Demo: Facilitating Instant Interactions for Stressful Experiences Sharing and Peer Support

Ryuhaerang Choi
KAIST
ryuhaerang.choi@kaist.ac.kr

Chanwoo Yun
KAIST
yuncw99@kaist.ac.kr

Hyunsung Cho
Carnegie Mellon University
hyunsung@cs.cmu.edu

Hwajung Hong
KAIST
hwajung@kaist.ac.kr

Uichin Lee
KAIST
uclee@kaist.ac.kr

Sung-Ju Lee
KAIST
profsj@kaist.ac.kr

ABSTRACT

We demonstrate StressTrendmeter, a mobile app that targets college students for anonymously sharing the source of stress via the form of hashtags, viewing stress topics based on trends, and providing social support through the empathy button and hashtag-based chat.

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)**; **Interaction paradigms**; **User studies**.

KEYWORDS

Smartphone-based Interaction Design

1 INTRODUCTION

Everyday life involves stress. Socially sharing one's negative emotions with others could help people relieve stress as they receive social support [4]. While any social support is encouraging, empathy from peers who can relate to or have similar experiences with the problem could carry more weight. However, technology-mediated peer support has largely been underexplored [1].

For college students, academic pressure, relationship issues, and job prospects all contribute to high stress levels [2, 5]. As students from the same campus likely share common experiences and understand one another's concerns, we believe that university is an ideal venue for investigating peer support practices. In recent years, university students have increasingly utilized social media and peer support networks to share their stressful experiences. In such communities, however, a post that needs timely responses could get
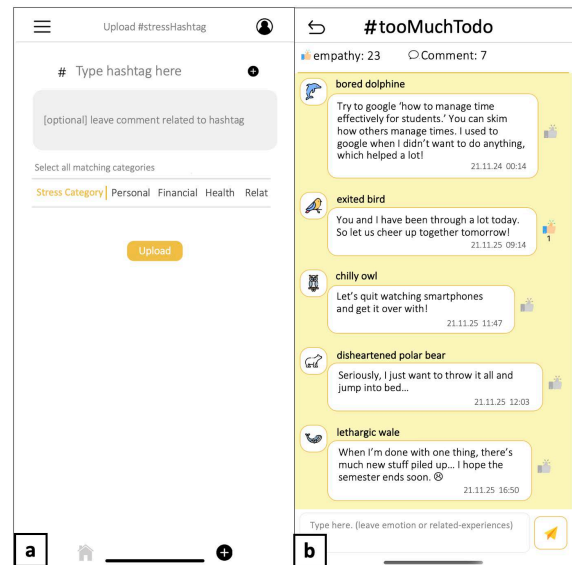
Figure 1: StressTrendmeter app snapshots; (a) a new hashtag post tab, and (b) stress topic-based chat room for a hashtag (e.g., tooMuchTodo).

lost in a large number of posts from a wide variety of users and hence not receive the attention and engagement.

How can technology be leveraged to bring together people who require attention from stressful event with peers who are experiencing or have gone through similar situations? To this end, we present *StressTrendmeter* (Figures 1 and 2), a mobile application for university students to anonymously share the source of stress via the form of hashtags (#). Peers can follow stress "trends" based on hashtags and express empathy to the topics they relate to.

2 STRESSTRENDMETER DESIGN

Figures 1 and 2 overview StressTrendmeter that is designed to create a lighthearted online platform for university students to share and manage stress together with peers who might have experienced or are going through similar issues. To achieve this goal, StressTrendmeter incorporates three key features.

(i) Anonymously share stressful experiences in the form of hashtags: We focused on facilitating spontaneous and instant sharing of stressful experiences by leveraging a hashtag format (Figure 1 (a)). Sharing stressful experiences through hashtags in StressTrendmeter has expected benefits. First, hashtags enable spontaneous posting, reducing the burden of posting. Second, viewers
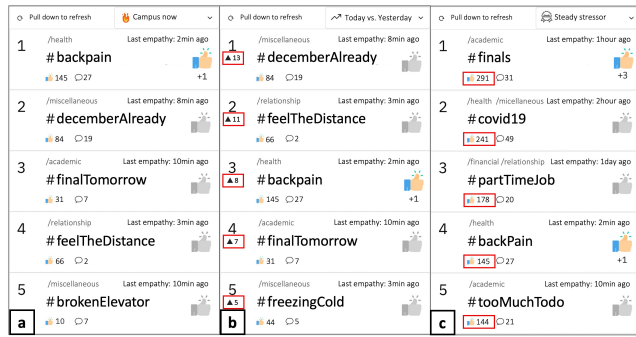
Figure 2: Trending examples of (a) *Campus Now,* **(b)** *Today vs. Yesterday,* **and (c)** *Steady Stressor.*

can navigate quickly through the topics because the information becomes concise and abstract. Third, sharing personal experiences with hashtags can strengthen anonymity as the abstraction and conciseness reduce the risk of identity revelation. Lastly, while abstract hashtags could obscure the details of individual experiences, abstraction increases the likelihood that a broader range of users would empathize with the topic. If desired, users can engage in further discussion through comments in the hashtag-based anonymous chat room, as shown in Figure 1 (b). Topic-based anonymous chat rooms could gather users with similar experiences to share coping strategies and leave encouraging comments, while general online bulletins are likely to disperse users' contribution to multiple redundant posts [3]. To compensate for the loss of context in hashtag-format sharing, StressTrendmeter lets users select relevant stress categories for their hashtag among 'personal', 'academic', 'health', 'relationship', 'financial', and 'miscellaneous', which are common stressors for college students [2, 5].

