THE AC-TG SEEKS TO SERVE AS A FORUM FOR FOSTERING THE CONTINUAL DESIGN AND DEVELOPMENT OF AUGCOG S&T AND FOR THE EXCHANGE AND DISSEMINATION OF INFORMATION

In This Issue:

Letter from the Editor .................................................. 2
Kollmorgen Award 2016 .................................................. 3
Student Award Winner 2017 Highlight: Joseph Nuamah .... 5
Augmented Cognition in Business: The Final Frontier .... 7
2016-2017 ACTG Officers .................................................. 9
ACTG Contact Information .............................................. 9

61st Annual Meeting

The next HFES conference is October 9th – 13th at the JW Marriott Austin, TX. The 2017 AC-TG Business Meeting is planned for Wednesday, October 11, 2017, 4:30 pm - 5:15 pm in Room 301 (Level 3). The technical session is: Wednesday, September 21, 2016, 9:15 am - 10:45 am.
Message from the Editor

I want to thank everyone who submitted content to this year’s newsletter, papers and posters to technical group sessions, and nominees for the Student Grant Award & Kollmorgen Award. If you did not have a chance to submit this year, please consider submitting next year. Your work and activities can be shared with the AugCog community in next year’s newsletter. See tg.hfes.org/actg/actg_submit.htm for details!

I hope you enjoy this year’s newsletter and have the opportunity to attend the Aug Cog events at HFES!

Best Wishes,
Ryan W. Wohleber, Ph.D.
Lauren Reinerman-Jones began her career at the University of Cincinnati with a focus in neuroergonomics using TCD to address questions related to personnel selection. She is now the Director of Prodigy at the University of Central Florida's Institute for Simulation and Training. Lauren has conducted countless experiments in the field of Augmented Cognition and notably, was the first to connect a single person to EEG, ECG, fNIR, TCD, and eye tracking simultaneously. Recently, she developed a physiologically driven robot closed-loop system that adapts to the operator's level of workload. Publications are underway for reporting the modeling techniques and experimental results of the impact of the system in performance. In her work, she has brought together collaborators from backgrounds in philosophy, psychology, engineering, medicine, and more, and authored over a hundred publications in the field of Augmented Cognition.

Lauren’s personal contribution to the Augmented Cognition Technical Group of the Human Factors and Ergonomic Society are extensive. As the technical group chair of the HFES ACTG from 2010-2012, she utilized her personal connections in Augmented Cognition and related communities of Neuroergonomics and Neuroscience to bolster several new initiatives. She started the Student Grant Award and the Student Paper of the Year Award. She also established the HFES Augmented Cognition Linked-In group, which set the precedence for this requirement by all TGs the following year. She still manages the group. She also established a HFES ACTG website and put into place ACTG bylaws for voting in new officers each year. She created and filled officer positions. Lauren held informative business meetings with invited speakers garnering greater interest in the Technical Group and Augmented Cognition as a field. These efforts ultimately tripled the membership in the two years she served as chair. With the increase in membership demand, she was able to increase fees to help make the ACTG awards possible. Prior to serving as the technical group chair, she served as the program chair growing the session number from one to four. Following her formal service for the ACTG, she has continued to support the TG with articles for the newsletter, as a keeper of ACTG records, and as an officer advisor. She currently serves on the Scientific Advisory Board for Augmented Cognition International and has serve on a variety of other boards in the research community.

Lauren’s outstanding contributions to Augmented Cognition both in the laboratory and in organizations such as the ACTG make her this year’s Admiral Leland Kollmorgen Spirit of Innovation Award Recipient.
The Leland S. Kollmorgen Spirit of Innovation Award was instituted in 2007 by the HFES AC-TG in honor of Leland S. Kollmorgen, Rear Admiral, U.S. Navy (Ret.). The award recognizes exceptional scientists and engineers who have made substantial and innovative contributions to the field of Augmented Cognition. The recipient will be someone whose extensive endeavors have pushed the frontiers of discovery, innovation, and design in Augmented Cognition transcending the boundaries of human-systems computing and is a true inspiration to the HSI field.

The Leland S. Kollmorgen Spirit of Innovation Award recipient is judged not only on accomplishments in the last year, but also on a career history of efforts contributing to the advancement of the Augmented Cognition field. Other criteria for selection include: resourcefulness and dedication in promoting and accomplishing innovative human-systems computing technologies, demonstrated leadership in forming and promoting teamwork among the various disciplines represented within the Augmented Cognition field, demonstrated professionalism and integrity, and the embodiment of the spirit of innovation and collaboration.

If you are interested in nominating an individual or nominating yourself, please complete the form below and return to Brett Borghetti (brett.borghetti@gmail.com) by August 21, 2018. The recipient will be honored at the 2018 HFES AC-TG Business Meeting.

**Nominator Information:**

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**Nominee Information (If Different from Above):**

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Please summarize in 1-2 paragraphs why this person embodies the spirit of this award, including contributions, collaborations, and other honors received pertaining to the field of Augmented Cognition.
Usability is defined as "the extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (ISO, 2010). Usability testing seeks to determine whether a given system or interface will meet its intended users' needs and preferences. By extension, it is a way to judge whether an interface is more or less effective, whether it reduces working memory demand and overall cognitive load.

