Ajay Divakar Sudhir

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Education

University of North Carolina at Charlotte **Aug 2023 - May 2026**
B.S. Computer Science - Artificial Intelligence, Robotics, and Gaming GPA: 4.0
Minors: Electrical Engineering, Mathematics, and Statistics
Honors: University Honors Program and College of Computing and Informatics Honors
Relevant Coursework: Artificial Intelligence, Machine Learning, Computer Vision, Natural Language Processing, Deep Reinforcement Learning, Foundational Models, Intelligent Robotics

Research Experience

Intrinsic vs. Explicit Feedback in Interactive Reinforcement Learning Dec 2024 - Present
Undergraduate Honors Researcher Advisor: Dr. Minwoo Lee

- Engineered and optimized reinforcement learning agents to compare between **intrinsic motivation** and **explicit human feedback** mechanisms in interactive environments.
- Developed experimental frameworks to evaluate **learning adaptability** and **goal alignment** for agents and human collaborators.
- Collaborated on integrating **BCI EEG signals** using OpenBCI and BrainFlow to analyze **intrinsic feedback dynamics** and their impact on agent learning.

AI Algorithms, Domains, and Accountability Aug 2025 - Present
Undergraduate Researcher Advisor: Dr. Divya Ramesh

- Analyzed how algorithmic structures influence **model accountability** across various AI **application domains**.
- Designed a **taxonomy** linking model characteristics to **transparency** and **ethical governance frameworks**.
- Proposed **auditing strategies** to enhance **interpretability**, **fairness**, and **accountability** in AI systems.

Exploring Relational Authenticity of LLMs for Human-AI Interaction Jan 2025 - Jun 2025
Undergraduate Honors Researcher Advisor: Dr. Elizabeth Johnson

- Explored **emotional reciprocity** and **temporal context maintenance** in **large language models** through structured human-AI dialogues.
- Conducted **sentiment analysis** and **thematic coding** to evaluate **relational authenticity** of various commercial models.
- Developed a **comparative framework** to assess how model architecture and training paradigms influence affective alignment and **long-term conversational coherence**.

Research Interests

My research interests encompass **Neuro-Symbolic Cognitive Meta-Learning systems** which can learn continually, reason adaptively, and generalize across many domains through **intrinsic curiosity** and **human feedback**. I aim to integrate neurocognitive architectures into current models to improve the theoretical and **algorithmic foundations** that enable efficient exploration, adaptive decision-making, and human-like **lifelong learning** for **safe autonomy** in complex real-world environments.

Publications

Johnson, L., Sudhir, A. D., & Padmapriya, A. A. (2025). The Feel of Friendship: Emotional Presence and Relational Authenticity in Large Language Models. *International Journal of Humanities and Social Science, 15*, 329-339. https://doi.org/10.30845/ijhss.vol15p29

Conferences

NeurIPS 2025: Attended the conference to explore cutting-edge research and network with leading experts.
SRHC/FLAIRS 2026: Submitted abstract for poster presentation on Interactive Reinforcement Learning.
ICLR/ICML 2026: Preparing submission on Intrinsic Interactive Reinforcement Learning.
Charlotte's Executive Roundtable 2025: Engaged in discussions about emerging technologies and leadership strategies with industry executives.

Selected Projects

Closet Canvas: Clothing Recommendation System Project Lead (In Progress)
Developed a **dual computer-vision recommendation system** that analyzed user body features and clothing dataset embeddings, which integrated **geolocational fashion trend data** to provide context-aware recommendations. Engineered **adaptive algorithms** to refine suggestions based on user feedback.

F1-Net: Deep Learning for Race Preparation Personal Project (In Progress)
Designed a **multi-model deep learning framework** for predicting **Formula 1 race outcomes** using telemetry streams, driver statistics, and historical race data. Applied **time-series neural architectures** and regression models to identify predictive indicators for race performance.

Human Activity Recognition: Smartphone Sensor Activity Classification Personal Project
Constructed a **machine learning model** for activity recognition using smartphone sensor data from the **UCI HAR** dataset. Implemented and evaluated **Logistic Regression**, **KNN**, and **Naïve Bayes** classifiers to evaluate model performance, achieving an accuracy of 97%.

