Ashwin R Bharadwaj

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Achievements

Select Recognitions and Accomplishments

- **Winner, AAAI 2025 Hackathon** — Built FakeXplainer AI, a system that generates adaptive fake news using reinforcement learning and LLMs. Achieved real-time personalization via human-in-the-loop learning and a 48-person UX study.
- **Nominated, Northeastern Student Research Award** — For Master's thesis *"Domain-Aware Decision Transformer"*, a novel autoregressive transformer architecture that models environment dynamics and domain shifts to generate domain-conditioned optimal policies.
- **Founder and Leader, Khoury Robotics Club** — Built two advanced open-source robotics platforms from scratch:
    * **Universal Wheeled Robot:** Designed and fabricated the full mechanical and electrical system; implemented SLAM using graph-based mapping and sensor fusion from depth cameras and CNN embeddings. Enabled autonomous, memory-efficient navigation through node-based environment modeling.
    * **Waltz Bipedal Robot:** Developed full mechanical design and control software. Trained walking policies in PyBullet and successfully transferred them to hardware for stable real-world locomotion.
- **Recipient, CNR Scholarship** — Awarded for academic excellence and research impact and courrse work.

Work Experience

Helping Hands Lab at Northeastern University
1 Year (May 2024 – May 2025)

Research Assistant — Python, PyTorch, ML, Kubernetes, Docker   *Boston, USA*

- Designed and developed multiple mobile robotic platforms, including a **bipedal walking robot** and a **universal-wheeled robot** capable of transporting **50+ kg loads**.
- Implemented **autonomous navigation systems** for indoor mobility and trained **reinforcement learning policies** for stable **bipedal standing and locomotion**.
- Proposed a **multimodal transformer-based policy model** for robotic manipulation in **domain-randomized** simulated environments with varying physical parameters (e.g., friction, gravity, elasticity).
- Encoded **robot states, actions, and environment parameters** as unified token sequences for **autoregressive dynamics prediction**.
- Achieved **zero-shot policy transfer** to unseen environments without fine-tuning by leveraging **attention over domain-specific tokens**.

Cisco Systems
2.5 years (Jan 2021 – Aug 2023)

Software Engineer — Python, C++, Golan, ML, Kubernetes, Docker, AWS   *Bangalore, India*

- Designed and deployed a **cloud-native CRUD system** in **Golang** that automated object management and database synchronization; replaced legacy infrastructure, boosting **DB operation throughput by 48%**.
- Automated **SSL/TLS certificate lifecycle management** using **CI/CD pipelines**, improving **encryption standards** and ensuring compliance with **secure deployment best practices**.
- Developed and enhanced existing firmware to enable servers and switches to dynamically update management ports and IPs, effectively isolating **management traffic from customer traffic** and improving **network security**.

Microsoft
May 2019 – July 2019, May 2020 – July 2020

Research Intern — PyTorch, MLOps, Graph Algorithms, NLP, Computer Vision   *Bangalore, India*

- Developed **machine learning models** combining **CNNs** and custom **graph algorithms** to connect historical **artworks, texts, and sculptures** in **low-data settings**.
- Proposed and implemented a **graph-based approach** to link **story characters** based on **contextual relationships** and **proximity**, boosting recognition of **rare or esoteric visual patterns**.
- Led a team of interns to develop a **ReactJS-based interactive visualization tool** for graph algorithms; deployed the platform using **GoLang** and **Python** for teaching **data structures** at **PES University**.

Education

Northeastern University   May 2025
Master of Science in Artificial Intelligence (GPA: 3.8 / 4.0)   *Boston, MA*
- Teaching Assistant for "Foundations of Artificial Intelligence" for 4 consecutive semesters, supporting both theoretical and practical components.
- Founder and President of the Khoury Robotics Club, leading research-driven robotics projects and mentoring graduate members.

PES University   July 2021
Bachelor of Technology in Computer Science   *Bangalore, India*
- Teaching Assistant for the undergraduate course on Cloud Computing, created the assignments and auto graders.
- Collaborated with the Microsoft Innovation Lab to develop a web-based visualization platform for teaching graph algorithms to undergraduates.

Major Graduate Projects

Cloud-Based Safety Monitoring Platform— *MLOps, Kubernetes, RTSP, VLMs, Microservices, CV, Docker*
- Developed a **cloud-native platform** inspired by Cisco Intersight to register and stream network-connected RTSP cameras, enabling **real-time workplace safety monitoring**.
- Built a suite of **containerized microservices** (DB, RTSP routing, vision models), orchestrated with **Kubernetes**, and deployed on-prem for local enterprise use.
- Fine-tuned a **Vision-Language Model (VLM)** to detect OSHA violations; built an auxiliary model to classify **specific violation codes** for detailed alerting and logging.
- Delivered a working prototype deployed on internal networks and **successfully pitched to a venture capital firm** for early-stage funding.

FakeXplainer AI— *Human-Centered AI, RL, LLMs, UX Experimentation*
- Developed an AI system that generates **adaptive fake news content** using RL and LLMs (GPT), based on user interaction history and cognitive features.
- Conducted a **48-person user study** to measure susceptibility to misinformation and adapt the model in real time.
- Won **1st Place** at AAAI 2025 Hackathon for innovation in human-in-the-loop learning and real-time behavioral adaptation.

Publications

Ashwin Bharadwaj, Anio Zhang, Rajagopla Venkat. *Shapeshifting Coloring Problems: An Interactive Tiling Assignment*. AAAI/EAAI 2025.

Anio Zhang, **Ashwin Bharadwaj** , Rajagopal Venkatesaramani. *Escape the Castle: Estimate the behaviour using MDP problem*. AAAI/EAAI 2025.

A. R. Bharadwaj, Anio Zhang, "Efficient Inverse Kinematics for High-DoF Robots: A Kolmogorov-Arnold Network Approach", Northeast Robotics Colloquium (NERC), Amhrest, USA, 2024.

A. R. Bharadwaj, S. S. Chandra, D. S. Nair, A. R. Hatim and A. Ravikumar, "Automated mythological scene recognition using machine learning and graphs", 2020 International Conference on Artificial Intelligence and Signal Processing (AISP), Amaravati, India, 2020, pp. 1-5, Jan 2020.

Ashwin R. Bharadwaj, Hardik Gourisaria, Hrishikesh Viswanath, "Video Frame Rate Doubling Using Generative Adversarial Networks", Computer Communication, Networking and IoT (ICICC 2020), Bengaluru, India, Aug. 2020