# MEEC: Second Workshop on Momentary Emotion Elicitation and Capture

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## ABSTRACT

Recognizing human emotions and responding appropriately has the potential to radically change the way we interact with technology. However, to train machines to sensibly detect and recognize human emotions, we need valid emotion ground truths. A fundamental challenge here is the momentary emotion elicitation and capture (MEEC) from individuals continuously and in real-time, without adversely affecting user experience nor breaching ethical standards. In this virtual half-day CHI 2021 workshop, we will (1) have participant talks and an inspirational keynote presentation (2) ideate elicitation, sensing, and annotation techniques (3) create mappings of when to apply an elicitation method.

## CCS CONCEPTS

• **Human-centered computing → Human computer interaction (HCI)**; *HCI design and evaluation methods.*

## KEYWORDS

emotion; affective computing; elicitation; capture; sensing; momentary

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## 1 BACKGROUND

One of the characteristics of human emotional intelligence is that it allows humans to recognize and respond accordingly to the emotions of others. Though it has become common for humans to interact with digital assistants and other forms of artificial intelligence daily, the current state-of-the-art cannot yet do the same. Krakovsky [24] states that this deficit will hinder the 'true success' of AIs, and therefore warrants further research. However, emotions are complex and difficult to capture; often there is a disconnect between how people *say* they feel and what they *actually* feel. Hence, emotions are often private to an individual, and do not always have a direct overt manifestation (e.g., in facial expressions [5]). From a social, interactionist view, emotions can be viewed as dynamic, culturally mediated, and socially constructed experiences [6]. Indeed, as Barrett [4] states, in the absence of an objective, external way to measure emotional experience, we can only examine emotions through self-reports, and it is our role as researchers to ensure that our ratings are useful and valid indicators of what a person is experiencing. To this end, recognizing human emotions necessitates the ability to reliably and ethically *elicit* emotional (affective) states, and *capture* them computationally in order to serve as ground truths for the detection and recognition systems we develop [7].

There has been a rich history of emotion elicitation (or induction) methods [20], ranging from imagination, film, sound, music, images, to dyadic interactions, and even Virtual Reality (VR) environments [25, 35]. Indeed, while VR environments show great promise of increased immersion and sense of presence, for example eliciting fear responses [27], users' sense of presence may differ during self-reports in or outside VR [32]. Other experimental methods to elicit natural emotional responses include manipulations to elicit spontaneous versus posed smiles. Posed smiles can be elicited with an instruction to produce them [11], or by asking participants to fake enjoyment [28]. Genuine smiles can be elicited by asking users to watch funny videos and asking them to withhold from laughing. Such subtle microexpressions can be measured through facial distal electromyography (EMG) [29, 30]. Recently, there has been work on collecting real-time and continuous emotion annotation data for mobile video watching using peripheral visualization techniques on smartphone displays [37]. Furthermore, there is a range of multisensory techniques that can also be used for modulating emotional state, including thermal stimulation for voice interaction [19] or olfactory stimulation of emotion in the car [13].

With respect to capture, previous work has shown the potential of improving smartphone interactions using emotional facial expressions [18] and heart-rate data [22]), detecting engagement at


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museums using Brain-Computer Interfaces [1]), detecting engagement through facial action units using a standard RGB webcam over the course of a workday [3], automatically detecting complex emotion constructs such as sympathy from foreign news media text [17] automatically detecting learner affect in classrooms using thermal imaging [2], and detecting emotions using the combination of EEG and eye tracking (pupillary response) [38]. Others have investigated what are called Experience Sampling Methods which collect context data (location, temperature, etc.) to intelligently nudge users to fill in experience reports (e.g., AWARE framework [21]), with further investigations on the response and recall accuracy rates of varying the scheduling of self-reports [34]. Furthermore, there has been shown differences in ESMs across devices [23], which result in differences in response times across devices, as well as trade-offs in interaction types, screen size, and device familiarity that can affect both users' experience and the reports made by users.

