YUDAI URABE

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https://yudaiurabe.github.io/

EDUCATION

Institute of Science Tokyo
(renamed from Tokyo Institute of Technology on October 1, 2024)   Tokyo, Japan
   Graduate Research Student in the Department of Mathematical and Computing Science   May 2024 -

Waseda University   Tokyo, Japan
   Bachelor of Human Sciences   April 2020 - March 2024
   Major in History and Philosophy of Science, Minor in Computer Science
   GPA: *3.9/4.0 (Valedictorian)*

RESEARCH EXPERIENCE

Research Project   Hybrid
   Academic advisor: Guannan Wei(Tufts University), Youyou Cong(Science Tokyo)   October 2024- present

- Aiming for sound and computable static analysis for programs with effect handlers. I first implemented several abstract machines (such as the CE(S)K machine and Krivine's machine) in OCaml. Based on previous work, I also designed an abstract machine semantics for the object language. After implementing this, using a systematic approach called Abstract Abstract Machines (AAMs), I will derive an abstract interpreter for the static analysis of the object language (planned).

History and Philosophy of Science Lab,
Waseda University,*Thesis Student*   Saitama, Japan
   Academic advisor: Shigeo Kato   April 2021- March 2024

- Research on the history of computer science (mainly in the 1960s). How early computer scientists tried to define programming languages, especially semantics. Focused on how C.A.R. Hoare's 1960s research, such as Quicksort and Axiomatic Semantics, was developed. Read papers and unpublished notes by influential figures such as Hoare, Dijkstra and Naur as primary sources, and over 400 papers and books as secondary sources. Wrote a 60-page paper (first author) and presented the results at a workshop.

- Thesis: *"C.A.R. Hoare's Research in the 1960s and the Emergence of Computer Science as a Discipline"*

Research Project (Applications of Derivatives of Regular Expressions),
University of California, Davis   Online
   Academic advisor: Caleb Stanford   September 2023-November 2023

- Aiming to bridge the gap between the theory and practice of regular expressions. Reading papers carefully on derivatives of regular expressions, such as Brzozowski's "Derivatives of Regular Expressions" (1964) and Antimirov's "Partial derivatives of regular expressions and finite automata construction" (1996). Also, studied various languages classes like Visibly Pushdown Languages and implemented a pattern matching program using the Brzozowski derivatives in OCaml (https://github.com/YudaiUrabe/Brzozowski-derivative-and-Pattern-Matching-in-OCaml).

Uno Takeaki Lab,
National Institute of Information (NII), Principles of Informatics Research Division   Tokyo, Japan
Academic advisor: Kazuki Maeyama, Towa Suda   November 2022-April 2023

- Created a network in Python (using tools like NetworkX and NLTK) based on words appearing in a philosophy book, calculated various centralities, and visualized semantic connections between words in natural language. Presented the results at the National Convention of IPSJ, 2023

PRESENTATION

[1] "Analysis of the Vocabulary Distribution of Chapters and the Relationship between Chapters in Russell's *The History of Western Philosophy*"   March 2023, Tokyo, Japan.
- The 85th National Convention of Information Processing Society of Japan.
[2] "C.A.R. Hoare's Research in the 1960s and the Emergence of Computer Science as a Discipline: Exploring the Application of Historical Studies to Theoretical Computer Science"   April 2024, Tokyo, Japan.
- Workshop on the History of Science, History of Technology, and Science, Technology, and Society(STS),

SCHOLARSHIP

Okuma Memorial Scholarship
Awarded to the top 2 students in a grade (out of 560 students)   2020-2021, 2021-2022, 2023-2024

Azusa Ono Memorial Scholarship
Awarded to students with academic excellence   2021-2022

SKILLS, SERVICE, AND INTERESTS

Student Volunteer
ICFP Student Volunteer   September 2023
The History of Science Society of Japan, 70th Annual General Meeting   May 2023

Natural Language
Japanese (native), English (fluent, C1), Chinese (reading knowledge, B2)

Programming
Python, OCaml, Isabelle/HOL, Scala, C, Java

Activities and Interests
Mathematics club, Programming club, Philosophy club, Reading, Hiking, Othello (2nd kyu)