Shaun Canavan

University of South Florida, Computer Science and Engineering
4202 E. Fowler Ave., Tampa, FL 33620, ENB 315
scanavan@usf.edu, 813-974-3137
www.csee.usf.edu/~scanavan/

EDUCATION

PhD Computer Science — May 2015
Binghamton University — Binghamton, NY
Dissertation Title: Facial Landmark Detection and Sketch Recognition
Advisor: Dr. Lijun Yin

MS Computer and Information Systems — 2008
Youngstown State University — Youngstown, OH
Thesis Title: Face Recognition from Multi-Frame Image Fusion
Advisors: Dr. Yong Zhang and Dr. John Sullins

BS Computer Science — 2006
Youngstown State University — Youngstown, OH
Advisor: Dr. John Sullins

RESEARCH EXPERIENCE

Visiting Faculty Research Program — May 2012 – August 2012
Air Force Research Lab — Rome, NY

Graduate Research Assistant, Graphics & Image Computing Lab — June 2008 – August 2009
Binghamton University — Binghamton, NY

Graduate Assistant, Computer Information Systems Department — August 2006-May 2008
Youngstown State University — Youngstown, OH

WORK EXPERIENCE

Assistant Professor — August 2017 - Present
University of South Florida

Research Assistant Professor — August 2015 – July 2017
Binghamton University

Summer Course Lecturer — June 2011 – August 2011
Binghamton University

Teaching Assistant — August 2009 – May 2013
Binghamton University

PATENTS

1. L. Yin, S. Canavan, and K. Hu *Hand Pointing Estimation for Human Computer Interaction* US 8, 971, 572
2. S. Canavan, Md T. Uddin, G. Zamzmi, *System and Method Including Affect in Pain Level Recognition* Patent Pending (PCT/US22/13871).

FUNDING

Current

1. Collaborative Research: SaTC: CORE: Medium: Toward Age-Aware Continuous Authentication on Personal Computing Devices, NSF, 5/1/2021-4/31-2024, $258,526. S. Canavan (Co-PI), T. Neal (PI), Jaime Ruiz (Co-PI), Lisa Anthony (Co-PI).
2. Testing & Evaluation for soldier-device teaming compatibility, vulnerability, and durability in emergent situations, DAC, 01/2022-12/2027, $5,000,000**.** S. Canavan (Co-PI), Sudeep Sarkar (PI), John Licato (PI), Tapas Das (PI), Max Owens (Co-PI), Michael Gilespie (Co-PI).

Past

1. A Novel, Robust Fake Video Detection System, DIA, 5/28/2020 – 5/27-2021, $904,980.96, S. Canavan (PI), D. Goldgof, (Co-PI), S. Sarkar (Co-PI), L. Hall (Co-PI), and P. Rosen (Co-PI).
2. Acquisition of eye tracking and EEG co-registration equipment, University of South Florida Strategic Investment Pool, 2020, $82,505, L. Schotter (PI), S. Canavan (Co-PI), Geoffrey Potts (Co-PI), Chad Dube (Co-PI), Peter Clayson (Co-PI), Marvin Andujar (Co-PI), and Jennifer Bugos (Co-PI).
3. Scalability of the Value Spring Technology enterpriseMind Ali-Tutor AI Solution, ValueSpring, 2019, $1,000, S. Canavan (Sole-PI).
4. Improvement of Computing and Storage Capabilities of the GAIVI Cluster at the College of Engineering, University of South Florida Equipment Acquisition and Improvement Grant, 2018, $35,942, Y. Tu (PI), S. Canavan (Co-PI), S. Chellappan (Co-PI).
5. Analysis of Human Emotion Using Multimodal Data, AWS Machine Learning Research Award (Amazon), 6/1/2018-6/1/2019, $150,000, S. Canavan (Sole-PI).
6. Deep Emotion Recognition, Google GCP Research Credits Program (Google), 2018, $5,000 of GCP credit, S. Canavan (PI).

