

Contents – Part II

Augmented Cognition in Training and Education

Agent-Based Practices for an Intelligent Tutoring System Architecture.	3
<i>Keith Brawner, Greg Goodwin, and Robert Sottolare</i>	
Intelligent Tutoring Gets Physical: Coaching the Physical Learner by Modeling the Physical World.	13
<i>Benjamin Goldberg</i>	
Measuring Stress in an Augmented Training Environment: Approaches and Applications.	23
<i>David Jones and Sara Dechmerowski</i>	
Alternate Rubric for Performance Assessment of Infantry Soldier Skills Training	34
<i>Douglas Maxwell, Jonathan Stevens, and Crystal Maraj</i>	
Leveraging Interoperable Data to Improve Training Effectiveness Using the Experience API (XAPI)	46
<i>Jennifer Murphy, Francis Hannigan, Michael Hruska, Ashley Medford, and Gabriel Diaz</i>	
Practical Requirements for ITS Authoring Tools from a User Experience Perspective.	55
<i>Scott Ososky</i>	
Making Sense of Cognitive Performance in Small Unit Training.	67
<i>William A. Ross, Joan H. Johnston, Dawn Riddle, CDR Henry Phillips, Lisa Townsend, and Laura Milham</i>	
Considerations for Immersive Learning in Intelligent Tutoring Systems	76
<i>Anne M. Sinatra</i>	
Elements of Adaptive Instruction for Training and Education	85
<i>Robert A. Sottolare and Michael W. Boyce</i>	
Adaptive Instruction for Individual Learners Within the Generalized Intelligent Framework for Tutoring (GIFT).	90
<i>Robert A. Sottolare</i>	
Applying Augmented Cognition to Flip-Flop Methodology	97
<i>Jan Stelovsky, Randall K. Minas, Umida Stelovska, and John Wu</i>	

Real Time Assessment of Cognitive State: Research and Implementation Challenges 107
Michael C. Trumbo, Mikaela L. Armenta, Michael J. Haass, Karin M. Butler, Aaron P. Jones, and Charles S.H. Robinson

How Novices Read Source Code in Introductory Courses on Programming: An Eye-Tracking Experiment 120
Leelakrishna Yenigalla, Vinayak Sinha, Bonita Sharif, and Martha Crosby

Human Cognition and Behavior in Complex Tasks and Environments

Implementing User-Centered Methods and Virtual Reality to Rapidly Prototype Augmented Reality Tools for Firefighters 135
Tess Bailie, Jim Martin, Zachary Aman, Ryan Brill, and Alan Herman

RevealFlow: A Process Control Visualization Framework 145
Ronald Boring, Thomas Ulrich, and Roger Lew

Paradigm Development for Identifying and Validating Indicators of Trust in Automation in the Operational Environment of Human Automation Integration 157
Kim Drnec and Jason S. Metcalfe

Performance-Based Eye-Tracking Analysis in a Dynamic Monitoring Task 168
Wei Du and Jung Hyup Kim

Exploring the Hybrid Space: Theoretical Framework Applying Cognitive Science in Military Cyberspace Operations. 178
Øyvind Jøsok, Benjamin J. Knox, Kirsi Helkala, Ricardo G. Lugo, Stefan Sütterlin, and Paul Ward

Empirical Study of Secure Password Creation Habit 189
Chloe Chun-Wing Lo

Team Cognition as a Mechanism for Developing Collaborative and Proactive Decision Support in Remotely Piloted Aircraft Systems 198
Nathan J. McNeese and Nancy J. Cooke

Supporting Multi-objective Decision Making Within a Supervisory Control Environment. 210
Ciara Sibley, Joseph Coyne, Gopi Vinod Avvari, Manisha Mishra, and Krishna R. Pattipati

Assessment of Expert Interaction with Multivariate Time Series ‘Big Data’ 222
Susan Stevens Adams, Michael J. Haass, Laura E. Matzen, and Saskia King

Aircraft Pilot Intention Recognition for Advanced Cockpit Assistance Systems 231
Stefan Suck and Florian Fortmann

Explaining a Virtual Worker’s Job Performance: The Role of Psychological Distance 241
Ayoung Suh and Christian Wagner