The foregoing notwithstanding, we face a fundamental challenge concerning temporal resolution in emotion elicitation and measurement: even though emotions, whether microexpressions or bodily changes, are in continuous flux and can be measured, self-reports do not have the same temporal resolution. Several factors contribute to this temporal resolution mismatch: different awareness (interoception) levels across individuals [9]; non-linearity in time perception [36]; and how emotions themselves alter time perception [14]. In this second (virtual) workshop[1] [16], we again address this challenge of Momentary Emotion Elicitation and Capture (MEEC) from individuals continuously and in real-time, without adversely affecting user experience. Specifically, we seek to more closely examine and define this wave of momentary emotion elicitation and capture. Furthermore, during current times (cf., COVID-19 pandemic) where we rely heavily on remote interactions, we are further faced with the challenge of effective remote capture of affective states.

## 2 SECOND MEEC WORKSHOP CHALLENGES

While other workshops[2] and dedicated conferences (cf., Affective Computing & Intelligent Interaction) focus on the many technical challenges of implementing emotion recognition (e.g., using deep learning methods), less attention has been devoted to eliciting emotions as they occur, and how to capture them continuously and in real-time to serve as valid ground truths for the analyses proposed in such venues. Challenges are split across elicitation and capture, and include:

**Elicitation:** Which multi-modal (e.g., film, music) and multisensory (e.g., thermal, auditory, taste, olfactory) elicitation methods are most suitable for which contexts? What are the peculiarities across domains (e.g., scents to reduce driver anger [13])? How can we leverage the immersiveness of VR technologies for use as an elicitation method (cf., [35]), and what limits does this impose on capture? How do we elicit emotional states over time (e.g., mood)? What ethical considerations (see "The Ethics of AI and Emotional Intelligence" whitepaper[3]) in elicitation [7] need to be considered to ensure we respect the users' personal, cognitive, and emotional boundaries?

**Capture:** How can we capture a wider range of human emotions / feelings / moods, in the moment that they occur? While there exist methods to collect in situ affect data [31], challenges remain in the range of emotions and moods we can capture [8]. Importantly, which emotions should we capture [12] and how do cross-cultural differences impact this [10, 26]? What emotional models do we draw upon, discrete e.g., Ekman's six basic emotions [15] or dimensional, e.g., Russell's Circumplex model [33]? Which annotation modalities (e.g., speech, gestures) and tools (e.g., questionnaires, ESMs) are most apt? Which devices (e.g., mobile, wearable) and sensors (e.g., RGB / thermal cameras, EEG, eye tracking) provide a good trade-off between unobtrusiveness and accurate measurements? How can we factor in attentional considerations (e.g., interruptions) to lower dropoff rates and improve self-reports in ESMs? How do we design better remote emotion capture techniques during times of minimal face-to-face interaction (cf., COVID-19 pandemic)?

As a community of HCI researchers, we need to steer research addressing the problem of elicitation and capture of emotions in the moment. Together with the Affective Computing community, we need to concretely define the collection and capture of valid emotion ground truths as an agenda and goal for the CHI community. Thus, the overarching goal of the MEEC workshops are to establish lasting and meaningful connections across research communities concerned with affective computing, and to bring together students and researchers from various disciplines who are working on studying, designing, building, and/or evaluating the elicitation, capture, and prediction of human emotions.

## 3 PRE-WORKSHOP PLANS

### 3.1 Participants and Workshop Publicity

We aim for the workshop to be interdisciplinary by nature, addressing academic researchers as well as industry. We expect participants from the areas of CHI, ACII, UbiComp, ICMI, but also related areas including (cognitive) psychology and industrial design. The program committee comprises researchers and practitioners active in these research areas and who, moreover, plan to encourage participants from their institutes to submit to this workshop. This would ensure active participation in the preparation and execution of the workshop. We further encourage young scientists and PhD students to explore their research topics with domain experts. The call for papers will be distributed through the ACM SIGCHI mailing list, and further promoted through a dedicated website we will set up, as well as social networks (e.g., Twitter, Facebook). We expect approximately 15-20 participants, where 20 is the maximum. Furthermore, we will request participants to read all accepted submissions before the workshop day (made available through the website). Submissions will be reviewed by the workshop organizers. Participants will be selected based on the submission reviews for quality, novelty and inspirational aspects, aiming for a good balance of different perspectives on the topic of momentary emotion elicitation and capture.

