GremoBot: Exploring Emotion Regulation in Group Chat

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Background

Maintaining a positive group emotion is important for team collaboration. However, it is non-trivial especially when group collaboration is carried out online via the increasingly popular text-based group chat applications (e.g., Slack). Recent advances in artificial intelligence show the possibility of using a chatbot (or a bot) to automatically monitor group emotion and facilitate its regulation. **However, little is known about how to design such a chatbot and how group members react to its presence.**

Design of GremoBot

Purposes
- Explore the design of chatbot emotion regulator
- Investigate how users react to chatbot's assistance

Technology
- Microsoft: Text Analytics API, Bot Framework
- IBM: Tone Analyzer API

Strategies of Emotion Regulation
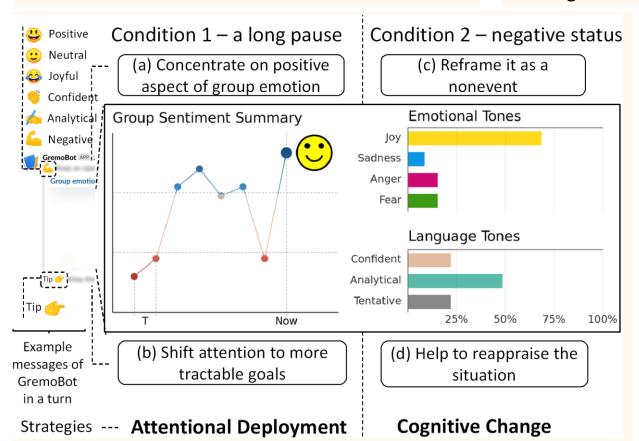- Attentional Deployment
- Cognitive Change

Figure: Message Design of GremoBot.

Attentional Deployment Strategies

(a) Concentration on positive aspect

(Positive)"The group has been making nice progress in the past few minutes." (Neutral)"Seems that the group discussion has been quite smooth so far." On dominant tone: (Joy)"I find the discussions valuable and enjoyable." (Confident)"Good to see the group's confidence is building up." (Analytical)"Glad that the group is taking an analytical approach to the problem."

(b) Shift attention to tractable goals

(DM) "How big is the candidate pool right now? Remember that the group needs to eventually narrow it down to five items." (Cr)"Feel free to share any idea, however small. The group can refine it together." (Db)"Try to express your opinions, as silence cannot help you win the debate."

Cognitive Change Strategies

(c) Reframe it as a nonevent

"I am sure that the group will work it out."

(d) Help to reappraise the situation

(DM)"You all have provided useful information that helps build the big picture. Compromise has to be made for the whole team's survival." (Cr) "It is a good start with everything the group has shared so far. Perhaps think outside the box and be adventurous." (Db)"The key to a convincing argument is to make other people feel comfortable enough to change their position."

Table: Script samples of GremoBot emotion regulation messages in Decision-Making (DM), Creativity (Cr), Debate (Db) tasks.

Experiment

Tasks
- **D**ecision-**M**aking: from desert survival task; personal goal + group goal;
- **Cr**eativity: brainstorm activities for environmental sustainability; group goal;
- **Deb**ate: discuss options to promote E-business; personal goal.

Some details
- Nine three-person groups
- Within-subjects
- Fifteen-minutes discussion per task

Results

- **Perceived more useful in Db and Cr than in DM tasks;**
- **Reinforce the positives; alert of negative situation;**
- **Design Considerations**
1) Put the visualization aside;
2) Shorten text messages;
3) Adapt timing to the group chat pace and task nature;
4) make clear how well the system can do what it can.

Task	Perceived Usefulness		Perceived Annoyance
	Aware emotion	Chat positively	
DM	**3.3 (1.4)** *	3.7 (1.5)	**4.0 (1.8)** **
Cr	3.7 (1.7)	4.0 (1.7)	**3.0 (1.6)** **
Db	**4.0 (1.4)** *	3.9 (1.4)	3.6 (1.4)

Table: aware of negative emotion; chat more positively; annoyance (7-point Likert scale).

"If I see the line jumps from the lower point to higher point, I am more happy and relaxed"; "I would check the line chart when it pops up, and if it goes down, I will speak (type) more quickly. It is a good impulse"; "*I find that they could be extremely useful, like reminding us how many ideas we should come up with and asking us to extend existing ones*".

Conclusion and Future Work

In this paper, we designed GremoBot and conducted an exploratory study to evaluate its impacts on user perception and behavior. Results suggest that a chatbot emotion regulator can enhance positive feelings and alert people of negative situations. We further discuss design issues raised in user feedback and propose design considerations concerning visual feedback, textual strategy timing and accuracy of emotion regulation chatbots. Future work: 1) improving the message design of GremoBot and conducting controlled experiment (with vs. without) to systematically evaluate its feasibility and efficacy; and 2) investigating appropriate manner of GremoBot in managing emotions, e.g., proactive intervention or reactive involvement.