Training Tactical Combat Casualty Care with an Integrated Training Approach 253
Lisa Townsend, Laura Milham, Dawn Riddle, CDR Henry Phillips, Joan Johnston, and William Ross

Exploratory Trajectory Clustering with Distance Geometry. 263
Andrew T. Wilson, Mark D. Rintoul, and Christopher G. Valicka

Interaction in Augmented Cognition

Serial Sequence Learning on Digital Games 277
Eduardo Adams, Anderson Schuh, Marcia de Borba Campos, Débora Barbosa, and João Batista Mossmann

Text Simplification and User Experience 285
Soussan Djamasbi, John Rochford, Abigail DaBoll-Lavoie, Tyler Greff, Jennifer Lally, and Kayla McAvoy

A Proposed Approach for Determining the Influence of Multimodal Robot-of-Human Transparency Information on Human-Agent Teams. 296
Shan Lakhmani, Julian Abich IV, Daniel Barber, and Jessie Chen

Assessment of Visualization Interfaces for Assisting the Development of Multi-level Cognitive Maps 308
Hengshan Li, Richard R. Corey, Uro Giudice, and Nicholas A. Giudice

Interactive Visualization of Multivariate Time Series Data 322
Shawn Martin and Tu-Toan Quach

Investigation of Multimodal Mobile Applications for Improving Mental Health. 333
Sushunova G. Martinez, Karla A. Badillo-Urquiola, Rebecca A. Leis, Jamie Chavez, Tiffany Green, and Travis Clements

Integrating Methodology for Experimentation Using Commercial Off-the-Shelf Products for Haptic Cueing 344
LT Joseph E. Mercado, Nelson Lerma, Courtney McNamara, and LT David Rozovski

Understanding Older Adults’ Perceptions of In-Home Sensors Using an Obtrusiveness Framework	351
<i>Blaine Reeder, Jane Chung, Jonathan Joe, Amanda Lazar, Hilaire J. Thompson, and George Demiris</i>	
The Role of Simulation in Designing Human-Automation Systems	361
<i>Christina F. Rusnock, Jayson G. Boubin, Joseph J. Giametta, Tyler J. Goodman, Anthony J. Hillesheim, Sungbin Kim, David R. Meyer, and Michael E. Watson</i>	
Navigating with a Visual Impairment: Problems, Tools and Possible Solutions	371
<i>Michael Schwartz and Denise Benkert</i>	
A Systems Approach for Augmented Reality Design	382
<i>Andrea K. Webb, Emily C. Vincent, Pooja Patnaik, and Jana L. Schwartz</i>	
Social Cognition	
Modeling of Social Media Behaviors Using Only Account Metadata	393
<i>Fernanda Carapinha, John Khoury, Shai Neumann, Monte Hancock, Federico Calderon, Mendi Drayton, Arvil Easter, Edward Stapleton, Alexander Vazquez, and David Woolfolk</i>	
The Willful Marionette: Modeling Social Cognition Using Gesture-Gesture Interaction Dialogue	402
<i>Mohammad Mahzoon, Mary Lou Maher, Kazjon Grace, Lilla LoCurto, and Bill Outcault</i>	
Improving Analysis and Decision-Making Through Intelligent Web Crawling	414
<i>Jonathan T. McClain, Glory Emmanuel Aviña, Derek Trumbo, and Robert Kittinger</i>	
Using an Augmented Training Event to Collect Data for Future Modeling Purposes	421
<i>Samantha Napier, Christopher Best, Debra Patton, and Glenn Hodges</i>	
The Art of Research: Opportunities for a Science-Based Approach	431
<i>Austin R. Silva, Glory E. Aviña, and Jeffrey Y. Tsao</i>	
Author Index	443

