Sebastian Tay Shenghong

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I am a Computer Science PhD student at the National University of Singapore (NUS) under the supervision of Prof. Bryan Kian Hsiang Low at NUS and Dr. Foo Chuan Sheng at A*STAR. My main research interest is adaptive experimental design, specifically via Bayesian optimization. My research intersects machine learning, probability, and optimization, and I hope to apply these techniques to solve real world problems of significance.

Education

National University of Singapore Aug 2020 — Jun 2024
Doctor of Philosophy (Computer Science) *Singapore*

- A*STAR Computing and Information Science (ACIS) Scholarship (4 recipients in 2020)
- 2× School of Computing Research Achievement Award (2022, 2023)
- CAP/GPA: 5/5
- Coursework: Algorithms at Scale, Theoretical Foundations in Multimedia, Theory and Algorithms for Machine Learning, Advanced Topics in Theoretical Computer Science, Advanced Topics in Machine Learning, Advanced Topics in Database Systems

Massachusetts Institute of Technology Jan 2024 — Jun 2024
Visiting Student *Cambridge, Massachusetts, USA*

- Hosted by Prof. Patrick Jaillet at the Laboratory for Information and Decision Systems (LIDS).
- First place at the "Race to Find the Food - First Come, First Serve" challenge, a reinforcement learning competition that involved training a simulated car to search for a target given only depth and grayscale cameras.

National University of Singapore Aug 2016 — May 2020
Bachelor of Computing (Computer Science) with Honours (Highest Distinction) *Singapore*

- CAP/GPA: 4.67/5
- Specialization in Artificial Intelligence
- NUS Merit Scholarship
- Honour Roll, University Scholar's Programme (Aug 2016 - May 2017)
- Dean's List, School of Computing (Aug 2017 - Dec 2017)

Publications

A Unified Framework for Bayesian Optimization under Contextual Uncertainty 2024
Sebastian Shenghong Tay, Chuan Sheng Foo, Bryan Kian Hsiang Low et al.
In Proceedings of the 12th International Conference on Learning Representations (ICLR-24).

Bayesian Optimization with Cost-varying Variable Subsets 2023
Sebastian Shenghong Tay, Chuan Sheng Foo, Bryan Kian Hsiang Low et al.
In Proceedings of the 37th Conference on Neural Information Processing Systems (NeurIPS-23).

No-regret Sample-efficient Bayesian Optimization for Finding Nash Equilibria 2023
Sebastian Shenghong Tay, Quoc Phong Nguyen, Chuan Sheng Foo, and Bryan Kian Hsiang Low.
In Proceedings of the 26th International Conference on Artificial Intelligence and Statistics (AISTATS-23).

Efficient Distributionally Robust Bayesian Optimization with Worst-case Sensitivity 2022
Sebastian Shenghong Tay, Chuan Sheng Foo, Bryan Kian Hsiang Low et al.
In Proceedings of the 39th International Conference on Machine Learning (ICML-22).

Incentivizing Collaboration in Machine Learning via Synthetic Data Rewards 2022
Sebastian Shenghong Tay, Xinyi Xu, Chuan Sheng Foo, and Bryan Kian Hsiang Low.
In Proceedings of the 36th AAAI Conference on Artificial Intelligence (AAAI-22).

Top-k Ranking Bayesian Optimization 2021
Quoc Phong Nguyen, **Sebastian Shenghong Tay**, Bryan Kian Hsiang Low, and Patrick Jaillet.
In Proceedings of the 35th AAAI Conference on Artificial Intelligence (AAAI-21).

Current projects

Efficient Alignment of Black-box Large Language Models

- Investigating algorithms to learn user preferences over language model outputs and subsequently align a language model to these preferences. We seek an efficient method to serve many users with different preferences using only one black-box language model (accessible only through API calls and cannot be fine-tuned).

Experience

Software Engineer Intern May 2019 – Aug 2019

JPMorgan Chase *Singapore*

- Developed an application handling payment transactions with Java, Spring and Cassandra, a distributed NoSQL DBMS.
- Developed a proof-of-concept blockchain application for managing invoices and payments with Solidity.

Research Intern May 2018 – Aug 2018

DSO National Laboratories *Singapore*

- Conducted research in the use of deep reinforcement learning for novel game strategies.
- Implemented various machine learning models and deep reinforcement learning algorithms with TensorFlow.

Technical Skills

General: Machine learning, deep learning, reinforcement learning, probability, optimization, linear algebra
Languages: Python (proficient), C/C++ (previous experience), Java (previous experience), Javascript (previous experience)
Frameworks: NumPy, pandas, TensorFlow, PyTorch, GPyTorch, BoTorch

Professional Service

Reviewer: ICML-22, ICLR-23, AISTATS-23, AAMAS-23, NeurIPS-23 (**Top Reviewer**), ICLR-24, AISTATS-24, TMLR