Apollo: Autonomous Campus Mobile Robot Project Manager / Technical Lead
Engineered **autonomous navigation and motion stack** on the **AgileX Scout Mini** mobile robot. Integrated **YOLOv8-based perception**, **ROS2 navigation**, and real-time **person tracking** to enable adaptive motion planning.

Neural Decoding: EEG-Based Robotic Control Technical Lead
Designed a **neural decoding system** to interpret **EEG signals** from the **MUSE S Athena** headset for robotic motor control. Implemented machine-learning classifiers to map neural features to motion commands for the Apollo Scout Mini robot.

Leadership & Affiliations

President: Association for Computing Machinery (ACM) Chapter
Led UNC Charlotte's largest student organization with 400+ members, organizing workshops, events, and industry collaborations, increasing student engagement in weekly meetings by 50% this semester.

Secretary/Project Manager: Charlotte AI Research (CAIR)
Organized industry AI tech panels, research meetings, and managed 5 projects for UNC Charlotte's student-led AI research organization.

Executive Member: CCI Student Council, Executive Leadership Program, Gold Rush Robotics
Honor Societies: Phi Kappa Phi, National Society for Leadership and Success
Professional Memberships: IEEE, ACM, AAAI
Lab Affiliations: Charlotte ML Lab (CharMLab), ACM Lab, CAIR Lab

Honors & Awards

Bank of America Scholarship: Summer 2023
Chancellor's List: Fall 2023 to Present
University Honors Program: Fall 2024 to Present
College of Computing and Informatics Honors: Spring 2025 to Present

Licenses & Certifications

CITI: Social and Behavioral Research
Microsoft Certified: Azure AI Fundamentals
AWS Certified: Cloud Practitioner & AI Practitioner (In Progress)

Skills

Programming Languages: Python, C++, Java, C, HTML5, CSS, MySQL
AI, Machine Learning & Deep Learning: PyTorch, TensorFlow, Scikit-learn, Hugging Face, Stable Baselines3, Gymnasium, SpaCy, OpenCV
Data Analysis & Statistics: NumPy, Pandas, SciPy, Matplotlib, MATLAB, Seaborn, R, SAS, NVivo
Research & Specialized Tools: OpenBCI, BrainFlow, Hydra, ROS2, Overleaf, LaTeX, FastAPI
Cloud, DevOps & Version Control: AWS, Azure, Google Cloud, Docker, GitHub, Git
IDEs & Productivity: VS Code, Jupyter, Google Colab, PyCharm, Eclipse, MS Office, Google Workspace
Currently Exploring: JAX, CUDA, Weights & Biases, RLlib, MLFlow
Languages: English, Hindi, Malayalam (Conversational), Tamil (Conversational)
Soft Skills: Research Methodology, Technical Collaboration, Critical Thinking, Academic Writing

Organizational & Volunteer Experience

CCI Startup Hackathon: Organized UNC Charlotte's largest hackathon, coordinating 250 participants, 12 CCI student organizations, and 6+ industry partners to foster innovation and entrepreneurship.
Lucid Programming Competition: Co-hosted a coding competition promoting algorithmic thinking and problem-solving skills among students.
Industry Tech Panels: Invited and coordinated discussions with industry professionals on AI, emerging technologies, and career development in the field of computer science.
AI Literacy Workshops: Designed and led interactive workshops to promote the understanding of AI concepts, ethics, and societal impact among peers.
Career Fair Preparation Workshops: Supported students across various disciplines in the preparation for university career fairs, enhancing engagement between students and employers.
Undergraduate Research Conference: Assisted with organization and technical support for student research presentations and academic collaboration.
Zero Waste Clean-Up Initiative: Volunteered in campus cleanliness efforts focused on waste removal to keep the environment we work in clean.
Cards for Humanity: Created uplifting messages and artwork for local community members in need as part of a university service project.
Black Student Support Programs: Contributed to inclusion and diversity initiatives through community engagement.