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Muhammad Arrasy Rahman

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Career Objective

An **experienced researcher and educator** who specializes in multi-agent systems and human-AI coordination. Following the increasing real-world deployment of AI agents by different organizations, my research aims to ensure their capacity to coexist safely with humans and other AI agents by advancing the theoretical and practical understanding of **Ad Hoc Teamwork** (AHT), **multi-agent reinforcement learning** (MARL), and **game theory**. With a proven track record of securing substantial research funding and publishing in top-tier conferences, I aim to contribute to academic excellence and research output at a leading institution. I am eager to establish my research group, mentor students in their research, and teach innovative courses in AI and multi-agent systems.

Education

Edinburgh, UK **The University of Edinburgh** **Sep 2018 – Jul 2023**

- **Ph.D. in Informatics**
- **Supervisor**: Dr. Stefano V. Albrecht
- **Thesis title**: Advances in Open Ad Hoc Teamwork and Teammate Generation
- **Funding**: Edinburgh Enlightenment Scholarship – Teaching Track

Edinburgh, UK **The University of Edinburgh** **Sep 2016 – Dec 2017**

- **M.Sc. in Data Science**, Graduated with Distinction
- **Supervisor**: Dr. Henry Thompson
- **Thesis title**: Implementing Repeated Updates with Prioritized Experience Replay as Deep Reinforcement Learning Algorithms
- **Funding**: Indonesia Endowment Fund for Education Scholarship

Depok, Indonesia **Universitas Indonesia** **Sep 2011 – Jan 2015**

- **B.Sc. in Computer Science**, GPA: 3.85/4.00
- **Supervisor**: Dr. Denny
- **Thesis title**: Weighted Ensemble Clustering Using Self-Organizing Maps
- **Funding**: Samsung Indonesia Scholarship

Employment

Postdoctoral Research Fellow **The University of Texas at Austin** **Nov 2022 – Now**

- **Host:** Prof. Peter Stone
- Researched RL-based teammate generation approaches, leading to a state-of-the-art method for designing agents to collaborate with previously unseen teammate policies published at AAAI 2024.
- Developed an offline RL to design AI advisors that enhance surgeons' decisions in the organ transplant domain.
- Secured $150K research funding from Lockheed Martin and $500K from DARPA to explore policy generation and generative AI models for designing agents capable of coexisting with humans and other agents.
- Assisted the Ph.D. admissions process by evaluating applicants' reference letters and research statements.

Research Intern **Five AI** **Apr 2021 – Jun 2021**

- Designed and evaluated a goal recognition algorithm for autonomous vehicles under partial observability based on inverse planning approaches, leading towards a publication at IROS 2021.

Data Scientist **Gojek Indonesia** **Oct 2017 – Mar 2018**

- Trained machine learning models to assign drivers to passengers.
- Developed an adaptive pricing model to handle service request surges.

Associate Data Scientist **Traveloka** **Sep 2015 – Apr 2016**

- Analyzed the different user clusters in the company's ticketing service app.
- Designed predictive models to identify potentially churning customers.

Key Achievements

Research Grants

- $500K research funding from DARPA to explore the use of generative AI models for AHT.
- $350K research funding from Lockheed Martin to explore teammate generation techniques for AHT.
- Research funding from the United States Office of Naval Research (ONR) to design learning algorithms enabling human-AI collaboration in open multi-agent systems.

Teaching Qualifications

- Edinburgh Teaching Award Category 1, equivalent to the Associate Fellowship of HEA.

Awards & Recognition

- **Reviewing Awards:** ICML 2024 Best Reviewers Award, ECAI 2023 Quality Champion Review Award, NeurIPS 2022 Top Reviewers, ICML 2022 Best Reviewers (Top 10%) Recognition
- **Best Paper Awards:** Best Paper Runner Up at the Adaptive & Learning Agents Workshop at AAMAS 2021
- **Competitions:** 4th Place in Huawei UK's 2019 Autonomous Vehicles Challenge, 6th place at the NeurIPS 2024 Concordia Competition
- **Academic Performance Awards:** 2017 Class Prize for Top Performance in MSc Data Science Program

Publications

Journals

1. Arrasy Rahman, Ignacio Carlucho, Niklas Höpner, and Stefano V Albrecht. A general learning framework for open ad hoc teamwork using graph-based policy learning. *Journal of Machine Learning Research*, 24(298):1–74, 2023
2. Arrasy Rahman, Elliot Fosong, Ignacio Carlucho, and Stefano V Albrecht. Generating teammates for training robust ad hoc teamwork agents via best-response diversity. *Transactions on Machine Learning Research*, 2023

Conferences

1. Caroline Wang, Arrasy Rahman, Ishan Durugkar, Elad Liebman, and Peter Stone. N-agent ad hoc teamwork. *Advances in Neural Information Processing Systems*, 2024
2. Elliot Fosong, Arrasy Rahman, Ignacio Carlucho, and Stefano V Albrecht. Learning complex teamwork tasks using a given sub-task curriculum. In *International Conference on Autonomous Agents and Multiagent Systems*, 2024
3. Arrasy Rahman, Jiaxun Cui, and Peter Stone. Minimum coverage sets for training robust ad hoc teamwork agents. In *Proceedings of the 38th AAAI Conference on Artificial Intelligence (AAAI-24)*, February 2024
4. Reuth Mirsky, Ignacio Carlucho, Arrasy Rahman, Elliot Fosong, William Macke, Mohan Sridharan, Peter Stone, and Stefano V Albrecht. A survey of ad hoc teamwork research. In *European Conference on Multi-Agent Systems*, pages 275–293. Springer, 2022
5. Josiah P Hanna, Arrasy Rahman, Elliot Fosong, Francisco Eiras, Mihai Dobre, John Redford, Subramanian Ramamoorthy, and Stefano V Albrecht. Interpretable goal recognition in the presence of occluded factors for autonomous vehicles. In *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 7044–7051. IEEE, 2021
6. Muhammad A Rahman, Niklas Hopner, Filippos Christianos, and Stefano V Albrecht. Towards open ad hoc teamwork using graph-based policy learning. In *International Conference on Machine Learning*, pages 8776–8786. PMLR, 2021

