Corey Pittman

2179 Fallon Blvd NE, Palm Bay, FL 32907 USA

1-561-578-3932 | pittmancoreyr@gmail.com

Research Interests

Novel user interfaces, Augmented Reality (AR), gesture recognition, human-robot interaction (HRI), human-computer interaction (HCI), multi-modal user interfaces, computer vision (CV)

Education

Ph.D.   **University of Central Florida (Orlando, FL, USA)**
Computer Science, 2019 (expected)
Advisor: Joseph LaViola
Research: Augmented Reality for Physics Education, Visualizing Uncertainty, Gesture Selection

M.S.   **University of Central Florida (Orlando, FL, USA)**
Computer Science (3.3/4.0), December 2013

B.S.   **University of Central Florida (Orlando, FL, USA)**
Computer Science (3.4/4.0), May 2012

Research Experience

Graduate Research Assistant   **University of Central Florida (Orlando, FL, USA)**
Interactive Systems and User Experience Lab, December 2012 – Present
Director: Dr. Joseph LaViola
Tasks: Conduct gesture recognition research; perform research paper writing; oversee undergraduate researchers; attend events to promote research lab and present work; demonstrate research projects to lab visitors and potential sponsors

Research Intern   **Microsoft Research (Redmond, WA, USA)**
Multimedia, Interaction, and eXperiences Group, June 2015 – September 2015
Director: Zhengyou Zhang (Mentored by Nikolai Smolyanskiy)
Tasks: Conduct research with teleoperated drones; simplify control schemes for consumer flying drones; present research ideas at weekly meetings

Undergraduate Research Assistant   **University of Central Florida (Orlando, FL, USA)**
Center for Research in Computer Vision, May 2011 – October 2011
Director: Dr. Mubarak Shah
Tasks: Conduct computer vision research; present research ideas and progress at weekly meetings; assist in grant writing

Teaching Experience

Teaching Assistant   **University of Central Florida (Orlando, FL, USA)**
Department of Electrical Engineering and Computer Science, Jan 2013 – May 2013
COP2500: Introduction to Computer Science (Jerry Hensel)
Tasks: teach lab sections, grade programming assignments and exams, provide assistance during office hours

Department of Electrical Engineering and Computer Science, Aug 2012 – Dec 2012
COT3100C: Introduction to Discrete Structures (Shaojie Zhang)
Tasks: teach lab sections, assist students during office hours, grade homework assignments and exams, proctor examinations

Research Projects

Augmented Reality for Physics Education University of Central Florida (Orlando, FL, USA)
January 2016 – Present
Low cost augmented reality displays have enabled developers to target new domains for applications. The education domain, specifically physics, benefits from the interaction and integration enabled by AR interfaces. The primary goal of this project is to enable distance learning students to experience immersive labs which interact with their surroundings and provide sandbox tools for non-technical educators to develop their own experiments for students. My contributions include project conception, simulation development (Unity3D/C#), and sandbox development.

Visualizing Uncertainty Data for Naval Planning University of Central Florida (Orlando, FL, USA)
December 2015 – Present
Tactical planning requires a careful balance of minimizing risks and maximizing rewards. One way we augment decision making processes is with visualizations which distill uncertainty related to gathered intelligence and situation reports. This project, which is funded by the Office of Naval Research, explores the cognitive effects of various levels of uncertainty on the decision-making process in several domains. My coding contributions include rapid prototyping web-based clients (HTML/JS/CSS), developing tactical simulation testbeds (Unity3D/C#), and managing experimental data (Python/R).

Alternative Controls for Multirotor UAVs Microsoft Research (Redmond, WA, USA)
June 2015 – September 2015
Consumer UAVs have become more ubiquitous, but the control schemes behind them have not changed since their introduction. Currently, multirotor UAV borrow their control layouts from RC planes, which is not an intuitive mapping. The goal of this project was to define and implement simpler controls for the casual user, instead of focusing on enthusiasts, by utilizing a common came controller and skeletal tracking. My coding contributions included flight management code (C++), ground station app (C#), and wireless communication (C++ with ROS).

