Sneha Gupta

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SUMMARY

Aspiring Researcher in Artificial Intelligence and Human–Robot Interaction with core expertise in safe reinforcement learning, human-aware control, and predictive intent modelling. Experienced in developing safety-constrained RL frameworks, runtime assurance mechanisms using CBF-QP shielding, and simulation-driven shared-control systems for assistive robotics. Strong background in machine learning, model-based control, cybersecurity-aware intelligent systems, and interpretable AI. Skilled in building real-world applications including health-focused AI assistants and autonomous interaction models. Seeking PhD opportunities to advance reliable, safe, and human-centric autonomous systems grounded in rigorous learning-based control.

WORK EXPERIENCE

Junior Research Assistant, Maharaja Agrasen Institute of Technology   Mar 2024 – Present **(GGSIPU)**

– Assisting in AI, Machine Learning, and Robotics research projects focused on safe autonomous systems and human–robot interaction.

– Developing simulation environments and ML pipelines for RL and control-based experiments with reproducible code and evaluations.

– Supporting literature reviews, manuscript preparation, and lab demonstrations for student and faculty research projects.

Frontend Developer, Tendr (Startup)   Jul 2025 – Present

– Developed interactive, responsive UI components using HTML, CSS, JavaScript, and modern frontend practices.

– Collaborated with design and backend teams to deliver seamless digital experiences.

– Ensured cross-browser compatibility, responsive design, and performance improvements.

– Worked in an agile environment contributing to debugging, new features, and rapid iteration cycles.

Data Analyst, Cognifyz Technologies   Aug 2025 – Sep 2025

– Performed data cleaning, preprocessing, and transformation using Python and Pandas.

– Conducted EDA and created trend reports identifying business performance patterns.

– Built interactive dashboards using Power BI to support insight-driven decisions.

– Improved analytical workflows in collaboration with mentors.

PROJECTS

Safe Reinforcement Learning for Human–Robot Shared Control   [GitHub Link]

A state-of-the-art benchmarking framework evaluating Safe RL algorithms in human–robot shared control. Includes SAC-Lagrangian, TD3-Constrained, TRPO/PPO-Lagrangian, RCPO, and classical baselines (MPC, LQR). Features cross-domain evaluations, human behaviour models, safety metrics, and publication-quality visualizations.

HealthBot Chat Assistant   [GitHub Link]

AI-powered health assistant built using Streamlit and Google Gemini Pro for symptom analysis and structured medical responses. Supports conversational memory, safe-response protocols, remedies, risk factors, and doctor-advice prompts with a clean, interactive UI. Live App: [HealthBot].

Model-Based RL for Predictive Human Intent Recognition

Developed a modular framework integrating human-behaviour modelling, Bayesian intent prediction, MPC, and Bayesian RL for anticipatory human–robot interaction. Predicts gestures, trajectories, and motion intent under uncertainty with full experiment pipeline and visualization tools.

EDUCATION

2022 – Present	**B.Tech in Information Technology**, Maharaja Agrasen Institute of Technology (GGSIPU), Delhi
	Relevant Coursework: Data Structures & Algorithms, OOP, DBMS, Operating Systems, Computer Networks, AI, ML, Cloud Computing.
2022	**Senior Secondary Education (Class 12), CBSE**, DAV Public School, Shrestha Vihar — Percentage: 84%
2020	**Secondary Education (Class 10), CBSE**, DAV Public School, Shrestha Vihar Percentage: 90%

PUBLICATIONS

1. Sneha Gupta. *Safe Reinforcement Learning for Human-Robot Shared Control*. TechRxiv Preprint, 2025. **DOI** (Under journal review).

   - **Methodological novelty:** Introduces the first unified benchmarking framework for Safe RL in shared-control robotics, featuring a real-time CBF–QP shield and evaluating safety, performance, and human factors under realistic conditions, with validated sim-to-real transfer.

2. Sneha Gupta. *Constrained Policy Optimization for Safe Robotic Learning: A Theoretical Framework*. (Manuscript in Progress)

   - **Methodological novelty:** Provides theoretical stability guarantees for CPO by establishing boundedness of dual multipliers and introduces the first PAC-style probabilistic safety bounds for constraint satisfaction under uncertainty.

SKILLS

Programming & Frameworks	Python (NumPy, Pandas, Scikit-Learn, PyTorch), Java, C++, JavaScript, HTML/CSS, React.js, Node.js, Streamlit, MATLAB, SQL (PostgreSQL, MySQL), Git/GitHub
Machine Learning & AI	Safe RL (CPO, PPO-Lagrangian, TD3-Constrained), Bayesian RL, Human-Robot Interaction Models, Intent Prediction, NLP , Anomaly Detection, Model Evaluation & Optimization
Robotics & Control	Model Predictive Control (MPC), Control Barrier Functions (CBF-QP), Safety-Constrained Learning, Human Behaviour Modelling, Motion Planning under Uncertainty, Shared-Control Systems
Data & Analytics Tools	Power BI, Tableau, Advanced Excel, EDA, Feature Engineering, Statistical Analysis, Visualization (Matplotlib, Seaborn)
Cloud & Deployment	Google Cloud (Gemini API), AWS (Basics), Firebase, API Integration, Streamlit Deployment, Environment Configuration
Cybersecurity Foundations	Secure System Design, Anomaly Detection Models, Cisco Packet Tracer, Cybersecurity Protocols, Risk Mitigation
Soft Skills	Problem-Solving, Research & Analysis, Team Collaboration, Adaptability, Communication, Critical Thinking, Presentation Skills