Shaun Canavan

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EDUCATION

PhD Computer Science — May 2015
Binghamton University — Binghamton, NY
Dissertation Title: Facial Landmark Detection and Sketch Recognition

MS Computer and Information Systems — 2008
Youngstown State University — Youngstown, OH
Thesis Title: Face Recognition from Multi-Frame Image Fusion

BS Computer Science — 2006
Youngstown State University — Youngstown, OH

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

Associate Professor — August 2024 - Present
University of South Florida

Assistant Professor — August 2017 – July 2024
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. 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. Distant Observation Enhancement and Recognition System (DOERS), Intelligence Advanced Research Projects Activity (IARPA)/Kitware, $687,752, 2021-2024 (Sarkar PI, Canavan Co-PI, Pamplona Segundo Co-PI).
2. 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).
3. Computer Vision-Based Emotion Assessment System for Precision Music Intervention: A Proof-of-Concept Study, Florida High Tech Corridor, $25,000, 2/22/23-12/23/23 S. Canavan (Co-PI), Yu Sun (Co-PI), Hongdao Meng (PI), Dmitry Goldgof (Co-PI).
4. 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).
5. 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).
6. Scalability of the Value Spring Technology enterpriseMind Ali-Tutor AI Solution, ValueSpring, 2019, $1,000, S. Canavan (Sole-PI).
7. 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).
8. 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).
9. 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. S. Aathreya and S. Canavan, “FlowCon: Out-of-Distribution Detection using Flow-based Constrative Learning”, European Conference on Computer Vision, 2024.
2. T. Nourivandi, S. Aathreya, and S. Canavan, “Multimodal Behavior Analysis and Impact of Culture on Affect”, Affective Computing & Intelligent Interaction, 2024.
3. S. Hinduja, T. Nourivandi, J. Cohn, and S. Canavan, “Time to retire F1 score for action unit detection”, Pattern Recognition Letters, 2024.
4. Sk R. Jannat, H. Agazzi, and S. Canavan, “Context-based Dataset for Analysis of Videos of Autistic Children,” Face and Gesture Recognition, 2024.
5. S. Aathreya, M. Chaudhary, T. Neal, and S. Canavan, “Multimodal Context-based Continuous Authentication,” International Joint Conference on Biometrics, 2023.

6. Md. T. Uddin, G. Zamzmi, and S. Canavan, “Cooperative Learning for Personalized Context-aware Pain Assessment from Wearable Data,” IEEE Journal of Biomedical and Health Informatics, 2023.
7. Md T. Uddin, L. Yin, and S. Canavan, “Spatio-temporal Graph Analytics on Secondary Affect Data for Improving Trustworthy Emotional AI,” IEEE Transactions on Affective Computing, 2023.
8. L. Jivnani, F. Goodman, J. Rottenberg, and S. Canavan, “Predicting Loneliness from Subject Self-report,” IEEE Affective Computing and Intelligent Interaction, 2023.
9. A. Elebiary, S. Aathreya, and S. Canavan, “An Automated Data Cleaning Framework for Improving Facial Expression Classification,” IEEE Affective Computing and Intelligent Interaction Workshops, 2023.
10. Md T. Uddin, G. Zamzmi, and S. Canavan, “Association between chronic back pain and protective behaviors is subjective and context dependent,” IEEE International Conference of the Engineering in Medicine and Biology Society, 2023.
11. R. Agarwal, M. Andujar, and S. Canavan, “Classification of emotions using EEG activity associated with different areas of the brain”, Pattern Recognition Letters 162, pp: 71-80, 2022.
12. S. Aathreya and S. Canavan, “Expression recognition using a latent-space representation”, International Conference on Pattern Recognition, 2022.
13. 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”, USENIX Symposium on Usable Privacy and Security, 2022.
14. Md T. Uddin and S. Canavan “Quantified Facial Expressiveness for Affective Behavior Analytics”, IEEE Winter Conference on Applications of Computer Vision, 2022.
15. T. Neal, K. Zanna, and S. Canavan “Clustering of Physiological Signals by Emotional State, Race, and Sex”, ACM International Conference on Multimodal Interaction Workshops, 2021.
16. Sk R. Jannat and S. Canavan “Expression recognition across age,” Face and Gesture Recognition 2021.
17. 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.
18. S. Aathreya, L. Jivnani, S. Srivastava, S. Hinduja, and S. Canavan, “Task-based classification of reflective thinking using mixture of classifiers,” IEEE Affective Computing and Intelligent Interaction Workshops, 2021.
19. I. Tynes and S. Canavan, “Real-time ubiquitous pain recognition,” IEEE Affective Computing and Intelligent Interaction Workshops, 2021.
20. S. Hinduja, G. Kaur, and S. Canavan “Investigation into Recognizing Context Over Time using Physiological Signals” IEEE Affective Computing and Intelligent Interaction, 2021.
21. S. Aathreya, L. Jivnani, S. Srivastava, S. Hinduja, and S. Canavan “Task-based Classification of Reflective Thinking using Mixture of Classifiers” IEEE Affective Computing and Intelligent Interaction Workshops, 2021.
22. Sk R. Jannat and S. Canavan, “Classification of Autism Spectrum Disorder Across Age using Questionnaire and Demographic Information,” International Conference on Pattern Recognition, 2020.
23. A. Sharma and S. Canavan, “Multimodal physiological-based emotion recognition,” International Conference on Pattern Recognition, 2020.
24. Sk. R. Jannat, D. Fabiano, S. Canavan, and T. Neal, “Subject identification across large expression variations using 3D facial landmarks,” International Conference on Pattern Recognition, 2020.

