

Kushal Vangara

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I am a Ph.D. candidate in my final semester, specializing in responsible AI, machine learning, computer vision, biometrics, computational psychology, and cybersecurity. My work focuses on leveraging multimodal data to model human behavior and personality traits, with an emphasis on improving the robustness, fairness, and interpretability of machine learning models. My past projects focused on face recognition systems by addressing demographic biases and enhancing accuracy across diverse populations. Additionally, I have contributed to person re-identification, long-range recognition, and deepfake detection, tackling critical identity verification challenges.

EDUCATION

Ph.D. in Computer Science

(May 2025)

Florida Institute of Technology, Florida, USA

Dissertation: Indirect Personality Prediction through Non-Verbal Cues Analysis in Videos

Advisor: Dr. Michael C. King

M.S. in Information Assurance & Cybersecurity

May 2018

Florida Institute of Technology, Florida, USA

Thesis: Transfer Learning with Convolutional Neural Networks (CNNs) Applied to Periocular Biometrics

Advisor: Dr. Michael C. King

B.Tech. in Electronics and Communications Engineering

July 2014

Jawaharlal Nehru Technological University, Hyderabad, India

Projects: Developed IoT automation and prototyping solutions using Arduino and Raspberry Pi

PROFESSIONAL EXPERIENCE

Graduate Research Assistant

Florida Institute of Technology, FL, USA

May 2018 – present

Computational Psychology for Indirect Personality Assessment

2021–2025

- **Corpora Development:** Designed and implemented protocols to create rich, naturalistic datasets, capturing personality traits through individual differences in speech, body gestures, and physical movements.
- **Spatio-Temporal Visual Analysis:** Researched and developed spatio-temporal machine learning models and computer vision methods to detect and analyze visual cues like body motion, facial micro-expressions, and hand gestures for passive personality assessment.

Long-Range Biometric Identification

2022–2023

- **Algorithm Development for Long-Range Biometric Identification:** Contributed to modules addressing atmospheric, motion, and resolution challenges for real-time whole-body biometric identification at long ranges.
- **Data Collection and Curation for Research:** Curated a diverse indoor/outdoor dataset with contextual attributes such as skin tone to enhance biometric research.

GAN-Based Synthetic Content Detection

2020–2021

- Researched Generative Adversarial Networks (GANs) to produce and detect adversarial content, contributing to techniques that counter deceptive or falsified media in online platforms.

Person Re-identification

2019

- Analyzed visual attributes (e.g., soft identifying features) to enhance person re-identification accuracy in congested, real-world video environments and developed a conceptual framework.

Face Recognition Research

2018–2020

- Investigated bias in face recognition systems, identifying root causes and developing mitigation strategies to enhance fairness across demographics. Findings aligned with NIST studies and extended beyond in some key areas.
- Explored the impact of exposure and training data diversity on false match rates, improving algorithmic fairness using facial brightness measurements and Deep Convolutional Neural Network (DCNN) models.
- Optimized a ResNet-50 DCNN with ArcFace loss to reduce demographic disparities in face recognition accuracy.

Volunteer Research Assistant

Florida Institute of Technology, FL, USA

Jan 2016 – Dec 2017

Designed and developed portable biometric systems using Raspberry Pi and Kinect, explored security vulnerabilities and benchmarked CPU architectures.

Internship

TalentSprint, Hyderabad, India

Jan 2015 - July 2015

Built an E-Billing web application leveraging Java, Spring Framework, and SQL database with an MVC-based scalable design.

Embedded Systems Intern

Potential Labs, Hyderabad, India

July 2014 - Dec 2014

Designed and tested electronic circuits, PCB, and IoT solutions.

TEACHING EXPERIENCE

Graduate Teaching Assistant/Tutor

Florida Institute of Technology, FL

Spring 2025

Assisted in teaching a graduate Cyber Identity course (*CSE-5800*), including materials, assignments, and assessments.

Graduate Teaching Assistant

Florida Institute of Technology, FL

Fall 2024

Developed and taught graduate-level biometrics course (*CYB-5677*), including creating materials, assignments, and exams, while conducting assessments and evaluating student performance.