Improving $-Family Recognizers University of Central Florida (Orlando, FL, USA)
February 2015 – Present
Sketch recognition has focused heavily on template based (kNN) recognition in recent years. Dollar family recognizers are typically leveraged for their balanced simplicity and accuracy. This project aims to determine the effect of dataset pruning and stroke averaging on spatial and temporal performance of $-family recognizers. My coding contributions included dataset management code (C#), stroke manipulation and processing (C#), and experimental management and analysis (Python).

Doppler Effect Gesture Recognition University of Central Florida (Orlando, FL, USA)
February 2014 – December 2016
Current gesture recognition technology requires the use of electromagnetic trackers attached to the body or cameras placed in the environment. There are work environments where noise or security issues would prohibit the use of these devices. This project focused on using the Doppler Effect to detect coarse gestures using sounds emitted from speakers placed around a user. My coding contributions included the application layout (WPF), audio processing (C#), and gesture recognition logic (C#).

Head-Tracking for UAV Teleoperation   **University of Central Florida (Orlando, FL, USA)**
March 2013 – February 2014
Manipulating robots using gestural inputs has been studied often in recent years, with emphasis on interactivity and naturalness. One mode of control that has not been studied as the primary navigation control is head tracking. This project focused on using head tracking to control an Unmanned Aerial Vehicle (UAV) in an indoor environment. Five control schemes were developed and compared to a ubiquitous game controller. My contribution to this work was developing ROS nodes for the head tracker (C++), HMD (C++/OpenGL), and control node (C++), as well as conducting the user study and analyzing the resulting data using SPSS. This work was published in IUI 2014.

Multimodal Interfaces for Robot Control   **University of Central Florida (Orlando, FL, USA)**
December 2012 – September 2013
Typical control stations for a group of robots include a large number of joysticks and assorted button for switching control modes and targets. This project aimed to reduce the cognitive load on operators by using a combination of body and hand gestures that better represented the robots' movements than a simple button press. The three selected robots were a humanoid robot, a flying UAV, and a scorpion-like robot. My contributions to this project included literature review and developing the UAV control class in C++.

Image Localization using Panoramio   **University of Central Florida (Orlando, FL, USA)**
May 2011 – October 2011
Image localization relies heavily on the density of the source dataset. Prior work using a systematically gathered dataset from Google Maps StreetView showed good performance for localization. The goal of this project was to test the performance of the previously developed system on a less structured dataset collected from image sharing webpages such as Flicker, Picasa, and Panoramio. I developed web crawlers for each of the repositories in Python that queried the servers via their respective APIs. Analysis of the data was done using MATLAB. This work was part of the Research Experience for Undergraduates in Computer Vision program.

Publications

Conference Publications

- Song, J., Newton, O., Fiore, S., Coad, J., Clark, J., **Pittman, C.**, & LaViola Jr, J. J. (September 2018). Examining the Impact of Training and Feedback on Visualization-Supported Decision Making under Uncertainty. Proceedings of the Human Factors and Ergonomics Society Annual Meeting.
- Fiore, S., Song, J., Newton, O., **Pittman, C.**, Warta, S., & LaViola Jr, J. J. (July 2018). Determining the effect of training on uncertainty visualization evaluations. International Conference on Applied Human Factors and Ergonomics.
- **Pittman, C.** & LaViola Jr, J. J. (May 2017). Multiwave: Complex Hand Gesture Recognition Using the Doppler Effect. Proceedings of the 43rd Graphics Interface Conference.
- Taranta, E., Samiei A., Maghoumi, M., Khaloo, P., **Pittman, C.**, & LaViola Jr, J. J. (May 2017). Jackknife: A Reliable Recognizer with Few Samples and Many Modalities. Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems. **[Best Paper Honorable Mention]**
- Taranta, E., Maghoumi, M., **Pittman, C.**, & Laviola Jr, J. J. (October 2016). A Rapid Prototyping Approach to Synthetic Data Generation for Improved 2D Gesture Recognition. Proceedings of the 29th Annual Symposium on User Interface Software and Technology.
- **Pittman, C.**, Wisniewski, P, Brooks, C., & LaViola Jr, J. (May 2016). Multiwave: Doppler Effect Based Gesture Recognition in Multiple Dimensions, Proceedings of the 34th Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems.
- **Pittman, C.**, Taranta. E., and LaViola, J. (March 2016). A $-Family Friendly Approach to Prototype Selection, Proceedings of the 2016 ACM International Conference on Intelligent User Interfaces.

