Sridhar Sola

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Education

University of Birmingham (UoB)
Birmingham, UK

MSc in Artificial Intelligence and Machine Learning *with Distinction* — *Sep 2022 - Sep 2023*

- Thesis: Explanation and Axiom Learning in Ad Hoc Robot Teamwork (Distinction)
- Supervisor: Dr. Mohan Sridharan

Sri Sathya Sai Institute of Higher Learning (SSSIHL)
Bengaluru, India

BSc (Honours) in Mathematics *with Distinction* — *Jun 2019 - Jun 2022*

- Minors in Computer Science and Statistics
- Thesis: Facial Expression Recognition in the Wild (95%)

Research Experience

UoB Intelligent Robotics Lab
Birmingham, UK

Research Associate with Mohan Sridharan — *Sep 2023 - Present*

- *Ground Robot Teamwork:* Implementing a hybrid knowledge-driven architecture for *ad hoc* teamwork on Turtlebot4 and AlienGo platforms; Designed a 'stacking' domain for experiments; Adapted declarative and model-based components to run with ROS2; Set up multi-camera tracking of the environment.

Master's Thesis — *Jun 2023 - Sep 2023*

- *Interactive Learning and Explainable Reasoning:* Incorporated interactive learning through relational RL to learn previously unknown rules about the environment within 50 episodes. Integrated systems for the robot to trace held beliefs to their cause, explain plans, and present counterfactuals about external agent actions. Master's Thesis, Project, Poster

UoB Human-Computer Interaction Group
Birmingham, UK

Research Assistant (Part-Time) with Han Wu, Tasos Spiliotopoulos — *Jun 2023 - Sep 2023*

- *Machine Unlearning:* Studied machine unlearning of tabular features in the context of privacy. Ran a survey to identify most requested features to unlearn and to then analyse its effect on inference.

Solinas Integrity, Indian Institute of Technology - Madras
Chennai, India

Research Intern with Moumita Mukherjee, Moinak Banerjee — *Jun 2022 - Sep 2022*

- *Underwater Robot Perception System:* Developed a perception system for a pipeline inspection robot operating in hazy water with poor lighting and motion blur. Adapted dark channel prior algorithm, deblurring and dehazing GANs, and GIS mapping. System runs on over a dozen robots across urban and rural India. Demo

SSSIHL AI Lab
Bengaluru, India

Graduate Researcher — *Mar 2023 – Aug 2023*

- *Occlusion Removal GAN:* Developed a conditional GAN to remove face mask occlusion in facial images with curated loss functions and discriminators to retain expression context and coherence. CVPRW'23 Paper, Project

Undergraduate Research Assistant with Darshan Gera — *Dec 2021 – Jul 2022*

- *Masked Image Dataset:* Created and benchmarked a dataset, MSD-E of 1,960 real-world masked and non-masked facial expression images to train occluded expression recognition models. ICVGIP'22 Paper, Project
- *Occluded Expression Recognition:* Demonstrated that contrastive learning and knowledge distillation approaches ignore the face mask during expression recognition through GradCAM visualizations. These outperformed SOTA approaches by 0.5% with only half the number of parameters. Undergraduate Thesis

Publications and Presentations

Belief Tracing, Explanation, and Counterfactual in Multi-Robot Teamwork
Society For Mathematical Psychology Workshop on Causality in Psychology, Philosophy & AI, 2023 **[Poster]**
Sridhar Sola *Link*

Unmasking Your Expression: Expression-Conditioned GAN for Masked Face Inpainting
Affective Behaviour Analysis in the Wild (ABAW'23) Workshop IEEE/CVF CVPR23, 2023 **[Workshop Paper]**
Sridhar Sola, Darshan Gera *Link*

Masked Student Dataset of Expressions
Indian Conference on Vision, Graphics, and Image Processing, ACM, 2022, IIT-Gandhinagar

[National Conference with 31% acceptance]
Sridhar Sola, Darshan Gera *Link*

Technical Skills

Programming: Python, Matlab, C/C++, Prolog, R
Machine Learning Toolboxes: PyTorch, TensorFlow, Keras, SciKit-Learn, MALib, sklearn-weka
Software: Linux, ROS, OpenCV, Pandas, Git, SWI-Prolog, SlicerRT
Robotics Coursework: Math Foundations for AI, Intelligent Robotics, Neural Computation, Current Topics in AI, Advanced Robotics, Robot Vision

Selected Course Projects

Multi-Agent Motion Planning and Scheduling: Designed and tested a MDP-based solution for task allocation, system management, low-level actuation, and collision avoidance in a simulated restaurant environment with robot waiters. Project, Report

Achievements

CVPR Travel Grant, 2023: Awarded to students by CVPR based on research contributions to the conference ($2k)

Best Undergraduate Thesis, 2022: Awarded by SSSIHL for the best thesis (95%) in my programme (1 out of 250 students).

Best Paper Award, 2022 : Awarded by the University of Pune at the National Conference for Undergraduate Research in Pune, India (3 out of 250 submissions; INR 3k).

Athletic and Cultural Championship, 2020: Awarded by SSSIHL for outstanding athletic and extra-curricular achievements (10 among 2,000 students).