PUBLICATIONS

Peer Reviewed Journal Articles, Conference Proceedings, and Abstracts

1. R. Agarwal, M. Andujar, and S. Canavan, "Classification of emotions using EEG activity associated with different areas of the brain", Pattern Recognition Letters, 2022.
2. S. Aathreya and S. Canavan, "Expression recognition using a latent-space representation", ICPRW, 2022.
3. T. Neal, L. Anthony, S. Canavan, J. Ruiz, S. Aathreya, M. Chaudhary, Y. Checn, H. Wang, R. Calvo, L. Jivnani, and N. Wai, "Toward understanding children's use and understand of user authentication systems", SOUPS, 2022.
4. Md T. Uddin and S. Canavan "Quantified Facial Expressiveness for Affective Behavior Analytics", WACV 2022.
5. T. Neal, K. Zanna, and S. Canavan "Clustering of Physiological Signals by Emotional State, Race, and Sex", ICMIW, 2021.
6. Sk R. Jannat and S. Canavan "Expression recognition across age," FG 2021.
7. H. Elhamdadi, S. Canavan, and P. Rosen "AffectiveTDA: Using Topological Data Analysis for Improved Explainability in Affective Computing", IEEE Transactions on Visualization and Computer Graphics, 2021.
8. S. Aathreya, L. Jivnani, S. Srivastava, S. Hinduja, and S. Canavan, "Task-based classification of reflective thinking using mixture of classifiers," ACIIW, 2021.
9. I. Tynes and S. Canavan, "Real-time ubiquitous pain recognition," ACIIW, 2021.
10. S. Hinduja, G. Kaur, and S. Canavan "Investigation into Recognizing Context Over Time using Physiological Signals" ACII, 2021.

11. S. Aathreya, L. Jivnani, S. Srivastava, S. Hinduja, and S. Canavan “Task-based Classification of Reflective Thinking using Mixture of Classifiers” ACIIW, 2021.
12. Sk R. Jannat and S. Canavan, “Classification of Autism Spectrum Disorder Across Age using Questionnaire and Demographic Information,” International Workshop on Artificial and Affective Intelligences in Healthcare Applications for Vulnerable Populations at ICPR, 2020.
13. A. Sharma and S. Canavan, “Multimodal physiological-based emotion recognition,” International Workshop on Pattern Recognition for Positive Technology and Elderly Wellbeing at ICPR, 2020.
14. Sk. R. Jannat, D. Fabiano, S. Canavan, and T. Neal, “Subject identification across large expression variations using 3D facial landmarks,” International Workshop on 3D Human Understanding at ICPR, 2020.
15. Md T. Uddin and S. Canavan, “Quantified Facial Temporal-Expressiveness Dynamics for Affect Analysis,” International Conference on Pattern Recognition, 2020.
16. S. Srivastava, S. Aathreya, S. Hinduja, Sk R. Jannat, H. Elhamdadi, and S. Canavan "Recognizing Emotion in the Wild using Multimodal Data", International Conference on Multimodal Interaction, 2020.
17. D. Fabiano, S. Canavan, H. Agazzi, S. Hinduja, and D. Goldgof, “Gaze-based classification of Autism Spectrum Disorder,” Pattern Recognition Letters, 135, pp. 204-212, 2020.
18. S. Aathreya, S. Hinduja, and S. Canavan, “Three-level training of multi-head architecture for pain detection,” Face and Gesture Recognition, 2020.
19. Md T. Uddin and S. Canavan, “Multimodal multilevel fusion for sequential protective behavior detection and pain estimation,” Face and Gesture Recognition, 2020.
20. S. Hinduja, S. Canavan, and G. Kaur, “Multimodal fusion of physiological signals and facial action units for pain recognition,” Face and Gesture Recognition, 2020.
21. T. Neal and S. Canavan, “Mood versus identity: studying the influence of affective states on mobile biometrics,” Face and Gesture Recognition, 2020.
22. S. Hinduja and S. Canavan, “Real-time action unit intensity detection,” Face and Gesture Recognition, 2020.
23. J. Schioppo, Z. Meyer, D. Fabiano, and S. Canavan, “Sign language recognition in virtual reality” Face and Gesture Recognition, 2020.
24. S. Hinduja and S. Canavan, “Recognizing perceived emotions using facial expressions” Face and Gesture Recognition, 2020.
25. J. Lou, X. Cai, Y. Wang, H. Yu, and S. Canavan, “Multi-subspace supervised descent method for robust face alignment,” Multimedia Tools and Applications, 2019
26. Md T. Uddin and S. Canavan, “Synthesizing physiological and motion data for stress and meditation detection,” Affective Computing and Intelligence Interaction Workshops, 2019.
27. D. Fabiano and S. Canavan, “Emotion recognition using fused physiological signals,” Affective Computing and Intelligent Interaction, 2019.
28. J. Schioppo, Z. Meyer, D. Fabiano, and S. Canavan, “Learning sign language in a virtual environment,” CHI Extended Abstracts, (LBW) 2019.
29. S. Hinduja, Md T. Uddin, Sk R. Jannat, A. Sharma, and S. Canavan, “Fusion of Hand-crafted and Deep Features for Empathy Prediction,” Face and Gesture Recognition, 2019.
30. D. Fabiano and S. Canavan, “Deformable Synthesis Model for Emotion Recognition,” Face and Gesture, 2019.
31. S. Canavan, M. Andujar, L. Yin, A. Nijholt, and E. Schotter, “Ubiquitous Emotion Recognition with Multimodal Mobile Interfaces,” UbiComp/ISWC, 2018.

