Contents

Cognitive Performance and Workload

Error Visualization and Information-Seeking Behavior for Air-Vehicle Control .................................................. 3
  Lewis L. Chuang

DataShopping for Performance Predictions ................................................................. 12
  Michael Collins, Kevin A. Gluck, and Tiffany S. Jastrzembski

Using Context to Optimize a Functional State Estimation Engine in Unmanned Aircraft System Operations .............. 24
  Kevin Durkee, Scott Pappada, Andres Ortiz, John Feeney, and Scott Galster

Methods for Determining the Role of Fatigue and Cognitive Load on Behavior Detection Officers (BDOs) Performance in the Field .................................................. 36
  Robert Kittinger and James Bender

  Gerald Matthews, Lauren Reinerman-Jones, Ryan Wohleber, Jinchao Lin, Joe Mercado, and Julian Abich IV

Time Dependent Effects of Transcranial Direct Current Stimulation and Caffeine on Vigilance Performance During Extended Wakefulness ............................................. 56
  R. Andy McKinley, Lindsey K. McIntire, Ryan Schilling, Chuck Goodyear, and Justin Nelson

Towards a Translational Method for Studying the Influence of Motivational and Affective Variables on Performance During Human-Computer Interactions .................................................. 63
  Jason S. Metcalfe, Stephen M. Gordon, Antony D. Passaro, Bret Kellihan, and Kelvin S. Oie

Impact of Acute Stress on Attentional Orienting to Social Cues in Special Operations Personnel .................................................. 73
  Charles A. Morgan, Harlan M. Fichtenholtz, and Bartlett Russell

Live-Virtual-Constructive (LVC) Training in Air Combat: Emergent Training Opportunities and Fidelity Ripple Effects .................................................. 82
  Kelly J. Neville, Angus L.M. Thom McLean III, Sarah Sherwood, Katherine Kaste, Melissa Walwanis, and Amy Bolton
A Composite Cognitive Workload Assessment System in Pilots Under Various Task Demands Using Ensemble Learning ................................. Hyuk Oh, Bradley D. Hatfield, Kyle J. Jaquess, Li-Chuan Lo, Ying Ying Tan, Michael C. Prevost, Jessica M. Mohler, Hartley Postlethwaite, Jeremy C. Rietschel, Matthew W. Miller, Justin A. Blanco, Shuo Chen, and Rodolphe J. Gentili

Sensitive, Diagnostic and Multifaceted Mental Workload Classifier (PHYSIOPRINT) ................................................................. Djordje Popovic, Maja Stikic, Theodore Rosenthal, David Klyde, and Thomas Schnell

The Neurobiology of Executive Function Under Stress and Optimization of Performance ................................................................. Ann M. Rasmusson and John M. Irvine

Objective-Analytical Measures of Workload – the Third Pillar of Workload Triangulation? .......................................................... Christina Rusnock, Brett Borghetti, and Ian McQuaid

Eye-Tracking Technology for Estimation of Cognitive Load After Traumatic Brain Injury ............................................................... Ashley Safford, Jessica Kegel, Jamie Hershaw, Doug Girard, and Mark Ettenhofer

Measuring Expert and Novice Performance Within Computer Security Incident Response Teams ................................................ Austin Silva, Glory Emmanuel, Jonathan T. McClain, Laura Matzen, and Chris Forsythe

Bracketing Human Performance to Support Automation for Workload Reduction: A Case Study .................................................. Robert E. Wray, Benjamin Bachelor, Randolph M. Jones, and Charles Newton