7. Filippos Christianos, Georgios Papoudakis, Muhammad A Rahman, and Stefano V Albrecht. Scaling multi-agent reinforcement learning with selective parameter sharing. In *International Conference on Machine Learning*, pages 1989–1998. PMLR, 2021

Workshop Papers & Preprints

1. Georgios Papoudakis, Filippos Christianos, Arrasy Rahman, and Stefano V Albrecht. Dealing with non-stationarity in multi-agent deep reinforcement learning. *arXiv preprint arXiv:1906.04737*, 2019
2. Kale-ab Abebe Tessera, Arrasy Rahman, and Stefano V Albrecht. Hypermarl: Adaptive hypernetworks for multi-agent rl. *arXiv preprint arXiv:2412.04233*, 2024

Teaching and Mentoring Experience

Mentor **Indonesia Mengglobal** **Jun 2024 – Now**

- **Advised student:** Rahmah Khoirussyifa' Nurdini
- Mentor Indonesian students seeking admission into top ML/AI graduate programs by providing advice and feedback on their research and application materials.

Research Advisor **King's College London** **Jun 2024 – Now**

- **Advised students:** Zihao Li, Dan Qiao
- Co-advise research on applying LLMs to MARL with Dr. Stefanos Leonardos and Dr. Yali Du.

Instructor **Bangkit Academy** **Sep 2023 – Feb 2024**

- **Courses:** Introduction to Machine Learning, Introduction to Unsupervised Learning
- Deliver lectures to prepare undergraduate students from different Indonesian universities with the required skills to pursue ML/AI-related careers.

Research Advisor **The University of Texas at Austin** **Nov 2022 – Now**

- **Advised students:** Caroline Wang, Jiaxun Cui, Zhihan Wang, Lingyun Xiao, Rolando Fernandez, Di Yang Shi, Cameron Angliss, Sanjit Juneja, Johnny Liu, Aditya Madhan, Alexa England
- Co-advise students researching Ad Hoc Teamwork (AHT) & MARL with Prof. Peter Stone.

Research Advisor **The University of Edinburgh** **Jan 2020 – Now**

- **Advised students:** Kale-ab Tessera, Elliot Fosong, Tawqir Sohail, Paul Chelarescu, Niklas Höpner
- Co-advise research related to Ad Hoc Teamwork (AHT) & MARL with Dr. Stefano Albrecht.

Teaching Support Provider **The University of Edinburgh** **Sep 2018 – Aug 2020**

- **Courses:** Reinforcement Learning (2018/2019); Reinforcement Learning (2019/2020).
- Designed slides on deep reinforcement learning and delivered them throughout four meetings.
- Devised assignments on model-free and deep RL while also implementing evaluation tools that help provide feedback to course participants.
- Held office hours and demonstration sessions to help students learn more about RL.

Teaching Support Provider **Universitas Indonesia** **Sep 2012 – Jan 2015**

- **Courses:** Linear Algebra (2012/2013); Intelligent Systems (2013/2014); Automata theory (2013/2014); Probability and Statistics (2014/2015).
- Held office hours and tutorials to discuss course materials with students.
- Provided feedback to student assignments.

Highlighted Talks

- **Minimum Coverage Sets for Training Robust Ad Hoc Teamwork Agents**
  Arrasy Rahman
  The University of Edinburgh's Reinforcement Learning Reading Group (Virtual), Sept 2023

- **Minimum Coverage Sets for Training Robust Ad Hoc Teamwork Agents**
  Arrasy Rahman and Jiaxun Cui
  UC Berkeley Multiagent Learning Seminar (Virtual), Oct 2023
- **Advances in Ad Hoc Teamwork**
  Arrasy Rahman
  Carnegie Mellon University – AI & Social Good Group Meeting (Virtual), Aug 2023
- **Deep Reinforcement Learning for Multi-Agent Interaction**
  Stefano Albrecht, Arrasy Rahman, Filippos Christianos, and Georgios Papoudakis
  UC Berkeley Multiagent Learning Seminar (Virtual), Jul 2022

Professional Activities

Organizational Roles

- **Seminar Series Organizer:** Ad Hoc Teamwork Seminar Series (2023-2024)
- **Workshop Organizer:** Workshop in Ad Hoc Teamwork (IJCAI 2022, AAAI 2024)

Reviewing/Editorial Work

- **Journals:** AAMAS Journal, Neural Computing & Applications (NCAA), TMLR
- **Conferences:** AAMAS (2022, 2023, 2024), ICML (2022, 2023, 2024), NeurIPS (2022, 2023, 2024), AAAI (2023, 2024), ECAI 2023, IJCAI 2024, ICLR 2024, RLC 2024
- **Workshops:** ALA 2022, ALA 2023, ALA 2024, CoCoMARL 2024