- **Pittman, C.** and LaViola, J. (February 2014). Exploring Head Tracked Head Mounted Displays for First Person Robot Teleoperation, Proceedings of the 2014 ACM International Conference on Intelligent User Interfaces.

Book Chapters

- LaViola Jr, J. J., Buchanan, S., & **Pittman, C.** (2014). Multimodal Input for Perceptual User Interfaces. Interactive Displays: Natural Human-Interface Technologies.

Patents

- Taranta, E., Maghoumi, M., Pittman, C., & Laviola Jr, J. J. (2018), Synthetic Data Generation of Time Series Data, US Patent App. 15/651,219

Professional Activities

Paper Reviewer

- Conference Full Paper Reviewer (1 papers), the 18th IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2019)
- Conference Full Paper Reviewer (2 papers), the 17th IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2018)
- Journal Paper Reviewer (1 paper), Virtual Reality (Springer 2018)
- Conference Full Paper Reviewer (1 paper), the 2017 Annual Symposium on Computer-Human Interaction in Play (CHI PLAY 2017)
- Conference Poster Reviewer (3 posters), the 14th IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2015)
- Conference Full Paper Reviewer (1 paper), the 13th IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2014)

Presentations

- Poster presenter for "Multiwave: Doppler Effect Based Gesture Recognition in Multiple Dimensions" at Annual ACM on Human Factors in Computing Systems (CHI), San Jose, CA, May. 2016
- Presenter for "A $-Family Friendly Approach to Prototype Selection" at International Conference on Intelligent User Interfaces (IUI), Sonoma, CA, Mar. 2016
- Poster presenter for "Exploring Head Tracked Head Mounted Displays for First Person Robot Teleoperation" at International Conference on Intelligent User Interfaces (IUI), Haifa, Israel, Feb. 2014

Conferences Attended

- April 2018: Conference on Human Factors in Computer Systems (CHI), Montreal, QC, Canada
- May 2017: Graphics Interface Conference (GI), Edmonton, AB, Canada
- May 2017: Conference on Human Factors in Computer Systems (CHI), Denver, CO
- May 2016: Conference on Human Factors in Computer Systems (CHI), San Jose, CA
- Mar 2016: International Conference on Intelligent User Interfaces (IUI), Sonoma, CA
- Apr 2014: Conference on Human Factors in Computer Systems (CHI), Toronto, ON, Canada
- Feb 2014: International Conference on Intelligent User Interfaces (IUI), Haifa, Israel
- Apr 2013: IEEE Virtual Reality 2013 (IEEE-VR), Orlando, FL

Skills

Programming Languages
C# (4 years), C/C++ (7 years), Python (3 years), Java (7 years)

Web Programming
  HTML, JavaScript (3 years), CSS, OpenLayers3

Libraries & Tools
  Unity3D, Adobe Creative Suite, MATLAB, SPSS, R, ROS, V-Rep, OPENGL, CUDA, Kinect SDK

Fitness Interests:
  Rock Climbing/Bouldering (5.12/V7), Distance running (completed 6 half marathons)

Relevant Coursework

- **Doctorate:** Computer Graphics (WebGL), Bioinformatics, Computer Vision, Computational Complexity
- **Master's:** Algorithms & Analysis, Pen-Based User Interfaces, 3D User Interfaces, 3D Computer Vision, Evolutionary Computation, Parallel Programming
- **Bachelor's:** Robot Vision, Computer Graphics (OpenGL), AI for Game Programming