BCI and Operational Neuroscience


Monitoring Mental States of the Human Brain in Action: From Cognitive Test to Real-World Simulations ................................ Deepika Dasari, Guofa Shou, and Lei Ding
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discrimination in Good-Trained Brain States for Brain Computer Interface</td>
<td>187</td>
</tr>
<tr>
<td>Mariko Funada, Tadashi Funada, and Yoshihide Igarashi</td>
<td></td>
</tr>
<tr>
<td>BCI and Eye Gaze: Collaboration at the Interface</td>
<td>199</td>
</tr>
<tr>
<td>Leo Galway, Chris Brennan, Paul McCullagh, and Gaye Lightbody</td>
<td></td>
</tr>
<tr>
<td>Using Behavioral Information to Contextualize BCI Performance</td>
<td>211</td>
</tr>
<tr>
<td>Stephen M. Gordon, Jonathan R. McDaniel, Jason S. Metcalfe,</td>
<td></td>
</tr>
<tr>
<td>and Antony D. Passaro</td>
<td></td>
</tr>
<tr>
<td>How Low Can You Go? Empirically Assessing Minimum Usable DAQ</td>
<td>221</td>
</tr>
<tr>
<td>Performance for Highly Fieldable EEG Systems</td>
<td></td>
</tr>
<tr>
<td>W. David Hairston and Vernon Lawhern</td>
<td></td>
</tr>
<tr>
<td>Investigation of Functional Near Infrared Spectroscopy in Evaluation of Pilot Expertise Acquisition</td>
<td>232</td>
</tr>
<tr>
<td>Gabriela Hernandez-Meza, Lauren Slason, Hasan Ayaz, Patrick Craven,</td>
<td></td>
</tr>
<tr>
<td>Kevin Oden, and Kurtulus Izzetoglu</td>
<td></td>
</tr>
<tr>
<td>Measuring Situational Awareness Aptitude Using Functional Near-Infrared Spectroscopy</td>
<td>244</td>
</tr>
<tr>
<td>Leanne Hirshfield, Mark Costa, Danushka Bandara, and Sarah Bratt</td>
<td></td>
</tr>
<tr>
<td>Neurocognitive Correlates of Learning in a Visual Object Recognition Task</td>
<td>256</td>
</tr>
<tr>
<td>Ion Juvina, Priya Ganapathy, Matt Sherwood, Mohd Saif Usmani,</td>
<td></td>
</tr>
<tr>
<td>Gautam Kunapuli, Tejaswi Tamminedi, and Nasser Kashou</td>
<td></td>
</tr>
<tr>
<td>Neural Adaptation to a Working Memory Task: A Concurrent EEG-fNIRS Study</td>
<td>268</td>
</tr>
<tr>
<td>Yichuan Liu, Hasan Ayaz, Banu Onaral, and Patricia A. Shewokis</td>
<td></td>
</tr>
<tr>
<td>The Effect of Limiting Trial Count in Context Aware BCIs: A Case Study with Language Model Assisted Spelling</td>
<td>281</td>
</tr>
<tr>
<td>Mohammad Moghadamfalahi, Paula Gonzalez-Navarro, Murat Akckakaya, Umut Orhan, and Deniz Erdogmus</td>
<td></td>
</tr>
<tr>
<td>Improving BCI Usability as HCI in Ambient Assisted Living System Control</td>
<td>293</td>
</tr>
<tr>
<td>Niccolò Mora, Ilaria De Munari, and Paolo Ciampolini</td>
<td></td>
</tr>
<tr>
<td>Human Computer Confluence in BCI for Stroke Rehabilitation</td>
<td>304</td>
</tr>
<tr>
<td>Rupert Ortner, Danut-Constantin Irinia, Christoph Guger, and Günter Edlinger</td>
<td></td>
</tr>
<tr>
<td>Relevant HCI for Hybrid BCI and Severely Impaired Patients</td>
<td>313</td>
</tr>
<tr>
<td>José Rouillard, Alban Duprès, François Cabestaing, Marie-Hélène Bekaert, Charlotte Piau, Christopher Coat, Jean-Marc Vannobel, and Claudine Lecocq</td>
<td></td>
</tr>
</tbody>
</table>
Brain-in-the-Loop Learning Using fNIR and Simulated Virtual Reality Surgical Tasks: Hemodynamic and Behavioral Effects

Patricia A. Shewokis, Hasan Ayaz, Lucian Panait, Yichuan Liu, Mashaal Syed, Lawrence Greenawald, Faiz U. Shariff, Andres Castellanos, and D. Scott Lind

Team Resilience: A Neurodynamic Perspective

Ronald Stevens, Trysha Galloway, Jerry Lamb, Ronald Steed, and Cynthia Lamb

Through a Scanner Quickly: Elicitation of P3 in Transportation Security Officers Following Rapid Image Presentation and Categorization

Michael C. Trumbo, Laura E. Matzen, Austin Silva, Michael J. Haass, Kristin Divis, and Ann Speed

Constrained Tensor Decomposition via Guidance: Increased Inter and Intra-Group Reliability in fMRI Analyses

Peter B. Walker, Sean Gilpin, Sidney Fooshee, and Ian Davidson

Cognition, Perception and Emotion Measurement

A Quantitative Methodology for Identifying Attributes Which Contribute to Performance for Officers at the Transportation Security Administration

