

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 Low Kian Hsiang at NUS and Dr. Foo Chuan Sheng at A*STAR. My broad research interests are artificial intelligence and machine learning. Specifically, my thesis is on machine learning in the low data regime via Bayesian optimization: a family of adaptive experimental design algorithms applicable to hyperparameter optimization, resource allocation, molecule design, and other problems constrained by a limited number of trials.

EDUCATION

National University of Singapore

Aug 2020 — Jun 2024

Doctor of Philosophy (Computer Science)

Singapore

- Supervised by Prof. Bryan Low Kian Hsiang who heads the Multi-Agent Planning, Learning and Coordination Group (MapleCG), which studies broad topics at the cutting edge of AI research, including data-centric AI, large language models, AI for the sciences, and machine learning in the low data regime.
- 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

Massachusetts Institute of Technology

Jan 2024 — Jun 2024

Visiting Scholar

Cambridge, Massachusetts, USA

- Hosted by Prof. Patrick Jaillet at the Laboratory for Information and Decision Systems (LIDS).
- 1st place at the “Race to Find the Food - First Come, First Serve” challenge, a reinforcement learning competition on training a simulated car with depth and grayscale cameras to search for a target.
- Investigating methods to align black-box large language models to user preferences in a sample-efficient manner.

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 (tuition fees and annual stipend)
- 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 a sample-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, large language models, probability, optimization, linear algebra

Languages: Python (proficient), C/C++ (previous experience), Java (previous experience), Javascript (previous experience)

Frameworks: NumPy, pandas, TensorFlow, PyTorch, Hugging Face Transformers, GPyTorch, BoTorch

PROFESSIONAL SERVICE

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