Similar to the previous MEEC workshop [16], results will be made available on the workshop website (https://meec-ws.com) as well as in dedicated proceedings. This will help attract higher

[1]Please note that last year the full extent of the WS was not held due to cancellation of CHI 2020, however, videos of talks and papers were made publicly available.
[2]Examples: Design for Affective Intelligence @ ACII2017, Affective Computing in HCI @ HCI 2018, Emotion Recognition in the Wild Challenge (EmotiW) @ ICMI2019)
[3]https://www.partnershiponai.org/the-ethics-of-ai-and-emotional-intelligence/; last retrieved: 14.10.2020

quality submissions and allow for increased exposure and impact of the workshop before and after the event.

### 3.2 Key dates

- Call for Participation (CfP): 15 December 2020
- Submission Deadline: 21 February 2021
- Notification of Acceptance: 7 March 2021
- Workshop Day: Sunday 9 May 2021

## 4 WORKSHOP PLAN

We plan for a half-day (4 hours 15 minutes) virtual workshop with paper submissions (2-9 pages) as position papers, demos, and/or posters focusing on novel concepts, perspectives, or works in progress.

The workshop will take place primarily over Zoom[4], where we will additionally use Miro for collaborative (synchronous) brainstorming, and the Mozilla Hubs[5] platform for facilitating social interaction before, during, and after the workshop. The entire workshop will be 4 hrs 15 min., with three hours of presentations and collaborative activities, and the remainder breaks. We will provide how-to tutorials a week before the workshop, in case any of the participants are not familiar with the tools we aim to use. Given the four timezones to accommodate for (GMT+1, +9, +11, -8) between organizers and our keynote speaker, our initial proposal for timing is: Sunday May 9, JST 20:00-01:15 (next day) / EST 08:00-12:15 / CET 14:00-18:15 (UTC+01:00). We aim to have a definitive date and timings after checking the majority of timezones from our WS participants.

An important goal is to attract high-quality submissions spanning multiple research disciplines to encourage and shape the discussion on momentary emotion elicitation and capture. Also noteworthy is that the workshop will be highly interactive and group-based to create a sense of community. Given that the workshop will be virtual, we propose the following schedule shown in Table 1.

In the first half of the workshop, we will start the day with a brief welcome to the workshop and planned activities. This will be followed by our invited keynote speaker from the Affective Computing community, Prof. Mohammad Soleymani, who will inspire participants with a talk on "Machine Understanding of Emotional Expressions". This will allow us all to reflect on how to bring researchers across fields to address the challenges of momentary emotion elicitation and capture. The exact timing of the keynote will be determined closer to the WS date. Additionally, by including flash presentations, and a long break in Mozilla Hubs, we aim to ensure focused and lively discussion. These topics will be used as inspiration for the interactive mapping session part.

For the 45 minutes break, we will encourage participants to set up booths in Mozilla Hubs, where they can play their prerecorded videos and/or slides so that other attendees learn more about their interests. This should help set the state for the subsequent ideation and mapping session. Participants are free to take a break during this part as well.