Glory Emmanuel, Robert Kittinger, and Ann Speed

Cognitive-Motor Processes During Arm Reaching Performance Through a Human Body-Machine Interface

Rodolphe J. Gentili, Isabelle M. Shuggi, Kristen M. King, Hyuk Oh, and Patricia A. Shewokis

How Mobile Phones Affect the Sustainability of the Work/Life Balance of Their Users

Edward Peter Greenwood White and Andrew Thatcher

Methodology for Knowledge Elicitation in Visual Abductive Reasoning Tasks

Michael J. Haass, Laura E. Matzen, Susan M. Stevens-Adams, and Allen R. Roach

Stability of a Type of Cross-Cultural Emotion Modeling in Social Media

Monte Hancock, Chad Sessions, Chloe Lo, Shakeel Rajwani, Elijah Kresses, Cheryl Bleasdale, and Dan Strohschein
Field-Theoretic Modeling Method for Emotional Context in Social Media: Theory and Case Study ......................................................... 418
  Monte Hancock, Shakeel Rajwani, Chloe Lo, Suraj Sood, Elijah Kresses, Cheryl Bleasdale, Nathan Dunkel, Elise Do, Gareth Rees, Jared Steirs, Christopher Romero, Dan Strohschein, Keith Powell, Rob French, Nicholas Fedosenko, and Chris Casimir

A Neurocognitive Approach to Expertise in Visual Object Recognition ...... 426
  Assaf Harel

Augmenting Bioacoustic Cognition with Tangible User Interfaces .............. 437
  Isak Herman, Leonardo Impett, Patrick K.A. Wollner, and Alan F. Blackwell

Predicting Learner Performance Using a Paired Associate Task in a Team-Based Learning Environment ................................................. 449
  Othalia Larue, Ion Juvina, Gary Douglas, and Albert Simmons

Exploring Day-to-Day Variability in the Relations Between Emotion and EEG Signals ................................................................. 461
  Yuan-Pin Lin, Sheng-Hsiou Hsu, and Tzyy-Ping Jung

Integration and Disintegration of Auditory Images Perception .................. 470
  Sergei Lytaev and Ksenia Belskaya

Effects of Professional Visual Search Experience on Domain-General and Domain-Specific Visual Cognition ........................................... 481
  Laura E. Matzen, Michael J. Haass, Laura A. McNamara, Susan M. Stevens-Adams, and Stephanie N. McMichael

Ethnographic Methods for Experimental Design: Case Studies in Visual Search ............................................................................ 492
  Laura A. McNamara, Kerstan Cole, Michael J. Haass, Laura E. Matzen, J. Daniel Morrow, Susan M. Stevens-Adams, and Stephanie McMichael

Removal of Ocular Artifacts with the Utilization of Filter Banks ................. 504
  Umut Orhan and Santosh Mathan

The Quantified Self ........................................................................... 514
  Celementina R. Russo

Adapting Ethics for Future Technologies .............................................. 521
  Todd Seech

Visual Search in Operational Environments: Balancing Operational Constraints with Experimental Control ................................. 528
  Ann Speed
Exploratory Analysis of Visual Search Data ........................................ 537  
David J. Stracuzzi, Ann Speed, Austin Silva, Michael Haass,  
and Derek Trumbo

Adaptive Tutoring and Training

Transitioning from Human to Agent-Based Role-Players  
for Simulation-Based Training .................................................. 551  
Robert G. Abbott, Christina Warrender, and Kiran Lakkaraju

Authoring Tools for Adaptive Training – An Overview of System Types  
and Taxonomy for Classification ............................................. 562  
Keith Brawner

Prolonged Physical Effort Affects Cognitive Processes During Special  
Forces Training ................................................................. 570  
Clayton A. Domingues, Esmaela C.P. Domingues,  
Osvaldo J. Nascimento, Nilton G. Rolim Filho, Jorge T. Annunziato,  
Jorge L.C. Rebelo, Seth R. Nieman, Kyle J. Jaquess,  
Rodolphe J. Gentili, and Bradley D. Hatfield

Development of a Smart Tutor for a Visual-Aircraft Recognition Task ...... 583  
Priya Ganapathy, Ion Juvisa, Tejaswi Tamminedi, Gautam Kunapuli,  
Matt Sherwood, and Mohd Saif Usmani

