Contents – Part I

Electroencephalography and Brain Activity Measurement

My Brain Is Out of the Loop: A Neuroergonomic Approach of OOTL Phenomenon .................................................. 3
Bruno Berberian, Jonas Gouraud, Bertille Somon, Aisha Sahai, and Kevin Le Goff

Testing the Specificity of EEG Neurofeedback Training on First- and Second-Order Measures of Attention .................. 19
Eddy J. Davelaar

Neural Dynamics of Spontaneous Thought:
An Electroencephalographic Study ........................................... 28
Manesh Girn, Caitlin Mills, Eric Laycock, Melissa Ellamil, Lawrence Ward, and Kalina Christoff

Mehdi Hajinoroosi, Zijing Mao, Yuan-Pin Lin, and Yufei Huang

Using Portable EEG to Assess Human Visual Attention ................. 56
Olave E. Krigolson, Chad C. Williams, and Francisco L. Colino

Investigating Brain Dynamics in Industrial Environment – Integrating Mobile EEG and Kinect for Cognitive State Detection of a Worker .......... 66
Pavle Mijović, Miloš Milovanović, Ivan Gligorijević, Vanja Ković, Ivana Živanović-Mačužić, and Bogdan Mijović

Characteristic Alpha Reflects Predictive Anticipatory Activity (PAA) in an Auditory-Visual Task ................................. 79
Julia A. Mossbridge

Influence of Spontaneous Rhythm on Movement-Related Cortical Potential - A Preliminary Neurofeedback Study ......................... 90
Lin Yao, Mei Lin Chen, Xinjun Sheng, Natalie Mrachacz-Kersting, Xiangyang Zhu, Dario Farina, and Ning Jiang

Multiple Human EEG Synchronous Analysis in Group Interaction-Prediction Model for Group Involvement and Individual Leadership .......... 99
Jiacai Zhang and Zixiong Zhou
Interactive Image Segmentation Method of Eye Movement Data and EEG Data ................................................................. 109
   Jiacai Zhang, Song Liu, and Jialiang Li

Eye Tracking in Augmented Cognition

Geometry and Gesture-Based Features from Saccadic Eye-Movement as a Biometric in Radiology .................................................. 123
   Folami T. Alamudun, Tracy Hammond, Hong-Jun Yoon, and Georgia D. Tourassi

Assessing Workload with Low Cost Eye Tracking During a Supervisory Control Task ............................................................... 139
   Joseph T. Coyne, Ciara Sibley, Sarah Sherwood, Cyrus K. Foroughi, Tatana Olson, and Eric Vorm

The Analysis and Prediction of Eye Gaze When Viewing Statistical Graphs ................................................................. 148
   Andre Harrison, Mark A. Livingston, Derek Brock, Jonathan Decker, Dennis Perzanowski, Christopher Van Dolson, Joseph Mathews, Alexander Lulushi, and Adrienne Raglin

Performance Evaluation of the Gazepoint GP3 Eye Tracking Device Based on Pupil Dilation .................................................. 166
   Pujitha Mannaru, Balakumar Balasingam, Krishna Pattipati, Ciara Sibley, and Joseph T. Coyne

Patterns of Attention: How Data Visualizations Are Read ............................. 176
   Laura E. Matzen, Michael J. Haass, Kristin M. Divis, and Mallory C. Stites

Eye Tracking for Dynamic, User-Driven Workflows ............................................. 192
   Laura A. McNamara, Kristin M. Divis, J. Daniel Morrow, and David Perkins

Investigating Eye Movements in Natural Language and C++ Source Code - A Replication Experiment .............................................. 206
   Patrick Peachock, Nicholas Iovino, and Bonita Sharif

Adapting Human-Computer-Interaction of Attentive Smart Glasses to the Trade-Off Conflict in Purchase Decisions: An Experiment in a Virtual Supermarket .............................................. 219
   Jella Pfeiffer, Thies Pfeiffer, Anke Greif-Winzrieth, Martin Meißner, Patrick Renner, and Christof Weinhardt
Practical Considerations for Low-Cost Eye Tracking: An Analysis of Data Loss and Presentation of a Solution

Ciara Sibley, Cyrus K. Foroughi, Tatana Olson, Cory Moclaire, and Joseph T. Coyne

A Comparison of an Attention Acknowledgement Measure and Eye Tracking: Application of the as Low as Reasonable Assessment (ALARA) Discount Usability Principle for Control System Studies