32. R. Jannat, I. Tynes, L. LaLime, J. Adorno, and S. Canavan, "Ubiquitous Emotion Recognition using Audio and Video Data," Workshop on Ubiquitous Emotion Recognition with Multimodal Mobile Interfaces, 2018.
33. S. Canavan and D. Fabiano, "Human Emotion Recognition using Fused Physiological Signals," Army Science and Technology Symposium, 2018.
34. D. Fabiano and S. Canavan, "Spontaneous and Non-Spontaneous 3D Facial Expression Recognition Using a Statistical Model with Global and Local Constraints" International Conference on Image Processing, 2018.
35. S. Canavan, W. Keyes, R. McCormick, J. Kunnumpurath, T. Hoelzel, and L. Yin, "Hand Gesture Recognition Using a Skeleton-based Representation with a Random Regression Forest" International Conference on Image Processing, 2017.
36. S. Canavan, M. Chen, S. Chen, R. Valdez, M. Yaeger, H. Lin, and L. Yin, "Combining Gaze and Demographic Feature Descriptors for Autism Classification" International Conference on Image Processing, 2017.
37. Z. Zhang, J. Girard, Y. Wu, X. Zhang, P. Liu, U. Ciftci, S. Canavan, M. Reale, A. Horowitz, H. Yang, J. Cohn, Q. Ji, and L. Yin, "Multimodal Spontaneous Emotion Corpus for Human Behavior Analysis" Computer Vision and Pattern Recognition, 2016.
38. S. Canavan, P. Liu, X. Zhang, and L. Yin, "Landmark Localization on 3D/4D Range Data Using a Shape Index-based Statistical Shape Model with Global and Local Constraints" Computer Vision and Image Understanding, 2015
39. S. Canavan, L. Yin, "Feature Detection and Tracking on Geometric Mesh Data Using a Combined Global and Local Shape Model for Face Analysis" IEEE International Conference on Biometrics: Theory, Applications and Systems, 2015
40. X. Zhang, L. Yin, J. Cohn, S. Canavan, M. Reale, A. Horowitz, P. Liu and J. Girard, "BP4D-Spontaneous: A high resolution spontaneous 3D dynamic facial expression database" Image and Vision Computing, 2014
41. M. Reale, P. Liu, L. Yin, and S. Canavan, "Art Critic: Multisignal Vision and Speech Interaction System in a Gaming Context" IEEE Transactions on SMC-Part B: Special Issue on Modern Control for Computer Games, July 2013
42. M. Reale, S. Canavan, L. Yin, K. Hu, and T. Hung, "A Multi-Gesture Interaction System using a 3D Iris Disk Model for Gaze Estimation and an Active Appearance Model for 3D Hand Pointing" IEEE Transactions on Multimedia Vol. 13, No. 3, June 2011
43. S. Canavan, X. Zhang, and L. Yin, "Fitting and Tracking 3D/4D Facial Data Using A Temporal Deformable Shape Model" IEEE International Conference on Multimedia and Expo, 2013
44. X. Zhang, L. Yin, J. Cohn, S. Canavan, M. Reale, A. Horowitz, and P. Liu, "A High-Resolution Spontaneous 3D Dynamic Facial Expression Database" IEEE International Conference on Automatic Face and Gesture Recognition, 2013
45. S. Canavan, Y. Sun, X. Zhang, and L. Yin, "A Dynamic Curvature Based Approach for Facial Activity Analysis in 3D Space" CVPR Workshop on Socially Intelligent Surveillance and Monitoring, 2012
46. S. Canavan, X. Zhang, L. Yin, and Y. Zhang, "3D Face Sketch Modeling and Assessment for Component Based Face Recognition" International Joint Conference on Biometrics, 2011
47. Y. Zhang, S. L. Ellyson, A. J. Zone, P. R. Gangam, J. R. Sullins, C. McCullough, S. Canavan, and L. Yin, "Recognizing Face Sketches by a Large Number of Human Subjects: A Perception-

