Monthir Ali

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Education

Dec 2024	PhD.: Computer Science University of Utah – Salt Lake City, Utah
Nov 2014	Bachelor of Science: Electrical and Electronic Engineering University of Khartoum – Khartoum, Sudan

Research Interest

- Artificial Intelligence
- Virtual Reality
- Human-Computer Interaction
- User Experience

Experience

Jan. 2017 – Present

Salt Lake City, University of Utah

Research Assistant

Navigating Event Boundaries in Virtual Reality (Jan. 2019 – Dec. 2024):

- Studied the effect of two types of visual cues on event segmentation and spatial memory during a virtual reality navigation task.
- Developed a virtual environment experiment to obtain final data for my dissertation topic which included features such as modulation techniques and eye tracking.
- Conducted a post-study analysis to determine whether these visual cues affect event segmentation and/or improve spatial memory and retention.

Virtual Reality Modules for MATH 1050 (Jan 2024 - Present):

- Served as a UX/VR expert to help design VR labs for the course MATH 1050 at the University of Utah.

- Served as a member of the design team which created the blueprints for VR engineers to carry out.
- Created Evaluation plans/documents and performed internal and external playtesting for each lab.

World-space Cueing: A Subtle Gaze Direction Modulation Technique for VR (Aug 2023 – Jan 2024):

- Developed a geometrically-compact modulation technique for subtle gaze guidance for HMD-based VR.
- Developed an Urban city VR environment to serve as a test environment.
- Gauged the efficacy of World-space Cueing technique in guiding users' gaze to object in their periphery.
- Results revealed the ability of World-space Cueing to guide attention in HMD-based VR while simultaneously mitigating distortion issues.

Computationally Simulating Gaze Guidance effect on Event Segmentation in VR (Jan 2023 – Aug 2023):

- Simulated the effect of two types of spatial cues (overt and covert) event segmentation via gaze guidance in Virtual Reality.
- Modeled gaze guidance through modification to The Fluid Events Model, a computational model that predicts the likelihood of changing actions in ongoing events.
- Results demonstrate the ability to explain the influence of spatial cues on gaze guidance and event segmentation in Virtual reality.

Project Alchemy: Simulating Human Narrative Sensemaking (Jan. 2023 – Jan. 2024):

- Developed code for the Inference module; a module which addresses story causal coherence and script anticipation and attempts to fill the narrative gaps.
- Incorporated the inference module into the TITAN planner; a planner A plan-space planner capable of reasoning about time and hierarchy.

Project CODE Switch: Mitigating Implicit Bias (Jan 2022 – Dec 2022):

- Developed a 2D serious (educational) game in Unity to train and teach faculty members about implicit bias during the hiring process of new faculty members.
- Piloted a prototype of the game and studied the effects of the game on a small sample size.

Spatial Gist Memory (Aug 2020 – Dec 2021):

- Participated in building the virtual environment to study the effect of navigation through a virtual city on spatial memory.
- Developed java code to extract data after participants finished the experiment.

- Developed python script to analyze and measure extracted data and draw comparisons.

Effect of Virtual Reality Input Devices on Interactive Fidelity (Jan 2018 - May 2020):

- Developed a first-person shooter (FPS) game in Unity using C#.
- Studied and measured performance effects of two input devices used by participants playing the game.
- Conducted post-study analysis to determine which device allowed for better user engagement.

Air Cam (May 2017 – August 2017):

- Developed code on a RaspberryPi connected to a camera to automate taking photos.
- Developed Python script to analyze photos and calculate air pollution factor.

Smart Glasses (Jan 2017 – May 2017):

- Developed code on RaspberryPi to allow for eye tracking using a small camera.
- Developed python code that changes glasses focus based on the eye tracking output

Feb. 2015 – Jan. 2017

Khartoum, Sudan

Software Engineer, BananIT

- Participated in the design of systems to be developed for clients.
- Performed unit testing on developed code.
- Participated in design and code reviews.
- Actively participated in the Agile Scrum process with the team.