Thomas A. Ulrich, Ronald L. Boring, Steffen Werner, and Roger Lew

Physiological Measuring and Bio-sensing

Rim-to-Rim Wearables at the Canyon for Health (R2R WATCH): Experimental Design and Methodology

Glory Emmanuel Aviña, Robert Abbott, Cliff Anderson-Bergman, Catherine Branda, Kristin M. Divis, Lucie Jelinkova, Victoria Newton, Emily Pearce, and Jon Femling

Investigation of Breath Counting, Abdominal Breathing and Physiological Responses in Relation to Cognitive Load

Hubert K. Brumback

Investigating the Role of Biofeedback and Haptic Stimulation in Mobile Paced Breathing Tools

Antoinette Bumatay and Jinsil Hwaryoung Seo

Pupil Dilation and Task Adaptation

Cyrus K. Foroughi, Joseph T. Coyne, Ciara Sibley, Tatana Olson, Cory Moclaire, and Noelle Brown

Rim-to-Rim Wearables at the Canyon for Health (R2R WATCH): Correlation of Clinical Markers of Stress with Physiological COTS Data

Lucie Jelinkova, Emily Pearce, Christopher Bossart, Risa Garcia, and Jon Femling

Grounded Approach for Understanding Changes in Human Emotional States in Real Time Using Psychophysiological Sensory Apparatuses

Ryan A. Kirk

Augmented Cognition for Continuous Authentication

Nancy Mogire, Michael-Brian Ogawa, Brent Auernheimer, and Martha E. Crosby

Analysis of Social Interaction Narratives in Unaffected Siblings of Children with ASD Through Latent Dirichlet Allocation

Victoria Newton, Isabel Solis, Glory Emmanuel Aviña, Jonathan T. McClain, Cynthia King, and Kristina T. Rewin Ciesielski
Smart Watch Potential to Support Augmented Cognition for Health-Related Decision Making .................................................. 372
   Blaine Reeder, Paul F. Cook, Paula M. Meek, and Mustafa Ozkaynak

Multidimensional Real-Time Assessment of User State and Performance to Trigger Dynamic System Adaptation ........................................ 383
   Jessica Schwarz and Sven Fuchs

An Affordable Bio-Sensing and Activity Tagging Platform for HCI Research ................................................................. 399
   Siddharth, Aashish Patel, Tzyy-Ping Jung, and Terrence J. Sejnowski

Machine Learning in Augmented Cognition

Facial Expression Recognition from Still Images ........................................... 413
   Bilge Süheyla Akkoca Gazioğlu and Muhittin Gökmen

CHISSL: A Human-Machine Collaboration Space for Unsupervised Learning .............................................................. 429
   Dustin Arendt, Caner Komurlu, and Leslie M. Blaha

Toward an Open Data Repository and Meta-Analysis of Cognitive Data Using fNIRS Studies of Emotion ................................. 449
   Sarah Bratt

   Keith Brawner and Michael W. Boyce

The Impact of Streaming Data on Sensemaking with Mixed-Initiative Visual Analytics ..................................................... 478
   Nick Cramer, Grant Nakamura, and Alex Endert

Some Syntax-Only Text Feature Extraction and Analysis Methods for Social Media Data .................................................. 499
   Monte Hancock, Charles Li, Shakeel Rajwani, Payton Brown,
   Olivia Hancock, Corinne Lee, Yaniv Savir, Nicolas Nuon,
   and Francesca Michaels

Using the Hash Tag Histogram and Social Kinematics for Semantic Clustering in Social Media .............................................. 510
   Monte Hancock, Chloe Lo, Shakeel Rajwani, Shai Neumann,
   Dale Franklin, Esnet Gros Negre, Tracy Hollis, Steven Knight,
   Vikram Tutupalli, Vineet Chintamaneni, Sheila Daniels, Brian Gabak,
   Venkata Undavalli, Payton Brown, and Olivia Hancock

Interface Metaphors for Interactive Machine Learning ........................................... 521
   Robert J. Jasper and Leslie M. Blaha
Classifying Tweets Using User Account Information . . . . . . . . . . . . . . . . . . . 535
  John Khoury, Charles Li, Chloe Lo, Corinne Lee, Shakeel Rajwani,
  David Woolfolk, Alexis-Walid Ahmed, Loredana Crusov,
  Arnold Pérez-Goicochea, Christopher Romero, Rob French,
  and Vasco Ribeiro

Machine Learning-Based Prediction of Changes in Behavioral Outcomes
Using Functional Connectivity and Clinical Measures in Brain-Computer
Interface Stroke Rehabilitation . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 543
  Rosaleena Mohanty, Anita Sinha, Alexander Remsik, Janerra Allen,
  Veena Nair, Kristin Caldera, Justin Sattin, Dorothy Edwards,
  Justin C. Williams, and Vivek Prabhakaran

