SHUBHAM PATERIA

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EXPERIENCE

Research Scientist
Singapore Management University

📅 March 2022 – Ongoing   📍 Singapore

- Co-developed a hierarchical multi-agent reinforcement learning system combining self-organizing and deep neural networks, for simulated defense research technology licensed to DSO National Laboratories.
- Co-lead of the Trustworthy Federated Ubiquitous Learning project under SMU and AI Singapore. Developed a first-of-a-kind self-organizing federated learning system that outperforms baselines by 25% in sparse data clustering and 3-4% in biomedical classification tasks.

Co-founder
Maargo Technologies (discontinued startup)

📅 October 2021 – March 2022   📍 Singapore

- Developed mental health recommendation service for university students. I implemented the front-end and back-end for user verification, profiling, and Question-Answer dialogue handling. We did pilot tests with two Singaporean universities but decided not to continue due to insufficient traction.

Founder-in-Residence (EFSG10)
Entrepreneur First

📅 July 2021 – January 2022   📍 Singapore

Research Scholar
Nanyang Technological University (NTU)

📅 July 2017 – August 2021   📍 Singapore

- Conducted original research on **methods and algorithms for Hierarchical Reinforcement Learning and Planning**, with publications in high-impact venues such as IEEE TNNLS, ACM CSUR, and AAMAS.
- Developed a novel approach for simulated multi-robot hierarchical reinforcement learning for Search and Rescue applications, leading to 50-70% better task-completion performance compared to baselines. This work was funded by ST Engineering. Published in IEEE SSCI.
- Developed a novel end-to-end hierarchical reinforcement learning approach for goal-based navigation and simulated robot control, leading to 30-40% increase in goal achievement rate over baseline. Published in IEEE TNNLS and AAMAS.
- Developed a novel hierarchical planning method for goal-based navigation and simulated robot control, leading to 39-46% improvement in reward-based performance and data efficiency compared to baselines. Published in IEEE TNNLS.

EDUCATION

Ph.D. in Computer Science
Nanyang Technological University (NTU), Singapore

📅 July 2017 – Aug 2021

B.Tech. in Electronics & Communication Engineering
National Institute of Technology, Durgapur, India

📅 July 2009 – June 2013

SKILLS

Analysis and Problem Solving
Research Writing   LaTex
Python   Pytorch   Tensorflow   Keras
Machine Learning   Reinforcement Learning
Deep Learning, CNN, LSTM, RNN
SQL   Data Analysis   C,C++
React   FastAPI   Django

LANGUAGES

English   ●●●●●
Hindi   ●●●●●

EXPERIENCE

Senior Software Engineer
Samsung R&D Institute India - Bangalore Pvt. Ltd.

📅 March 2014 – July 2017   📍 Bengaluru, India

Software Engineer
Samsung R&D Institute India - Bangalore Pvt. Ltd.

📅 June 2014 – March 2017   📍 Bengaluru, India

- Worked with SRI-B and Samsung HQ on the commercialization and upgrade projects for Galaxy S4-variants, A7, Tab4, and other mid-tier smartphone variants.
- I was part of the Display technology team responsible for board bring-up and device driver upgrades critical for the successful commercial launch of Samsung smartphones in the worldwide market.
- R&D Contribution: Developed a patent-pending algorithm for display composition at hardware level on Samsung smartphones, which reduced power consumption by 6.8% (**patent**: India 4621/CHE/2015).
- R&D Contribution: Developed a power-efficient and fault-tolerant sensor management system for Smart Home IoT sensors with minimal error (average $0.24°$C) in temperature prediction. Published in IEEE IACC.

Trainee-Technology
Sapient Global Markets

📅 Oct Oct 2013 – Feb 2014   📍 Bengaluru, India

PUBLICATIONS

📄 Journal Articles

- **S. Pateria**, B. Subagdja, A.-H. Tan, and C. Quek, "Value-based subgoal discovery and path planning for reaching long-horizon goals," *IEEE Transactions on Neural Networks and Learning Systems*, 2023.
- **S. Pateria**, B. Subagdja, A.-H. Tan, and C. Quek, "End-to-end hierarchical reinforcement learning with integrated subgoal discovery," *IEEE Transactions on Neural Networks and Learning Systems*, vol. 33, no. 12, pp. 7778–7790, 2021.
- **S. Pateria**, B. Subagdja, A.-h. Tan, and C. Quek, "Hierarchical reinforcement learning: A comprehensive survey," *ACM Computing Surveys (CSUR)*, vol. 54, no. 5, pp. 1–35, 2021.

👥 Conference Proceedings

- K. P. Wai, M. Geng, B. Subagdja, **S. Pateria**, and A.-H. Tan, "Towards explaining sequences of actions in multi-agent deep reinforcement learning models," in *Proceedings of the 2023 International Conference on Autonomous Agents and Multiagent Systems*, 2023, pp. 2325–2327.
- **S. Pateria**, B. Subagdja, and A. H. Tan, "Hierarchical reinforcement learning with integrated discovery of salient subgoals," in *Proceedings of the 19th International Conference on Autonomous Agents and Multi-Agent Systems*, ser. AAMAS '20, Richland, SC, 2020, pp. 1963–1965.
- **S. Pateria**, B. Subagdja, and A.-H. Tan, "Multi-agent reinforcement learning in spatial domain tasks using inter subtask empowerment rewards," in *2019 IEEE Symposium Series on Computational Intelligence (SSCI)*, IEEE, 2019, pp. 86–93.
- **S. Pateria**, "Aspect based sentiment analysis using sentiment flow with local and non-local neighbor information," in *Proceedings of COLING 2016, the 26th International Conference on Computational Linguistics: Technical Papers*, 2016, pp. 2635–2646.
- P. K. Choubey, **S. Pateria**, A. Saxena, V. P. C. SB, K. K. Jha, and S. B. PM, "Power efficient, bandwidth optimized and fault tolerant sensor management for iot in smart home," in *2015 IEEE International Advance Computing Conference (IACC)*, IEEE, 2015, pp. 366–370.