Augmenting Instructional Practice in GIFT Using the Engine  
for Management of Adaptive Pedagogy (EMAP) ......................... 595  
Benjamin Goldberg

Measuring Concentration While Programming with Low-Cost BCI  
Devices: Differences Between Debugging and Creativity Tasks .......... 605  
Víctor M. González, Romain Robbes, Gabriela Góngora,  
and Salvador Medina

Adapting Immersive Training Environments to Develop Squad Resilience  
Skills ............................................................... 616  
Joan H. Johnston, Samantha Napier, and William A. Ross

Authoring Intelligent Tutoring Systems Using Human Computation:  
Designing for Intrinsic Motivation ........................................... 628  
Andrew M. Olney and Whitney L. Cade

Opportunities and Risks for Game-Inspired Design of Adaptive  
Instructional Systems .......................................................... 640  
Scott Ososky

From Desktop to Cloud: Collaborative Authoring for Intelligent Tutoring ... 652  
Charlie Ragusa
Designing Representations and Support for Metacognition in the Generalized Intelligent Framework for Tutoring .................. 663
James R. Segedy, John S. Kinnebrew, Benjamin S. Goldberg, Robert A. Sottilare, and Gautam Biswas

A Personalized GIFT: Recommendations for Authoring Personalization in the Generalized Intelligent Framework for Tutoring .................. 675
Anne M. Sinatra

Augmented Cognition on the Run: Considerations for the Design and Authoring of Mobile Tutoring Systems .................. 683
Robert A. Sottilare

Modeling Shared States for Adaptive Instruction .................. 690
Robert A. Sottilare

EEG Coherence Within Tutoring Dyads: A Novel Approach for Pedagogical Efficiency .................. 697
Bradly Stone, Kelly Correa, Nandan Thor, and Robin Johnson

Applications of Augmented Cognition

Contact Activity Visualization for Seniors .................. 709
Ana Almeida, Micael Carreira, Joaquim Jorge, and Daniel Gonçalves

Setting a Privacy and Security Comfort Zone in the Internet of Things ........ 722
Barbara Endicott-Popovsky, Scott David, and Martha E. Crosby

Designing, Developing, and Validating an Adaptive Visual Search Training Platform .................. 735
Kelly S. Hale, Katie Del Giudice, Jesse Flint, Darren P. Wilson, Katherine Muse, and Bonnie Kudrick

An Object-Centric Paradigm for Robot Programming by Demonstration ........ 745
Di-Wei Huang, Garrett E. Katz, Joshua D. Langsfeld, Hyuk Oh, Rodolphe J. Gentili, and James A. Reggia

Optimization-Based Training in ATM .................. 757
Amela Karahasanović, Tomas Eric Nordlander, and Patrick Schittekat

Human Factors Within the Transportation Security Administration:
Optimizing Performance Through Human Factors Assessments ........ 767
Bonnie Kudrick, Daniel Caggiano, and Ann Speed

Breathing Life into CPR Training .................. 777
Dominic Lamboy and Patricia J. Donohue
Enhanced Physical Security Through a Command-Intent Driven Multi-agent Sensor Network ......................................................... 784
  Joshua Love, Wendy Amai, Timothy Blada, Charles Little, Jason Neely, and Stephen Buerger

Technology-Supported Health Measures and Goal-Tracking for Older Adults in Everyday Living .................................................. 796
  Blaine Reeder, Angela Richard, and Martha E. Crosby

The Use of Eye Tracking in Software Development ................................. 807
  Bonita Sharif and Timothy Shaffer

An Examination of Visual Search Success for Transportation Security Officers and Behavior Detection Officers .............................. 817
  Randall D. Spain, Jerry W. Hedge, and Katrina M. Ladd

Determining the Optimal Time on X-Ray Analysis for Transportation Security Officers .......................................................... 825
  Ann Speed, Austin Silva, Derek Trumbo, David Stracuzzi, Christina Warrender, Michael Trumbo, and Kristin Divis

Author Index ........................................................................................................ 835
Foundations of Augmented Cognition
9th International Conference, AC 2015, Held as Part of
HCI International 2015, Los Angeles, CA, USA, August
2-7, 2015, Proceedings
Schmorrow, D.D.; Fidopiastis, C.M. (Eds.)
2015, XX, 837 p. 276 illus., Softcover
ISBN: 978-3-319-20815-2