Charan Pushpanathan Prabavathi

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Research Agenda

My research advances human–AI interaction to create active learning environments, collaborative systems, and novel interfaces that augment human intellect and bridge the gap between expert and novice users. I work at the intersection of HCI, AI, and learning sciences.

Education

University of Illinois Urbana-Champaign (UIUC), Champaign, IL Aug 2025 – Present
Ph.D. in Information Sciences
Advisor: Michael B. Twidale
School of Information Sciences

Pennsylvania State University (University Park), State College, PA Aug 23 – May 25
M.S., Informatics (Conc. Human-Computer Interaction); GPA: 3.97/4.0
Advisor: John M. Carroll
College of Information Sciences and Technology
Scholarly Paper: Synergies and Reciprocity in Co-parenting Interactions.

Kumaraguru College of Technology, Coimbatore, India Aug 19 – May 23
B.Eng., Computer Science and Engineering; GPA: 8.12/10.0
Advisors: Latha. L and Kanagaraj. G
Department of Computer Science and Engineering

Research Experience

Collaboration Innovation Laboratory, State College, PA Dec 23 – May 25
Graduate Research Assistant
Advisor: John M. Carroll
College of Information Sciences and Technology
Pennsylvania State University
Designed a co-parenting system via co-design studies and scenario-based design with parents, featuring emotional-awareness, validation, and playfulness to foster synergies, reciprocity, and closeness.

Selected Publications

Conference Papers

1. **Parental Collaboration and Closeness: Envisioning with New Couple Parents.**
   Proceedings of the 2025 ACM Designing Interactive Systems Conference
   Ya-Fang Lin, Xiaotian Li, Wan-Hsuan Huang, **Charan Pushpanathan Prabavathi**, Jie Cai, John M Carroll

2. **Trust and Decision-Making with Explainable AI in Immersive Technologies: A Systematic Literature Review.**
   Manuscript in preparation, 2025
   Hillmer Chona, Yihao Zhou, Ping Xu, Jeffrey Samuel Schulman Jr., Ting Yu Wu, Chenglin Weng, Siyu Wu, **Charan Pushpanathan Prabavathi**

Posters

1. **A Collaborative System to Augment Co-parenting Closeness.**
   Manuscript in preparation, 2025
   Charan Pushpanathan Prabavathi, Ya-Fang Lin, John M. Carroll

Engineering Experience

HDFC Bank Limited, Mumbai, India Nov 2022 – Jun 2023
Product Designer Intern

- Redesigned account aggregation, digital payments, and consumer service interfaces through benchmarking and field studies, achieving a 93% UAT success rate.
- Prototyped assistive technology features by integrating user needs and contextual insights into innovation workflows.

Angel Startup in Capital Market (Closed Startup), Remote, India Aug 2022 – Oct 2022
Founding Member and Designer

- Led user-centered design via concept testing, scenario creation, and iterative prototyping for a social investing platform.
- Participated in early-stage research and design validation with co-founders before the venture was closed due to regulatory constraints.

Freecharge (backed by Axis Bank Limited), Bangalore, India Jul 2021 – Jan 2022
Product Designer Intern

- Conducted user interviews, usability testing, and A/B experiments for 20M+ users in Neo-banking and Pay-later flows.
- Designed high-fidelity wireframes, PWAs, and cognitive walkthroughs, earning a Tech Award for UX research and design effectiveness in high-scale emailer systems.

Teaching Experience

Pennsylvania State University
College of Information Sciences and Technology, State College, PA

IST 505: Foundations of Research Design in Information Sciences and Technology
Spring 2025, Assisted with: Xiaolong Luke Zhang
Classroom facilitation, Grading, Qualitative methods, HCI research topics, Method selection, Study design

IST 526: Development Tools and Visualizations for Human-Computer Interaction
Spring 2025, Assisted with: Xiaolong Luke Zhang
Classroom facilitation, Grading, Method critiques, Proposal drafts, D3.js

IST 402: Emerging Issues and Technology: Computer Graphics and Virtual Reality
Fall 2024, Assisted with: Xiaolong Luke Zhang
Classroom facilitation, Grading, Three.js, HTML5 Canvas, VR scene design.

IST 504: Foundations of Theories and Methods of Information Sciences and Technology Research
Fall 2024, Assisted with: Xiaolong Luke Zhang
Classroom facilitation, Grading, Foundations of HCI, Research question development, Literature reviews

Selected Projects and Collaborations

Trust and Decision-Making with Explainable AI in XR – Literature Review
IST 597: Explainable AI — Instructor: Jonathan Dodge Fall 2024

- Conducted a systematic literature review analyzing 89 papers on trust and decision-making in XR, identifying key mechanisms for explainability and user trust calibration.
- Developed a framework to evaluate explanation techniques in immersive interfaces, studying how visualization methods impact user understanding and trust.
- Investigated ethical implications of AI in XR, focusing on transparency, bias mitigation, and strategies for human-AI trust calibration.

Machine Learning and Reinforcement Learning – Course Project
IST 597: Explainable AI — Instructor: Jonathan Dodge Fall 2024

- Designed and evaluated MDP agents using Q-learning, policy iteration, and deep Q-networks for sequential decision-making in high-stakes domains.
- Applied explainability methods (AIX360, LIME, SHAP) to visualize model decisions and identify feature importance.
- Explored fairness and bias mitigation via feature engineering and model interpretation in machine learning pipelines.

Natural Language Understanding – Course Project
IST 597: Human-Centered Artificial Intelligence — Instructor: Syed Billah Fall 2024

- Built a GPT-2 based conversational AI agent using PEFT/LoRA and LangChain for logic-based semantic queries and real-time content understanding.
- Developed a multimodal chatbot integrating Whisper (speech), FastSpeech2 (TTS), and Stable Diffusion (image generation) via Hugging Face tools.
- Implemented reinforcement learning agents using MinWoB++ and WGE to automate UI tasks and study learning from demonstrations.

Post and Gather – Course Project
IST 521: HCI – User and Technology — Instructor: Instructor: Frank E. Ritter Spring 2024

- Conducted qualitative user research via in-depth interviews and thematic analysis to identify pain points in campus event management.
- Performed Hierarchical Task Analysis (HTA) to map 10 key workflows and restructure information architecture based on user behavior patterns.
- Applied iterative HCI methods journey mapping, prototyping, and user testing to design a platform serving all 24 Penn State campuses.

Graduate Coursework

Research Foundations in Information Sciences and Technology, HCI: User and Technology, Computer-Supported Cooperative Work, Tools and HCI Tools and Visualizations, Human-Centered Artificial Intelligence, Explainable AI, Special Topics in HCI

Services

External Reviewer

2025 ACM SIGCHI Conference on Human Factors in Computing Systems (CHI) – Late-Breaking Work (LBW)

Invited Talks and Presentations

2023 "Persuasive Design: Influencing Billions of Mobile Users", Dept of CSE, Kumaraguru College of Technology, January 18
2022 "How to Present a Presentation – VC Pitches and Academia", Dept of CSE, Kumaraguru College of Technology, December 5

Test Scores

2024 American English Oral Communicative Proficiency Test (AEOCPT) — Score: 293/300
Qualified for TA positions, Department of Applied Linguistics, Pennsylvania State University

Last updated: August 2025