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Demonstration: Interactive Social-Emotional Toolkit (iSET)

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Abstract

Social communication in autism is significantly hindered by difficulties processing affective cues in real-time face-to-face interaction. The interactive Social-Emotional Toolkit (iSET) allows its users to record and annotate video with emotion labels in real time, then review and edit the labels later to bolster understanding of affective information present in interpersonal interactions. The iSET demo will let the ACII audience experience the augmentation of interpersonal interactions by using the iSET system.

1. Introduction

Autism Spectrum Disorder (ASD) includes three sub-conditions—Autistic Disorder, Asperger’s Syndrome, and Pervasive Developmental Disorder Not Otherwise Specified—that differ in severity of symptoms, but each specifies persistent difficulties and misunderstandings during social interactions [1]. Existing technology-based systems designed to help autistic persons with reading emotions and learning about affective cues have been largely static (using prerecorded videos) and have featured actors instead of persons familiar to the user [2]. Furthermore, they have focused mainly on comprehension of six “basic” emotions [3], despite the fact that analysis of real-life social interactions indicates that more complex expressions, such as confusion and concentration, occur more frequently [4].

The interactive Social Emotional Toolkit (iSET) is designed to strengthen users’ face-reading skills, allowing them to develop strong communication skills that can be honed and practiced during real-time social interactions. iSET consists of a portable device (we are currently using Samsung’s Q1 ultramobile computer) - equipped with an on-board outward facing camera - that runs custom software that we have developed. The software allows for recording and live annotation of video by the filmer using a set of preset emotion labels assisted by automated analysis algorithms. During replay, each label is assigned a different color and displayed on a timeline. The timeline can be used to navigate the video for easier analysis of recordings of social interactions. Figure 1 shows the expression labels (which can be used for both real-time and offline tagging of video) and the playback interface timeline, which appears below the video window.

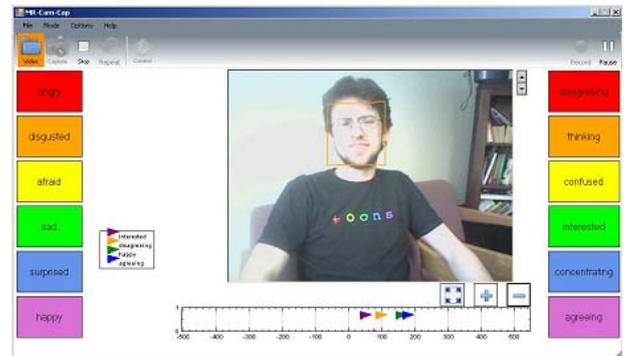


Figure 1: iSET real-time tagging and video playback.

By allowing users to record emotions as they are actually seen in their own environments, the iSET system allows the user to record and analyze conversations of immediate social importance and impact. Thus, iSET facilitates engagement in and understanding of emotion recognition during real-time interaction, which may help users improve their real-time communication abilities.

2. iSET for Autism

iSET has been created through extensive testing and feedback sessions with students on the autism spectrum. By interacting with these students and listening to their comments, we have been able to refine the iSET design to allow emotion recording, labeling, and playback to be highly intuitive and fun. We have also developed some usage scenarios designed to encourage positive interactions for the iSET system. For instance, in the “expression hunt game,” students are asked to elicit expressions such as “happy” or “surprised” from their peers and record them for later offline viewing with a teacher.

This approach not only encourages students to approach each other and attend to facial cues, but also encourages them to think about what elicits different emotions – a key skill that is not addressed in many existing interventions. In another example, students using the iSET system developed role-playing “actor and director” games where they imitated the sort of instructions typically delivered by a movie director to an actor. These interaction scenarios appear to facilitate engagement with and comfort using the iSET system.

3. iSET Demo

Our tool enables researchers, for the first time, to systematically compare people's ability to label facial expressions *in situ* (real-time tagging) to people's ability to label the same facial expressions offline. While the former presents a more accurate representation of people's facial-expression recognition abilities, the latter approach is the one typically used in the majority of research. Our results so far demonstrate that for some emotions, context is crucial, while for others, high inter-coder agreement is obtained regardless of context.

During the iSET demonstration, ACII attendees will get to experience the challenges of real-time *in situ* emotion labeling of facial expressions, and better appreciate how difficult this might be for autistic individuals. We will also ask ACII attendees to contribute feedback and make suggestions on our system, and think together about how to better teach emotion recognition during interpersonal interactions.

As shown in Figure 2, the demo will proceed as follows: The user (the filmer) will hold a Q1 while the iSET software is displayed on the screen. The filmer will elicit and capture expressions of other attendees. The filmer can then "tag" emotions s/he sees during live interactions, and can replay the video with annotations later. An exemplary video of this setup can be seen at <http://affect.media.mit.edu/projectpages/iSET/ACII-iSET.AVI>.

4. Conclusions

The iSET system has the potential to facilitate social interactions by allowing real-time, *in situ* learning of perceived emotional states. Given that anecdotal reports suggest that much of the social stress in autism is attributed to dynamic social interactions and a failure to detect subtle social cues, a technology-enabled platform that assists in real-time interactions could be immensely valuable for the autistic population by increasing their understanding and comfort with face-to-face communication.

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Figure 2: Storyboard of iSET-augmented social interaction.

- a. Video subject displays emotion



- b. Computer displays video of subject in iSET



- c. Filmer labels video



- d. Filmer reviews videos offline



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