

Bharath Muppasani

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📖 Education

University of South Carolina

Doctor of Philosophy, Computer Science

Columbia, SC, USA

Jan 2022–Present

International Institute of Information Technology

Bachelor in Technology, Electronics and Communication

Naya Raipur, Chhattisgarh, India

Aug 2016 - May 2020

👋 Research Interests and Skills

- **Research Interests:** Reasoning (Automated Planning), Learning (Deep Learning, Reinforcement Learning, Large Language Models), Representation (Ontology).
- **Proficient:** Python, PDDL, C, SQL, Machine Learning

🔧 Selected Projects

Planning Strategies for Dynamic Opinion Networks

May 2023–May 2024

Related Publications: NeurIPS-24, AAIL-24 Demo Track

- Designed intervention strategies using ranking algorithms and neural network classifiers to identify key nodes for accurate information dissemination in dynamic networks.
- Developed a reinforcement learning framework for large-scale networks, analyzing five reward structures tailored to network dynamics.
- Conceptualized information spread as a numerical planning problem and built a network visualization tool for simulating information propagation and visualizing plans for targeted information spread.

Solving Automated Planning Problems using Large Language Models

May 2022–July 2023

Related Publications: IJCAI-23 Demo Track; NeurIPS-23 GenPlan

- Spearheaded the development and curation of a comprehensive dataset for fine-tuning and evaluating the performance of various Large Language Model (LLM) architectures, including encoder-only, decoder-only, and encoder-decoder configurations in automated planning scenarios using Planning Domain Definition Language (PDDL).
- Played a pivotal role in executing evaluations of LLM outputs, providing critical insights that informed the design and optimization of learning-based planners, notably the Plansformer model, as evidenced by its demonstrable efficacy accessible at Plansformer Website

A Planning Ontology to Represent and Exploit Planning Knowledge

May 2022–May 2024

Related Publications: ICAPS-23 PLATO; CODS COMAD-24

- Developing a planning ontology to leverage knowledge from diverse planning domains and improve planner performance, with a focus on action ordering constraints and open access resources.
- The documentation for the current stage of Planning Ontology is available on PyLODE and the OWL file is accessible via PURL.

Solving complex puzzles with automated planners using symbolic representations

Jan 2022–Dec 2022

Related Publications: ICAPS-24 HSDIP; ICAPS-24 Demo Track

- Developed, and submitted to IPC-2023, the first-ever PDDL representation for the Rubik's Cube domain, a complex combinatorial puzzle, showcasing the potential of symbolic representations in automated planning.

Power State Identification through Non-Intrusive Harmonics Analysis

Jan 2022–May 2022

Related Publications: IAAI/AAAI-23

- Formulated the State Identification Problem (SIP), a novel approach to discern unique power usage patterns through harmonics data in real-world scenarios.
- Conducted in-depth data analysis on electricity data, encompassing a comprehensive set of 221 features, spanning across key sectors: manufacturing, education, and hospital, to derive insights into intricate power consumption patterns.

Selected Publications

- **Bharath Muppasani**, Vignesh Narayanan, Biplav Srivastava and Michael N. Huhns. *Towards Effective Planning Strategies for Dynamic Opinion Networks*. NeurIPS Main Track (2024)
- **Bharath Muppasani**, Nitin Gupta, Vishal Pallagani, Biplav Srivastava, Raghava Mutharaju, Michael N. Huhns and Vignesh Narayanan. *Building a Plan Ontology to Represent and Exploit Planning Knowledge and Its Applications*. CODS-COMAD (2024).
- **Bharath Muppasani**, Vignesh Narayanan, Biplav Srivastava and Michael N. Huhns. *Expressive and Flexible Simulation of Information Spread Strategies in Social Networks Using Planning*. AAAI - Demonstrations Track (2024)
- Vishal Pallagani, **Bharath Muppasani**, Biplav Srivastava, Francesca Rossi, Lior Horesh, Keerthiram Murugesan, Andrea Loreggia, Francesco Fabiano, Rony Joseph, Yathin Kethepalli. *Plansformer Tool: Demonstrating Generation of Symbolic Plans Using Transformers*. IJCAI Demonstrations Track (2023)
- Kausik Lakkaraju, Sai Krishna Revanth Vuruma, Vishal Pallagani, **Bharath Muppasani** and Biplav Srivastava. *Can LLMs be Good Financial Advisors?: An Initial Study in Personal Decision Making for Optimized Outcomes*. FinPlan Workshop at ICAPS (2023).
- **Bharath Muppasani**, Cheyyur Jaya Anand, Chinmayi Appajigowda, Biplav Srivastava and Lokesh Johri. *A Dataset and Baseline Approach for Identifying Usage States from Non-intrusive Power Sensing with MiDAS IoT-Based Sensors*. IAAI Technical Track on deployed Highly Innovative Applications of AI, AAAI (2023)
- **Bharath Muppasani**, Vishal Pallagani, Kausik Lakkaraju, Shuge Lei, Biplav Srivastava, Brett Robertson, Andrea Hickerson and Vignesh Narayanan. *On safe and usable chatbots for promoting voter participation*. AI Magazine, Volume 44, Issue 3, AAAI (2023)
- Vishal Pallagani, Vedant Khandelwal, **Bharath Muppasani**, Venkanna Udutalapally, Debanjan Das and Saraju P Mohanty. *DCrop: A deep-learning based framework for accurate prediction of diseases of crops in smart agriculture*. IEEE iSES (2019)

Experience

Research Intern

Indian Institute of Technology, Kharagpur

Kharagpur, India

May 2018–Aug 2018

Advisor: Niloy Ganguly, Mentor: Madhumita Mallick

Smart Home Automation

- Conducted in-depth analysis on multi-resident smart home data from Samsung, focusing on time, sensor, and frequency-based segmentation. Identified challenges such as the absence of activity annotations and the complexities of classifying activities.
- Initiated the groundwork for the development of an unsupervised algorithm aimed at labeling and classifying activities within smart homes. Proposed innovative measures to verify the goodness of clusters, setting the stage for future research and improvements in smart home data analysis and activity classification.
- Recognized by Samsung for outstanding research contributions in the field of smart home data analysis.

Patents

- **Improving Planner Performance by Learning and Using Metadata of Experiences**

Accepted on March 24, 2023

Patent Office: United States (US)

Inventors: Vishal Pallagani, **Bharath Muppasani**, Biplav Srivastava