TECHNICAL SKILLS

Programming	Python (<i>numpy</i> , <i>pandas</i> , <i>scikit-learn</i>), Deep Learning (<i>PyTorch</i> , <i>Tensorflow</i> , <i>JAX</i>), OpenCV, R, C/C++, MATLAB, Bash
Big Data	Accelerated Computing (<i>CUDA</i> , <i>HPC</i>), Parallel Processing, Cloud Computing (<i>AWS/SageMaker</i> , <i>GCP</i>), Database (<i>SQL</i>)
DevOps	Git/Github, Docker, Workflow Management (<i>MLFlow</i> , <i>Airflow</i>), Testing, CI/CD, Open Source
Data Visualization	Matplotlib, Seaborn, Plotly, Graphana, Tableau

PUBLICATIONS

- **Kushal Vangara**, Gabriella Pangelinan, Xavier Merino, Gary Burns, and Michael King “Beyond the Smile: Predicting Personality from Facial Movements Using AI”. in: *Society for Industrial and Organizational Psychology Annual Conference*. (Accepted). Apr. 2025
- **Kushal Vangara**, Gabriella Pangelinan, Xavier Merino, Gary Burns, and Michael King “Indirect Assessment of Personality from Facial Expressions”. In: *Society for Personality and Social Psychology Annual Convention*. (Accepted). 2025
- Cody E Harrell, Gary N Burns, Michael C King, William B Ridgway, **Kushal Vangara**, Zachary B Hesson, Vanessa A Edkins, and Charles A Morgan “Investigating the overlapping concepts of the Dark Core and the General Factor of Personality”. In: *Personality and Individual Differences* 225 (2024), p. 112650. ISSN: 0191-8869
- Gabriella Pangelinan, KS Krishnapriya, Vitor Albiero, Grace Bezold, Kai Zhang, **Kushal Vangara**, Michael C King, and Kevin W Bowyer “Exploring Causes of Demographic Variations In Face Recognition Accuracy”. In: *Computer Vision: Challenges, Trends, and Opportunities* (2024), p. 61
- Gabriella Pangelinan, Xavier Merino, Samuel Langborgh, **Kushal Vangara**, Joyce Annan, Audison Beaubrun, Troy Weekes, and Michael C King “The CHROMA-FIT Dataset: Characterizing Human Ranges of Melanin for Increased Tone-Awareness”. In: *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) Workshops*. Jan. 2024, pp. 1170–1178
- Kevin W Bowyer, Michael C King, Walter J Scheirer, and **Kushal Vangara** “The ‘Criminality From Face’ Illusion”. In: *IEEE Transactions on Technology and Society* 1.4 (2020), pp. 175–183
- Vitor Albiero, KS Krishnapriya, **Kushal Vangara**, Kai Zhang, Michael C King, and Kevin W Bowyer “Analysis of gender inequality in face recognition accuracy”. In: *Proceedings of the IEEE Winter Conference on Applications of Computer Vision Workshops*. 2020, pp. 81–89

- KS Krishnapriya, Vitor Albiero, **Kushal Vangara**, Michael C King, and Kevin W Bowyer “Issues related to face recognition accuracy varying based on race and skin tone”. In: *IEEE Transactions on Technology and Society* 1.1 (2020), pp. 8–20
- Vitor Albiero, Kevin Bowyer, **Kushal Vangara**, and Michael King “Does face recognition accuracy get better with age? Deep face matchers say no”. In: *The IEEE Winter Conference on Applications of Computer Vision*. 2020, pp. 261–269
- KS Krishnapriya, **Kushal Vangara**, Michael C King, Vitor Albiero, and Kevin Bowyer “Characterizing the variability in face recognition accuracy relative to race”. In: *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops*. 2019, pp. 0–0
- Tiziano Bernard, Andrea Gonzalez, Vincenzo Miale, **Kushal Vangara**, Lucas Stephane, and Winston E Scott “Haptic feedback astronaut suit for mitigating extra-vehicular activity spatial disorientation”. In: *AIAA SPACE and Astronautics Forum and Exposition*. 2017, p. 5113

RESEARCH PRESENTATIONS

Invited Presentation

Sep 2023

Center for Advanced Manufacturing and Innovative Design (CAMID)

Melbourne, FL

Presented a poster at the Computational Cybersecurity in Compromised Environments (C3E) workshop, titled: “*Deep Learning-Based Personality Trait Analysis from Facial Expressions.*”

Invited Presentation

Feb 2020

University of North Carolina Wilmington

Wilmington, NC

Invited to present the Cyber Identity and Behavior Analytics Research Consortium (CIBAR) workshop, titled: “*Facing Off with Deep Fakes.*”

MAJOR COLLABORATORS

- Dr. Kevin Bowyer from University of Notre Dame
- Dr. Charles A. Morgan III from University of New Haven
- Dr. Mark Liberman from Linguistic Data Consortium, University of Pennsylvania
- Dr. Vanessa A. Edkins, Emeritus Faculty, Florida Institute of Technology

REVIEWS

- IEEE Winter Conference on Applications of Computer Vision (WACV)
- Workshop on Demographic Variations in Performance of Biometrics and Related Technology (DVPBA)
- ACM Transactions on Privacy and Security (TOPS)

PROFESSIONAL AFFILIATIONS

- IEEE
- ACM
- SPSP
- ARRL (*Call Sign: KQ4YAG*)