

Gyanendra Sharma, Ph.D.

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in Gyanendra Sharma

🔖 Scholar

👤 Webpage

Senior HMI Researcher at Audi of America with **5+ years of HCI experience** in academia and industry. Currently 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.

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.
 - **Led 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, *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.