap.

Five out of seven participants agreed that Potluck was overall easy to use (figure 7). P6 said: “It is very simple to use and everyone having basic knowledge and IT can use it.” However, only three out of seven participants agreed that the system was overall easy to understand (figure 7). P2 said: “I can see what it is trying to do, but overall, I found it a bit confusing” but also noted that they did not think they had enough time to evaluate it. This suggests that future deployments should be longer than ten days so that participants have sufficient time to understand the system.

5.2. Overall impressions

Participants provided their impressions of Potluck by rating statements and writing long-form responses in the post-study survey.

Only three out seven participants agreed that Potluck presented diverse viewpoints, with the same participants agreeing that the system presented viewpoints that they had not previously considered before (figure 7). The participants were professionally homogeneous and from these results, we can infer that they likely had the same ideas on the discussed topics.

Nevertheless, participants recognised the potential of Potluck to expose differing opinions. P4 said: “Very useful idea which needs more field testing in the intended environment, eg. covering topics where people disagree the most.”

Overall, six out of seven participants reported a positive experience on Potluck. Notably, the system was found to be informative (figure 7). P6 described the system as “very user friendly, educative and informative” and P5 said that it was a “good tool to navigate.” Participants agreed or were neutral that Potluck was suitable for online discussion (figure 7).

6. LIMITATIONS AND FUTURE WORK

Potluck restricts the exchange between participants to the asking and answering of questions, making it unintuitive to communicate certain types of information. Solutions on how to maintain structure and reciprocity while allowing different communicative forms will be investigated in future work iterations.

The summaries on Potluck are currently ordered chronologically. The number of answers with unique viewpoints (and thus unique summaries) were expected to be small in the preliminary study. But as this number grows, the summaries will need to be organised to display salient viewpoints to the user. We will implement a weighting system in future work.

The summarisation and similarity detection are done without human intervention. Although convenient, an automatic summary could be suboptimal compared to a human summary. The similarity detection might not detect all similar cases or mistakenly group dissimilar cases. These concerns could be addressed in future work by allowing users to review and fix the automatic summaries, and move answers to a better-suited summary.

Due to the asynchronicity of the system and the small group size of participants, we found it difficult to sustain and observe engagement. Moreover, the participants expressed similar views on the discussed topics. In future studies, we will recruit larger heterogenous groups and select topical or
controversial discussion prompts. This will enable us to observe how Potluck handles the display of many differing opinions.

7. CONCLUSION

We designed and implemented Potluck, a structured online commenting system that aims to encourage the inclusion and reflection of differing viewpoints. It features a discussion flow that requires users to actively answer and ask questions to advance through the system. Although the usage of Potluck is more restrictive than existing commenting systems, our preliminary user study shows that it is feasible for small to medium sized groups. In future work, Potluck will be evaluated with larger heterogenous groups.

ACKNOWLEDGEMENT

We thank the study participants for volunteering their time. We also thank Rikke Bjerg Jensen, Yingqin Zheng, and the reviewers for their guidance and feedback. This work was supported by the Leverhulme Magna Carta Doctoral Centre for Individual Freedom.

REFERENCES

Chen, G. M. (2017), Online Incivility and Public Debate: Nasty Talk, Springer International Publishing AG, Cham, SWITZERLAND.

Dave, K., Wattenberg, M. and Muller, M. (2004), Flash forums and forumReader: Navigating a new kind of large-scale online discussion, in Proceedings of the 2004 ACM Conference on Computer Supported Cooperative Work, CSCW '04, Association for Computing Machinery, Chicago, Illinois, USA, pp. 232–241.

Faridani, S., Bitton, E., Ryokai, K. and Goldberg, K. (2010), Opinion space: A scalable tool for browsing online comments, in Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, CHI ’10, Association for Computing Machinery, Atlanta, Georgia, USA, pp. 1175–1184.

Gowdy, T. (2020), Doesn’t Hurt to Ask: Using the Power of Questions to Communicate, Connect, and Persuade, Bantam Dell Publishing Group, Div of Random House, Inc.

Graf, J., Erba, J. and Harn, R.-W. (2017), ‘The Role of Civility and Anonymity on Perceptions of Online Comments’, Mass Communication and Society 20(4), 526–549.

Hoque, E. and Carenini, G. (2016), MultiConVis: A Visual Text Analytics System for Exploring a Collection of Online Conversations, in Proceedings of the 21st International Conference on Intelligent User Interfaces, ACM, Sonoma California USA, pp. 96–107.

Jones, Q., Ravid, G. and Rafaeli, S. (2004), ‘Information Overload and the Message Dynamics of Online Interaction Spaces: A Theoretical Model and Empirical Exploration’, Information Systems Research 15(2), 194–210.

Kim, H., Kim, H., Jo, K. J. and Kim, J. (2021), ‘Starry-Thoughts: Facilitating Diverse Opinion Exploration on Social Issues’, Proceedings of the ACM on Human-Computer Interaction 5(CSCW1), 1–29.

Klein, M. (2007), ‘How to Harvest Collective Wisdom for Complex Problems: An Introduction to the MIT Deliberatorium’, Center for Collective Intelligence Working Paper.

Moore, A., Fredheim, R., Wyss, D. and Beste, S. (2021), ‘Deliberation and Identity Rules: The Effect of Anonymity, Pseudonyms and Real-Name Requirements on the Cognitive Complexity of Online News Comments’, Political Studies 69(1), 45–65.

Murphy, K. (2020), You’re Not Listening: What You’re Missing and Why It Matters, Random House.

Perspective API (n.d.), https://perspectiveapi.com/.

Reimers, N. and Gurevych, I. (2019), ‘Sentence-BERT: Sentence Embeddings using Siamese BERT-Networks’, arXiv:1908.10084 [cs].

Rowe, I. (2015), ‘Civility 2.0: A comparative analysis of incivility in online political discussion’, Information, Communication & Society 18(2), 121–138.

Shirky, C. (2008), Here Comes Everybody: The Power of Organizing without Organizations, Allen Lane, London.

Springer, N., Engelmann, I. and Pfaffinger, C. (2015), ‘User comments: Motives and inhibitors to write and read’, Information, Communication & Society 18(7), 798–815.

Walther, J. B. and Jang, J.-w. (2012), ‘Communication Processes in Participatory Websites’, Journal of Computer-Mediated Communication 18(1), 2–15.

Wright, S. and Street, J. (2007), ‘Democracy, deliberation and design: The case of online discussion forums’, New Media & Society 9(5), 849–869.