Based Study for Facial Distinctiveness" International Conference on Automatic Face and Gesture Recognition, 2011

48. K. Hu, S. Canavan, and L. Yin, "Hand Pointing Estimation for Human Computer Interaction Based on Two Orthogonal-Views" International Conference on Pattern Recognition 2010
49. S. Canavan, B. Johnson, M. Reale, Y. Zhang, L. Yin, and J. Sullins, "Evaluation of Multi-Frame Fusion Based Face Classification Under Shadow" International Conference on Pattern Recognition, 2010
50. H. A. Al Nizami, J. P. Adkins-Hill, Y. Zhang, J. R. Sullins, C. McCullough, S. Canavan, and L. Yin, "A Biometric Database with Rotating Head Videos and Hand-drawn Face Sketches" International Conference on Biometrics: Theory, Applications and Systems, 2009
51. S. Canavan and L. Yin, "Dynamic Face Appearance Modeling and Sight Direction Estimation Based on Local Region Tracking and Scale-Space Topo-Representation" International Conference on Multimedia and Expo, 2009
52. S. Canavan, M. P. Kozak, Y. Zhang, J. R. Sullins, M. A. Shreve, D. B. Goldgof, "Face Recognition by Multi-Frame Fusion of Rotating Heads in Videos" IEEE International Conference on Biometrics: Theory, Applications and Systems, 2007

Technical Reports

1. S. Hinduja and S. Canavan, "Transforming 3D facial landmarks for action unit prediction," University of South Florida, 2019.
2. S. Hinduja and S. Canavan, "Impact of data distribution on action unit detection," University of South Florida, 2019.
3. Sk R. Jannat, D. Fabiano, and S. Canavan, "Subject identification using 3D facial landmarks," University of South Florida, 2019.
4. A. Sharma and S. Canavan, "Multimodal physiological-based emotion recognition," University of South Florida, 2019.
5. D. Fabiano, M. Jaishanker, and S. Canavan, "Analysis of 3D face, action units, and physiological data for multimodal emotion recognition," University of South Florida, 2019.
6. S. Canavan, "Camera Zoom and Multi-View Stereo Methods", Air Force Research Lab Technical Report, 2012
7. S. Canavan, "Biometric Feature Tracking Via Deformable Models", Binghamton University Technical Report, 2010
8. M. Shreve, S. Canavan, Y. Zhang, J. Sullins, and R. Patil, "Imaging and Characterization of Facial Strain in Long Video Sequences", Youngstown State University Technical Report, 2007

STUDENTS ADVISED

Current PhD Students

1. Rahatul Jannat, PhD
2. Taufeeq Uddin, PhD
3. Saandeep Aathreya, PhD
4. Anis Elebiary, PhD
5. Tara Nourivandi, PhD
6. Neil Sambhu, PhD
7. Liza Jivnani, Undergraduate

8. Yuying Wang, Masters

Graduated Students

1. Saurabh Hinduja, PhD, Dissertation title: Analysis of Contextual Emotions using Multimodal Data
2. Shivam Srivastava, Masters, Thesis title: Recognizing Emotion in the Wild using Multimodal Data
3. Iyonna Tynes, Masters, Thesis title: Pain Recognition Performance on a Single Board Computer
4. Astha Sharma, Masters, Thesis title: Emotion Recognition using Deep Convolutional Neural Network with Large-scale Physiological Data
5. Diego Fabiano, Masters, Thesis title: Multimodal Emotion Recognition using 3D Facial Landmarks, Action Units, and Physiological Data.
6. Neil Sambhu, Masters, Thesis title: Detecting Digitally Forged Faces in Online Videos
7. Zach Meyer, Undergraduate Research
8. Jacob Schioppo, Undergraduate Research