[4]https://zoom.us/
[5]https://hubs.mozilla.com/

**Table 1: Proposed schedule**

| | Duration | Activity |
|---|---|---|
| **Presentations** | 5 minutes | **Warm Up:** Login to the virtual workshop (Zoom) and meet all the participants |
| | 15 minutes | **Welcome:** Introduce organizers, participants, workshop objectives and schedules |
| | 30 minutes | **Keynote** presentation by Prof. Mohammad Soleymani titled "Machine Understanding of Emotional Expressions" |
| | 10 minutes | **Q&A** |
| | 15 minutes | **Break** |
| | 30 minutes | **Pitch / Flash presentations** for Papers, Demos, Posters (approx. 1.5 minutes per participant if N=20). Prepared in advance in Google Slides or as prerecorded video presentations |
| | 45 minutes | Break (Social gathering on Mozilla Hubs) |
| **Ideation & Mapping Session** | 5 minutes | **Join Pre-assigned Groups** (annotation or sensing) in Zoom breakout rooms |
| | 15 minutes | **Ideation Session:** collaborative Miro board ideation sessions for Annotation (group 1), Sensing (group 2), and Context (group 3). |
| | 35 minutes | **Mapping Session:** using Miro boards for Elicitation-Annotation mapping (group 1), Elicitation-Sensing mapping (group 2), and Elicitation-Context (group 3). |
| | 5 minutes | **Summarize Discussions:** Each group makes 1-2 slides to summarize their mapping results |
| | 15 minutes | **Break** |
| | 15 minutes | **Group Presentations:** Each group gives a 5 minutes presentation of the discussion results to main plenary |
| | 15 minutes | **Wrap Up:** Summarize the workshop, actions on follow-up activities, and take virtual group photos |

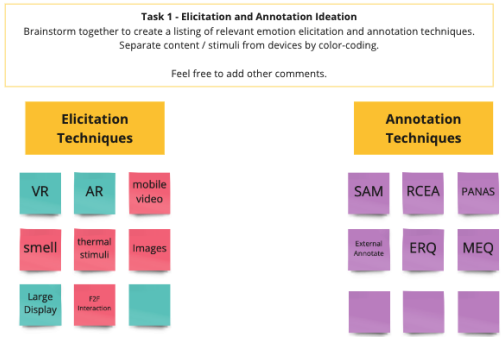


**Figure 1: Example Miro board: emotion elicitation and annotation ideation.**

In the second half of the workshop, we (the organizers) will begin by providing a survey of current elicitation, sensing and annotation techniques. This will be done in three separate breakout rooms, each covering elicitation, sensing or annotation. With this survey of work fresh in our minds, we will begin the mapping session in pre-designed Miro boards. We will have three Miro boards: elicitation-annotation mapping, elicitation-sensing mapping, and

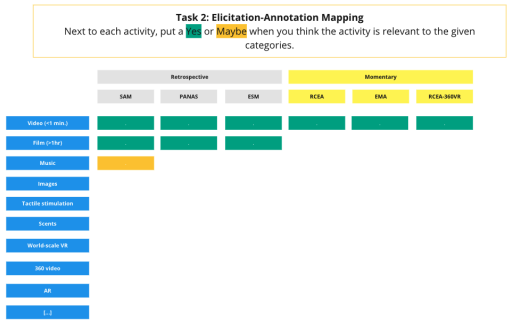


**Figure 2: Example Miro board: emotion elicitation and annotation mapping task.**

elicitation-context mapping. Groups will be divided by work covering elicitation to annotation, elicitation to sensing, or elicitation to context (or domain), and will be pre-assigned accordingly. During the mapping sessions, groups will perform two tasks on Miro: (1) Ideation and (2) Mapping. An example of an ideation task (Figure 1) and mapping task (Figure 2) is shown for a group that covers emotion elicitation and annotation. These mappings will be collaboratively done on each respective Miro board, and moderated by the organizers.

The tangible outcomes we expect are: (1) **Listing** of relevant emotion elicitation, annotation, and sensing techniques (2) **Mapping** of relevant emotion elicitation methods to annotation techniques, sensing techniques, and under which contexts (e.g., outdoors walking, sitting at home) or domains (e.g., automotive, healthcare). These outcomes will be later aggregated and analyzed further, and made available on the dedicated workshop website.

## 5 POST-WORKSHOP PLANS

After the workshop, we will provide a summary report to be published on the website, an ACM Interactions contribution, and put the proceedings (in .pdf) online. We also aim at providing a growing resource of best practices of mapping (ethical) emotion elicitation to annotation and sensing techniques across contexts (e.g., mobile, AR/VR interaction) and domains (e.g., healthcare, public good, automotive, etc.).

