Gyanendra Sharma, Ph.D.

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Senior HMI Researcher with over 7 years of experience in human-computer interaction and user experience design. Adept at creating user flows, wireframes, and prototypes to solve complex customer problems and enhance usability. Strong advocate for high-quality design and user-centered solutions.

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**
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-led in-vehicle driving studies on **usability, acceptance, and situational awareness** of hands-free driving systems, using **qualitative (eg: user interviews) and quantitative (inferential statistics) research** to derive data-driven conclusions.
- Presented study results to primary stakeholders **(Audi AG, Porsche AG)** through workshops and discussions, **influencing product decisions for future ADAS systems**.
- **Led efforts on eye-tracking instrumentation and data analysis** using Smart Eye Pro system.

2021 – 2023 **HMI Researcher,** Toyota Research Institute/Woven Planet, NA.

- Designed and conducted **within-subject AB testing study** for continuous steering guidance system, incorporating visual feedback through HUD.
- Designed and conducted **psychophysical experiment** to determine the detection threshold of asynchrony between vibration and audio in steering wheel interactions.
- Investigated the **perception of vibration warnings** in a force feedback steering wheel by applying a psychophysical method, demonstrating a linear relationship.
- Collaborated with Cornell University and designers to **develop and validate mixed reality applications** for automated vehicles through user studies.

Relevant Experience (continued)

2019 – 2020 **Postdoctoral Researcher**, Network Science Institute, Northeastern University.

- Analyzed key metrics for verbal and non-verbal human behavior, focusing on leadership in small group interactions using **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. Izmirli 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.