

Gyanendra Sharma, Ph.D.

✉ gyanendra.sharma870@gmail.com

in Gyanendra Sharma

🔖 Scholar

👤 Webpage

HMI Researcher at Audi of America, working on design and execution of research projects in the domain of **semi autonomous vehicles and ADAS with the aim of maximizing safety** and usability. **5+ years of HCI experience** in academia and industry.

Education

- 2014 – 2019 **Ph.D., Rensselaer Polytechnic Institute** Department of Computer Science.
Thesis title: *Spatially Aware Interactions in Large Scale Immersive Environments*.
Research Area: **Human Computer Interaction**, Computer Vision
Advisor: Dr. Richard J. Radke
- 2009 – 2013 **Bachelors of Arts, Connecticut College**
Majors: Mathematics and Computer Science
Advisors: Dr. Ozgur Izmirli and Dr. Christopher Hammond

Skills

Languages	Fluent in English, Nepali and Hindi.
HCI Research	Human Subject Experimental Design, Human Vehicle Interaction, Statistical Inference, Psychophysical Experiments, Prototyping Hardware Software Systems
Programming Languages	Python, MATLAB, R, Javascript, C++, C#
AI Tools	Tensorflow, Keras, generative AI
Others	RabbitMQ, Websocket, Node.js, AWS, Atlassian tools (Jira, Confluence)

Relevant Experience

- 2023 – **Senior HMI Researcher**, Audi of America, ADAS.
- Co-lead the design and execution of **in-vehicle driving studies** exploring the usability and acceptance of hands-free urban driving for level 2+ systems.
 - **Presented study results to primary stakeholders (Audi AG, Porsche AG) and management** through presentations, workshops and discussions, that lead to direct influence on product decisions for future ADAS systems.
 - **Lead the instrumentation, data collection and analysis efforts on eye tracking of study participants using the Smart Eye Pro system** for all in-vehicle studies.
- 2021 – 2023 **HMI Researcher**, Toyota Research Institute/Woven Planet, NA.
- Investigated acceptance and mental model of a **continuous steering guidance system with and without visual feedback through HUD** by designing a within-subject AB test-study in a table top simulator.
 - Designed and conducted a **psychophysical experiment** to determine the detection threshold of asynchrony between vibration and audio in a **force feedback steering wheel (Sensodrive) for an ADAS based interaction concept**.
 - Investigated the perception of **vibration warnings in a force feedback steering wheel as part of an interaction concept** by applying a psychophysics based method called MLDS and showed that the relationship is linear.
 - Worked closely with **university collaborators** (Cornell University) and interaction designers to **develop and validate through user studies, mixed reality applications for automated and semi-automated vehicles**.

Relevant Experience (continued)

2019 – 2020

■ **Postdoctoral Researcher**, Network Science Institute, Northeastern University.

- Studied key metrics for verbal and non-verbal human behavior, focusing on leadership in the context of small group interactions by applying **statistical methods (t-test, regression models, multi-level modeling)**.
- **Conducted a meta-study** to outline the scope and current state of **verbal and non-verbal behavior research** in the context of small group interactions.

2014 – 2019

■ **Ph.D Student**, Rensselaer Polytechnic Institute.

- Led the instrumentation of an indoor space with camera arrays and implemented a multi-person location and orientation tracking system to **apply it on interaction concepts**.
- Investigated through human subject experiments, **usability and workload of multi-modal interaction inputs**; voice, gestures, user locations and mobile devices to interact with a large physically immersive space.
- **Prototyped and conducted pilot studies** to rapidly iterate over various *user-to-smart room* interaction concepts, using devices ranging from ubiquitous (mobile) to more uncommon ones (Leapmotion) alongside voice, gestures, user location and orientation.
- **Sample Project Link:** <https://bit.ly/2ZLNhY9>

Research Publications

- 1 F. Bu, S. Li, G. Sharma, W. Ju, *et al.*, “Extending driving simulation from lab to the road,” *Accepted at CHI*, 2024.
- 2 R. Lange, R. J. Radke, G. Sharma, *et al.*, “Multimodality in group communication research,” *Submitted to Journal of Organizational Research Methods*, 2024.
- 3 G. Sharma, H. Yasuda, and M. Kuehner, “Continuous visual feedback of risk for haptic lateral assistance,” *arXiv:2301.10933*, 2023.
- 4 G. Sharma, H. Yasuda, and M. Kuehner, “Detection threshold of audio haptic asynchrony in a driving context,” *arXiv:2307.05451*, 2023.
- 5 G. Sharma and R. J. Radke, “Multi-person spatial interaction in a large immersive display using smartphones as touchpads,” in *Proceedings of the 2020 IntelliSys, Volume 3*, Springer, 2021, pp. 285–302.
- 6 D. Jivani, G. Sharma, and R. J. Radke, “Occupant location and gesture estimation in large-scale immersive spaces,” in *Living Labs Workshop, CHI*, 2018.
- 7 G. Sharma, D. Jivani, and R. Radke, “Manipulating screen elements in an immersive environment with a wrist-mounted device and free body movement,” in *Living Labs Workshop, CHI*, 2018.
- 8 G. Sharma, J. Braasch, and R. J. Radke, “Interactions in a human-scale immersive environment: The craive-lab,” in *Cross-Surface 2016, ACM International Conference on Interactive Surfaces and Spaces*, 2017.
- 9 Ö. Izmirlı and G. Sharma, “Bridging printed music and audio through alignment using a mid-level score representation,” in *ISMIR*, 2012, pp. 61–66.

Patents

- 2022 ■ H Yasuda, M Kuehner and G Sharma, J Mathews, J Braasch, R J Radke, D Jivani, *Systems and Methods for Enhancing Operator Vigilance*, U.S. Pat. App. No. 18/095,286.
- G Sharma, J Mathews, J Braasch, R J Radke, D Jivani, *Multi-Sensor Systems and Methods for Providing Immersive Virtual Environments*, PCT/US2022/051474.
- 2017 ■ G Sharma, M Nawhal, A Prakash, P Kumar, M Jain, A Singhee and A Shah, *Hybrid Virtual and Physical Jewelry Shopping Experience*, US 2018/0357702 A1.