Content Feature Extraction in the Context of Social Media Behavior . . . . . . 558
  Shai Neumann, Charles Li, Chloe Lo, Corinne Lee, Shakeel Rajwani,
  Suraj Sood, Buttons A. Foster, Toni Hadgis, Yaniv Savir,
  Frankie Michaels, Alexis-Walid Ahmed, Nikki Bernobic,
  and Markus Hollander

Detecting Mislabeled Data Using Supervised Machine
Learning Techniques . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 571
  Mannes Poel

Author Index . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 583
 Contents – Part II

Cognitive Load and Performance

Comparing Capacity Coefficient and Dual Task Assessment of Visual Multitasking Workload ..................................................... 3
   Leslie M. Blaha

Moving Vigilance Out of the Laboratory: Dynamic Scenarios for UAS Operator Vigilance Training ................................................... 20
   Tarah Daly, Jennifer Murphy, Katlin Anglin, James Szalma, Max Acree, Carla Landsberg, and Laticia Bowens

Cognitive Augmentation Metrics Using Representational Information Theory ................................................................. 36
   Ron Fulbright

Neurophysiological Impact of Software Design Processes on Software Developers .......................................................... 56
   Randall K. Minas, Rick Kazman, and Ewan Tempero

Text Simplification and Pupillometry: An Exploratory Study .............................................................. 65
   Mina Shojaeizadeh, Soussan Djamasi, Ping Chen, and John Rochford

Attentional Trade-Offs Under Resource Scarcity .............................................................. 78
   Jiaying Zhao and Brandon M. Tomm

Adaptive Learning Systems

Towards a Dynamic Selection and Configuration of Adaptation Strategies in Augmented Cognition .............................. 101
   Sven Fuchs and Jessica Schwarz

Adaptive Training Across Simulations in Support of a Crawl-Walk-Run Model of Interaction .................................................. 116
   Benjamin Goldberg, Fleet Davis, Jennifer M. Riley, and Michael W. Boyce

Modeling Training Efficiency in GIFT .............................................................. 131
   Gregory A. Goodwin, James Niehaus, and Jong W. Kim
Personalizing Training to Acquire and Sustain Competence Through Use of a Cognitive Model ................................................................. 148

Tiffany S. Jastrzembski, Matthew Walsh, Michael Krusmark, Suzan Kardong-Edgren, Marilyn Oermann, Karey Dufour, Teresa Millwater, Kevin A. Gluck, Glenn Gunzelmann, Jack Harris, and Dimitrios Stefanidis


Jong W. Kim, Christopher Dancy, Benjamin Goldberg, and Robert Sottilare

Assessing Motivation to Individualize Reinforcement and Reinforcers for an Intelligent Tutor ................................................................. 175

Elizabeth Lameier, Lauren Reinerman-Jones, Michael W. Boyce, and Elizabeth Biddle

Flow Experience in AR Application: Perceived Reality and Perceived Naturalness ................................................................. 185

Hansol Lee and Sangmi Chai

Using Mobile Technology to Generate Learning Content for an Intelligent Tutoring System ................................................................. 199

Rodney A. Long, Jennifer M. Riley, and Christina K. Padron

A Conceptual Assessment Model (CAM) for Operationalizing Constructs in Technology-Augmented Assessments ................................................................. 210

Mark E. Riecken, Clayton W. Burford, Grace Teo, Joseph McDonnell, Lauren Reinerman-Jones, and Kara Orvis

Recommendations for Use of Adaptive Tutoring Systems in the Classroom and in Educational Research ................................................................. 223

Anne M. Sinatra, Scott Ososky, Robert Sottilare, and Jason Moss

Defining Complexity in the Authoring Process for Adaptive Instruction ................................................................. 237

Robert Sottilare and Scott Ososky

Brain-Computer Interfaces

Validation of a Brain-Computer Interface (BCI) System Designed for Patients with Disorders of Consciousness (DOC): Regular and Sham Testing with Healthy Participants ................................................................. 253

Brendan Z. Allison, Woosang Cho, Rupert Ortner, Alexander Heilinger, Guenter Edlinger, and Christoph Guger
Wheels Within Wheels: Brain-Computer Interfaces as Tools for Artistic Practice as Research ................................................................. 266

Andrés Aparicio and Rodrigo F. Cádiz

Using Brain Painting at Home for 5 Years: Stability of the P300 During Prolonged BCI Usage by Two End-Users with ALS ...................... 282

