Aniketh Ramesh

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A doctoral student specializing in experiment and solution design for human multi-robot system interaction. I explore paradigms that enable a single human to monitor task execution by multiple intelligent robots, each capable of dynamically self-regulating their autonomy. With a focus on multi-robot missions in extreme environments, I combine insights from robotics, machine learning, and UX design to enhance human-robot teaming.

Academic History

April 2020 – Now	**PhD in Robotics and Artificial Intelligence at Extreme Robotics Laboratory (ERL), University of Birmingham. Supervisors: Dr. Manolis Chiou, Prof. Rustam Stolkin.** Developed the 'Robot Vitals and Robot Health' framework to quantify robot performance degradation. Applied this framework to develop an AI agent that can assist remote tele-operator's multi-robot missions.
Sept 2018 – Sept 2019	**M.Sc. Robotics at University of Bristol.** Thesis: Mapping hazardous environments using a swarm of robots. Graduated with Merit.
July 2012 – July 2016	**BTech in Electrical Engineering at Amrita School of Engineering,** Bangalore, India. Graduated with Distinction.

Academic Collaborations and Outreach

May 2022	**Data Study Group, Alan Turing Institute** – Performed data wrangling and exploratory analysis on electric train brake time series data to predict brake failures. Used Pandas, NumPy and Seaborn for programming, presented research findings, experimental results, and methodology in a final report.
September 2021	**Data Study Group, Alan Turing Institute** – Facilitated an interdisciplinary research group to develop a machine learning model to automate dark field microscopy (DFM) based vascular perfusion index calculation. Used OpenCV and Pytorch for developing a DFM scan quality assessment tool. Presented research findings, experimental results, and methodology in a final report.
June 2021	**Showcase Planner, UK RAS Robotics Festival** – Mobilised the team, planned, and organised the ERL showcase for the festival.

Academic Training

July 2022	**Cambridge Ellis Machine Learning Summer School, University of Cambridge** – Topics: Causal Inference, Gaussian Processes, Graphical Neural Networks, Bayesian Networks, Neural Controlled Differential Equations etc.
September 2020	**Multi-Robot Systems Summer School, CTU Prague** – Topics: Latest advancements in multi-robot systems research, localisation, mapping, swarm optimisation algorithms, search and rescue missions, data visualisation etc.

Academic Service

Conference Reviewing	AAMAS 2023, IROS 2022, HRI 2021

| Organising Committee | Variable Autonomy for Human Robot Teaming Workshop at HRI 2023 |

Technical Skills

Platforms	ROS, ROS2, Unity
Languages	Python, C, C++, Unity C#
ML Libraries	Pytorch, Keras, Scikit-Learn, Seaborn, Numpy, Pandas

Relevant Work Experience

| June 2019 to July 2019 | Curriculum Design for Robotics Workshop, Firetech Camp London – Designed a curriculum which simplified important robotics concepts like sensing, actuating, algorithms for children aged 9-12 based on the Lego EV3 Kit and Microsoft MakeCode. |
| Sep 2016 to Dec 2017 | Network Engineer for Ericsson India Global Services, Mumbai, India – Developed a novel data ingestion pipeline for customer internet and call usage analysis using Pandas. |

Invited Talks

| March 2023 | Towards Triaging Human-Multirobot teams
Responsible AI Group
Department of Computing Science, Umea University, Sweden |
| May 2023 | Towards Triaging Human-Multirobot teams
Inform Lab
STIIMA, National Research Council of Italy, Milan |

Publications

- Ramesh, A., Stolkin, R. and Chiou, M., 2022. Robot Vitals and Robot Health: Towards Systematically Quantifying Runtime Performance Degradation in Robots Under Adverse Conditions. IEEE Robotics and Automation Letters, 7(4), pp.10729-10736. (Journal)
- Ramesh, A., Chiou, M. and Stolkin, R., 2021, March. Robot vitals and robot health: An intuitive approach to quantifying and communicating predicted robot performance degradation in human-robot teams. In Companion of the 2021 ACM/IEEE International Conference on Human-Robot Interaction (pp. 303-307). (Conference)
- Panagopoulos, D., Petousakis, G., Ramesh, A., Ruan, T., Nikolaou, G., Stolkin, R. and Chiou, M., 2022, November. A Hierarchical Variable Autonomy Mixed-Initiative Framework for Human-Robot Teaming in Mobile Robotics. In 2022 IEEE 3rd International Conference on Human-Machine Systems (ICHMS) (pp. 1-6). IEEE (Conference)
- Ramesh, A., Englund, M., Theodorou, A., Stolkin, R. and Chiou, M., 2023. Robot Health Indicator: A Visual Cue to Improve Level of Autonomy Switching Systems. In VAT4HRI Workshop 2023 ACM/IEEE International Conference on Human-Robot Interaction (Workshop)
- Braun, C.A., Ramesh, A., Rothfuss, S., Chiou, M., Stolkin, R. and Hohmann, S., 2023. Model Predictive Degree of Automation Regulation for Mobile Robots Using Robot Vitals and Robot Health. In-Press, 2023 World Congress of the International Federation of Automatic Control (IFAC). (Conference)
- Braun, Christian Alexander, et al. "Model Predictive Control of the Degree of Automation Optimizing Robot Health." 2023 IEEE 17th International Symposium on Applied Computational Intelligence and Informatics (SACI). IEEE, 2023. (Conference)
- Ramesh, A., et al. Experimental Evaluation of Model Predictive Mixed-initiative Variable Autonomy Systems Applied to Human-robot Teams. 1, In-Press, IEEE System Man and Cybernetics Conference 2023, 28 Aug. 2023, doi:10.36227/techrxiv.24018825.v1. (Conference)
- Data Study Group team. (2022). Data Study Group Final Report: University of Birmingham. Zenodo. https://doi.org/10.5281/zenodo.6799096. (Journal)

Interests/Hobbies

- Playing the Piano, Melodica, Guitar and Darbuka
- Classical and contemporary philosophy