Disha Sardana

Recently graduated, interdisciplinary Ph.D. at Virginia Tech

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Education

PH.D., INTERDISCIPLINARY
Virginia Tech, Blacksburg, VA, USA — May 2023 | Cum. GPA: 3.88 / 4.0

M.S., ELECTRICAL ENGNEERING
Virginia Tech, Blacksburg, VA, USA — May 2018 | Cum. GPA: 3.85 / 4.0

Skills

RESEARCH
User Studies • Experimental Design • Hypothesis Testing • Surveys • Mixed-Methods Research • Qualitative & Quantitative Methods • Interviews • Usability Testing • Thematic Analysis • Machine Learning

PROGRAMMING
Python • R • MATLAB • C# • Javascript

TOOLS/ DEVICES
HoloLens 2 • Magic Leap 1 • HoloLens 1 • Unity3D • Git • Visual Studio • Miro • Figma • Max/MSP

Experience

LEAD IMMERSIVE ANALYTICS RESEARCHER
Demo I | Demo II | Creativity + Innovation Day-Article | Student Spotlight

Jan 2019 – May 2023 | Center for Human-Computer Interaction (CHCI) at VT

- Developed and tested an approach for embodied data exploration of multi-dimensional datasets in an immersive **mixed reality (MR)** environment using HoloLens 2
- Demonstrated the proof-of-concept at a science fair (ICAT Creativity + Innovation Day 2019) and gathered user feedback from a diverse general audience (over **20 users**)
- Designed, conducted and analyzed a research study with **34 participants** to evaluate the strengths and limitations of analyzing data in a 3D immersive environment compared to a non-immersive WebGL desktop environment based on accuracy and task completion times of specific visual analytics tasks
- Recommended design guidelines for doing data analytics in an MR environment based on frames of reference by assessing user performance, presence, rank order, and subjective user feedback
- Designed, conducted, and analyzed 90-minute in-person research sessions with **55 participants** to quantify the impact of audio on augmenting visual data analysis in MR environments using real-world space weather datasets
- Performed thematic analysis on the collected data and compared task metrics such as the number of patterns identified by users, their confidence level, task responses, NASA-TLX, and SUS questionnaire between audio-visual and visual-only scenarios
- Conducted a user study at a space weather conference (CEDAR 2023) and collected data from **43 space science experts** to broaden the demographics in order to more rigorously quantify and assess the potential impact of XR technologies on educational and analysis tools and techniques
- Wore many hats through various projects as a designer, coder, engineer, and artist, and learned to work with people from different backgrounds, communicate research across disciplines, and look at a problem from diverse perspectives

LEAD RESEARCHER ON AN NSF-FUNDED PROJECT
Spatial Audio Data Immersive Experience (SADIE) - NSF Funded Project | WVTF-Article | VT-News

Aug 2017 – Jul 2020 | Institute for Creativity, Arts, and Technology (ICAT) at VT

- Designed a new motion-tracking glove to enable user interaction with immersive sound environments utilizing **motion capture systems**
- Programmed the logic to recognize 3-dimensional gestures (such as pinch, zoom, etc.) from real-time coordinates of various glove elements

- Tested and debugged the system by conducting beta-testing with around 40 users
- Conducted in-person user studies with over **150 users** to study the human perception of sound in an immersive multi-layered auditory environment
- Performed hypothesis testing and **statistical analysis** (including t-test and ANOVA) on user data, leading to four publications in prestigious audio-related conferences

Projects

STUDY OF GEOMAGNETIC SOLAR STORMS USING MACHINE LEARNING

Best Presentation Award

Aug 2015 - May 2018 | Center for Space Science and Engineering Research at VT

- Presented a study of large solar storms occurring from 2000-2018 to quantify their effects on the Total Electron Content (TEC) in the ionosphere over the U.S. sector
- Studied the strength of influence of various storm parameters on the TEC using tree-based **machine learning** techniques, such as, random forest
- Used AWS, Python, and scikit learn to build a pipeline to fetch and ingest ionospheric data (order of 10s of GBs) to train and test machine learning models
- Work won **student presentation award** at the AMS 98th Annual Meeting (2018)

AN INTERACTIVE AUGMENTED REALITY BOARD GAME

Best Poster Award | Game Design

Jan 2019 - Dec 2019 | Center for Human-Computer Interaction (CHCI) at VT

- Designed and prototyped an "Interactive Augmented Reality (AR) Board Game for Recruiting Prospective Students", as an innovative recruitment strategy to promote playful information delivery and collective decision-making
- Game design was achieved through various research methods such as focus groups, semi-structured interviews, personas, formative evaluation, and usability studies
- Led the development of the AR component of the game using Vuforia and Unity3D
- Communicated findings to the stakeholders at the university
- Work won the best poster award at the Center for Human-Computer Interaction Student Symposium, Blacksburg, VA, in May 2019.

Selected Publications [Full List on Google Scholar]

- **Sardana, D.**, Chandrashekhar, N. D., Gračanin, D., Matković, K., & Earle G. D., "Iterative Design of an Immersive Analytics Environment," in **HCII 2023**.
- **Sardana, D.**, Kahu, S. Y., Gračanin, D., & Matković, K., "Multi-modal Data Exploration in a Mixed Reality Environment Using Coordinated Multiple Views," in **HCII 2021**.
- **Sardana, D.**, Joo, W., Bukvic, I. I., & Earle, G. D., "Perception of spatial data properties in an immersive multi-layered auditory environment," in **ACM AM 2020**.
- **Sardana, D.**, Joo, W., Bukvic, I. I., & Earle, G., "Introducing Locus: A NIME for immersive exocentric aural environments," in **NIME 2019**.
- **Sardana, D.**, "Quantification of Effect of Solar Storms on TEC over US sector Using Machine Learning," **Thesis (2018)**, Virginia Tech.

Leadership

- **President** | CHCI Student Council, Inaugural Chapter at Virginia Tech, 2022-2023
- **Co-Founder & VP** | Kala - Indian Classical Music Society, 2018-2022
- **Event Coordinator** | Eta Kappa Nu (IEEE-HKN) Honor Society, 2017-2018
- **President** | Indian Students Association at Virginia Tech, 2015-2019

Honors

- Received an honorable mention for the **IEEE VAST Challenge 2022**
- Awarded NSF scholarship for the Student ThinkTank at the **ICAD '19**
- Received a student presentation award at the **AMS 98th Annual Meeting** for exceptional research & presentation
- Invited **reviewer** for technical submissions, full papers and posters at 7 conferences and 1 journal paper in the past 4 years.
- Inducted life member of **Phi Kappa Phi**