Oct. 2014 – Jan 2015

Khartoum, Sudan

VR Software Engineer Intern, Blueprint Technology

- Developed python script to control an interactive virtual reality experience.
- Integrated and calibrated an IMU sensor to adjust for orientation.
- Ran a pilot study to collect preliminary data.
- Built a prototype device to run the VR experience on.

Skills

- Microsoft Office
- VR perception and Interaction
- Programming (C#, Python, C++)
- VR Experiment Design & Development (Unity)
- Design Tools (Unity, Blender)
- User Experience (UX) Design for VR
- Data Analysis (Python,R
- Game Development (Unity)
- Software Design & Implementation
- Frameworks (Visual Studio, Linux, Windows)
- Test Automation & Source Control (Git)
- Data Management
- User Studies & Evaluation
- Modeling
- VR Technology (Focus3, VIVE, Index)
- Communication

Publications

1. Monthir Ali, Po-Jui Huang, Rogelio E. Cardona-Rivera. World-space Cueing: A Geometrically-compact Modulation Technique for Subtle Gaze Direction in Head-mounted Virtual Reality Displays. In Proceedings of the 7th IEEE International Conference on Artificial Intelligence & eXtended and Virtual Reality. 2025.

2. Monthir Ali, Rogelio E. Cardona-Rivera. Computationally Simulating the Effect of Gaze Guidance on Interactive Event Segmentation within Immersive Virtual Environments. In Proceedings of the 7th IEEE International Conference on Artificial Intelligence & eXtended and Virtual Reality. 2025.

3. Michael Clemens, Nancy N. Blackburn, Rushit Sanghrajka, Monthir Ali, Shilpa Thomas, M. Gardone, Hunter Finney, and Rogelio E. Cardona-Rivera; A Case-Based Reasoning Approach to Plugin Parameter Selection in Vocal Audio Production. 2022.

4. Monthir Ali and Rogelio E. Cardona-Rivera; Comparing Gamepad and Naturally-mapped Controller Effects on Perceived Virtual Reality Experiences. In Proceedings of the 2020 ACM Symposium on Applied Perception, 2020.

Public and Professional Service

- Reviewer for AIIDE 2023 (The Artificial Intelligence for Interactive Digital Entertainment) Conference as well as an artifact (software) tester.
- Secretariat of Khartoum's ACM Professional Chapter, the first Chapter in Sudan
- Member of Institute of Electrical and Electronic Engineering (IEEE) in Sudan

Awards

- University of Utah Teaching Grant: The VR Sim Lab. Rogelio E. Cardona-Rivera (PI), Michael P. Clemens (Co-PI, de facto), and Monthir Ali (Co-PI, de facto). August 2022-December 2022.
- Research Assistantship (University of Utah 2017)
- Teaching Assistantship (University of Utah 2020 | University of Khartoum 2015)
- Graduates' (Electrical & Electronic Engineering Student Exhibition (EEESE) 1st Prize, 2015
- Top 100 outstanding students in Sudan's College entrance exams (ranked 48th)—Included the Outstanding Students Forums (OSF) Fellowship to cover tuition fees for undergraduate studies and an educational expedition to Mecca, Saudi Arabia.

References

- Prof. Rogelio E. Cardona-Rivera.
  Assistant Professor and Founding Faculty of the Division of Games, and Adjunct Assistant Professor in the Kahlert School of Computing and the Department of Psychology at the University of Utah. Email: r.cardona.rivera@utah.edu

- Prof. Sharief Babikir.
  Assistant Professor in the Electrical Engineering Department at the University of Tennessee at Chattanooga. Email: sharief-babikir@utc.edu

- Prof. Jeanine Stefanucci.
  Professor in the Psychology Department at the University of Utah and an adjacent faculty member at the Kahlert School of Computing. Email. Email: jeanine.stefanucci@psych.utah.edu