Contents – Part I

Brain-Computer Interfaces

Developing an Optical Brain-Computer Interface for Humanoid Robot Control.	3
<i>Alyssa M. Batula, Jesse Mark, Youngmoo E. Kim, and Hasan Ayaz</i>	
Using Motor Imagery to Control Brain-Computer Interfaces for Communication	14
<i>Jonathan S. Brumberg, Jeremy D. Burnison, and Kevin M. Pitt</i>	
An Online Gaze-Independent BCI System Used Dummy Face with Eyes Only Region as Stimulus	26
<i>Long Chen, Brendan Z. Allison, Yu Zhang, Xingyu Wang, and Jing Jin</i>	
A Kronecker Product Structured EEG Covariance Estimator for a Language Model Assisted-BCI	35
<i>Paula Gonzalez-Navarro, Mohammad Moghadamfalahi, Murat Akcakaya, and Deniz Erdogmus</i>	
Poor BCI Performers Still Could Benefit from Motor Imagery Training.	46
<i>Alexander Kaplan, Anatoly Vasilyev, Sofya Liburkina, and Lev Yakovlev</i>	
Predicting EEG Sample Size Required for Classification Calibration	57
<i>Zijing Mao, Tzyy-Ping Jung, Chin-Teng Lin, and Yufei Huang</i>	
An SSVEP and Eye Tracking Hybrid BNCI: Potential Beyond Communication and Control.	69
<i>Paul McCullagh, Chris Brennan, Gaye Lightbody, Leo Galway, Eileen Thompson, and Suzanne Martin</i>	
Multi-Brain BCI: Characteristics and Social Interactions	79
<i>Anton Nijholt and Mannes Poel</i>	
Comparing EEG Artifact Detection Methods for Real-World BCI.	91
<i>Michael W. Nonte, William D. Hairston, and Stephen M. Gordon</i>	
Examining the Neural Correlates of Incidental Facial Emotion Encoding Within the Prefrontal Cortex Using Functional Near-Infrared Spectroscopy. . .	102
<i>Achala H. Rodrigo, Hasan Ayaz, and Anthony C. Ruocco</i>	
Exploring the EEG Correlates of Neurocognitive Lapse with Robust Principal Component Analysis	113
<i>Chun-Shu Wei, Yuan-Pin Lin, and Tzyy-Ping Jung</i>	

Augmenting VR/AR Applications with EEG/EOG Monitoring and Oculo-Vestibular Recoupling	121
<i>John K. Zao, Tzyy-Ping Jung, Hung-Ming Chang, Tchin-Tze Gan, Yu-Te Wang, Yuan-Pin Lin, Wen-Hao Liu, Guang-Yu Zheng, Chin-Kuo Lin, Chia-Hung Lin, Yu-Yi Chien, Fang-Cheng Lin, Yi-Pai Huang, Sergio José Rodríguez Méndez, and Felipe A. Medeiros</i>	
Electroencephalography and Brain Activity Measurement	
Neural Correlates of Purchasing Decisions in an Ecologically Plausible Shopping Scenario with Mobile fNIR Technology.	135
<i>Murat Perit Çakır, Tuna Çakar, Yener Girişken, and Ari K. Demircioğlu</i>	
Real-Time Monitoring of Cognitive Workload of Airline Pilots in a Flight Simulator with fNIR Optical Brain Imaging Technology	147
<i>Murat Perit Çakır, Murat Vural, Süleyman Özgür Koç, and Ahmet Toktaş</i>	
Truthiness: Challenges Associated with Employing Machine Learning on Neurophysiological Sensor Data	159
<i>Mark Costa and Sarah Bratt</i>	
Evaluation of Cognitive Control and Distraction Using Event-Related Potentials in Healthy Individuals and Patients with Multiple Sclerosis	165
<i>Thomas J. Covey, Janet L. Shucard, and David W. Shucard</i>	
Auditory Alarm Misperception in the Cockpit: An EEG Study of Inattentive Deafness	177
<i>Frédéric Dehais, Raphaëlle N. Roy, Thibault Gateau, and Sébastien Scannella</i>	
Multi-model Approach to Human Functional State Estimation	188
<i>Kevin Durkee, Avinash Hiriyanna, Scott Pappada, John Feeney, and Scott Galster</i>	
Using fNIRS for Real-Time Cognitive Workload Assessment	198
<i>Samuel W. Hincks, Daniel Afegan, and Robert J.K. Jacob</i>	
Modeling and Tracking Brain Nonstationarity in a Sustained Attention Task	209
<i>Sheng-Hsiou Hsu and Tzyy-Ping Jung</i>	
Linking Indices of Tonic Alertness: Resting-State Pupil Dilation and Cingulo-Opercular Neural Activity	218
<i>Stefanie E. Kuchinsky, Nick B. Pandža, and Henk J. Haarmann</i>	
Evaluating Neural Correlates of Constant-Therapy Neurorehabilitation Task Battery: An fNIRS Pilot Study	231
<i>Jesse Mark, Banu Onaral, and Hasan Ayaz</i>	