(ii) Express support to peers by pressing the empathy button and leaving comments: StressTrendmeter employs the empathy button (a thumbs-up icon), allowing users to express their empathy for each hashtag by clicking the empathy button (Figure 2). While empathetic reactions can grant relief, form a sense of normalcy, and promote a sense of community, recognizing empathy from others online is more difficult than in-person interactions where empathy can be sensed via facial expressions and gestures (e.g., nodding). The empathy button, as a lightweight interface, could facilitate expressing and recognizing empathy in StressTrendmeter. StressTrendmeter shows the number of empathy button clicks for each hashtag. Through visualization of others' empathy, we believe people could actively share stressful experiences by satisfying their desire to receive attention and empathy.

(iii) Browse the trending stress topics: StressTrendmeter ranks hashtag-based stress topics based on empathy counts from users. We developed four categories of trends, namely (a) *Campus Now* showing the current stress trends, (b) *Today vs. Yesterday* sorting hashtags by the difference between the trend rankings of the *Campus Now* today and yesterday, (c) *Steady Stressor* ranking the hashtags according to the accumulated empathy counts, and (d) *New* simply showing the latest hashtags.

Campus Now prioritizes the topics that experience sharp temporal increases based on the calculated *z-score* in a 3-hour window ($t = 3$). Each hashtag's empathy count E_t at the time window t is used to calculate the exponential moving average $\mathcal{S}$ with $\alpha = 0.9$

(Equation 1). The z-score for time t, $\mathcal{Z}_t$, is calculated by dividing the subtraction of the average $\mathcal{S}_{t-1}$ from the empathy count E_t by the standard deviation of empathy counts over the recent period (Equation 2). To account for recent empathy counts, *Campus Now* calculates the z-score every minute and re-ranks the hashtags.

$$\mathcal{S}_t = \begin{cases} E_1 & t = 1 \\ \alpha E_t + (1 - \alpha)\mathcal{S}_{t-1} & t > 1, \end{cases} \tag{1}$$

$$\mathcal{Z}_t = \begin{cases} 0 & t = 1 \\ \frac{E_t - \mathcal{S}_{t-1}}{Standard\ Deviation\ of\ E} & t > 1. \end{cases} \tag{2}$$

Figure 2 shows example results of three different algorithms given the same data. We believe that displaying trending topics helps users to easily recognize which stressful experiences are empathized now by the campus members.

We implement the StressTrendmeter mobile app with React Native running on both Android and iOS. The log data of every user in StressTrendmeterare stored in the cloud data storage, Google Firebase. All data are anonymized with a random identifier.A computer in our lab serves as an external StressTrendmeter server that fetches the collected data from the cloud data storage every minute and updates stress trends data. The StressTrendmeter mobile app shows stress trends by fetching the stress trends data from the external StressTrendmeter server.

3 DEMONSTRATION

We will implement a new StressTrendmeter for MobiSys by modifying the current StressTrendmeter features that are dedicated to university students to what is appropriate for conference attendees. For instance, we will create stress categories such as 'presenter nerves' and 'first-time attendees', etc. We plan to make available the StressTrendmeter Android app during the conference period to attendees. We will also showcase how StressTrendmeter features work. Using a display connected to a smartphone that runs StressTrendmeter mobile app, we will present the stress trends shared and empathized by conference attendees.

REFERENCES

[1] Nazanin Andalibi and Madison K Flood. 2021. Considerations in Designing Digital Peer Support for Mental Health: Interview Study Among Users of a Digital Support System (Buddy Project). *JMIR mental health* 8, 1 (2021), e21819.

[2] Dong Hun Lee, Sunwoo Kang, and Sichang Yum. 2005. A Qualitative Assessment of Personal and Academic Stressors among Korean College Students: An Exploratory Study. *College Student Journal* 39, 3 (2005), 442.

[3] Hai Liang and King-wa Fu. 2017. Information overload, similarity, and redundancy: Unsubscribing information sources on Twitter. *Journal of Computer-Mediated Communication* 22, 1 (2017), 1–17.

[4] Bernard Rimé. 2009. Emotion elicits the social sharing of emotion: Theory and empirical review. *Emotion review* 1, 1 (2009), 60–85.

[5] Shannon E Ross, Bradley C Niebling, and Teresa M Heckert. 1999. Sources of stress among college students. *College student journal* 33, 2 (1999), 312–312.