PRESENTATIONS

Invited Talks

JP Morgan Chase Innovation Week — June 2019
Topic: Biometrics and Affective Computing at USF — Tampa, FL

JP Morgan Chase Tech Fest — October 2019
Topic: Biometrics and Affective Computing at USF — Tampa, FL

Interdisciplinary Data Sciences Consortium — November 2017
Topic: Multimodal Facial Data for Affective Computing — Tampa, FL

Computer Science Graduate Student Organization Weekly Seminar — February 2013
Topic: Fitting and Tracking 3D/4D Facial Data Using a Temporal Deformable Shape Model — Binghamton, NY

Conference Presentations

Affective Computing and Intelligent Interaction — September 2019
Topic: Emotion Recognition using Fused Physiological Signals — Cambridge, UK

Computer Vision and Pattern Recognition Workshop on Socially Intelligent Surveillance and Monitoring — June 2012
Topic: A Dynamic Curvature Based Approach for Facial Activity Analysis in 3D Space — Providence, RI

International Joint Conference on Biometrics — October 2011
Topic: 3D Face Sketch Modeling and Assessment for Component Based Face Recognition — Washington DC

International Conference on Multimedia and Expo — June 2009
Topic: Dynamic Face Appearance Modeling and Sight Direction Estimation on Local Region Tracking and Scale-Space Topo-Representation — New York, NY

International Conference on Biometrics: Theory, Applications and Systems — September 2007
Washington DC

Topic: Face Recognition by Multi-Frame Fusion of Rotating Heads in Videos

Conference Posters

Face and Gesture Recognition — May 2019
Topic: Deformable Synthesis Model for Emotion Recognition — Lille, France

International Conference on Image Processing — September 2017
Topic: Hand Gesture Recognition Using a Sketch-based Representation with a Random Regression Forest — Beijing, China

International Conference on Image Processing — September 2017
Topic: Combining Gaze and Demographic Feature Descriptors for Autism Classification — Beijing, China

International Conference on Biometrics: Theory, Applications and Systems — September 2009
Topic: A Biometric Database with Rotating Head Videos and Hand-Drawn Face Sketches — Washington DC

AWARDS and Honors

Best paper award — November 2021
ACIIW - Affective Movement Recognition Challenge and Workshop — Virtual

Best reviewer award — May 2018
Face and Gesture 2018 — Xi'an, China

Selected to attend *KEEN Integrating Curriculum with Entrepreneurial-Mindset (ICE) Workshop* ($2000) — March 2018
Tampa, FL

Selected to attend *Second Annual Student Research Summit at GE Global Research* — August 2013
Niskayuna, NY

Selected to attend *International Joint Conference on Biometrics Doctoral Consortium* ($1500) — October 2011
Washington DC

NSF travel fellowship to attend *Sino-USA Summer School in Vision, Learning, and Pattern Recognition* ($2500) — July 2010
Xi'an, China

SERVICE

Professional – Peer Review

ACM Transactions on Multimedia Computing, Communications, and Applications; Computer Vision and Pattern Recognition; European Conference on Computer Vision; Biometrics: Theory, Applications, and Systems; IEEE Transactions on Affective Computing; IEEE Transactions on Biometrics, Behavior, and Identity Science; IEEE Transactions on Image Processing; IEEE Transactions on Circuits and Systems for Video Technology; IEEE Transactions on Cybernetics; Image and Vision Computing; International Conference on Pattern Recognition; SIBGRAPI –Conference on Graphics, Patterns and Images (Tutorials); Signal, Image and Video Processing; Signal Processing Letters; International Conference on Image Processing; Face and Gesture; Affective Computing and Intelligent Interaction; Computer Vision and Image Understanding

Professional – Proposal Peer Review

NSF; NIH

Professional – Committees

Publication Chair, ACII 2023; Program Chair, FG 2024; Program Committee, IEEE BigData; Area Chair, FG 2023; Area Chair, ML4H 2022; Demo Chair, ACII 2021; Program Committee, FG 2020; Demo Chair, FG 2019; Technical Committee, ICIP 2018; Technical Committee, ICPR 2018; Program Committee, FG 2018; Technical Program Committee, ECCV 2014.

Professional - Membership

- IEEE Member
- IEEE Signal Processing Society Member
- IEEE Young Professional Member
- Association for the Advancement of Affective Computing (AAAC)