## 6 ORGANIZERS AND PROGRAM COMMITTEE

Below are short biographies of each organizer. Expertise and interests are complementary and reflect the interdisciplinary perspectives of the workshop topic.

**Abdallah El Ali** (main contact) is a Tenure-track Researcher at the Distributed & Interactive Systems group at Centrum Wiskunde & Informatica (CWI) in the Netherlands. His research focus is on temporal challenges in eliciting, capturing, and predicting human emotions, specifically on usable and effective emotion elicitation and annotation techniques across environments (VR/AR, mobile, wearables). Website: https://abdoelali.com/

**Monica Perusquía-Hernández** is a Research Associate at NTT Communication Science Laboratories, Japan. She is interested in affective computing and bio-signal processing. In particular, she works with sensing techniques such as Computer Vision, EMG and Skin Conductance for congruence estimation between facial expressions and emotions when assessing subjective user experience, time perception and affective awareness. Website: http://monicaperusquia.com/.

**Mariam Hassib** is a Postdoctoral Researcher at the Bundeswehr University Munich in Germany. Her research interests are Brain Computer Interfaces (BCI), and Physiological Computing. She is working on building systems which provide feedback and adapt to the cognitive and affective states of users. She leverages the current ubiquity of BCI devices and wearable physiological sensors to create new tools that support cognitive-awareness outside the lab environment.

**Yomna Abdelrahman** is a Postdoctoral Researcher at the Bundeswehr University Munich in Germany. Her research focuses on Thermal Imaging operating in the far-infrared spectrum, novel interactive systems, engagement sensing and adaptive bio-sensor assistive systems. Recently, her research focus shifted to affective computing using thermal cameras as an unobtrusive sensor.

**Joshua Newn** is a Postdoctoral Researcher in School of Computing and Information Systems at The University of Melbourne in Australia, where he specialises in the design, development and evaluation of Human-Centred AI. His research interests span across a wide range of areas, including the applications of novel inputs technologies to support human-AI interaction, multimodal sensing for cognition- and context-aware AI systems for health and learning applications, and the design and evaluation of explainable AI interfaces.

## 7 CALL FOR PARTICIPATION

To train machines to sensibly detect and recognize human emotions, we need valid emotion ground truths. A fundamental challenge here is the momentary emotion elicitation and capture (MEEC) from individuals continuously and in real-time, without adversely affecting user experience. In this half-day virtual CHI 2021 workshop, we will (1) have participant talks and a keynote presentation (2) ideate elicitation, sensing, and annotation techniques (3) create mappings of when to apply an elicitation method.

We seek contributions across disciplines that explore how emotions can be naturally elicited and captured in the moment. Topics include:

**Elicitation:**

- multi-modal (e.g., film, music) and multi-sensory (e.g., smell, taste, thermal) elicitation
- emotion elicitation across domains (e.g., automotive, healthcare)
- elicitation and immersiveness (e.g., AR/VR)
- elicitation over time (e.g., mood)
- ethical considerations

**Capture:**

- emotion models (dimensional, discrete)
- annotation modalities (e.g., speech) and (remote) tools (e.g., ESMs)
- devices (e.g., mobile, wearable) and sensors (e.g., RGB / thermal cameras, EEG, eye-tracking)
- attention considerations (e.g., interruptions)
- ethical issues in tracking and detection

## 7.1 Submission

We invite position papers, posters, and demos (2-9 pages, including references) that describe/showcase emotion elicitation and/or capture methods. Submissions will be peer-reviewed by 2 peers, and selected on their potential to spark discussion. Submissions should be prepared according to the ACM Master Article template (single column) and submitted in PDF through Easychair (https://easychair.org/conferences/?conf=meec2021). Accepted submissions will be made available on the workshop website. At least one author must register for the workshop and one day of the conference, with (TBD) special rates for remote attendance.

- Submission Deadline: 21 February 2021
- Notification of Acceptance: 7 March 2021
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Website: https://meec-ws.com/

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