25. Md T. Uddin and S. Canavan, “Quantified Facial Temporal-Expressiveness Dynamics for Affect Analysis,” International Conference on Pattern Recognition, 2020.
26. 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.
27. 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.
28. S. Aathreya, S. Hinduja, and S. Canavan, “Three-level training of multi-head architecture for pain detection,” Face and Gesture Recognition, 2020.
29. Md T. Uddin and S. Canavan, “Multimodal multilevel fusion for sequential protective behavior detection and pain estimation,” Face and Gesture Recognition, 2020.
30. S. Hinduja, S. Canavan, and G. Kaur, “Multimodal fusion of physiological signals and facial action units for pain recognition,” Face and Gesture Recognition, 2020.
31. T. Neal and S. Canavan, “Mood versus identity: studying the influence of affective states on mobile biometrics,” Face and Gesture Recognition, 2020.
32. S. Hinduja and S. Canavan, “Real-time action unit intensity detection,” Face and Gesture Recognition, 2020.
33. J. Schioppo, Z. Meyer, D. Fabiano, and S. Canavan, “Sign language recognition in virtual reality” Face and Gesture Recognition, 2020.
34. S. Hinduja, S. Canavan, and L. Yin, “Recognizing perceived emotions using facial expressions” Face and Gesture Recognition, 2020.
35. 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
36. Md T. Uddin and S. Canavan, “Synthesizing physiological and motion data for stress and meditation detection,” Affective Computing and Intelligence Interaction Workshops, 2019.
37. D. Fabiano and S. Canavan, “Emotion recognition using fused physiological signals,” Affective Computing and Intelligent Interaction, 2019.
38. J. Schioppo, Z. Meyer, D. Fabiano, and S. Canavan, “Learning sign language in a virtual environment,” CHI Extended Abstracts, (LBW) 2019.
39. 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.
40. D. Fabiano and S. Canavan, “Deformable Synthesis Model for Emotion Recognition,” Face and Gesture, 2019.
41. S. Canavan, M. Andujar, L. Yin, A. Nijholt, and E. Schotter, “Ubiquitous Emotion Recognition with Multimodal Mobile Interfaces,” ACM International Joint Conference and International Symposium on Pervasive and Ubiquitous Computing and Wearable Computers, 2018.
42. 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.
43. S. Canavan and D. Fabiano, “Human Emotion Recognition using Fused Physiological Signals,” Army Science and Technology Symposium, 2018.
44. 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.

45. 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.
46. 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.
47. 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.
48. 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
49. 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
50. 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
51. 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
52. 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
53. 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
54. 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
55. 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
56. 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
57. 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
58. 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
59. 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

60. 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
61. 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
62. 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 Students

1. Saandeep Aathreya, PhD
2. Anis Elebiary, PhD
3. Tara Nourivandi, PhD
4. Neil Sambhu, PhD
5. Liza Jivnani, Undergraduate
6. Yuying Wang, Masters

Graduated Students

1. Md Taufeeq Uddin, PhD, Dissertation title: Context-aware Affective Behavior Modeling and Analytics
2. Rahatul Jannat, PhD, Dissertation title: Multimodal Assessment of Human Behavior with Applications in Analysis of Autism Spectrum Disorder
3. Saurabh Hinduja, PhD, Dissertation title: Analysis of Contextual Emotions using Multimodal Data

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

PRESENTATIONS

Invited Talks

Affective Computing & Intelligent Interaction — September 2023
Topic: Context-aware Affective Computing — Cambridge, MA

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

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 – Editor

Pattern Recognition (Associate Editor); Pattern Recognition Letters (Associate Editor)

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; DOJ

Professional – Committees

Publication Chair, Affective Computing & Intelligent Interaction 2023; Program Chair, Face and Gesture Recognition 2024; Program Committee, IEEE BigData; Area Chair, IEEE Face and Gesture Recognition 2023; Area Chair, ML4H 2022; Demo Chair, Affective Computing & Intelligent Interaction 2021; Program Committee, IEEE Face and Gesture Recognition; Demo Chair, IEEE Face and Gesture Recognition 2019; Technical Committee, IEEE International Conference on Image Processing; Technical Committee, International Conference on Pattern Recognition; Program Committee, IEEE Face and Gesture Recognition; Technical Program Committee, European Conference on Computer Vision.

Professional - Membership

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