Overloaded and Biased? Using Augmented Cognition to Understand the Interaction Between Information Overload and Cognitive Biases 242
Randall K. Minas and Martha E. Crosby

Session-to-Session Transfer in Detecting Steady-State Visual Evoked Potentials with Individual Training Data 253
Masaki Nakanishi, Yijun Wang, and Tzzy-Ping Jung

Paired Associative Stimulation with Brain-Computer Interfaces: A New Paradigm for Stroke Rehabilitation 261
Nikolaus Sabathiel, Danut C. Irimia, Brendan Z. Allison, Christoph Guger, and Günter Edlinger

Single Trial Variability of Event-Related Brain Potentials as an Index of Neural Efficiency During Working Memory 273
David W. Shucard, Thomas J. Covey, and Janet L. Shucard

Cognitive Modelling and Physiological Measuring

A More Complete Picture of Emotion Using Electrocardiogram and Electrodermal Activity to Complement Cognitive Data 287
Danushka Bandara, Stephen Song, Leanne Hirshfield, and Senem Velipasalar

Real-Time Fatigue Monitoring with Computational Cognitive Models 299
Leslie M. Blaha, Christopher R. Fisher, Matthew M. Walsh, Bella Z. Veksler, and Glenn Gunzelmann

Introduction to Real-Time State Assessment 311
Brett J. Borghetti and Christina F. Rusnock

User Abilities in Detecting Vibrotactile Signals on the Feet Under Varying Attention Loads 322
Alison Gibson, Andrea Webb, and Leia Stirling

Estimate Emotion Method to Use Biological, Symbolic Information Preliminary Experiment 332
Yuhei Ikeda, Yoshiko Okada, and Midori Sugaya

Job Analysis and Cognitive Task Analysis in National Security Environments 341
Robert Kittinger, Liza Kittinger, and Glory E. Avina

Measuring the Effect of Tangible Interaction on Design Cognition 348
Mary Lou Maher, John Gero, Lina Lee, Rongrong Yu, and Tim Clausner

Psychophysiological Baseline Methods and Usage 361
Avonie Parchment, Ryan W. Wohleber, and Lauren Reinerman-Jones

Physiological Measures of Arousal During Soldier-Relevant Tasks
Performed in a Simulated Environment 372
Debra Patton and Katherine Gamble

Theoretical Versus Mathematical Approach to Modeling Psychological
and Physiological Data 383
*Lauren Reinerman-Jones, Stephanie J. Lackey, Julian Abich IV,
Brandon Sollins, and Irwin Hudson*

Monitoring Attention with Embedded Frequency Markers
for Simulation Environments 394
*Bartlett A.H. Russell, Jon C. Russo, Ian P. Warfield,
and William D. Casebeer*

Augmenting Robot Behaviors Using Physiological Measures
of Workload State 404
*Grace Teo, Lauren Reinerman-Jones, Gerald Matthews, Daniel Barber,
Jonathan Harris, and Irwin Hudson*

Posture Based Recognition of the Visual Focus of Attention for Adaptive
Mobile Information Systems 416
*Martin Westhoven, Christian Plegge, Timo Henrich,
and Thomas Alexander*

Considerations in Physiological Metric Selection for Online Detection
of Operator State: A Case Study 428
*Ryan W. Wohleber, Gerald Matthews, Gregory J. Funke,
and Jinchao Lin*

Sensing and Assessing Cognitive Workload Across Multiple Tasks 440
*Matthias D. Ziegler, Amanda Kraft, Michael Krein, Li-Chuan Lo,
Bradley Hatfield, William Casebeer, and Bartlett Russell*

Author Index 451



<http://www.springer.com/978-3-319-39951-5>

Foundations of Augmented Cognition:
Neuroergonomics and Operational Neuroscience
10th International Conference, AC 2016, Held as Part of
HCI International 2016, Toronto, ON, Canada, July
17-22, 2016, Proceedings, Part II
Schmorrow, D.D.; Fidopiastis, C.M. (Eds.)
2016, XX, 446 p. 108 illus., Softcover
ISBN: 978-3-319-39951-5