Praneet Kumar Sahoo

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Education

Master of Science in Kinesiology (Grade - 90/100)
Human Factors, University of Windsor, Canada — *September 2022 - April 2024*

Bachelor of Technology in Biotechnology (CGPA - 8.98)
Biotechnology, National Institute of Technology Durgapur, India — *August 2018 - May 2022*

Research Interest

Self Driving Vehicles, Automotive Systems, Human Factors, Human-Machine Interface (HMI), User Experience (UX), Virtual Reality, Machine Vision, Artificial Intelligence, AI Automation, Human Centric Design

Technical Skills

- **Tools:** Figma, Unreal Engine, MATLAB, CATIA, Ansys, GIMP, SPSS
- **Programming Languages & Web:** Python, R Studio (R), C, C++, Java, HTML, JavaScript
- **AI/ML Frameworks:** PyTorch, TensorFlow, YOLO, MediaPipe, OpenPose
- **AI Automation:** n8n Workflows, API Integrations, Generative AI Tools

Work Experience

- **Research Associate** (*Human System Labs, University of Windsor, 2024-Present*): Project lead, experiment design, data collection, analysis, literature reviews, report authoring, methodology development, team management, mentoring.
- **Research Assistant** (*Human System Labs, University of Windsor, 2022-24*): Data collection, analysis, experimental support, report drafting, team collaboration.
- **Graduate Assistant** (*Dept. of Kinesiology, University of Windsor, 2022-24*): Faculty support, teaching assistance, administrative tasks.

Projects

Real-Time Driver Behavior Detection Using AI and Machine Vision
Human System Labs — *2025-Present*
- Developed software to analyze driver behavior using YOLO, MediaPipe, Pytorch & Tensorflow.
- Integrated gen-AI APIs to assess glance allocation and distractions for road safety analysis.
- Studied driver behavior patterns and distraction levels across different driving modes using machine vision.

Real-Time Posture Detection & Feedback Using Machine Vision
Human System Labs — *2025-Present*
- Built an OpenPose-based system for real-time posture monitoring in healthcare settings.
- Designed an Arduino Uno R4 WiFi device to alert on posture risks, improving worker safety.

Evaluating Cognitive Workload: Projection vs. Software Based Guidance
Human System Labs & Atlas Copco — *2025-Present*
- Compared UX of laser projection vs. software guidance for EV battery pack assembly.
- Assessed eye metrics to evaluate impact on engagement, efficiency, and workload.

Workload Analysis Across Industrial Workstations
Human System Labs, TRQSS & Atlas Copco — *2025*
- Collected worker data to assess workload variations across workstations and shifts.
- Analyzed findings to optimize performance efficiency in industrial settings.

Comparing Cognitive Workload Across Different Modalities of Instruction
Human System Labs — *2024*

- Created a VR environment to study workload in assembly manufacturing processes.
- Compared cognitive workload and performance across laser, pictorial, and video guidance.

Transportation Safety: Driver Distraction in BIAs and School Zones
Human System Labs & Windsor Police Department *2024*
- Analyzed driver distraction patterns in BIAs and school zones to enhance traffic safety.
- Partnered with police to develop data-driven measures reducing transportation risks.

Blink Detection AI for Driver Safety
Human System Labs *2024*
- Developed a CNN-based blink detection model using NVIDIA TinyCUDA.
- Processed real-time video to enhance driver safety awareness.

Driver Workload in Manual vs. Automated Driving
Human System Labs & Ministry of Transportation, Ontario *2023*
- Compared driver attention and cognitive load on ON-401 for manual and automated vehicle safety.
- Analyzed physiological data such as heart rate, DRT, and eye tracking data.

Situation Awareness and Cognitive Workload in VR Driving
Human System Labs *2022-24*
- Designed a VR based autonomous driving scenario to study situational awareness(SA).
- Assessed cognitive workload and SA using eye tracking, NIRS, and DRT.

Off road vehicle designing & driver ergonomics for SAE BAJA
NIT Durgapur & SAE BAJA *2019-21*
- Led team strategy & oversaw complete vehicle design as the Vice-Captain
- Designed & manufactured a BAJA vehicle and assessed ergonomics using RULA and REBA.
- Fabricated and tested suspension systems to optimize driver comfort and vehicle stability.
- Evaluated roll cage design and crash dynamics to enhance driver protection and fabricated it.

Publications

- Sahoo, P., & Biondi, F. N. (2026). "On the Effect of Using an Augmented Reality Laser Projection Operator Guidance System on Cognitive Workload and Assembly Task Performance", *Applied Ergonomics*, 130, 104662.
- Sahoo, P., Bain, A. J., & Biondi, F. N. (2025). "Investigating the Interplay between Cognitive Workload and Situation Awareness during Full Driving Automation", *Theoretical Issues in Ergonomics Science*, 26(4), 457-477.
- Biondi, F., Sahoo, P., & Jajo, N. (2025). "The Distraction Potential of Driving a Partially Automated Vehicle through a Construction Zone", *Scientific Reports*, 15(1), 8539.
- Li, Y., Sahoo, P., Vasta, N., & Biondi, F. (2025). "Stabilization Time after Mode Switch in Conditionally Automated Driving: Focusing on Drivers' Cognitive Load and Visual Attention", *Transportation Research Record*.
- Sahoo, P. K., & Biondi, F. (2025). "On the Effect of Laser Projection Operator Guidance on Cognitive Workload and Task Performance", *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 69(1).
- Sahoo, P. K. (2024). "Exploring the Potential for Metrics of Cognitive Workload to Measure Situational Awareness", *Master's Thesis*, University of Windsor, Canada.

Achievements

- **Mitacs Award (2024-25)**: Research collaboration and innovation.
- **Ontario Graduate Scholarship (2023 & 2024)**: Academic excellence and research potential.
- **Dean's Honor Roll (2023)**: Exceptional graduate coursework performance.
- **Ignite & Entrance Scholarships (2022-23)**: Leadership, academic excellence, and community contributions.

Volunteering

- **Windsor Symphony Orchestra** Volunteered in various capacities to support performances and community outreach initiatives, enhancing the cultural landscape of the region.

Hobbies & Activities

Reading, Listening to Podcasts, Martial Arts, Combination Boxing, Calisthenics and Cube Solving