Loïc Botrel, Elisa Mira Holz, and Andrea Kübler

Music Imagery for Brain-Computer Interface Control .................... 293

Mei Lin Chen, Lin Yao, and Ning Jiang

An Experimental Study on Usability of Brain-Computer Interaction Technology in Human Spaceflight. ........................................... 301

Shuangiang Chen, Jin Jiang, Jiabei Tang, Xuejun Jiao, Hongzhi Qi, Yong Cao, Chunhui Wang, and Dong Ming

A Brain-Computer Interface Based on Abstract Visual and Auditory Imagery: Evidence for an Effect of Artistic Training .................. 313

Kiret Dhindsa, Dean Carcone, and Suzanna Becker

Brain-Computer Interfaces (BCI) Based 3D Computer-Aided Design (CAD): To Improve the Efficiency of 3D Modeling for New Users...... 333

Yu-Chun Huang and Kuan-Lin Chen

NeuroSnap: Expressing the User’s Affective State with Facial Filters .... 345

Ryan Lieblein, Camille Hunter, Sarah Garcia, Marvin Andujar, Chris S. Crawford, and Juan E. Gilbert

Tactile Stimulation Training to Enhance MRCP Detection in Chronic Stroke Patients ................................................................. 354

Natalie Mrachacz-Kersting, Susan Aliakbaryhosseinabadi, Martin Pedersen, Ning Jiang, and Dario Farina

Digital Interface Brain Computer Interaction Method Based on Icon Control ................................................................. 364

Yafeng Niu, Chengqi Xue, Haiyan Wang, Wenzhe Tang, Xinyu Zhang, Tao Jin, and Yingjie Victor Chen

Differences in Motor Imagery Activity Between the Paretic and Non-paretic Hands in Stroke Patients Using an EEG BCI ......................... 378

Zhaoyang Qiu, Shugeng Chen, Brendan Z. Allison, Jie Jia, Xingyu Wang, and Jing Jin

Multimodal Neural Interfaces for Augmenting Human Cognition .......... 389

William J. Tyler
Human Cognition and Behavior in Complex Tasks and Environments

Using Assessment to Provide Application in Human Factors Engineering to USMA Cadets ............................................. 411  
   Michael W. Boyce, Charles P. Rowan, Devonte L. Baity, and Michael K. Yoshino

Towards Technologically Assisted Mindfulness Meditation Practice in Older Adults: An Analysis of Difficulties Faced and Design Suggestions for Neurofeedback .......................................................... 423  
   Simon Cook, Ronald M. Baecker, Cosmin Munteanu, and Andrew Walker

Dynamic Task Sharing Within Human-UxS Teams: Computational Situation Awareness ............................................. 443  
   Scott Grigsby, Jacob Crossman, Ben Purman, Rich Frederiksen, and Dylan Schmorrow

Developing a High-Speed Craft Route Monitor Window .......................................................... 461  
   Odd Sveinung Hareide, Frode Voll Mjelde, Oeystein Glomsvoll, and Runar Ostnes

A Review of Personnel Selection Approaches for the Skill of Decision Making .......................................................... 474  
   Irwin Hudson, Lauren Reinerman-Jones, and Grace Teo

Macrocognition Applied to the Hybrid Space: Team Environment, Functions and Processes in Cyber Operations .......................................................... 486  
   Øyvind Josok, Benjamin J. Knox, Kirsi Helkala, Kyle Wilson, Stefan Sütterlin, Ricardo G. Lugo, and Terje Ødegaard

Nuclear Reactor Crew Evaluation of a Computerized Operator Support System HMI for Chemical and Volume Control System .......................................................... 501  
   Roger Lew, Thomas A. Ulrich, and Ronald L. Boring

Understanding the Success of Pokémon Go: Impact of Immersion on Players’ Continuance Intention .......................................................... 514  
   Lili Liu, Christian Wagner, and Ayoung Suh

Extempore Emergency Response Technique with Virtual Reality Gaming .......................................................... 524  
   Trinh Nguyen and Godwin Nyong

Author Index .......................................................... 537
Augmented Cognition. Neurocognition and Machine Learning
11th International Conference, AC 2017, Held as Part of
HCI International 2017, Vancouver, BC, Canada, July
9-14, 2017, Proceedings, Part I
Schmorrow, D.D.; Fidopiastis, C.M. (Eds.)
2017, XXIV, 586 p. 189 illus., Softcover
ISBN: 978-3-319-58627-4