Traditional behavioral and subjective methods employed by usability researchers to evaluate human-system interactions are not inadequate (Frey, Mühl, Lotte, & Hachet, 2013; Hill, & Bohil, 2016). Even though researchers are able to measure the accuracy with which participants complete a task and how long it takes for them to complete that task with a user interface, they find it difficult to measure a subjective factor like mental workload (Hirshfield et al., 2011). Surveys, which are usually administered after a task has been completed, are inherently subjective and can elicit participant biases. Moreover, they lack insight into participants’ changing experiences as they work with a user interface. Some usability researchers employ think-aloud protocols to measure dynamic user experience. However, these protocols lack objective measurement of continuous changes in mental state. Besides, they can change user experience by increasing the overall workload of the task (Hirshfield et al., 2011; Pike, Maior, Porcheron, Sharples, & Wilson, 2014).

Physiological measures, particularly electroencephalography (EEG), have the advantage that they are continuously available and their collection does not interfere with user performance (Wilson & Russell, 2003). In usability testing, EEG could be used to determine whether a particular user interface produces a general difference in brain function. The physiological information, along with behavioral and subjective assessments, can then be used to determine whether the user interface produces same human responses as compared to a baseline system (Kramer & Weber, 2000).

The proposed study seeks to understand the effects that a new user interface will have on users’ mental resources. Working memory overload is a source of performance errors when humans interact with systems (Olson, & Olson, 1990). Thus, there is the need to minimize working memory load in these interactions. The aim of this study is to determine whether a user interface for an inherently intuitive task is more or less effective, whether it reduces working memory demand and overall cognitive load. The specific objective of the current project is to employ EEG to augment usability testing of user interfaces judgment tasks by:

1. Using benchmark tasks from cognitive psychology as cognitive benchmark tasks for low and high working memory
2. Creating a set of tasks that participants will perform with the user interfaces to be evaluated
3. Recording EEG while participants complete cognitive benchmark tasks, and user interface tasks
4. Using EEG data from the cognitive benchmark tasks as training data to build SVM classifiers for each participant
5. Using EEG data from the user interface tasks as testing data for respective classifiers
Overall, I seek to demonstrate ways that EEG could be used to complement usability testing by assessing participants’ working memory while working with a user interface. An effective means of evaluating the working memory load demands of user interfaces would be a useful tool (in the usability engineer’s toolkit) for evaluating alternative interface designs. I am elated about the opportunity to explore how user interface usability testing may be augmented with EEG. I will use the award money from the Augmented Cognition Technical Group to purchase consumable materials and compensate research participants.

References


Over recent decades, technological and organizational capabilities have greatly improved, resulting in technology being relied upon for communication, decision making, and innovation across the world. The field of human factors has tracked this progress, with research evolving to include increasingly complex machines that vary widely in their physical and cognitive capabilities (Hancock, 2017). Other fields of research, such as those in business, have been slower to get on board, but the necessity for research and application of intelligent technology in various business contexts has never been greater. Today, it is perfectly feasible to expect that business leaders can have their decisions made for them by machines, or at least augmented by them.

The ability to augment business decision-making is one of several technological capabilities that remains under-researched. Additionally, businesses today rarely, if ever, utilize the full arsenal of technological capabilities available to them. This may be due to a general lack of awareness. It may also be due to lack of clear answers. Indeed, several technology-related questions remain unanswered in the science of business. For example, how can technology augment the cognition of business leaders and followers to improve organizational performance? How can entrepreneurs use such technology to grow new businesses and set themselves apart? Finally, is there such a thing as technology too innovative to benefit business outcomes?

In order to answer these questions, it is important to combine the perspectives of human factors engineering, industrial/organizational psychology, cognitive science, computer science, and business management. Business schools today are becoming aware of this need and starting programs focused on technology management (e.g., CMU’s Tepper School of Business now has a program in Business Technologies). However, many of these programs focus on bringing together computer scientists and business professionals, often missing the unique perspectives of select human factors professionals who study human-computer interaction (HCI) and related topics such as augmented cognition.

Today, those studying HCI and augmented cognition face a unique opportunity to apply their research in novel ways to improve business outcomes. Specifically,
innovations in that have been tested in warfighting and healthcare contexts can be revised and tested in business contexts. For example, research for advancing data visualization has shown promise (Donalek, et al., 2014; Ward, Grinstein, & Keim, 2010), but more can be done to study its utility and usability in business management. Furthermore, research on augmented reality has yet to make traction in business management, though initial research in various workplace contexts paints an exciting picture (e.g., Henderson & Feiner, 2010; Stafford, Thomas, & Piekarski, 2009). The next task at hand is to further research in these and related areas—and expand them to address issues in leadership, operations management, and business innovation. The possibilities are endless. For professionals in HCI and augmented cognition, business management may be the final frontier.

References


2016-2017 AC-TG Officers

• AC-TG Chair: Chang S. Nam, Ph.D.
• AC-TG Program Chair: Brett Borghetti, Ph.D.
• AC-TG Webmaster/Newsletter Editor: Ryan W. Wohleber, Ph.D.
• AC-TG Student Outreach Officer: Eric Fichtel

Contact Information

AC-TG Newsletter Submissions: Email ryan.wohleber@gmail.com if you have content you would like to submit to the AC-TG newsletter.

AC-TG ListServ: Email the AugCog listserv at hfes-actg@hfes.org with anything you would like to share with the community such as job announcements, funding opportunities, scholarships, questions, etc.

AC-TG Website: Also, be sure to check out our updated website: http://tg.hfes.org/actg/

AC-TG Group on LinkedIn: Join the Augmented Cognition LinkedIn Group: https://www.linkedin.com/groups/Augmented-Cognition-International-ACI-2579497/about